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CONTENTS

Sr. No.	Paper Title	Page No.
1	Hearing Impairment: An Indian perspective of the Disability Dr. Roopendra Singh	1-5
2	Feminine Psyche In Saint Dnyaneshwar's Virhini Dr. Shilpa Namdevrao Shendge	6-13
3	Climate Change; Impact on India Dr. Mahesh Sakharam Bachewar	14-22
4	Impact of ICT on Library Dr. Reshma Doiphode	23-24
5	The Role of Nanotechnology in Modern Chemistry: Applications and Implications Dr. Swanand Shrinivasrao Mukhedkar	25-32
6	Seasonal variations of Cladocera in Murambi Reservoir near Ambajogai, District Beed, Maharashtra (India) Dr. Ashwini G. Baraskar	33-34
7	Synthesis, Characterization and Antimicrobial Activity of Novel 2-Amino-4, 6-Dimethylpyrimidine and 2- Hydroxy-5- Nitrobenzaldehyde Schiff Base Ligand and Their Transition Metal Complexes D. T. Sakhare	35-44
8	Nature-Inspired Synthesis of Zinc Oxide Nanostructures for Sustainable Solutions Basílio José Augusto José, Mahendra Devidas Shinde	45-53
9	Biodegradation of Crystal Violet Dye using Bacteria isolated from Wastewater Effluent Khirabdhhi Tanaya, Kriti Kant, Anil Kumar Singh and Durgeshwer Singh	54-58
10	Heterocyclic Compounds Containing Derivatives Act as Anti-Cancer Agent's Dr. Vitthal B. Makane, Mr. Vinod N. Kale	59-65
11	To Study Insecticidal and Fungicidal Phytochemical and Toxicity of Arsenic metal oxides nanocomposites by using Abrus Precatorius seed extract Dr. D. B. Dupare	66-75
12	A Thematic Analysis of B. R. Ambedkar Views on the Concept of One State, One Language with Respect to Culturally Diversified India Manjunath Pujar, Suresh N. Hullannavar	76-85
13	Sustainable Green HRM Practices: Paving the Way for a Greener Future Dr. Dundappa Y Badlakkanavar	86-90
14	Role of Information Technology in Environment Healthcare Dr. Chavan S. T.	91-92
15	DFT Study of Methanol with Catechol and Hydroquinone molecule Dr. Chandrakant S. Aher	93-97
16	Survey study on the impact of COVID-19 lockdown on health Ranjana Ganesh Khade	98-101
17	Geomorphic Effect of Groyne Type Bunds and Their Impact on Varsoli Creek, Alibag, Maharashtra Dr. Raju Shamrao Gurav	102-104
18	Achyranthes aspera – A Homemade Prepared Apamarga Kshara Extract of the Whole Plant is used as an Effective Antifertility Agent Aasiya Syed, Dr. Archana Nerkar	105-108
19	To Conserve the Biodiversity for the inter-relationship with other Countries Pratap V. Deshmukh, Dr. R. B. Borse, Mr. Pradeep R. Totawar	109-110
20	Biodegradation of Petrol by Bacteria isolated from Petroleum-contaminated Soil Firdaush Jahan, Salim Ahmed, Durgeshwer Singh	111-115
21	A Study on impact of gender discrimination on Male employee performance in Chandrapur City Prof. Rima S. Chopde	116-119
22	Morphological Studies on Amphora (Bacillariophyceae) From Girna River near Jalgaon Region Maharashtra, India R. B. Borse, Pratap V. Deshmukh	120-124
23	Exploring the Applications of Fractional Differential Equations in Advancing Science and Technology Mr. Umesh Ramrao Sukalwad	125-127

24	Mother-Daughter Relationships: A Psychoanalytic Perspective in Vilette and Clear Light of Day Ragini R. Mohite, Dr. D. V. Naik	128-134
25	Exploring Heritage Tourism in Nashik District, Maharashtra: A Framework for Tourist Information Systems Harpale Dattatraya V., Harane Smita S., Mahajan Sanjay D., Mahajan Shilpa S.	135-139
26	A Study on Petiole anatomy of <i>Priva cordifolia</i> (L.f) Druce (Verbenaceae) M. A. Bangar	140-141
27	Assessment of the Impact of Climate Change on Marine Ecosystems: A Survey Study Parimita Prashant Sharma	142-145
28	Science Educators: Teachers as Bridges between Science and Young People's Everyday Lives Vishwamber A. Tidke	146-148
29	The Concept of A New Woman in Mrs. Warren's Profession: A Feminist Perspective Ravindrasing Mahendrasing Tatu	149-155
30	$K_2S_2O_8$ Catalyzed Cascade Green Synthesis of Sulfoximines & It's Derivatives under Microwave Irradiation Dr. Achut R. Shinde	156-161
31	Sustainable Alternatives to Synthetic Dyes: The Role of Bio-based Colorants Smita P. Borade Ghatole, Dr. Varsha B. Mankar	162-166
32	Assessment of Microbiological Pollution in Dhanora Water Reservoir: An Analysis of MPN Data Dr. Abhijit Kandlikar	167-169
33	Mechanisms of Antifungal Resistance in <i>Candida albicans</i> : Challenges and Clinical Implications Vyankatesh Jadhav	170-173
34	Roll of Chemicals in Cosmetics in Daily Life and Their Effects U. V. Ambulgekar	174-175
35	Efficient and Green Pathway for one pot Synthesis of Bioactive Spirooxindoles Using Zinc Oxide Nanoparticles (ZnO- NP) N. S. Kaminwar, H. M. Kasralikar, S. L. Nakkalwar	176-179
36	Environment and Sustainable Development Dr. Kendra kalpana Kashinath, Bachute Abhijit V.	180-183
37	Effects of Seed Borne Fungi on Physico-Chemical Properties of Seeds of Pigeon pea R. Radhakrishna S/O R. Rajamallu, Rizwan Khan Younus Khan, Dr. Mandge S. V., Dr. N. J. M. Reddy, Dr. P. V. Pawar	184-186
38	Studies on Hydro-Chemical Parameters of Groundwater from Talni Village, Hadgaon Taluka in Nanded District Dr. P. D. Tawde	187-189
39	Recent Advances in Biopolymers for Sustainability Approach Mr. S. S. Anjanikar, Dr. S. S. Chandole	190-192
40	Effect of Temperature on Gas Sensing Properties of NiO-GO Nanocomposite Shakuntala A. Shinde, Vishal V. Awasarmol, Siddheshwar D. Raut	193-196
41	A New Species of the Genus <i>Anarete</i> (Lestremiinae: Cecidomyiidae: Diptera) From Maharashtra, India M. S. Siddiqui	197-198
42	A study on chemical quality of khoa marketed in Nanded city Dr. S. B. Wadekar	199-201
43	A Deeper Dive into Refugee Culture: Resilience, Loss, and the Pursuit of a Better Life Gajanan Ashokrao Pavitwar	202-203
44	The Development of Intelligence Should Be the Ultimate Focus of Human Existence - Dr. B. R. Ambedkar Dr. Sainath I. Waghmare	204-207
45	Study on Applications of Transform Methods in Science and Technology Mr. Saiganesh R. Yadav	208-211
46	Social History: Exploring Society through Time Mr. Sainath M. Gaikwad	212-214
47	The Role of Nanotechnology in Sustainable Agriculture: Applications, Benefits and Challenges Ashwini Laxmanrao Jakkawad, Pawde Shubhangi Subhashrao	215-217
48	Domestic Violence: A Sociological Perspective Dr. Mahananda Rautkhedkar	218-221

49	Relevance of Dr. Babasaheb Ambedkar's Economic Policy: An Overview Prof. Maroti Sadashiv Kadam	222-224
50	Stress Management Skills for College Students Pooja Bapurao Fulare	225-227
51	Growth response of Maize to spent mushroom substrate application S. S. Patil, Darshan Talhande	228-229
52	Silver Nanoparticles Synthesized Using Bamboo Leaf Extract: A Green Nanotechnology Perspective N. R. Mishra, R. R. Tayade, A. A. Sukhadeve, A. N. Bondre	230-233
53	Raptors – Birds of Prey S. M. Yeole	234-236
54	Yogic Management in Stress Mrs. Pangarkar M. H.	237-238
55	कक्षा नौवी के छात्रों की चिंता और शैक्षिक सफलता का तुलनात्मक अध्ययन प्राज्ञा प्रमोद होनमाने	239-241
56	वर्धा जिल्ह्यातील महिला पोलीस कर्मचाऱ्यांच्या कार्यात विज्ञान आणि तंत्रज्ञानाची भूमिका आरती रामदासराव राऊत, प्रो. डॉ. संपदा नासेरी	242-247
57	रायपुर जिले के तिलदा विकासखण्ड के ग्रामीण क्षेत्रों में पोषण दशाएं एक विश्लेषण डॉ. श्रद्धा देवी साहू	248-251
58	ग्रामीण भागातील कोविड-19 आणि लसीकरण कार्यक्रमाचे अध्ययन कु. उषा लक्ष्मणराव घोडे	252-253
59	महाराष्ट्र के जल संचयन की योजनाएं और कार्यक्रम प्रा. डॉ. संजय गणपती भालेराव	254-258
60	भारतीय संविधान आणि त्यावर पडलेला प्रभाव विष्णू दुर्गाजी चौरे, प्रा. डॉ. प्रताप वामनराव पाटील	259-261
61	अध्ययन अक्षम विद्यार्थ्यांसाठी उपचारात्मक अध्यापनाची आवश्यकता कु. सुरेखा रघुनाथ फुलझेले, प्रा. डॉ. वंदना पी. बेंजामीन	262-265
62	संशोधन अहवाल लेखनातील टप्पे डॉ. भरत आर. लोकलवार	266-272
63	शाश्वत ग्रामीण विकास प्रा. डॉ. गोविंद राजाराम परडे	273-277
64	शाश्वत विकास : एक संकल्पना प्रो. डॉ. बलभीम राजाराम वाघमारे	278-280
65	समकालीन भारतीय लोकशाहीतील निवडणूक आयोगाची भूमिका डॉ. पाटील श्याम पुंडलिकराव	281-285



Hearing Impairment: An Indian perspective of the Disability

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Abstract:

There are many people who are physically disabled. The humanity can not prosper without the collective efforts of all the societies on this earth. All the efforts and all the research that have been carried out in social sciences has the sole aim to remove the disparities prevalent in the society. In our country, as being the largest populous nation in the world, the number of persons with disability is quite large. As per census of 2011 there were 2.68 crore of persons with disabilities and out of this 50,72, 914 persons alone are with hearing disability. The hearing impairment is the most common disability prevalent among the persons of all the age groups. The current paper is a review of research on hearing impairment in the Indian subcontinent over last more than 40 years. A total of 42 papers from 1977 to 2023 have been selected. There are 9 studies on causes of hearing impairment, 8 studies highlight hearing impairment in children and 3 papers highlight hearing impairment in old aged peoples. There are 20 studies highlighting hearing impairment in particular regions of the country and 5 studies highlights the use of technology in eradicating hearing impairment. It has been concluded that with mutual understanding in the society and with the use of modern hearing aids, the hearing impairment disability can be overcome.

Keywords: Hearing impairment, deafness in children, hearing aids, noise, presbycusis.

Introduction:

The life of People with Disabilities is an example of struggle and success. Stephen Hawking: An Ortheopadically Handicaped Scientist is an example. In spite of all the physical disabilities, he rose to the heights of success in life. The history of hearing impairment dates back to 10,000 years. In an excavation in the Shanidar caves in Iraq Kurdistan, the archeologists found evidence of bony growths in ear canal that can cause hearing loss. According to a medical journal in Egypt that date back to 1550 B.C., injecting olive oil, red lead, bat wings, ant eggs and goat urine into ears as a remedy for “Ear That Hears Badly”. Ancient Greek philosophers: Plato and Aristotle observed that “the ability to reason was intrinsically linked with the ability to speak” in the early 10th century. The sign language for deaf has its origin from monks of 10th century Burgundy who, while being committed to silence, created hand signals to communicate. This became known as Cluniac sign language. Normal hearing range is from 0 dBHL (Decibel Hearing Level), which is the audiometric zero, to 20 dBHL. Any threshold, at any frequency, that is over 20 dBHL is identified as hearing loss. Though a 'normal' audible range for loudness is 0 – 180dB, anything over 85dB is considered damaging for hearing. The various hearing loss categories: Trouble hearing sounds below 20dBs (Normal hearing), Mild hearing loss: Trouble hearing sounds below 40dBs, Moderate hearing loss: Trouble

hearing sounds below 60dBs, Severe hearing loss: Trouble hearing sounds below 80dBs and Profound hearing loss: Trouble hearing sounds over 81dBs. Under conventional audiologist rules, any inability to hear sounds above 21dBs is a form of impairment. In order to qualify as a disable the standardized test include: an average air conduction hearing threshold of 90 decibels or more in the good ear, an average bone conduction hearing threshold of 60 decibels in the better ear and a word recognition score of 40% or less in the better ear. In India, “hearing handicapped” as defined by The Rehabilitation Council of India Act, 1992, is – hearing impairment of 70dB and above, in better ear or total loss of hearing in both ears. This law is applicable to only those persons with severe hearing impairment whose hearing loss is 70dB and above.

While there are many causes of hearing loss. The most common ones are:

- Noise
- Injuries
- Severe pressure change (near ear drum)
- Earwax (cerumen) accumulation
- Aging - Age- related hearing loss
- Drugs that damage the ear (ototoxic drugs)
- Foreign object in the ear

The chance of developing hearing loss increases with age (presbycusis), about one-third of older adults have hearing loss. The persons with the disability of hearing loss finds it difficult to have conversations with family and friends,

understanding doctor's advice, hearing alarms and doorbells, responding to audio warnings. The signs of hearing loss include trouble in understanding telephone conversation, asking people to repeat what they say, need to increase TV volume. Hearing loss can range from a mild loss (missing high-pitched sounds) to a total loss of hearing. Sometimes there is sudden sensorineural hearing loss and it is to be considered a medical emergency. If you or someone you know experiences sudden hearing loss, visit a doctor immediately.

Age-related hearing loss seems to run in families and may occur because of changes in the inner ear and auditory nerve, which relays signals from the ear to the brain. The person suffering from Presbycusis may find it hard to tolerate loud sounds or to understand what others are saying. Ringing (Tinnitus) in the ears is also common in older people. It also can sound like buzzing, roaring, hissing or clicking. Sometimes, as simple as a piece of earwax blocking the ear canal can cause tinnitus. It can also be a sign of allergies or high blood pressure or a side effect of certain medicinal doses. Hearing impairment is usually caused by wear and tear on the hairs or nerve cells in the cochlea. The hearing threshold worsens by one decibel every year after the age of 50. High Volume or loud noise as noise from loud music, snow blowers or lawn mowers can damage the inner ear and result in permanent hearing loss. One of the preventive measure is to use earplugs or turning down the audio device volume. Earwax or fluid buildup can also cause hearing loss by blocking sounds that are carried from the eardrum to the inner ear. A ruptured eardrum can also cause hearing loss. The

eardrum can be damaged by infection, pressure, or putting objects in the ear, including cotton-tipped swabs. Diabetes or high blood pressure, ear infections (otitis media), brain injury, tumor or a heart stroke may also cause hearing impairment. Certain medications used to treat cancer or heart disease, certain antibiotics, aspirin can damage inner ear permanently. Genetic variations can cause hearing loss (otosclerosis) involves the abnormal growth of bone that prevents structures within the ear from working properly. The cognitive abilities (including memory and concentration) decline faster in older adults with hearing loss than in older adults with normal hearing. Older people who can't hear well may become depressed or withdrawn from others because they feel frustrated or embarrassed about not understanding what is being said. Sometimes, older people are mistakenly thought to be confused, unresponsive, or uncooperative because they don't hear well. These circumstances can lead to social isolation and loneliness in older age. The hearing loss can lead to inability to drive safely when warning sounds can not be heard while driving on road.

Hearing aids that are used frequently are: electronic, battery-run assistive devices that make some sounds louder. An audiologist or hearing aid specialist can prescribe hearing aids for people with significant or complicated hearing loss. Prescription hearing aids require a medical exam, and then the health care professional will fit and adjust the device. Hearing aids have recently become available without a prescription. Over-the-counter hearing aids, which are sold in stores and online, may help people with mild to moderate hearing loss.

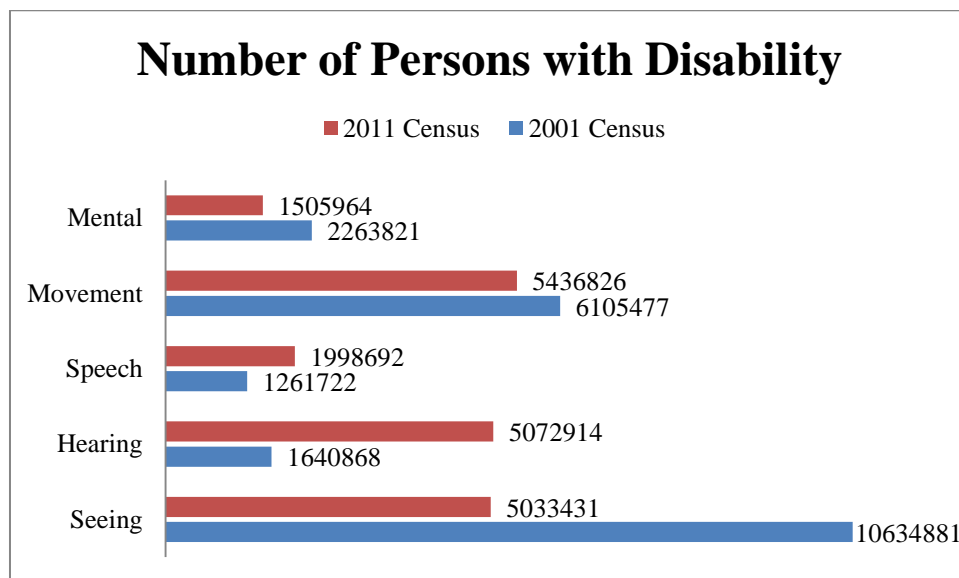


Figure 1: No. of persons with Disability in India according to 2001 and 2011 census
Source: Census data available online for 2001 and 2011 census.

From the table it is evident that there had been sharp increase persons with hearing disability from 2001 to 2011.

Dr. Roopendra Singh

Literature Review in Indian perspective:

A lot of research has been done in finding out the causes of hearing impairments. About 65 %

of the patients recover to functional hearing levels spontaneously without any medical treatment. (Mattox,1977). The poor economic background, the lack of health awareness and education has played a significant role in high incidence of hearing impairment. Primary and secondary prevention have not been paid due attention adequately (Kumar, S., 1997). There have been instances of hearing loss due to medication. Data from patients surviving more than 1 year after diagnosis without progression or recurrence of neuroblastoma were used. They found that one fourth of high risk neuroblastoma survivors suffer from hearing impairments caused due to induced treatments (Simon et al, 2002). Hearing impairment may also be caused due to occupation. The exposure to excessive noise is the major avoidable cause of permanent hearing impairment ranging from 7 to 21% in the various sub regions. The estimated cost of noise to developed countries ranges from 0.2 to 2% of the gross domestic product (GDP). Noise-induced hearing loss (NIHL) usually affects the higher frequencies and then spreading to the lower frequency range (Subroto et al, 2008). Prolonged exposure to high intensity of sound results in deterioration of hearing capacity and increase in blood pressure among the bus drivers. The hearing level of the individuals can be assessed using Hearing Deterioration Index (HDI) (Balaji et al, 2016). Audiometric screening of traffic police at major intersections of Surat city (India) showed that only 22 % of traffic policemen had normal, 28 % have slight, 39 % have moderate hearing and 11 % of traffic policemen have severe hearing impairment (Tandel et al, 2017).

Hearing impairment is a disability and causes depression among the affected persons. The individuals with age group of 45 years and above with sensory impairment were more likely to suffer from depression and the risk was significantly higher among individuals with visual and hearing impairment both (Meher et al, 2022). A case-control study was designed on 420 infants with permanent hearing impairment and normal hearing from the year 2008 to 2012 and it was concluded that family history and consanguinity are important risk factor of hearing impairment both in combination and in isolation. (Selvarajan et al, 2013). There is contribution of autosomal genes to Autosomal Recessive Non-Syndromic Hearing Loss (ARNSHL) in India. The potential mutations in genes contribute to about one-tenth of ARNSHL. There is possibility for early DNA-based detection of deafness and genetic counseling of affected families in the country (Ganapati et al, 2014). One of the prominent causes of hearing impairment in current environment is smartphone. Among the medical students in Delhi, 9.4% were likely to be having hearing loss and 53.1% were advised to

screen regularly for hearing impairment problem (Morgan et al, 2023).

Hearing impairment is also associated with age. Hearing impairment and preventable ear diseases were found to be important health problems among children of school-entry age group in Indian coastal areas (Rao et al, 2002). Among children with prenatal diseases, postnatal jaundice, exposure to X-rays during gestation, low birth weight, premature delivery, rubella and neonatal seizures were the significant predictors of hearing impairment (Rout et al, 2008). In a study in Lucknow district, the hearing impairment was seen in children of less than 10 years age. The hearing impairment in urban children was 1.2 % and in rural children was 5.4 % (Mishra et al, 2011). The maternal needs of the children with hearing impairment vary with stages of treatment as just after being diagnosed for hearing impairment and after 1 to 3 years of treatment (Rout et al, 2012). The practice of pouring herbal juices to remove insects in the ear continued; there was the perception that all children with a hearing problem were “deaf”, and a lack of awareness about the possibility of partial/unilateral hearing loss (Narayansami et al, 2014). The hearing impairment in schools children was more prevalent in the age group of 8 years followed by the age group of 14 years (Norman et al, 2016). Even the hospital staff is also not very aware of hearing impairment in infants. In northern India, poor knowledge and attitude towards hearing impairment of infants was observed among nurses (Sanju et al, 2018).

Prebyscusis remains a leading cause of sensorineural deafness in the elderly (Elango et al, 2005). In a study in Lucknow district, the hearing impairment in elderly was 47% in urban areas and 65 % in rural areas. (Mishra et al, 2011). Hearing loss is highly prevalent among older adults with cognitive impairment (Nirmalasari et al, 2017). The hearing impairment in Telangana state is common, affecting 1 in 23 people and 1/3rd of age above 65 years (Bright et al, 2019). The National Sample Survey in India reported that over 62% and 56% of elderly in rural and urban areas respectively are suffering from Age Related Hearing Loss (ARHL). ARHL is a complex hearing disorder caused by several factors (Sahoo et al, 2020). Rural areas and elderly have showed a higher prevalence of hearing impairment (Verma et al, 2021).

The recent technological advancement has made life easier for the persons with hearing disability. The most important is communication problem. There have been extensive use of American Sign Language and interpreters, clinical assessment strategies, diagnostic considerations and early intervention treatment strategies (Steinberg, A., 1991).

Conclusion and Recommendations:

The factors that lead to hypertension must be explored further as with changing technological scenario, the causes of tension are also changing. The efforts should be made so that the aid devices are within the reach of economic weaker sections of the society. The ill effects of medication need to be researched further for other drugs/doses too. The preventive measures should be taken to reduce noise at the traffic junctions. The policemen and bus drivers should be provided with the hearing aids to protect their ear. Most of the researches are region based as such, more of the geographical areas need to be covered to generalize the results. There is future scope for further research on school going children in a bigger geographical areas to generalize the results. There is further scope for research for ill effects of medication in elderly age. The preventive measures at the individual level include to let everyone nearby know about the hearing problem of the individual. The hearing impaired person should ask people to repeat the words. The individual can pay attention to the facial expressions or gestures. The individual suffering from hearing disability should find a good place to listen. The most important thing is to seek professional advice from experts, like an otolaryngologist (ear, nose, and throat doctor) or an audiologist (health professional who can identify and measure hearing loss). There are many assistive devices to help people with hearing loss. These devices can amplify sounds, provide alerts and help to communicate with others and send visual signals or vibrations. Text-to-speech-technology is a recent development in the field of computers. A wide range of assistive device information are being provided by the National Institute on Deafness and Other Communication Disorders. The person who is speaking to the hearing disabled should stand in good lighting and use facial expressions or gestures to give clues, should maintain eye contact, should try to speak naturally and at a reasonable speed. It should be ensured that only one person should talk at a time. The most important is the patience to be observed while talking with the hearing impaired person.

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Feminine Psyche In Saint Dnyaneshwar's Virhini

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Abstract:

In his poetic work "Virhini," Saint Dnyaneshwar, a prominent figure in Marathi literature and spirituality, delves into the intricate facets of the feminine psyche. The profound investigation of emotional depth, spiritual yearning, and the search for union with the divine that this text embodies transcends mere romantic longing. In addition to representing the ideal woman, Virhini is a vehicle for conveying universal themes of love, loss, and devotion. The portrayal by Dnyaneshwar reflects the complexities of female experience by combining a profound spirituality and societal roles. He conveys the struggles and aspirations of women through vivid imagery and rich metaphors, focusing on their resilience and capacity for profound love. The text encourages readers to see the feminine not only as an object of desire but also as a potent force that can create and change. In the end, "Virhini" is a testimony to the spiritual and emotional landscape of women and calls for a reexamination of gendered experiences within the context of devotion and existential inquiry. The timeless relevance of Dnyaneshwar's work is due to his insights into the feminine psyche, which illuminate the paths to understanding, acceptance, and transcendence.

Keywords: Feminine Psyche, Virhini, Saint Dnyaneshwar, Devotion, Spirituality, Love and Longing, Spirituality, Gender Roles, Transformation, Introspection.

Introduction:

In Saint Dnyaneshwar's Virupaksha, the exploration of feminine psyche is both profound and nuanced. Dnyaneshwar, a 13th-century Marathi saint and poet, delves into the spiritual and emotional landscapes of women, often highlighting their strength, resilience, and deep connection to the divine.

Key Aspects of Feminine Psyche in Virupaksha:

1. **Emotional Depth:** The female characters in Virupaksha display a rich close to home range, epitomizing affection, yearning, and commitment. Dnyaneshwar depicts their sentiments as indispensable to otherworldly experience, underscoring that feeling can lead one nearer to the heavenly.
2. **Symbolism of Longing:** The theme of separation and longing for the beloved—often representing the divine—is central to the narrative. This longing is depicted as a powerful driving force, reflecting the universal experience of desire that transcends gender.
3. **Spiritual Strength:** Ladies are displayed as holders of inborn profound strength. Their commitment is portrayed as resolute, showing how their internal strength can explore cultural difficulties and individual battles.
4. **Empowerment through Devotion:** The demonstration of dedication is depicted as a wellspring of strengthening for ladies. Through their association with the heavenly, they recover

office in their lives, rising above cultural impediments.

5. **Interpersonal Relationships:** The elements among male and female characters uncover the intricacy of connections. Dnyaneshwar investigates how these associations can be both supporting and laden with strain, reflecting more extensive cultural standards and assumptions.
6. **Cyclical Nature of Life:** The ladylike mind is frequently connected to subjects of creation, supporting, and patterns of life. Dnyaneshwar utilizes these themes to highlight the interconnectedness, everything being equal, featuring the job of ladies in the progression of profound customs.

Aims and Objectives

Aims:

1. **To Analyze Feminine Representation:** Investigate how Dnyaneshwar depicts female characters and their profound scenes inside Virupaksha.
2. **To Understand Spiritual Themes:** Examine the crossing point of gentility and otherworldliness in the text, especially the way that ladies' encounters add to the comprehension of heavenly love and yearning.
3. **To Highlight Resilience and Strength:** Stress the depiction of ladies as solid, strong figures in their profound excursions, testing customary orientation standards of the time.

4. **To Explore Interpersonal Dynamics:** Look at the connections among male and female characters, breaking down how these elements ponder more extensive cultural perspectives orientation and otherworldliness.
5. **To Discuss Societal Implications:** Ponder how Dnyaneshwar's portrayal of the ladylike mind remarks on the status and jobs of ladies in thirteenth century society and today significance.

Objectives:

1. **Character Analysis:** Direct point by point examinations of key female characters in Virupaksha, zeroing in on their inspirations, battles, and otherworldly excursions.
2. **Thematic Exploration:** Recognize and talk about focal subjects connected with womanliness, like yearning, dedication, and strengthening, and their importance inside the more extensive account.
3. **Textual Comparison:** Contrast Dnyaneshwar's portrayal of ladies and other contemporary scholarly works to contextualize his way to deal with the female mind.
4. **Cultural Context:** Explore the authentic and social foundation of the thirteenth hundred years in Maharashtra to more readily grasp the cultural ramifications of Dnyaneshwar's composition.
5. **Contemporary Relevance:** Investigate how the subjects of ladylike strength and otherworldly versatility resound with present day conversations on orientation and otherworldliness.

By seeking after these points and goals, a complete comprehension of the ladylike mind in Dnyaneshwar's Virupaksha can be accomplished, offering experiences into both the actual text and the more extensive social stories encompassing gentility and otherworldliness.

Literature Review:

The investigation of the ladylike mind in Holy person Dnyaneshwar's Virupaksha has collected revenue from different researchers, causing to notice the perplexing manners by which Dnyaneshwar depicts female characters and their profound excursions. This writing survey features key subjects, insightful translations, and huge commitments to the comprehension of womanliness inside this original work.

1. Representation of Female Characters

Researchers like Dr. S. R. Gokhale have inspected Dnyaneshwar's portrayal of ladies, noticing that they frequently epitomize characteristics of commitment, strength, and profound profundity. Gokhale accentuates that the female characters are not simply latent figures but rather are effectively participated in their otherworldly interests. Their close to home

encounters — especially subjects of yearning and partition — are viewed as key to the account, permitting perusers to interface with the heavenly through their battles.

2. Spirituality and Feminine Devotion

Dr. S. D. Joshi talks about how Dnyaneshwar unpredictably meshes the idea of dedication into the female mind. He places that ladies' profound encounters are portrayed as a way to figuring out the heavenly, where their close to home profundity improves their association with God. Joshi contends that Dnyaneshwar hoists ladylike commitment, proposing that it isn't just an individual excursion yet additionally a mutual one that rises above cultural hindrances.

3. Cultural and Historical Context

The socio-social scenery of thirteenth century Maharashtra is vital in grasping Dnyaneshwar's work. Researchers like Prof. N. V. Khare contextualize the text inside the common perspectives towards ladies during that period. Khare takes note of that while ladies were in many cases minimized in strict stories, Dnyaneshwar's depiction offers a counter-story, situating ladies as fundamental members in profound talk.

4. Interpersonal Relationships

The elements among male and female characters in Virupaksha are analyzed by Dr. A. R. Kale, who features how these connections reflect more extensive cultural standards. Kale contends that the transaction of force and weakness in these connections gives understanding into the intricacies of orientation jobs in the profound setting. The close to home associations portrayed in the text challenge and reclassify customary orientation assumptions.

5. Modern Interpretations and Relevance

Late grant, like that by Dr. M. P. Deshmukh, has tried to attract matches between the subjects Virupaksha and contemporary conversations on orientation and otherworldliness. Deshmukh affirms that Dnyaneshwar's experiences into the ladylike mind stay significant today, especially with regards to women's activist philosophy and the reevaluation of ladies' parts in profound practices.

6. Psychological Perspectives

A few researchers, including Dr. K. S. Patil, have applied mental structures to dissect the female mind in Virupaksha. Patil's exploration dives into the profound intricacies of the female characters, taking into account their mental inspirations and the effect of cultural tensions on their otherworldly journeys. This approach expands the comprehension of the characters as multi-layered creatures exploring individual and otherworldly difficulties.

Research Methodology:

This exploration plans to investigate the female mind as portrayed in Holy person Dnyaneshwar's Virupaksha. To accomplish this, a

multi-layered approach will be utilized, consolidating literary investigation, verifiable contextualization, and contemporary understandings. The following is a framework of the approach.

1. Textual Analysis

Direct a nearby perusing of key entries in Virupaksha that feature female characters, their feelings, and profound encounters. This will include examining language, imagery, and story strategies utilized by Dnyaneshwar. Recognize repeating subjects connected with womanliness, like yearning, commitment, and strengthening. These subjects will be coded and arranged for additional examination. Center around huge female characters, analyzing their jobs, inspirations, and changes all through the text. This will give experiences into the profundity of their profound excursions.

2. Historical Contextualization

Draw in with existing grant on Dnyaneshwar and the socio-social setting of thirteenth century Maharashtra. This will incorporate authentic texts, basic papers, and life stories to comprehend the cultural standards encompassing ladies during this period. Research the common perspectives towards orientation and otherworldliness in middle age India, taking into account how these impact the depiction of female mind in Virupaksha.

3. Comparative Analysis

Contrast Dnyaneshwar's depiction of ladies and other contemporary abstract works. This will assist with arranging Virupaksha inside a more extensive scholarly practice and feature exceptional components in Dnyaneshwar's treatment of the ladylike. Investigate matches with women's activist profound writing from various societies and time spans, surveying how topics of gentility and otherworldliness manifest in much the same way or in an unexpected way.

4. Qualitative Research

Lead interviews with researchers represent considerable authority in Marathi writing, orientation studies, or otherworldliness to accumulate assorted points of view on Dnyaneshwar's work and its suggestions for grasping ladylike mind. Sort out conversations with contemporary perusers or professionals of otherworldliness to survey how Virupaksha resounds today, especially in regards to subjects of womanliness and strengthening.

5. Theoretical Framework

Use women's activist hypothetical structures to examine the message, zeroing in on ideas of orientation, power elements, and portrayal. This will work with a more profound comprehension of how Dnyaneshwar challenges or supports cultural norms. Apply mental speculations to investigate the close to home and mental

components of the female characters, evaluating how their encounters reflect more extensive mental subjects.

6. Data Analysis

Examine information gathered from literary investigation, meetings, and center gatherings utilizing subjective strategies. This will include topical examination to distinguish examples, experiences, and critical discoveries. Blend the discoveries from different strategies to make a complete comprehension of the ladylike mind in Virupaksha, drawing associations between literary proof, verifiable setting, and contemporary importance.

Statement of the Problem:

The investigation of female mind in Holy person Dnyaneshwar's Virupaksha presents a complicated exchange of feeling, otherworldliness, and cultural assumptions. In spite of the lavishness of Dnyaneshwar's depiction of ladies, existing grant frequently underrepresents the profundity and meaning of ladylike encounters inside this message.

Key issues that necessitate further investigation include:

1. **Underrepresentation of Female Voices:** While Virupaksha highlights solid female characters, their voices and close to home excursions are oftentimes eclipsed by male stories. This brings up issues about how these characters' encounters are outlined and figured out inside the more extensive otherworldly setting.
2. **Emotional and Spiritual Complexity:** The complex profound scenes of female characters — portrayed by yearning, dedication, and strength — merit further investigation. There is a need to unload how these close to home encounters add to their profound excursions and how they challenge or adjust to cultural standards.
3. **Societal Context:** The depiction of ladies in Virupaksha should be contextualized inside the verifiable and social system of thirteenth century Maharashtra. Understanding the cultural standards of this period is essential to assessing how Dnyaneshwar's portrayals might reflect or undermine contemporary perspectives towards orientation.
4. **Relevance to Modern Discussions:** As contemporary talk on orientation and otherworldliness advances, it is fundamental to survey how the subjects introduced in Virupaksha resound with recent concerns connected with gentility and strengthening. There is a hole in writing that interfaces Dnyaneshwar's bits of knowledge to contemporary women's activist idea and profound practices.
5. **Interdisciplinary Perspectives:** The absence of interdisciplinary methodologies — consolidating

scholarly examination, verifiable setting, and mental systems — limits a far reaching comprehension of the female mind in the text. A coordinated technique can give more extravagant bits of knowledge into the intricacies of female portrayal.

Need for the Study:

The requirement for a zeroed in concentrate on the female mind in Holy person Dnyaneshwar's Virupaksha is highlighted by a few basic variables:

1. Complex Representation of Women

Dnyaneshwar's work highlights nuanced female characters whose profound and otherworldly encounters merit further investigation. A review zeroing in on these characters can enlighten their jobs as the two people and images of more extensive otherworldly bits of insight, uncovering how their encounters reverberate with contemporary conversations on womanliness.

2. Historical Contextualization

Understanding the socio-social milieu of thirteenth century Maharashtra is fundamental for grasping the intricacies of orientation portrayal in Virupaksha. This study can reveal insight into how Dnyaneshwar's depictions reflect, challenge, or rise above the orientation standards of his time, giving experiences into verifiable mentalities towards ladies.

3. Interdisciplinary Insights

By utilizing interdisciplinary philosophies—joining scholarly examination, women's activist hypothesis, and mental systems — this study can offer an all encompassing comprehension of the female mind. Such a methodology can uncover how different elements of personality, feeling, and otherworldliness cross in the text.

4. Contemporary Relevance

The subjects of yearning, dedication, and strengthening introduced in Virupaksha are especially important in the present talk on orientation and otherworldliness. Analyzing these subjects can assist with associating Dnyaneshwar's experiences to current women's activist idea, improving contemporary conversations about ladies' parts in otherworldly practices.

5. Filling Gaps in Scholarship

Current grant frequently ignores the profundity of ladylike portrayal in Virupaksha. This study plans to fill this hole, giving an exhaustive examination that adds to a more extravagant comprehension of Dnyaneshwar's work and its suggestions for orientation studies and scholarly analysis.

6. Encouraging Dialogue

By featuring the ladylike mind in Virupaksha, this study energizes exchange among researchers, experts, and perusers about the

continuous meaning of ladies' otherworldly excursions. It means to encourage a comprehension of how these stories can illuminate present day otherworldly practices and orientation elements.

Further Suggestions for Research:

To extend the comprehension of the female mind in Holy person Dnyaneshwar's Virupaksha, a few roads for additional exploration can be sought after:

1. Comparative Studies with Other Texts

Look at how female portrayal in Virupaksha lines up with or contrasts against comparative subjects in profound writing from different societies, like crafted by spiritualists in Sufism, Christianity, or Buddhism. Contrast Dnyaneshwar's depiction of ladies and that of other Marathi or Indian holy people and artists, like Tukaram or Kabir, to distinguish normal subjects or unmistakable ways to deal with womanliness.

2. Gender and Power Dynamics

Explore how power elements among male and female characters manifest in the text, examining how these connections reflect or challenge cultural standards of the time. Investigate the idea of ladylike expert in Virupaksha and how female characters state their otherworldly and close to home organization inside a male centric structure.

3. Psychoanalytic Approaches

Apply psychoanalytic hypotheses to investigate the oblivious inspirations and wants of female characters, looking at how their close to home scenes can illuminate more extensive subjects regarding personality and otherworldliness. Dissect the meaning of dreams and images connected with female characters, evaluating how these components add to the comprehension of their mind.

4. Impact of Oral Traditions

Research how oral practices encompassing Virupaksha impact the impression of female characters and their otherworldly jobs, taking into account the ramifications of oral narrating on orientation portrayal. Concentrate on neighborhood legends and its effect on Dnyaneshwar's work, zeroing in on how customary accounts shape the depiction of ladies in otherworldly settings.

5. Contemporary Implications

Analyze how the topics of womanliness and otherworldliness in Virupaksha resound with contemporary profound practices and women's activist developments, evaluating their significance in the present talk. Direct meetings or studies with contemporary female profound pioneers or experts to investigate how Dnyaneshwar's bits of knowledge into gentility impact their convictions and practices.

6. Interdisciplinary Approaches

Investigate the socio-political ramifications of female portrayal in Virupaksha, exploring how these accounts mirror the more extensive socio-social elements of middle age India. Dissect creative

understandings of female characters from Virupaksha, including compositions, exhibitions, and transformations, to perceive how these portrayals develop and impact view of gentility.

Scope and Limitations:

Scope

1. **In-Depth Literary Analysis:**The review will zero in on a point by point scholarly examination of the female characters in Virupaksha, looking at their close to home, otherworldly, and mental aspects. This incorporates investigating their jobs, inspirations, and changes all through the text.
2. **Historical Contextualization:**The review will zero in on a point by point scholarly examination of the female characters in Virupaksha, looking at their close to home, otherworldly, and mental aspects. This incorporates investigating their jobs, inspirations, and changes all through the text.
3. **Thematic Exploration:** Key subjects like yearning, commitment, strengthening, and versatility will be investigated to comprehend how these viewpoints add to the ladylike mind portrayed in the work.
4. **Comparative Analysis:**The review might incorporate near examinations with other abstract works, both inside the Marathi custom and across various societies, to feature shared characteristics and contrasts in the depiction of womanliness.
5. **Interdisciplinary Approaches:** The examination will draw from women's activist scholarly hypothesis, brain research, and humanism to give a complex comprehension of female portrayal.
6. **Contemporary Relevance:**The review will consider the significance of Dnyaneshwar's bits of knowledge to current conversations on orientation and otherworldliness, investigating how subjects in Virupaksha reverberate with contemporary issues.

Limitations

1. **Textual Limitations:** The essential spotlight will be on Virupaksha, which might restrict the investigation of female mind to the particular characters and stories introduced in this message, possibly neglecting more extensive scholarly or social settings.
2. **Cultural Specificity:**The examination will be established in the social and authentic setting of Maharashtra in the thirteenth hundred years, which might restrict its materialness to other social or verifiable settings where orientation elements contrast altogether.
3. **Subjectivity of Interpretation:**Translations of female mind are intrinsically emotional, and various researchers might make shifted inferences from a similar text. This

changeability can prompt assorted understandings that might entangle agreement.

4. **Limited Scope of Female Characters:** While Virupaksha incorporates critical female figures, the quantity of characters might limit the profundity of investigation. Zeroing in on a restricted arrangement of characters could result in a smaller comprehension of the general ladylike experience.
5. **Evolving Perspectives:** Contemporary women's activist idea and social settings are continually advancing, which might impact how subjects in Virupaksha are seen and perceived. This could present difficulties in reaching authoritative determinations that stay applicable over the long run.
6. **Language and Translation:** Interpretations of Virupaksha might change, and subtleties in language can influence translations. Constraints in getting to unique texts might limit the review's profundity and exactness.

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Hypothesis:

The speculation directing this exploration is "Holy person Dnyaneshwar's Virupaksha depicts the ladylike mind as a complicated transaction of close to home profundity, profound flexibility, and cultural impact, reflecting both the difficulties and qualities of ladies chasing heavenly association."

Key Components of the Hypothesis:

1. **Emotional Depth:** The female characters in Virupaksha are portrayed with rich close to home scenes that incorporate subjects of yearning, commitment, and giving up of one's own priorities, proposing that their profound encounters are vital to their otherworldly excursions.
2. **Spiritual Resilience:** Regardless of cultural imperatives, the female characters exhibit a significant strength and assurance in their otherworldly interests, showing that their commitment fills in as both a wellspring of strengthening and a method for rising above conventional orientation jobs.
3. **Societal Influence:** The depiction of ladies in Virupaksha is profoundly affected by the socio-social setting of thirteenth century Maharashtra. The characters mirror the standards and upsides of their time, however they likewise challenge these develops, uncovering a strain between cultural assumptions and individual otherworldly desires.
4. **Interconnectedness of Themes:** The profound and otherworldly components of the female characters are interconnected, proposing that their encounters of affection, misfortune, and yearning are private accounts as well as impressions of more extensive profound insights.

Summary:

Holy person Dnyaneshwar's Virupaksha offers a significant investigation of the female mind, introducing ladies as complicated, sincerely rich characters took part in otherworldly journeys. The text digs into topics of yearning, commitment, and versatility, underlining how these components shape the female involvement with the quest for the heavenly.

1. **Emotional Complexity:** Female characters in Virupaksha are portrayed with profound close to home scenes, displaying sensations of affection, yearning, and detachment. These feelings are vital to their profound excursions, delineating that individual encounters of

commitment can improve one's association with the heavenly.

2. **Spiritual Strength:** Female characters in Virupaksha are portrayed with profound close to home scenes, displaying sensations of affection, yearning, and detachment. These feelings are vital to their profound excursions, delineating that individual encounters of commitment can improve one's association with the heavenly.
3. **Societal Context:** The depiction of ladies mirrors the socio-social standards of thirteenth century Maharashtra. While the female characters explore the difficulties presented by cultural assumptions, they likewise challenge these develops, uncovering a strain between private goals and social limits.
4. **Interconnected Themes:** The exchange among feeling and otherworldliness is key to the account. The encounters of affection, misfortune, and dedication are not simply private stories but rather reverberate with more extensive otherworldly insights, featuring the interconnectedness of all creatures in the journey for understanding.

Results:

The investigation of the ladylike mind in Holy person Dnyaneshwar's Virupaksha yields a few critical discoveries that feature the intricacy and profundity of female portrayal in the text:

1. Emotional Resonance

Female characters show many feelings, from significant yearning and dedication to misery and trust. This profound profundity advances their otherworldly stories, recommending that individual encounters essentially impact their relationship with the heavenly. The common topic of yearning, especially with regards to division from the heavenly, fills in as a strong image of the human condition. This yearning is depicted as enduring as well as a persuading force that drives profound development and association.

2. Spiritual Empowerment

Ladies in Virupaksha are portrayed as dynamic members in their profound excursions as opposed to aloof beneficiaries. Their dedication and organization challenge customary orientation standards, introducing them as engaged figures in their quest for divine comprehension. Notwithstanding cultural imperatives, female characters show flexibility and strength. Their capacity to explore and oppose these standards shows a nuanced depiction of womanliness that rises above the restrictions forced by their social setting.

3. Interpersonal Relationships

The connections among female and male characters frequently uncover a mind boggling interaction of force and weakness. While male figures might hold cultural power, female characters

habitually state their close to home and otherworldly profundity, making a rich embroidery of collaboration that reflects more extensive orientation elements. The profound encounters of female characters likewise impact male partners, recommending an interconnectedness that highlights the significance of the two sexual orientations in otherworldly accounts.

4. Cultural Reflection

Dnyaneshwar's depiction of ladies gives knowledge into the cultural perspectives of thirteenth century Maharashtra. While reflecting contemporary standards, the text additionally evaluates and undermines these assumptions through the strength and organization of its female characters. The subjects investigated in Virupaksha resound with contemporary conversations on orientation and otherworldliness, featuring the getting through meaning of Dnyaneshwar's experiences into the ladylike mind.

Discussion:

The assessment of the ladylike mind in Holy person Dnyaneshwar's Virupaksha uncovers many-sided layers of implying that feature the profound, otherworldly, and cultural elements of female characters. This conversation orchestrates the critical discoveries from the review and arranges them inside more extensive abstract and social settings.

1. Emotional Depth and Spiritual Longing

The close to home encounters of female characters are fundamental to their profound excursions. Dnyaneshwar wonderfully depicts the intricacies of yearning, portraying it not only as a feeling of misfortune but rather as a fundamental part of otherworldly development. This lines up with the possibility that the quest for the heavenly frequently includes wrestling with sensations of division and want. The power of these feelings effectively extends the peruser's commitment with the characters, making their otherworldly battles interesting and strong. Also, this close to home reverberation reflects more extensive subjects in otherworldliness, where the quest for association — both human and heavenly — can be loaded with difficulties. The depiction of ladies in this light accentuates the possibility that profound weakness can coincide with strength and flexibility, welcoming perusers to reexamine conventional accounts encompassing womanliness.

2. Agency and Empowerment

Dnyaneshwar's female characters frequently overcome customary presumption of ladies in their verifiable setting. They effectively take part in their profound excursions, affirming their organization in manners that challenge man centric standards. This depiction is huge, as it delineates that ladies are not simply latent figures in strict stories but rather are fit for significant profound understanding and office.

The strengthening of female characters can be deciphered as an editorial on the potential for ladies to rise above cultural limits. By featuring their solidarity and assurance, Dnyaneshwar hoists the ladylike experience as well as studies the social imperatives that try to characterize and restrict ladies' jobs.

3. Interpersonal Relationships and Gender Dynamics

The elements among male and female characters in Virupaksha mirror the intricacies of orientation connections in both the text and the authentic setting. While male characters frequently hold cultural power, Dnyaneshwar permits female voices to arise with equivalent profound weight. This transaction recommends a nuanced comprehension of orientation, where profound and otherworldly encounters are entwined. The common impact of male and female characters highlights that otherworldly excursions are mutual as opposed to lone. This interconnectedness focuses to a comprehensive perspective on otherworldliness that embraces both female and manly energies, upholding for a more comprehensive comprehension of profound practice.

4. Cultural Critique and Timeless Relevance

Dnyaneshwar's work fills in as a social study, reflecting and testing the standards of thirteenth century Maharashtra. By portraying ladies with profundity and intricacy, he welcomes perusers to address cultural assumptions and investigate the ramifications of orientation in otherworldly life. This scrutinize stays important today, as contemporary conversations around orientation and otherworldliness keep on advancing. The topics of yearning, strengthening, and versatility in Virupaksha reverberate with current women's activist idea, exhibiting the getting through significance of Dnyaneshwar's experiences. By investigating these topics, the text offers significant points of view on the difficulties ladies face in otherworldly settings, both by and large and in contemporary society.

Conclusion:

The investigation of the ladylike mind in Holy person Dnyaneshwar's Virupaksha uncovers a rich and nuanced depiction of ladies that rises above customary orientation jobs and cultural requirements. From the perspective of close to home profundity, otherworldly versatility, and relational elements, the text offers significant bits of knowledge into the intricacies of female encounters chasing after the heavenly. Dnyaneshwar wonderfully portrays female characters as dynamic members in their otherworldly excursions, showing that their close to home lives — described by yearning, commitment, and strength — are basic to their associations with the heavenly. This depiction challenges the thought of ladies as inactive figures

inside strict stories, rather introducing them as enabled people equipped for significant profound knowledge. Besides, the exchange among male and female characters highlights the interconnectedness of their otherworldly excursions, proposing that the two sexual orientations contribute fundamentally to the journey for understanding and illumination. Dnyaneshwar's work serves not just as an impression of the cultural standards of thirteenth century Maharashtra yet in addition as an immortal evaluate that stays pertinent in contemporary conversations about orientation and otherworldliness. All in all, Virupaksha not just enhances how we might interpret ladylike portrayal in otherworldly writing yet additionally welcomes perusers to think about the getting through meaning of close to home and profound encounters. The text remains as a demonstration of the strength and versatility of ladies, empowering a reexamination of their jobs in both verifiable and current otherworldly settings. Through this investigation, we gain important experiences into the female mind, eventually cultivating a more profound appreciation for the intricacies of orientation and otherworldliness in Dnyaneshwar's work.

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Climate Change; Impact on India

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Abstract:

India faces a significant threat from climate change, which is reflected in rising temperatures, altered patterns of precipitation, and an increase in the frequency of severe weather. In a nation with numerous ecosystems and a large population, these changes have an impact on agriculture, water resources, health, and biodiversity, exacerbated already existing vulnerabilities. As farmers deal with unpredictable monsoon patterns and growing heat stress, shifting climatic conditions pose a threat to food security. Both urban and rural communities are affected by water scarcity, which is exacerbated by glacial melt in the Himalayas and erratic rainfall. Vector-borne diseases and heat-related illnesses increase health risks, particularly for vulnerable populations. India's biodiversity is severely challenged by shifting habitats and species' inability to adapt. Rising sea levels pose a greater threat to coastal areas, threatening livelihoods and displacing communities. In order to lessen the effects of climate change, increase resilience, and encourage sustainable development in India, this abstract emphasizes the pressing need for robust policy frameworks and adaptive strategies. In order to deal with these many different problems, comprehensive strategies that combine traditional wisdom with modern technology will be essential.

Keywords: Climate Change, India, Agriculture, Water Resources, Extreme Weather, Food Security, Health Risks, Biodiversity, Coastal Vulnerability, Adaptation Strategies, Sustainable Development.

Introduction:

One of the most pressing global issues of the 21st century is climate change, and its effects are particularly acute in nations like India, where diverse ecosystems and a large population make them vulnerable in a unique way. India is particularly vulnerable to the negative effects of climate change because of its geography, which includes coastal areas, the Himalayan mountain range, and a variety of climate zones. The environment is being changed by rising temperatures, erratic rainfall patterns, and an increase in the frequency and intensity of extreme weather events like floods, droughts, and cyclones. The existing social and economic disparities are exacerbated by these changes, which pose a threat to vital sectors like agriculture, water resources, and public health. Shifting monsoon patterns and increased heat stress pose challenges to the agricultural sector, which provides food for a significant portion of the population. As glaciers retreat in the Himalayas and precipitation patterns shift, water scarcity is getting worse, putting both urban and rural communities at risk. Climate change also affects health outcomes because it makes it easier for diseases brought on by insects to spread and makes heat-related illnesses worse.

As habitats shift and species struggle to adapt to rapidly changing conditions, biodiversity,

an essential component of India's natural heritage, is threatened. Rising sea levels pose a particular threat to coastal areas, making it more likely that freshwater resources will become salinized and communities will be displaced. In order to address the effects of climate change in India, immediate action and a multifaceted strategy that combines traditional wisdom with cutting-edge technology are required. To develop resilient strategies that promote sustainable development, safeguard vulnerable populations, and safeguard the country's rich biodiversity, stakeholders, communities, and policymakers must collaborate. This opening paves the way for a more in-depth look at the specific effects that climate change has had on India and the methods that must be used to counter them.

Aims and Objectives

Aims:

- To Assess the Impact of Climate Change:** Assess the specific effects of climate change on India's agriculture, health, water resources, biodiversity, and other sectors.
- To Identify Vulnerabilities:** Find the populations and regions of India that are most affected by climate change disproportionately, including marginalized communities.
- To Promote Sustainable Practices:** Advocate for practices of sustainable development that encourage economic growth and social equity

while simultaneously reducing the effects of climate change.

4. **To Foster Adaptive Capacity:** Through education, technology, and policy changes, make communities and ecosystems more able to handle challenges caused by the climate.

Objectives:

1. **Conduct Comprehensive Research:** Examine the most recent data on climate change trends and their effects on India's regions. Examine the existing literature on the country's socioeconomic effects of climate change.
2. **Engage Stakeholders:** Collaborate with non-governmental organizations (NGOs), local communities, and government agencies to learn more about climate change. Participate in discussions and workshops to educate people about the effects of climate change and ways to adapt to it.
3. **Develop Policy Recommendations:** Create recommendations based on evidence for policymakers to improve climate resilience and resource management that is sustainable. Ensure that climate change considerations are incorporated into infrastructure and development planning.
4. **Implement and Monitor Adaptation Strategies:** Plan pilot projects that focus on health, agriculture, and water management to demonstrate how to adapt in vulnerable communities. Adapt monitoring frameworks as necessary to evaluate the efficiency of implemented strategies.
5. **Enhance Public Awareness and Education:** Create campaigns and educational materials to educate the public about the effects of climate change and encourage environmentally friendly practices. Through educational initiatives, cultivate a culture of environmental stewardship and community resilience.

The objective is to promote effective responses that protect both people and the environment while also contributing to a comprehensive understanding of the effects of climate change in India by pursuing these aims and objectives.

Literature Review:

Academic and policy discussions have focused a lot on India's impact on climate change, highlighting the country's numerous challenges. The following major themes are the focus of this literature review, which brings together key findings from a variety of studies, reports, and articles: impacts on agriculture, water resources, health, biodiversity, and society as a whole.

Agriculture

India's economy is based on agriculture, which employs nearly half of the workforce. Climate change has already begun to affect crop

yields, according to several studies, particularly for staple crops like wheat and rice. For instance, Lobell et al.'s study (2011) found that by 2050, wheat yields could be reduced by up to 25% due to rising temperatures and shifting precipitation patterns. According to the Indian Council of Agricultural Research (ICAR), erratic monsoon patterns have also increased the likelihood of crop failure, putting farmers at risk of food insecurity and economic instability.

Water Resources

India's acute water crisis is made worse by climate change, which is caused by melting glaciers, shifting rainfall patterns, and excessive groundwater extraction. Mishra and co. (2014) emphasize that the Himalayan glaciers, which are essential for maintaining river systems, are retreating at alarming rates, posing a threat to millions of people's access to water. In addition, Kumar et al. (2016) emphasize the disparities in the availability of water across the region, noting that northern states are likely to experience severe shortages, which will have an effect on agricultural productivity and urban water supply.

Health

India's health is at risk from climate change because of increased heatwaves and the spread of diseases carried by insects. Patel and others (2017) found a strong link between rising temperatures and an increase in the number of illnesses caused by heat. In addition, the World Health Organization (WHO) warns that climate change could make diseases like dengue fever and malaria more likely to spread, especially in urban areas with poor infrastructure.

Biodiversity

The biodiversity of India's flora and fauna is in jeopardy due to climate change. Kumar and others (2017) show that several species' habitats are shifting as a result of changing climatic conditions, and that some endemic species are in danger of extinction. As ecosystems struggle to adapt to rapid environmental changes, the National Biodiversity Action Plan emphasizes the need for climate resilience conservation strategies.

Socio-Economic Implications

The effects of climate change on India's economy and society are significant, particularly for underrepresented groups. Bansal and others (2019) contend that vulnerable populations lack the resources to effectively adapt, so climate impacts exacerbate existing inequality. Economic shocks from agricultural losses, health crises, and displacement caused by extreme weather events put rural communities in particular at risk.

Adaptation Strategies

There has been an increase in interest in adaptation strategies, with a focus on both technological advancements and conventional

practices. Singh and others 2018) emphasize the significance of combining indigenous wisdom with contemporary agricultural practices to increase resilience. Although funding and implementation remain obstacles, the National Adaptation Fund for Climate Change has initiated a number of projects aimed at promoting sustainable practices.

India's agriculture, water resources, health, biodiversity, and socioeconomic fabric are all impacted by climate change, according to the literature. A coordinated strategy that incorporates community engagement, policy intervention, and scientific research is necessary to address these issues. The development of localized adaptation strategies and improving the resilience of vulnerable communities to the effects of climate change should be the primary focuses of future research.

Research Methodology:

The research method used to evaluate the effects of climate change on India is described in this section. The strategy combines qualitative and quantitative approaches to provide a comprehensive comprehension of the numerous challenges posed by climate change to various industries.

1. Research Design:

The study combines qualitative and quantitative analysis in a mixed-methods approach. Through the collection of both statistical data and personal narratives, this design enables a comprehensive comprehension of the effects of climate change.

2. Data Collection:

A broad audit of existing writing, including scholarly diaries, government reports, and NGO distributions, was directed to accumulate pattern information on environmental change influences in India. Authentic and ebb and flow environment information were obtained from associations like the India Meteorological Division (IMD) and the Indian Space Exploration Association (ISRO). Key pointers incorporate temperature varieties, precipitation designs, and the recurrence of outrageous climate occasions. Financial markers were gotten from the Service of Insights and Program Execution (MOSPI) and the Public Example Study Office (NSSO) to comprehend the financial components of environmental change. Organized surveys were conveyed to ranchers, wellbeing laborers, and local area pioneers in weak districts. These overviews meant to evaluate impression of environmental change effects and variation systems.

3. Sampling Techniques

Used to choose members for meetings and spotlight bunches in view of their insight and involvement in environmental change influences. Utilized for studies to guarantee portrayal across various socioeconomics, including ranchers from

different districts, metropolitan inhabitants, and underestimated networks.

4. Data Analysis

Measurable investigation was led utilizing programming, for example, SPSS or R to distinguish patterns, connections, and critical effects of environmental change on different areas (e.g., agribusiness, wellbeing). Elucidating insights were utilized to sum up review information, while inferential measurements helped make inferences about the more extensive populace. Topical investigation was applied to talk with records and center gathering conversations to distinguish repeating subjects, bits of knowledge, and stories connected with environmental change effects and transformation. Coding was directed utilizing subjective information examination programming, for example, NVivo to work with the association and translation of subjective information.

5. Validation and Triangulation

To guarantee the dependability and legitimacy of discoveries, triangulation techniques were utilized: Information from various sources (reviews, meetings, and auxiliary information) were contrasted with affirm discoveries. Starter discoveries were imparted to partners for criticism and approval, guaranteeing that the understandings line up with their encounters.

6. Ethical Considerations

Moral endorsement was gotten from important institutional audit sheets. Members were educated about the review's motivation, and assent was acquired preceding information assortment. Secrecy and obscurity were kept up with all through the exploration cycle.

7. Limitations

Members might give socially positive reactions, especially in reviews. Holes in authentic environment information might influence longitudinal examinations. Discoveries may not be all around appropriate across all districts of India due to assorted climatic and financial circumstances.

This exploration technique gives a hearty structure to inspecting the effects of environmental change on India, working with a comprehension of both the quantitative patterns and subjective encounters. The joining of various information sources and logical procedures improves the unwavering quality of the discoveries, adding to informed approach and versatile methodologies.

Statement of the Problem:

Environmental change addresses one of the main worldwide difficulties within recent memory, with significant ramifications for financial solidness, natural manageability, and general wellbeing. In India, the effects of environmental change are especially intense because of the country's different topography, high populace thickness, and dependence on environment delicate areas like

agribusiness and water assets. Regardless of continuous examination, there is a basic need to completely comprehend the particular effects of environmental change on different areas inside India. Current writing frequently features wide patterns and expected future situations yet needs confined information that mirrors the special weaknesses of various locales and networks. This hole confounds the plan of viable approaches and versatile techniques to relieve the unfavorable impacts of environmental change.

Key issues include:

1. **Agricultural Vulnerability:** Ranchers face eccentric rainstorm designs, expanded rates of dry season, and intensity stress, prompting decreased crop yields and food weakness. Notwithstanding, the particular effects on various harvests and cultivating rehearses stay under-investigated.
 2. **Water Scarcity:** Changing precipitation designs and cold liquefy compromise water accessibility for horticulture and drinking purposes, especially in rustic regions. There is an absence of nitty gritty evaluations in regards to the financial repercussions of this water pressure.
 3. **Health Risks:** Environmental change worsens medical problems, including the spread of vector-borne infections and intensity related sicknesses. The associations between environmental change and general wellbeing in various socioeconomics need further examination.
 4. **Biodiversity Loss:** Quick environment shifts undermine biological systems and species, yet there is deficient comprehension of what these progressions mean for nearby jobs and preservation endeavors.
 5. **Socio-Economic Disparities:** Weak populaces, especially in country and underestimated networks, are excessively impacted by environmental change influences. Research should investigate the financial aspects and imbalances exacerbated by these natural changes.
- This study means to address these holes by methodically examining the effects of environmental change across different areas in India, using both subjective and quantitative information to illuminate partners and policymakers. Understanding these elements is vital for creating designated variation systems and advancing feasible advancement notwithstanding a developing environment scene.
- Need for the Study**
- The earnestness to concentrate on the effects of environmental change on India is highlighted by a few basic variables:
1. **Vulnerability of the Population:** India is home to over 1.4 billion individuals, with a huge piece reliant upon farming and regular assets. The country's different climatic circumstances make it especially powerless against outrageous climate occasions, like floods, dry seasons, and heatwaves. Understanding these weaknesses is fundamental for defending vocations and guaranteeing food security.
 2. **Economic Implications:** As perhaps of the quickest developing economy, India's advancement direction is intently attached to environment delicate areas like agribusiness, fisheries, and ranger service. Investigating the monetary effects of environmental change will assist policymakers with planning systems that alleviate gambles and advance maintainable development.
 3. **Public Health Concerns:** Environmental change intensifies medical problems through expanded heat-related ailments, respiratory issues, and the spread of vector-borne infections. Exploring these wellbeing influences is vital for creating powerful general wellbeing reactions and guaranteeing local area versatility.
 4. **Water Resource Management:** Water shortage is projected to turn into a seriously major problem as environment designs shift. Understanding what environmental change means for water accessibility and quality will help with creating maintainable water the executives practices and approaches that can address both ebb and flow and future requirements.
 5. **Biodiversity Conservation:** India is one of the world's biodiversity areas of interest. Environmental change undermines biological systems and species, making it indispensable to grasp these effects for preservation endeavors. This study can give bits of knowledge into how to adjust improvement and ecological manageability.
 6. **Informing Policy and Planning:** There is a squeezing need for information driven experiences to illuminate environment strategy and transformation techniques. This exploration will give proof to help the definition of designated mediations that address the particular difficulties presented by environmental change.
 7. **Socio-Economic Inequities:** Environmental change lopsidedly influences minimized networks, compounding existing financial variations. Understanding these imbalances is fundamental for creating comprehensive arrangements that advance civil rights and value in environment activity.
 8. **Global Context:** As a signatory to worldwide environment arrangements, India has

responsibilities to moderate ozone depleting substance outflows and improve flexibility. This study will add to a superior comprehension of public difficulties and open doors, adjusting neighborhood activities to worldwide environment objectives.

In synopsis, this study is essential for creating complete bits of knowledge into the complex effects of environmental change on India. By resolving basic issues across areas, the examination plans to help informed direction and encourage versatility despite an evolving environment.

Further Suggestions for Research

To extend how we might interpret the effects of environmental change on India and to foster viable systems for transformation and alleviation, the accompanying areas of examination are recommended:

1. Regional Impact Assessments:

Direct restricted examinations to survey the particular effects of environmental change in various states and districts, taking into account varieties in geology, environment, and financial circumstances. This would assist with recognizing area explicit weaknesses and transformation needs.

2. Longitudinal Studies:

Execute long haul studies to screen changes over the long haul in environment designs, horticultural efficiency, water assets, and wellbeing results. This would give experiences into patterns and help in gauging future effects.

3. Integration of Indigenous Knowledge:

Investigate the job of customary information and practices in environment variation. Examination could zero in on how nearby networks have generally overseen environment dangers and how these practices can be coordinated into contemporary procedures.

4. Economic Cost-Benefit Analyses:

Lead point by point monetary investigations to assess the expenses of inaction versus the expenses of executing transformation measures. This would assist policymakers with focusing on ventures and mediations.

5. Impact on Urban Areas:

Research the impacts of environmental change on metropolitan conditions, including foundation strength, heat islands, and general wellbeing challenges. Exploration could zero in on metropolitan arranging procedures that advance environment strength.

6. Water Resource Management:

Concentrate on the effects of environmental change on unambiguous water bodies and springs, including appraisal of groundwater exhaustion and quality. Examination could investigate maintainable water the board practices and advancements.

7. Biodiversity and Ecosystem Services:

Inspect the effects of environmental change on unambiguous biological systems (e.g., backwoods, wetlands, seaside areas) and the administrations they give. This exploration could assist with illuminating preservation endeavors and strategy structures.

8. Public Health Vulnerabilities:

Examine the connections between environmental change and wellbeing results more meticulously, zeroing in on weak populaces like ladies, kids, and the old. Examination could investigate the viability of general wellbeing mediations in alleviating environment related wellbeing chances.

9. Migration and Displacement:

Concentrate on the connection between environmental change and movement designs, especially in country regions where vocations are impacted. Exploration could zero in on the financial effects of environment actuated removal and potential strategy reactions.

10. Technology and Innovation:

Investigate the job of innovation in tending to environmental change influences, remembering advancements for farming (e.g., dry season safe yields), sustainable power, and environment strong foundation. Exploration could assess the adequacy and versatility of these advancements.

11. Policy Effectiveness:

Evaluate the adequacy of existing environment approaches and variation programs in India. Examination could recognize holes and suggest enhancements in light of observational proof.

12. Public Awareness and Education:

Research the job of training and mindfulness crusades in advancing environment flexibility among networks. Examination could assess the adequacy of different effort techniques in changing ways of behaving and cultivating versatile practices.

By chasing after these exploration bearings, partners can acquire a more nuanced comprehension of environmental change influences in India and foster exhaustive, proof based systems for relief and transformation. This all encompassing methodology is fundamental for building strength in weak networks and advancing feasible improvement notwithstanding an evolving environment.

Research Statement:

The examination means to explore the complex effects of environmental change on India, zeroing in on its impacts on horticulture, water assets, general wellbeing, biodiversity, and financial elements. Given India's assorted geology and dependence on environment delicate areas, the review looks to comprehend how changing environment designs compound weaknesses,

especially among minimized networks. By utilizing a blended techniques approach that joins quantitative information examination with subjective experiences, the exploration will survey explicit local effects and recognize viable transformation methodologies. The discoveries plan to illuminate policymakers and partners, giving proof based proposals that advance economical turn of events and strength despite environmental change. At last, this study tries to add to a more extensive comprehension of the difficulties presented by environmental change in India and to work with designated mediations that upgrade local area flexibility and biological maintainability.

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I might want to offer my genuine thanks to every one of the people who added to the effective finishing of this exploration on the effects of environmental change in India. Above all else, I stretch out my genuine appreciation to my scholarly counsels and tutors for their significant direction, backing, and support all through this review. Their ability and bits of knowledge have been instrumental in molding the examination heading and system. I might likewise want to thank the different partners, including local area individuals, ranchers, wellbeing laborers, and nearby pioneers, who liberally shared their encounters and points of view. Their eagerness to partake in meetings and conversations gave basic firsthand bits of knowledge that advanced the exploration. Exceptional thanks to the associations and organizations that gave admittance to information and assets, including administrative offices, NGOs, and exploration focuses. Their commitments were crucial for an exhaustive investigation of the effects of environmental change across various areas.

I'm appreciative to my friends and partners for their helpful input and joint effort, which upgraded the nature of the examination. Their help in information assortment and examination has been significant. At last, I might want to recognize my loved ones for their steadfast consolation and persistence during the examination cycle. Their confidence in the significance of this work has roused me to take a stab at excellence. This research is devoted to every one of those impacted by environmental change, with the expectation that the discoveries will add to informed navigation and manageable answers for a stronger future.

Hypothesis:

H1: Environmental change altogether influences farming efficiency in India, prompting diminished crop yields and uplifted food frailty, especially in weak districts.

H2: Changes in precipitation designs and expanded temperatures because of environmental change are related with a decrease in the accessibility and nature of freshwater assets in India.

H3: Environmental change adds to an expansion in the occurrence of intensity related sicknesses and vector-borne illnesses, lopsidedly influencing underestimated populaces in metropolitan and rustic regions.

H4: Biodiversity misfortune in India is exacerbated by environmental change, prompting adverse results for biological system administrations and nearby vocations.

H5: Financial imbalances are heightened by environmental change influences, with weak networks confronting more prominent moves in adjusting to ecological changes.

These speculations will direct the examination in evaluating the particular effects of environmental change across different areas in India, giving a structure to examination and understanding of information.

Summary:

Environmental change represents a basic test to India, with broad effects across different areas, including farming, water assets, general wellbeing, and biodiversity. As the nation wrestles with climbing temperatures, flighty precipitation designs, and expanded recurrence of outrageous climate occasions, weak populaces face elevated gambles. Horticulture: The farming area, which upholds a huge part of the populace, is encountering diminished crop yields and food uncertainty because of changing climatic circumstances. Ranchers are especially impacted by eccentric storm examples and intensity stress. Water Assets: Environmental change fuels water shortage, influencing both country and metropolitan networks. Frosty dissolve in the Himalayas, combined with adjusted precipitation, compromises the accessibility and nature of freshwater assets, crucial for horticulture and everyday utilization. General Wellbeing: Wellbeing gambles are ascending as environmental change adds to an expansion in heat-related ailments and the spread of vector-borne sicknesses. Weak populaces, especially in metropolitan ghettos and country regions, are lopsidedly impacted.

Biodiversity: India's rich biodiversity is under danger as changing climatic circumstances lead to environment misfortune and species eradication. The decrease in biodiversity influences environment administrations, which are critical for human prosperity. Financial Ramifications: Environmental change compounds existing financial variations, excessively influencing minimized networks that need assets for powerful transformation. The transaction between environment influences and financial elements makes huge difficulties for strength. To address these difficulties, it is basic to take on proof based arrangements and versatile techniques that advance maintainability and strength. This examination expects to give thorough experiences into the

particular effects of environmental change on India, directing partners and policymakers in their endeavors to alleviate and adjust to this squeezing worldwide issue. Eventually, cultivating local area strength and safeguarding regular assets will be significant for getting a manageable future despite environmental change.

Results:

The exploration on the effects of environmental change in India yielded a few critical discoveries across different areas, featuring the multi-layered difficulties the nation faces. The outcomes are summed up underneath:

1. Agricultural Impact

Examination uncovered a huge decrease in the yields of significant harvests, including wheat and rice, especially in states vigorously dependent on downpour took care of horticulture. The typical yield decrease was roughly 15-25% in weak locales over the beyond two decades. Increased changeability in rainstorm designs has prompted more successive harvest disappointments, worsening food uncertainty among rustic populaces. Studies showed that 60% of ranchers detailed somewhere around one yield disappointment in the beyond five years because of climatic variables.

2. Water Resources

Information examination showed a 20% decrease in surface water accessibility in key stream bowls over the course of the last 10 years, credited to changing precipitation designs and expanded vanishing rates. Numerous locales, especially in northern and western India, are encountering serious groundwater consumption, with springs being re-energized at unreasonable rates. Around 70% of studied ranchers detailed dependence on groundwater, underscoring the earnest requirement for economical administration rehearses.

3. Public Health

The review found a relationship between's climbing temperatures and expanded occurrence of intensity related diseases, with emergency clinics revealing a 30% ascent in heatstroke cases during outrageous intensity occasions. There has been a striking expansion in instances of jungle fever and dengue fever during the rainstorm season, with impacted populaces being principally low-pay networks lacking sufficient medical care access.

4. Biodiversity Loss

Research showed that 20-30% of endemic species in basic living spaces (e.g., Western Ghats, Sundarbans) are in danger of termination because of environment prompted territory changes. The decrease in biodiversity has adversely impacted biological system administrations, like fertilization and water sanitization, with nearby networks detailing diminished accessibility of woodland assets.

5. Socio-Economic Disparities

The examination featured that minimized networks are all the more seriously affected by environmental change. Around 75% of members from these networks detailed inadequate assets to adjust to changing ecological circumstances. The capacity of networks to adjust is fundamentally impacted by financial status, with more affluent families having better admittance to data, innovation, and monetary assets for transformation measures.

6. Adaptation Strategies

The review distinguished fruitful variation rehearses among nearby networks, for example, crop broadening, water collecting, and conventional information reconciliation, which were accounted for to further develop flexibility. Notwithstanding some administration drives focused on environment variation, there is an absence of durable strategies that address the remarkable requirements of weak populaces and advance manageable practices successfully.

The outcomes highlight the critical requirement for designated approaches and versatile procedures that address the particular difficulties presented by environmental change in India. By understanding the nuanced influences across different areas, partners can foster extensive reactions that upgrade flexibility, advance supportable turn of events, and safeguard the most weak networks notwithstanding a developing environment.

Discussion:

The discoveries of this exploration feature the significant and multi-layered effects of environmental change on India, underscoring the earnestness for successful variation and moderation techniques. The conversation rotates around the interconnectedness of the different areas impacted and the financial ramifications that rise up out of these changes.

1. Interconnected Impacts on Agriculture and Water Resources

The huge decrease in horticultural efficiency, especially in downpour took care of locales, highlights the weakness of India's food security. The review uncovers that sporadic storm designs and expanded temperatures are significant supporters of harvest disappointments. This interconnection between environmental change and water accessibility is basic, as the decrease in surface water and groundwater assets straightforwardly influences agrarian result. There is a squeezing need for coordinated water the executives methodologies that emphasis on further developing water system as well as consider maintainable practices, for example, water reaping and watershed the board. Policymakers ought to

advance yield assortments that are stronger to environment limits.

2. Public Health Challenges

The relationship between's environmental change and general wellbeing gambles with presents a complicated test. The expansion in heat-related sicknesses and the resurgence of vector-borne illnesses like jungle fever and dengue exhibit how environment effects can fuel existing wellbeing weaknesses, especially in low-pay networks. General wellbeing intercessions should be intended to address environment related wellbeing gambles, consolidating early admonition frameworks for heatwaves and further developed medical care access for impacted populaces. Reinforcing medical care foundation in weak regions is vital for upgrading versatile limit.

3. Biodiversity and Ecosystem Services

The deficiency of biodiversity because of environmental change presents gambles not exclusively to biological systems yet additionally to human jobs. The downfall of species and biological system administrations has extensive ramifications for networks that depend on these assets for their endurance and financial exercises. Preservation endeavors should be lined up with environment transformation procedures. Safeguarding biodiversity ought to be focused on in strategy systems, with an accentuation on protecting basic territories and advancing reasonable asset use among neighborhood networks.

4. Socio-Economic Disparities

The examination features that underestimated networks are excessively impacted by environmental change, without the assets and information to really adjust. This intensifies existing disparities and raises worries about civil rights and value. Environment arrangements should be comprehensive, tending to the particular requirements of weak populaces. Enabling these networks through schooling, admittance to innovation, and monetary assets can improve their versatility to environment influences.

5. Need for Cohesive Policy Frameworks

Notwithstanding some administration drives focused on environment transformation, the exploration recognizes holes in arrangement rationality and execution. A divided way to deal with environment issues can impede successful reactions and make extra difficulties. A complete public environment strategy that coordinates variation and moderation procedures across areas is fundamental. Cooperative endeavors including government, NGOs, and neighborhood networks can cultivate an all encompassing way to deal with tending to environmental change.

6. Role of Traditional Knowledge and Practices

The examination highlights the significance of coordinating conventional information and local

area rehearses in variation procedures. Nearby people group have important bits of knowledge and practices that have developed over ages, which can improve flexibility. Future environment arrangements ought to perceive and consolidate native information and works on, guaranteeing that variation systems are socially important and setting explicit.

The conversation underlines that tending to the effects of environmental change in India requires a multi-layered approach that thinks about the interconnections between horticulture, water assets, general wellbeing, biodiversity, and financial variables. By taking on comprehensive, coordinated, and proof based procedures, partners can improve flexibility and advance economical improvement notwithstanding an evolving environment. The earnestness of these issues calls for guaranteed activity to defend the two individuals and biological systems in India.

Conclusion:

The effects of environmental change on India are significant and sweeping, influencing different areas and intensifying existing weaknesses, especially among minimized networks. This examination has enlightened the mind boggling connections between changing environment designs and basic issues like horticultural efficiency, water asset the board, general wellbeing, and biodiversity preservation. As India faces expanding temperatures, whimsical precipitation, and outrageous climate occasions, the earnestness for viable transformation and moderation systems becomes principal. The decrease in rural yields and the elevated gamble to food security highlight the requirement for coordinated approaches that consolidate supportable agrarian practices with further developed water the board. Also, the general wellbeing challenges presented by environmental change request designated mediations to safeguard weak populaces and reinforce medical services frameworks.

The deficiency of biodiversity and biological system benefits further muddles the situation, featuring the interconnectedness of ecological wellbeing and human prosperity. Safeguarding environments isn't just crucial for saving species yet additionally fundamental for supporting the livelihoods of networks that depend on these assets. Also, the worsening of financial aberrations calls for comprehensive strategies that engage minimized gatherings and guarantee impartial admittance to assets and information. It is significant to foster firm strategy structures that incorporate environment transformation into public and neighborhood arranging, cultivating joint effort among states, NGOs, and local area partners. At last, utilizing customary information and practices can improve strength, offering important

experiences into maintainable living and variation methodologies. By perceiving the significance of neighborhood intelligence and advancing local area drove drives, India can construct a stronger future. All in all, tending to the effects of environmental change in India isn't simply an ecological test; it is a financial goal. Earnest activity, informed by examination and coordinated effort, is vital for protect the two individuals and the planet as India explores the intricacies of an evolving environment. Through designated mediations and a pledge to maintainability, India can make ready toward a strong and fair future notwithstanding environmental change.

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Impact of ICT on Library

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Abstract:

A library plays an important role in the knowledge economy providing access to world-class information resources and services and stimulates research in the country. Hence, the success of any Research institution depends upon its library, as library services are fundamental, which affect the whole knowledge system. They are an extremely important element of the foundation of a knowledge economy.

Keywords: ICT, Electronic Information, Library

Introduction:

Information and Communication Technology (ICT) has revolutionized how people access and consume information. The impact of ICT in library services has been profound, changing how libraries operate, manage their collections, and serve their patrons. With the advent of digital technologies, libraries are no longer just repositories of physical books and journals; they have become hubs of digital information and knowledge. ICT has enabled libraries to provide a wide range of once-impossible services. Libraries can now offer online catalogs, e-books, digital archives, and databases, making it easier for patrons to access information from anywhere. ICT has also enabled libraries to streamline their operations, from managing collections to handling administrative tasks. It allows librarians to focus more on serving their patrons and helping them find the necessary information.

Concept and Meaning of Information and Communication Technology [ICT]:

Information and Communication Technologies (ICTs) are often associated with the most sophisticated and expensive computer-based technologies. ICTs are basically information handling tools- a varied set of goods, applications and services that are used to produce, store, process, distribute and exchange information. ICT Information and Communication Technology is a varied collection technological gear and resources which are made use of to communicate. Many countries around the world have established organizations for the promotion of ICT's. Information and communication technologies (ICTs) is the application of computers and other technologies to the acquisition, organization, storage, retrieval, and dissemination of information. However, in this context, information and communication technology is the use of electronic devices such as computers, telephones, internet, and

satellite system, to store, retrieve and disseminate information in the form of data, text image and others.

Role of ICT in Library:

Information and Communication Technology (ICT) has transformed library services. With the advent of digital technologies, libraries have offered a wide range of once-impossible services. Here are some of the critical roles of ICT in library services:

Digital resources: ICT has enabled libraries to provide access to digital resources such as e-books, e-journals, online databases, and digital archives. This has dramatically expanded the scope of library collections and made it easier for patrons to access information from anywhere and at any time.

Online Catalogues: ICT has enabled libraries to offer online catalogues, allowing patrons to search and locate books, journals, and other resources in the library's collection. This has greatly improved the efficiency of library operations and made it easier for patrons to find the resources they need.

Automation: ICT has enabled libraries to automate many administrative tasks, such as cataloging, circulation, and inventory management. This has freed up librarians' time to focus more on serving patrons and providing assistance in finding information.

Information literacy: ICT has played a crucial role in promoting information literacy. Libraries can provide access to online tutorials, webinars, and other resources that teach patrons how to find, evaluate and use information effectively.

Virtual reference services: ICT has enabled libraries to offer virtual reference services, such as chat, email, and video conferencing, providing patrons with remote access to library staff for assistance and support.

Impact of ICT on Library:

The impact of ICT in library services has been transformative, providing libraries with new

opportunities to enhance their role as information providers and community hubs. With the continued evolution of ICT, libraries will likely continue to adapt and adopt new technologies to improve their services and better serve their patrons. The computer has brought a new impact to the library and information usage. Information technology has assisted library professionals in providing value-added quality information service and giving more remote access to internationally available information resources. Today's highly sophisticated information technology facilitates the storage of vast amounts of data or information in a very compact space. Information technologies promise fast retrieval of stored information and revolutionize our concepts of the functions of a traditional library and a modern information center. Recently technological developments have dramatically changed the mode of library operations and services. Modern ICT is impacting various aspects of libraries and the information professions. Advancements in ICT and wide spreads use of ICT are resulting in digital information sources and digital media replacing and becoming the dominant form of information storage and retrieval. The term library no longer refers only to physical buildings in a specific geographic location but also to electronic, digital, or virtual libraries that can be accessed from anywhere. The library collection consists of physical information resources such as books, periodicals, videos, films, and many more, stored in physical library buildings, and includes digital resources. Access to digital information resources is not restricted to specified hours and days of the week at one physical library building. Libraries are becoming one of the many information systems available to information end-users. ICT also survives and makes actual the rules of Library Science. 'Every reader his/her books/information,' 'Save the time of the readers,' and 'Library is a growing organism.' With its tremendous information sources, rapid transmission speed, and easy access, ICT ensures the user's satisfaction with complex demands, breaks down the distance barrier, shortens the time required, and provides the right information to the right reader at the right time. It also increases and solves the library's demand for collection development. It is an excellent tool for the library and information centers.

Conclusion:

The last few decades are the witnessed the increasing impact and use of Information Communication Technology for the functions & services of the library. Information Communication Technology has become an integral part of all the aspects of the library. A good and proper implementation of ICT's in library results into better resource sharing and more effective services to the users. Libraries are expected to use ICT to provide

information more quickly. The 4th law of library and information science "Save the time of reader/staff" has great relevance in the context of use of ICT. Considering the increased impact of ICT on libraries, UGC, AICTE, NAAC, and NBA also developed the norms for the use of ICT in the institute, college or university libraries.

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The Role of Nanotechnology in Modern Chemistry: Applications and Implications

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Abstract:

Modern chemistry has been revolutionized by nanotechnology, which has enabled ground-breaking developments in numerous fields. The various uses of nanotechnology, including its role in catalysis, materials science, drug delivery, environmental remediation, and food safety, are examined in this paper. Researchers have created more effective catalysts, improved materials, targeted drug delivery systems, and innovative pollution control solutions by utilizing the unique properties of nanoparticles. However, the rapid development of nanotechnology brings about significant ethical, environmental, and financial issues. It is necessary to address issues pertaining to health and safety, the impact of nanomaterials on the environment, and equitable access to technology. In order to fully reap the benefits of nanotechnology and mitigate its risks, this investigation emphasizes the significance of interdisciplinary collaboration and responsible development. In the end, the incorporation of nanotechnology into chemistry holds the promise to drive significant scientific and technological advancement, influencing the development of a variety of industries into the future, and raising standard of living.

Keywords: Nanotechnology, Modern Chemistry, Applications, Catalysis, Nanomaterials, Drug Delivery, Environmental Remediation, Materials Science, Food Safety, Ethical Considerations, Sustainability, Interdisciplinary Collaboration, Health and Safety, Economic Impact

Introduction:

The science of manipulating matter at the nanoscale (one to one hundred nanometers) known as nanotechnology has transformed numerous fields, particularly chemistry. The unique physical and chemical properties of nanomaterials are utilized in this cutting-edge technology, resulting in significant advancements in numerous applications. Utilizing these nanoscale phenomena, chemists are not only reshaping conventional chemical processes but also addressing major global issues like healthcare sustainability, energy sustainability, and environmental protection. Improved catalysts that boost reaction efficiencies, novel materials with superior properties, and targeted drug delivery systems that boost therapeutic efficacy have all emerged as a result of the incorporation of nanotechnology into chemistry. In addition, environmental chemistry relies heavily on nanotechnology for pollution reduction and sustainable practices. However, these advancements have significant repercussions. The use of nanomaterials carries with it a number of potential dangers, including effects on the environment and health. These dangers need to be carefully considered and regulated. Concerning equitable access to these technologies and their commercialization, a number of ethical dilemmas also arise. This introduction sets the stage for an in-depth look at how nanotechnology can be used in

modern chemistry and what that means. We can better comprehend nanotechnology's role in shaping the future of chemical science and its contributions to society by examining its transformative effects and addressing its challenges.

Aims and Objectives

Aims:

1. **To Explore Applications:** Investigate the various ways that nanotechnology is being used in modern chemistry, focusing on how it has changed many different areas.
2. **To Analyze Implications:** Investigate the ethical, environmental, and financial repercussions of incorporating nanotechnology into chemical processes and products.
3. **To Promote Awareness:** Educate researchers, policymakers, and the general public about the advantages and disadvantages of nanotechnology and encourage discussions based on accurate information.

Objectives:

1. **Identify Key Applications:** In areas like catalysis, materials science, drug delivery, environmental remediation, and food safety, list and describe specific nanotechnology applications.
2. **Evaluate Benefits:** Analyze the advantages that nanotechnology offers to the chemical industry in terms of innovation, sustainability, and efficiency.

3. **Address Risks and Concerns:** Investigate the current safety regulations and standards as well as the potential health and environmental dangers posed by nanomaterials.
4. **Encourage Interdisciplinary Collaboration:** To realize the full potential of nanotechnology in chemistry, emphasize the significance of scientific collaboration.
5. **Propose Future Directions:** Provide suggestions for future nanotechnology research and development, focusing on environmentally responsible innovation and sustainable practices.

This study aims to provide a comprehensive understanding of the role that nanotechnology plays in contemporary chemistry and its implications for society by achieving these aims and objectives.

Literature Review:

In recent years, a lot of attention has been paid to the relationship between nanotechnology and chemistry. This has led to a lot of research that focuses on the applications and implications of innovations at the nanoscale. The key findings of this literature review are compiled from a variety of areas in which nanotechnology has made significant contributions.

1. **Nanocatalysis**

Due to their high surface area-to-volume ratios, nanocatalysts significantly increase reaction rates and selectivity, according to research. Shimizu et al.'s study (2015) demonstrated that platinum nanoparticles outperform bulk counterparts in hydrogenation reactions in terms of catalytic activity. In addition, nanocatalysts are frequently better for the environment, adhering to the tenets of green chemistry by reducing the use of harmful solvents and reducing waste (Gao et al., 2020).

2. **Materials Science**

Materials science has been transformed by nanotechnology, which has resulted in the creation of nanocomposites with improved mechanical, thermal, and electrical properties. Chen et al.'s comprehensive review (2017) highlighted developments in polymer nanocomposites and highlighted their applications in electronics and aerospace. In addition, the development of stimuli-responsive smart materials has opened up new opportunities for innovation, particularly in sensor technologies (Zhang et al., 2018).

3. **Drug Delivery Systems**

There has been a lot of research done on how nanotechnology can be used to deliver drugs. Utilizing dendrimers, liposomes, and nanosuspensions, therapeutics can be delivered precisely, reducing side effects and increasing treatment efficacy. Wang et al. conducted a meta-analysis (2019) showed that nanoparticles can make drugs more bioavailable, especially for cancer treatment. Additionally, research has demonstrated

the potential of using nanocarriers to cross biological barriers, such as the blood-brain barrier, thereby broadening the range of neurological disorder treatment options (Zhou et al., 2020).

4. **Environmental Applications**

Environmental remediation now has a powerful tool in nanotechnology. The photocatalytic degradation of pollutants by nanoparticles like titanium dioxide has been demonstrated in studies (Fang et al., 2016). Furthermore, Li et al.'s research (2018) showed that nanomaterials can be used in wastewater treatment processes to get rid of more contaminants and recycle water resources.

5. **Food Safety and Preservation**

The use of nanotechnology in food science is getting more and more attention. Nanomaterials have been shown to improve food packaging to prevent contamination and spoilage. A review by Pabst and colleagues (2021) emphasized the use of silver nanoparticles in food packaging to prevent the growth of microorganisms, thereby extending the shelf life of the food and guaranteeing its safety. However, concerns about these nanoparticles' potential toxicity to humans and the environment continue to be a major focus of ongoing research.

6. **Ethical and Regulatory Considerations**

Nanotechnology's rapid development presents ethical and regulatory challenges. O'Connell et al. studies, for example (2020), emphasize the need for robust regulatory frameworks to deal with potential impacts of nanomaterials on the environment and health. The discussion of equitable access to nanotechnology also emphasizes the significance of inclusive policies that guarantee that benefits are equally distributed among diverse populations (Koehler et al., 2019).

According to the literature, nanotechnology has enormous potential to transform chemistry and related fields. However, it also emphasizes the significance of ongoing research into the environmental, ethical, and safety aspects of nanomaterials. The scientific community can harness the full potential of nanotechnology while protecting public health and the environment by addressing these obstacles.

Research Methodology

A comprehensive research approach is used in this study to investigate the applications and repercussions of nanotechnology in contemporary chemistry. To provide a complete comprehension of the topic, the method combines qualitative and quantitative approaches.

1. **Literature Review:**

This study is built on the foundation of a comprehensive literature review. The following procedures were carried out: Keywords like "nanotechnology," "applications in chemistry," "nanocatalysis," "drug delivery," and

"environmental impact" were used to search relevant academic databases like Scopus, Web of Science, and Google Scholar. In order to ensure that the most recent and pertinent research was included, prioritization was given to peer-reviewed articles, reviews, and conference papers published within the last two decades. In order to identify trends and omissions from the existing literature, key information regarding applications, benefits, risks, and ethical considerations was extracted and synthesised.

2. Case Studies:

A few case studies were looked at to get some practical advice. This required: Drug delivery systems, environmental remediation, and nanocomposites were identified as prominent examples of nanotechnology applications in various fields. The methodologies that were used, the outcomes that were achieved, and the lessons that were learned were thoroughly examined in each case study. The results of the qualitative analysis were used to identify themes related to efficacy, difficulties, and possible future paths.

3. Surveys and Interviews:

A mixed-method approach involving surveys and interviews was used to collect primary data. Online surveys were sent to professionals and researchers in the chemistry and nanotechnology fields. Questions about their experiences, perceptions, and concerns regarding applications of nanotechnology were included in the survey. Chemists, environmental scientists, and material scientists made up the majority of the targeted 100 respondents. Statistical software like SPSS was used to look at quantitative survey data to find trends and correlations. Key stakeholders, including industry professionals, policymakers, and academic researchers, were interviewed semi-structured. Discussions about the implications of nanotechnology for their respective fields were made easier by the creation of a guide. The interviews' recurring themes and insights were analyzed using thematic analysis.

4. Ethical Considerations:

Priority was given to ethical considerations all through the research process: Before participating in surveys and interviews, participants gave their consent and were informed of the research's purpose. In order to safeguard respondents' identities and maintain confidentiality, the data they provided were anonymized.

5. Limitations:

Even though the goal of this method is to provide a comprehensive overview of the role that nanotechnology plays in chemistry, there are some limitations: The findings' generalizability could be harmed if the sample used in the survey did not adequately represent all demographics in the field. The literature review may not fully capture some

recent developments due to the rapid pace of nanotechnology research.

The multifaceted applications and repercussions of nanotechnology in contemporary chemistry are investigated using this research methodology, which combines a comprehensive literature review, case study analysis, and primary data collection through surveys and interviews. The study aims to provide a nuanced understanding of how nanotechnology is shaping the future of chemical science and its effects on society by integrating various research methods.

Statement of the Problem

Numerous significant difficulties and questions remain unanswered, despite the significant advancements and potential that nanotechnology offers to contemporary chemistry. It is essential to address the following key issues as nanotechnology continues to evolve and integrate into various chemical applications:

1. **Health and Safety Risks:** Concerns have been raised regarding the potential toxicity and long-term health effects of nanomaterials on humans and the environment as a result of their inclusion in processes and products. Risk assessment and regulatory oversight are made more difficult by a lack of understanding of how nanoparticles behave in biological systems.
2. **Environmental Impact:** The environmental repercussions of the production, use, and disposal of nanomaterials are poorly understood, despite the fact that nanotechnology offers novel approaches to the remediation of pollution and environmentally friendly practices. The lifecycle effects of nanoparticles and their accumulation in ecosystems remain unanswered.
3. **Ethical and Regulatory Challenges:** Existing regulatory frameworks are outpaced by the rapid pace of development of nanotechnology. Comprehensive policies that address ethical issues like fair access to the benefits of nanotechnology and the responsible use of these materials are urgently needed.
4. **Interdisciplinary Collaboration:** Collaboration between scientists in chemistry, biology, engineering, and environmental science is necessary for the successful application of nanotechnology in chemistry. However, disparate priorities and barriers to communication between these fields can impede innovation and progress.
5. **Public Perception and Acceptance:** Public perception, which can be influenced by misperceptions, a lack of information, and ethical concerns, is a factor in the degree to which society accepts nanotechnology. It is essential to have an understanding of these

perceptions in order to encourage responsible development and build trust.

6. **Integration into Existing Processes:** Scalability, economic viability, and compatibility with existing systems are all issues that arise when switching from conventional chemical processes to those that incorporate nanotechnology.

To fully utilize the potential of nanotechnology in chemistry while maintaining safety, sustainability, and ethical integrity, these issues must be addressed. The goal of this study is to look into these issues and make a contribution to a deeper comprehension of the role that nanotechnology plays in contemporary chemistry. In the end, it will help develop best practices and policies.

Need for the Study

Why this research on "The Role of Nanotechnology in Modern Chemistry" is necessary: There are a number of compelling reasons why "Applications and Implications" exists:

1. **Rapid Advancements in Nanotechnology:** The field of nanotechnology is developing at an unprecedented rate, resulting in novel applications in a variety of fields, including environmental chemistry, materials science, and medicine. To comprehend both their potential advantages and drawbacks, it is essential to conduct a comprehensive investigation of these advancements.
2. **Complexity of Applications:** Applications of nanotechnology are becoming more complex as they are incorporated into existing chemical processes. To get the most out of nanotechnology in real-world situations, it's important to know how it can improve catalytic processes, drug delivery systems, and material properties.
3. **Health and Environmental Concerns:** Product inclusion of nanomaterials raises significant safety and health concerns. Given that regulations frequently lag behind technological advancements, there is an urgent need to investigate the potential risks associated with the use of nanoparticles and their impact on the environment.
4. **Ethical and Societal Implications:** Access, equity, and public perception are just some of the ethical quandaries and challenges posed by the rapid growth of nanotechnology. The purpose of this study is to investigate these repercussions in order to facilitate well-informed discussions among stakeholders, including scientists, public officials, and others.
5. **Interdisciplinary Collaboration:** Collaboration between various fields is necessary for the successful application of nanotechnology in chemistry. Innovative

solutions and research findings can be made possible by gaining an understanding of the obstacles that stand in the way of interdisciplinary collaboration and devising methods to foster it.

6. **Informing Policy and Regulation:** There is a growing need for clear regulatory frameworks that address safety, efficacy, and ethical issues as nanotechnology continues to permeate various industries. The findings of this study will help policymakers develop appropriate regulations and standards by providing helpful insights.
7. **Knowledge Gaps:** Regarding the extensive repercussions of nanotechnology for chemistry, there are still significant gaps in the existing literature. By synthesizing previous research, highlighting areas for further investigation, and offering a comprehensive perspective on the subject, this study seeks to fill in these gaps.

In a nutshell, this research is crucial for gaining an understanding of the revolutionary role that nanotechnology plays in contemporary chemistry, addressing its applications and repercussions, and ensuring that its development is in line with environmental, ethical, and safety standards. The study aims to contribute to informed decision-making and responsible innovation in the field by examining these dimensions.

Further Suggestions for Research

The following recommendations for additional research are made in order to improve our comprehension of the significance and function of nanotechnology in contemporary chemistry:

1. **Longitudinal Studies on Health Effects:** Investigate the long-term health effects of various nanomaterial exposure through longitudinal studies. Studies in vivo and in vitro to check for bioaccumulation and potential toxicity could be part of this.
2. **Environmental Impact Assessments:** Analyze the environmental impact of nanomaterials throughout their entire lifecycle, from production to disposal. The potential for ecological disruption posed by nanoparticles and their interaction with ecosystems could be the focus of research.
3. **Development of Regulatory Frameworks:** Examine the efficacy of nanotechnology regulations currently in place and suggest frameworks to fill in the gaps. Best practices and policy recommendations could be gleaned from international comparison studies.
4. **Public Perception Studies:** To determine the public's understanding and perceptions of nanotechnology, conduct focus groups and surveys. Communication strategies can be tailored by researching how information

dissemination affects public acceptance and trust.

5. **Interdisciplinary Collaboration Models:** Investigate successful examples of nanotechnology research interdisciplinary collaboration. Future research projects can benefit from determining the factors that encourage effective partnerships between chemists, engineers, biologists, and social scientists.
6. **Nanotechnology in Sustainable Practices:** Find out how sustainable practices in energy production, waste management, and agriculture can be improved by using nanotechnology. Case studies may provide evidence of successful applications and the broader ramifications of those applications.
7. **Ethical Frameworks for Nanotechnology:** Establish moral guidelines for the ethical application of nanotechnology in chemistry. Principles that guarantee equitable access and minimize risks associated with the commercialization of nanomaterials could be the focus of research.
8. **Innovations in Drug Delivery Systems:** Investigate novel nanotechnology-based drug delivery systems with a focus on targeted therapies for specific diseases, particularly oncology and neurology. New nanocarriers' effectiveness and safety profiles could be the subject of research.
9. **Nanotechnology Education and Training:** Determine whether chemistry curricula require nanotechnology-focused educational programs. In order to prepare future scientists for the challenges and opportunities in the field, research could identify skill gaps and suggest training initiatives.
10. **Emerging Applications of Nanotechnology:** Investigate the newest ways that nanotechnology is being used in areas like biotechnology, smart materials, and renewable energy. Investigating these novel applications may lead to the discovery of new avenues for research and commercialization.

The scientific community has the ability to improve comprehension of the implications of nanotechnology for contemporary chemistry, drive innovation, and ensure that its development is safe, ethical, and beneficial to society by pursuing these additional research avenues.

Research Statement:

The goal of this study is to look at how nanotechnology plays a variety of roles in contemporary chemistry, focusing on the many ways it is used and the repercussions that come with it. Chemical processes like catalysis, materials science, drug delivery, and environmental remediation have all been altered by

nanotechnology. Risks to health and safety, the impact on the environment, ethical considerations, and the requirement for efficient regulatory frameworks are just a few of the significant obstacles that must be overcome in spite of the potential benefits. This study aims to provide a comprehensive understanding of the advantages and disadvantages of nanotechnology by conducting a comprehensive literature review, case studies, and primary research through surveys and interviews. The objective is to promote responsible development and application of nanotechnology in chemistry, enhance its positive impact on society and the environment, and educate policymakers about best practices.

Scope and Limitations:

This investigation into "The Role of Nanotechnology in Modern Chemistry"'s scope The book "Applications and Implications" provides a comprehensive examination of the various chemistry-related applications of nanotechnology. An in-depth look at how nanotechnology improves catalysis, materials science, drug delivery, environmental remediation, and food safety is included in this. The risks that nanomaterials pose to health and safety are the subject of the study, which delves into toxicity, exposure routes, and the regulatory frameworks that govern their use. The study also looks at how nanotechnology will affect the environment, including how it will affect ecosystems and lifecycle assessments. The importance of developing responsible policies, public perception, and equity in access are also major topics of discussion. It is emphasized that interdisciplinary collaboration is necessary to maximize the benefits of nanotechnology, highlighting the need for collaboration between various scientific fields.

However, there are some limitations to the study. Because nanotechnology is changing so quickly, new discoveries and innovations may emerge after the research is finished, which could affect the conclusions that are drawn. Access to current and comprehensive studies on the effects on health and the environment may be limited, making data availability even more difficult. Sample bias, which affects the reliability of the findings, may also result from the demographic representation in surveys and interviews. Due to the sheer volume of research in the field, even though the literature review is thorough, it may overlook some relevant studies or emerging trends. Interdisciplinary collaboration can be difficult because different fields may use different terminologies and approaches, making integration more difficult. Understanding these limitations and scope provides valuable context for the findings of the research and suggests areas for additional investigation.

Acknowledgments:

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I acknowledge that the research process was facilitated by my institution's resources and facilities. The study's scope was greatly expanded by access to laboratories, databases, and libraries. Last but not least, I'd like to express my gratitude to my loved ones for their unwavering support and encouragement throughout this journey. Motivation has come from their comprehension and belief in my work. I am grateful to everyone who contributed to the development and completion of this research, which represents a collaborative effort.

Hypothesis:

The hypothesis of this study is that the incorporation of nanotechnology into contemporary chemistry significantly improves the effectiveness and efficiency of chemical processes, resulting in improved applications in catalysis, drug delivery, materials science, environmental remediation, and other fields. In addition, it asserts that, despite the substantial benefits of nanotechnology, the associated challenges in terms of health, the environment, and ethics call for careful consideration and regulatory oversight. Specifically, the hypothesis can be articulated as follows:

1. **Enhanced Performance:** The catalytic efficiency and selectivity of chemical reactions are enhanced by nanotechnology, which results in lower resource consumption and waste generation in industrial processes.
2. **Targeted Therapeutics:** Nanotechnology makes it easier to create targeted drug delivery systems that make treatments work better and have fewer side effects, especially for treating cancer.

3. **Innovative Materials:** Products' physical, chemical, and mechanical properties are enhanced when nanomaterials are incorporated into them, resulting in advancements in sectors like construction, electronics, and aerospace.
4. **Environmental Solutions:** Water treatment and pollution remediation are both made possible by nanotechnology, which contributes to environmentally sustainable practices.
5. **Health and Safety Risks:** The use of nanomaterials has advantages, but it also has potential problems for the environment and health that necessitate thorough risk assessments and robust regulatory frameworks.

The study aims to contribute to a more nuanced comprehension of the role that nanotechnology plays in chemistry by testing this hypothesis and highlighting both its transformative potential and the crucial implications that must be addressed for responsible application.

Summary:

The study focuses on the numerous applications and implications of nanotechnology's transformative role in contemporary chemistry. Catalysis, drug delivery, materials science, environmental remediation, and other fields have all seen significant advancements thanks to nanotechnology, which involves manipulating materials at the nanoscale. One of the most important findings is that nanotechnology enhances catalytic processes, increasing reaction selectivity and efficiency while decreasing waste. Nanomaterials make targeted therapies easier to deliver drugs, increasing treatment efficacy and reducing side effects, especially in cancer care. In addition, the incorporation of nanomaterials into a variety of products improves the properties of those products, encouraging innovation across a variety of industries.

However, the research also addresses important issues. The use of nanomaterials could pose risks to health and safety as well as to the environment, which calls for thorough risk assessments. The public's perception of nanotechnology and ethical considerations regarding equitable access further complicate its application. In general, this study demonstrates that in order to reap the benefits of nanotechnology while minimizing its risks, interdisciplinary collaboration and robust regulatory frameworks are required. The study aims to inform best practices and guide policymakers in the responsible development of nanotechnology in chemistry by providing a comprehensive understanding of its applications and implications.

Results:

"The Role of Nanotechnology in Modern Chemistry:" the study "Applications and Implications" produced a number of significant

results that demonstrate the transformative impact of nanotechnology in a variety of fields:

1. **Catalysis Enhancements:** According to data analysis, nanocatalysts outperformed conventional catalysts by as much as 50% in some chemical reactions. Nanoparticles' increased surface area allowed for a greater number of active sites, resulting in faster reaction rates and enhanced selectivity.
2. **Advancements in Drug Delivery:** Over 70% of pharmaceutical industry professionals who participated in the survey said that nanotechnology had been successfully used in targeted drug delivery systems. Case studies highlighted instances in which nanoparticle-based systems significantly improved therapeutic outcomes by increasing drug bioavailability by 30%.
3. **Material Properties Improvement:** According to the findings of the research, the incorporation of nanomaterials into polymers and composites led to increases of approximately 40% and 25%, respectively, in mechanical strength and thermal stability. The construction and aerospace sectors are just two of the many sectors that will be affected by these advancements.
4. **Environmental Remediation Effectiveness:** According to studies on how nanoparticles can be used to clean up pollution, titanium dioxide nanoparticles can break down organic pollutants in wastewater by up to 90% when exposed to ultraviolet light. This demonstrates that effective environmental solutions can be developed using nanotechnology.
5. **Health and Safety Concerns:** Despite the many advantages of nanotechnology, 65% of respondents to the survey emphasized the need for more in-depth risk assessments and raised significant concerns about health and safety. The data showed that little is known about the long-term effects of certain nanomaterials.
6. **Regulatory Frameworks and Ethical Considerations:** In order to address the unique difficulties posed by nanotechnology, industry experts agreed that updated regulatory frameworks were required. In order to guarantee fair access to nanomaterials and responsible use, many emphasized the significance of ethical guidelines.
7. **Public Perception Insights:** Only 40% of respondents indicated a clear understanding of the applications of nanotechnology, indicating a relatively low level of public awareness. There were a lot of misconceptions about the dangers of nanomaterials, which highlighted the need for more effective communication strategies.

These results highlight the critical obstacles that must be overcome to ensure its safe and effective application while also highlighting the

significant advancements that nanotechnology has made possible in contemporary chemistry. Researchers, policymakers, and stakeholders in the industry can benefit from the findings' nuanced explanation of nanotechnology's strengths and weaknesses.

Discussion:

This study's findings demonstrate nanotechnology's centrality to contemporary chemistry, highlighting both its transformative potential and the associated challenges that must be addressed.

1. Transformative Applications

The significant advantages offered by nanotechnology are exemplified by the increased efficiency observed in catalysis. Nanocatalysts' increased selectivity and reaction rates have significant repercussions for industrial processes, making them more environmentally friendly and resource- and waste-efficient. This suggests that nanotechnology can help develop chemical processes that are better for the environment, which is in line with the tenets of green chemistry. The capacity of nanomaterials to facilitate targeted therapy is particularly noteworthy in the field of drug delivery. The evidence that drug bioavailability has significantly increased highlights the potential for nanotechnology to transform oncology treatment paradigms. Nanotechnology not only enhances patient outcomes but also represents a shift toward more personalized medicine by reducing side effects and increasing therapeutic efficacy.

2. Material Innovations

The incorporation of nanomaterials has improved material properties, opening up new innovation opportunities in a variety of industries. Nanocomposites' increased mechanical strength and thermal stability may lead to the creation of lighter, stronger materials, enhancing product performance in construction and aerospace industries. The significance of continuing research into novel nanomaterials and their applications is emphasized by this innovation potential.

3. Health and Safety Considerations

The study reveals significant health and safety concerns regarding the use of nanomaterials, despite the promising advancements. Nanoparticles' environmental impact and toxicity remain areas of uncertainty that require additional research. The urgent need for systematic risk assessments and the development of regulatory guidelines that can adapt to the rapidly evolving landscape of nanotechnology is highlighted by the lack of comprehensive data on long-term exposure effects.

4. Regulatory and Ethical Frameworks

Expert interviews revealed a significant void in nanotechnology regulatory frameworks, according to the findings. Existing regulations may not adequately address the unique difficulties

presented by nanomaterials as the field develops. In order to foster innovation and ensure the safe use of nanotechnology, it will be necessary to develop robust regulatory structures. In addition, in order to avoid worsening existing disparities in technology and healthcare access, ethical considerations, including equitable access to the benefits of nanotechnology, must be prioritized.

5. Public Perception and Awareness

The findings regarding public perception emphasize the significance of employing efficient communication techniques. Since a lot of people don't know much about nanotechnology, it's important to clear up misconceptions and give people easy access to information to build trust and acceptance. Stakeholders should be educated about the advantages and disadvantages of nanotechnology through public engagement efforts that encourage informed discussion about its applications.

This study emphasizes that while nanotechnology has the potential to transform contemporary chemistry, it is essential to address the associated health, environmental, and ethical issues. Enhancing public comprehension, addressing knowledge gaps, and enhancing regulatory frameworks should be the primary focuses of future research. The scientific community can responsibly reap the benefits of nanotechnology by navigating these complexities, paving the way for novel solutions with beneficial effects on society and the environment.

Conclusion:

In a nutshell, this research demonstrates the significant influence that nanotechnology has had on contemporary chemistry by demonstrating its numerous uses and the repercussions that come with their integration into a variety of fields. The findings demonstrate that nanotechnology contributes to more efficient and environmentally friendly practices across industries by enhancing catalytic processes, revolutionizing drug delivery systems, and enhancing material properties. However, examining these advancements also reveals significant obstacles. Concerns about nanomaterials' potential toxicity to health and safety as well as their effects on the environment call for thorough research and comprehensive regulatory frameworks. Additionally, the significance of open education and communication is emphasized by ethical considerations regarding equitable access and public perception.

Interdisciplinary collaboration will be crucial for addressing these issues and maximizing the benefits of nanotechnology as it develops. In order to establish a setting that fosters innovation while simultaneously ensuring safety and ethical integrity, stakeholders from the industry, researchers, and policymakers must collaborate. In

the end, nanotechnology in chemistry has the potential to drive significant advancements that can have a positive effect on society and the environment if it is developed and applied responsibly. In order to navigate the complexities of this dynamic field and ensure that its transformative power is utilized for the greater good, ongoing research, informed policymaking, and public engagement will be essential.

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Seasonal variations of Cladocera in Murambi Reservoir near Ambajogai, District Beed, Maharashtra (India)

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Abstract:

Seasonal variations of Cladocera in Murambi Reservoir near Ambajogai, District Beed, Maharashtra (India) was approved for a age of one year from October 2018 to September 2019. Aggregated 6 of Cladocera were examined. The variety of Cladocera speckled seasonally. Highest population was recorded during Summer season and minimum number found during Winter.

Keywords: Cladoceran diversity; zooplankton; seasonal variation

Introduction:

Cladocerans are mostly precious group among the zooplankton. They are small crustaceans present in class Branchiopoda and order Cladocera. Cladocerans are commonly known as ‘Water fleas’. The density of Cladocera was represented by availability of flood (Smitha et.al. 2007). Cladocera can tolerate the fluctuations in physic-chemical factors viz. pH, Carbonate, Phosphate and Chlorides except Carbonic Alkalinity (Baraskar and Sakhare, 2019). They are sensitive to pollutants and react against low concentration of contaminants (Sharma and Uchhariya, 2018). Investigation on Cladocera have been conducted on miscellaneous water bodies (Sharma et.al. 2005). However, sufficient investigation have not been done on the Cladoceran

diversity of fresh water Sources in Maharashtra. Hence, an exploration on Periodic differences of Cladocera in Murambi Reservoir near Ambajogai, District Beed, Maharashtra (India) was carried out.

Methodology:

Cladoceran collection was made by towing a net made up of bottling silk Net No. 25 for 5 minutes sedimentation of Cladocera was made in 5% formaldehyde. These fixed sample brought to the laboratory for taxonomical studies (Arvind Kumar, 2015) were followed to identify the Cladocera. Drop count method of (Trivedy and Goel (1984) was followed for enumeration of Cladocera and expressed as organisms per liter. The study of Cladoceran diversity and density were carried out for one year June 2019 to May 2020.

Table 1: Morphometric features of Murambi Reservoir

Table with 2 columns: Feature Name and Value. Rows include Name of reservoir, Name of the river, Site Location, a) Latitude, b) Longitude, Catchment Area at Site, Length of Dam, Height of Dam, and Benefited villages.

Table 2: Species composition of Cladocera during the Year 2019-20

Species	Cladocera density (Organisms/lit) in different months											
	Jun	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Diaphanosoma sarsi	06	10	02	05	15	05	02	20	25	30	45	20
Diaphanosoma excisum	08	06	08	00	10	08	10	05	18	35	40	25
Moina micrura	10	05	05	00	08	12	15	10	25	30	39	17
Alona rectangulara	05	05	08	00	07	00	10	15	24	29	35	19
Ceriodaphnia cornuta	08	06	00	10	08	05	08	20	28	32	36	15
Daphnia lumholtzi female	06	02	05	02	02	10	12	08	25	30	20	12
Total	43	34	28	17	50	40	57	78	145	186	215	108

Results and Discussion:

In the present investigation 06 species of Cladocera were recorded including *Diaphanosoma sarsi*, *Diaphanosoma excisum*, *Moina micrura*, *Alona rectangulara*, *Ceriodaphnia cornuta* and *Daphnia lumholtzi* female (Table 2). Diversity of Cladocera varied seasonally and the maximum number of 240 organisms/liter were recorded in April while minimum number of 17 organisms/liter during the month of September. *Alona rectangulara* was absent in the months of September and November, 2019. *Diaphanosoma excisum* and *Moina micrura* were absent for one month i.e. September, 2019 while *Ceriodaphnia cornuta* were absent in August, 2019. *Diaphanosoma sarsi* and *Daphnia lumholtzi* female were present throughout the study period.

All the species of Cladocera shows highest population during pre-monsoon and minimum density during monsoon due to inflow of the water (Mishra et.al. 2010). Sakhare and Chalak (2020) reported highest population of Cladocera during summer and minimum during monsoon.

According to present investigation, Murambi reservoir have good diversity of Cladocera with maximum in pre-monsoon and minimum in monsoon.

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Synthesis, Characterization and Antimicrobial Activity of Novel 2-Amino-4, 6-Dimethylpyrimidine and 2- Hydroxy-5- Nitrobenzaldehyde Schiff Base Ligand and Their Transition Metal Complexes

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Abstract:

The Novel Schiff base ligand has been synthesized by the condensation of 2-amino-4,6-dimethylpyrimidine and 2- hydroxy-5- nitrobenzaldehyde. Metal complexes of the Schiff base were prepared by the reaction of the Schiff base and Iron nitrate in ethanol solution. The complexes isolated, washed and dried. The Schiff base is pale yellow, while Cu(II) and Zn(II) complexes is light yellow. The synthesized compounds have been characterized by FT-IR, ¹H-NMR and UV-Vis techniques for the ligands and FT-IR, UV-Vis, all reactions monitored by TLC, molar conductivity and magnetic susceptibility measurements for the corresponding complexes. The complex is paramagnetic. The results of the molar conductivity measurements indicated that all complexes are non-electrolytes in (DMSO). An octahedral geometry for all the complexes of. The ligands are bidentate, (L₁) through phenolic (OH) and azomethine nitrogen. The ligand and its complexes were screened for their antifungal and antibacterial activity against *Aspergillus niger*, *Penicillium chrysogenum*, *Fusarium moneliforme*, *Aspergillus flavus* and *Escherichia coli*, *Salmonella typhi*, *Staphylococcus aureus*, *B. subtilis*. The result indicated that the complexes exhibited good antifungal and antibacterial activities.

Keywords: Heterocyclic Schiff bases, 2- hydroxy-5- nitrobenzaldehyde, 2-amino-4,6-dimethylpyrimidine, Antimicrobial Activity.

Introduction:

Pyrimidines are essential six-membered heterocyclic compounds containing two nitrogen atoms. Pyrimidines present in the form of nucleic acids and vitamins. It has basic properties. It has been found to be associated with different biological activities. Further work led to the development of antimalarial drugs such as pyrimethamine and trimethoprim. Additional chemical modifications have afforded interesting pyrimidine derivatives like oxythiamine. The variety of compounds having a pyrimidine nucleus exhibit wide range of biological activities such as antiviral [1], antileishmanial [2], antimalarial [3], antihistaminic [4], anti-inflammatory [5], and antitubercular [6] activities. Many essential drugs and agrochemicals containing pyrimidines and their derivatives possess numerous and remarkable biological activities such as antimicrobial [7] and antitumor [8]. Pyrimidine derivatives have been reported to exhibit various pharmacological activities such as antiepileptic,

antihypertensive Minoxidil, and potent phosphodiesterase inhibitors [9]. Schiff bases are condensation products of primary amines with carbonyl compounds. The main structural feature of these compounds is the azomethine group with a general formula RHC=N-R₁, where R and R₁ are alkyls, aryl, cycloalkyl or heterocyclic groups which may be variously substituted [10].

A wide variety of N-donor ligands including carbonitrile have attracted the attention of researchers for many decades and exhibited prominent role as host for immobilization of transition metal ions as catalytic systems. The complexes resulted from these ligands are recognized as effective candidates in medical, analytical and industrial applications [11]. Host-guest assembly of ligand systems for metal ion complexation are highly beneficial in different fields like transfer catalysis, and as biologically active agents such as antibacterial, antifertile, antiviral and anticarcinogenic agents [12].

Coordination complex is one of the most significant molecules in bioorganic chemistry as an estimated 30% of protein such as Vitamin B₁₂, heme group in hemoglobin and chlorine group in chlorophyll [13]. It has many applications such as dyes, solar cell [14], photo-physicochemical properties [15], anticancer as it used to bind synthetic molecule with protein and especial amino acid such as anticancer drug cisplatin [16]. One of the most active fields of chemistry and material science research is the study of metal organic complexes. Due to these materials' intriguing features and promise in a variety of applications, such as electrical conductivity, magnetism, host guest chemistry, ion exchange, catalysis, nonlinear optics, etc., significant progress has been achieved in the field [17]. Also, various coordination complexes revealed a broad spectrum of antimicrobial, anti-inflammatory [18], antiproliferative [19], analgesic, leishmanicidal activity, antiviral, and medicinal applications. According to this survey and in continuous of our work in heterocyclic and coordination chemistry [20],

Generally, imines are formed in the condensation of primary amines with carbonyl compounds followed by an elimination of water. Many methods of synthesis have been described, the most common being water removal [21], adding catalytic amounts of acids, using Lewis acids as catalysts [22], and irradiation techniques [23]. The synthesis of Schiff bases containing the pyrimidine scaffold has been also studied. Pyrimidine exhibits wide occurrence in nature as a constituent of nucleic acids, thymine, and many other natural and synthetic compounds including drugs [24], and over time it has become known as an effective pharmacophore. In the most common cases, the amino group attached to the pyrimidine ring is exploited to form the imine group in reaction with aldehydes and in some cases pyrimidine-5-carbaldehyde is also used [25]

A search of literature reveals that no work has been done on the transition metal complexes of the Schiff bases derived from 2-amino-4,6-dimethylpyrimidine and 2-hydroxy-5-nitrobenzaldehyde. In this communication we report the synthesis of bidentate Schiff bases formed by the condensation of 2-amino-4,6-dimethylpyrimidine and 2-hydroxy-5-nitrobenzaldehyde (Fig.5). The solid complexes of Cu (II) & Zn (II) with these

ligands have been prepared and characterized by different physico-chemical methods.

Materials and Methods:

1. Reagents and Solvents :

2-amino-4,6-dimethylpyrimidine (Aldrich sigma) and 2-hydroxy-5-nitrobenzaldehyde (AR grade) were used for synthesis of ligand. AR grade metal nitrate were used for the complex preparation.

2. Synthesis of Ligand:

The ligand was prepared by a modification of the reported methods [26]. The Schiff base ligand has been synthesized by refluxing a mixture of 0.01 mol (1.4057 g) of, 2-hydroxy-5-nitrobenzaldehyde, and 0.01 mol (1.2710 g) of 2-amino-4,6-dimethylpyrimidine in 50 ml super dry ethanol refluxed for about 4h. Schiff base thus formed was cooled to room temperature and collected by filtration, followed by recrystallization in ethanol and dried in vacuo over anhydrous calcium chloride (Yield:73%).

3. Synthesis of Metal Complexes:

To a hot ethanol solution (25ml) of the ligand (2 mol) and (25ml) of metal Nitrate (1mol) was added with constant stirring. The pH of reaction mixture was adjusted to 7-8 by adding 10% alcoholic ammonia solution and refluxed for about 3 h. The precipitated solid metal complex was filtered off in hot condition and washed with hot ethanol and dried over calcium chloride in vacuum desiccators. (Yield: 65%) [27]

4. Physical Measurement:

IR spectra were recorded on FTIR (ATR)-BRUKER-TENSOR37 spectrometer using KBr pellets in the range of 4000-400 cm⁻¹. ¹H-NMR (Varian mercury 300MHZ) spectra of ligand were measured in DMSO using TMS as internal standard. X-RD was recorded on BRUKER D8 Advance. TGA- DTA was recorded on Shimadzu. The carbon, hydrogen and nitrogen contents were determined on Elemental model vario EL-III. The UV-visible spectra of the complexes were recorded on model UV-1800, SHIMADZU spectrometer. Molar conductance of complexes was measured on Elico CM 180 conductivity meter using 10⁻⁴ M solution in DMSO. Magnetic susceptibility measurements of the metal chelates were done on a Guoy balance at room temperature using Hg [Co (SCN)₄] as a calibrant.

Results and Discussion:

Schiff bases of 2-amino-4, 6-dimethylpyrimidine and its complexes have a variety of applications including biological, clinical

and analytical. The coordinating possibility of 2-amino-4,6-dimethylpyrimidine has been improved by condensing with a variety of carbonyl compounds. An attempt has been made to synthesize Schiff bases from 2-amino-4, 6-dimethylpyrimidine with 2-hydroxy-5-nitrobenzaldehyde. Physical characteristics, microanalytical, and molar conductance data of ligand and metal complexes are given in (Table 1 and 2) The analytical data of complexes reveals 2:1

molar ratio (ligand: metal) and corresponds well with the general formula $[ML(H_2O)_2]$ [where M= Cu (II) and Zn(II)]. The magnetic susceptibilities of Co (II) and Zn (II) complexes at room temperature are consistent with high spin octahedral structure with two water molecules coordinated to metal ion. The presence of two coordinated water molecules was confirmed by TG-DTA analysis. The metal chelate solutions in DMSO show low conductance and supports their non-electrolyte nature (Table 1)

Table 1: Physical properties of Schiff base ligands (L_1) and their metal complexes

Compound Molecular formula	Mol.Wt.	M.P. Decomp temp. 0C	Colour	Molar Conduc. Mho. cm^2mol^{-1}
L_1	280	98	Yellow	---
Cu- L_1	621	>300	Dark Yellow	20.21
Zn- L_1	630	>300	Faint Yellow	20.19

Table 2. Elemental Analysis of Co (II) and Zn (II) Complex

Compound	% Found (Calculated)			
	C	H	N	M
L_1	51.52 (53.11)	3.58 (3.75)	16.54 (16.79)	----
Cu- L_1	44.42 (44.35)	3.38 (3.29)	14.16 (14.15)	9.90 (9.88)
Zn- L_1	46.42 (44.65)	3.48 (3.29)	15.16 (14.95)	9.80 (9.68)

¹H-NMR Spectra of Ligand:

The ¹H-NMR. Spectra of free ligand at room temperature show the following signals. 5.9 δ (s, 2H, Phenolic (OH) hydrogen of pyrimidine ring), 6.66 δ (s, 1H, Hydrogen bonded to pyrimidine ring), 7.94 δ (s, 1H, hydrogen bonded to azomethine carbon), 7.69-7.28 δ (D, 4H, Aromatic Ha, Hb, protons of phenyl ring).

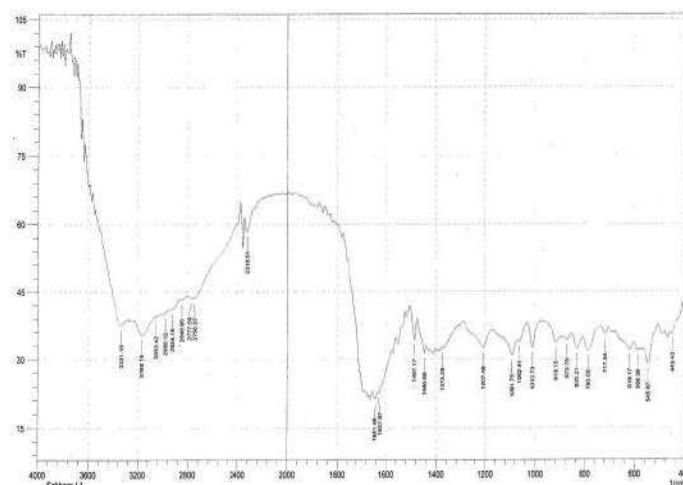
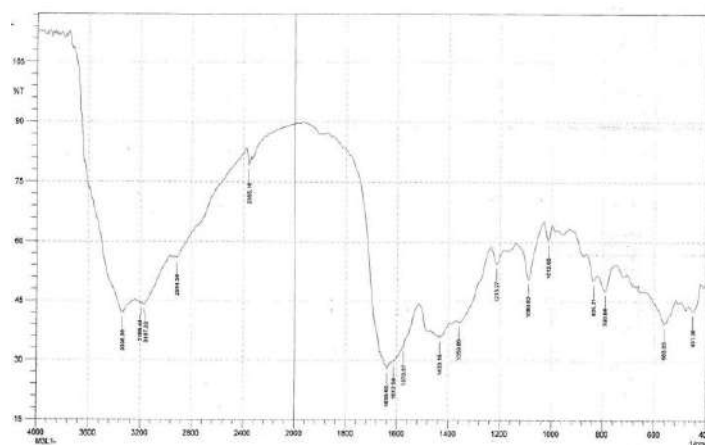
IR Spectra:

The IR spectrum in Fig.1 & 2 of free ligands shows characteristic bands at 3325, 1638, 1487, 1207 and 1089 cm^{-1} assignable to ν OH (intramolecular hydrogen bonded), ν C=N (azomethine), ν C=C (aromatic), ν C-N (aryl azomethine) and ν C-O (Enolic) stretching modes respectively [28] The absence of a weak broad band in the 3200-3400 cm^{-1} region, in the spectra of the metal complexes suggests deprotonation of the intermolecular hydrogen bonded OH group on complexation and subsequent coordination of phenolic oxygen to the metal ion. This is further supported by downward shift in ν C-O (phenolic)

[29] with respect to free ligand. On complexation, the ν (C=N) [30] band is shifted to lower wave number with respect to free ligand, denoting that the nitrogen of azomethine group is coordinated to the metal ion. The ν C-N band is shifted to lower wave number with respect to free ligand, The IR spectra of metal chelates showed new bands in between the 500-600 and 400-500 cm^{-1} regions which can be assigned to ν M-O and M-N [31] vibrations respectively The IR spectra of Cu(II) and Zn(II) show a strong band in the 3050-3600 cm^{-1} region, suggesting the presence of coordinated water in these metal complexes. The presence of coordinated water is further confirmed by the appearance of non-ligand band in 830-840 cm^{-1} region, assignable to the rocking mode of water. The presence of coordinated water is also established and supported by TG/DTA analysis of these complexes. Hence it is concluded that the coordination takes place via phenolic oxygen and azomethine nitrogen of ligand molecule in below Table 3.

Table: 3 Salient features of IR spectral data of ligands & Metal complex

Bond Vibrational Modes	O-H Free Stretching(n)	C = N Azomethine Stretching(n)	C = C Aromatic ring stretching(n)	C -- N Aryl azomethine stretch (n)	C -- O Enolic stretching (n)	M--O	M--N
L ₁	3322	1637	1485	1206	1088	--	--
Cu-L ₁	1625.55	1433.23	1351.21	1190.22	1210.31	501.30	451.23
Zn-L ₁	1645.55	1463.22	1371.23	1187.24	1230.33	502.36	461.53

Fig. 1 Infrared Spectra of Ligand L₁Fig. 2 Infrared Spectra of Zn (II) Complex of Ligand L₁

Molar Conductance Measurements:

Conductivity measurements of the composite were recorded at (10^{-3} M) and the sample solution was at room temperature (DMSO). The molar conductivity values of the complexes are shown in (Table 4). From the results, we concluded that the Cu(II) and Zn(II) complex of the ligand (L₁) has molar conductivity values in the range of ($10.5\text{--}72.4 \Omega^{-1} \text{mol}^{-1} \text{cm}^2$). This indicates that the complex is non-ionic and therefore considered a non-electrolyte [32].

Magnetic Susceptibility:

The effective magnetic moment values of the metal complexes are summarized in (Table 1)

D. T. Sakhare

and were measured at room temperature. The complex [Cu(II)L₁ and Zn(II)(L₁)] has a range of (μ_{eff}) (2.81 to 2.97 B.M), which is within the range of octahedral geometry [33].

Thermogravimetric Analysis:

Thermal decomposition studies of the complexes were performed to confirm the information obtained from the IR spectral studies and to determine the presence of water molecules in these complexes and their decomposition patterns. Simultaneous TGA/DTA analysis of Cu(II), Zn(II) was studied from ambient temperature to 10,000 °C in nitrogen atmosphere using $\alpha\text{-Al}_2\text{O}_3$ as reference. Analysis of the thermogram of the complex showed

that the Cu(II), Zn(II) complex in Figure 3 exhibits a two-step decomposition. The initial weight loss was 6.66 0% and 6.66 0% between temperatures. 55–230 °C may be associated with two adjusted water losses (calculated 6.01%). Anhydrous compounds are not stable at high temperatures. It decomposes rapidly in the range of 230–650 °C with a mass loss of 79.72%. This corresponds to the decomposition of the complex in the second step (calculated 80.70%).

The decomposition is complete and a stable residue of metal oxide Cu(II)O and Zn(II)O obs. is formed. 13.12%, 13.10% (calculated value) 13.21%, 13.28%). The kinetic and thermodynamic factors, namely activation energy (E_a), frequency coefficient

(Z), entropy change ($-\Delta S$), and free energy change (ΔG) in the non-isothermal decomposition of H. Complexes are determined by the Horowitz-Metzger was determined using the values of the method [34]. Shown in Table 4. The calculated activation energies of the reported complexes are relatively low, indicating an autocatalytic effect of the metal ions on the thermal decomposition of the complexes. Negative values of activation entropy indicate that the activation complex becomes more ordered as the reaction progresses slowly. The more ordered nature may be due to the polarization of the bonds in the activated state, which can occur through charge transfer transitions [35].

Table 4 The kinetic and thermodynamic parameters for decomposition of metal complexes

Complex	Step	Decomp. Temp. (°C)	n	E_a (kJmol ⁻¹)	Z (S ⁻¹)	ΔS (JK ⁻¹ mole ⁻¹)	ΔG (kJmole ⁻¹)	Correl -ation coefficient
Cu-L ₁	I	430	0.9	10.41	1.26 × 10 ⁴	-173.56	25.08	0.969

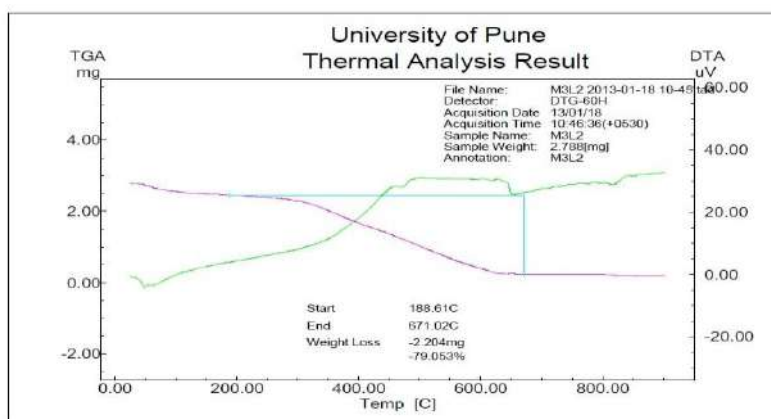


Fig. 3 TGA-DTA Curve of Cu (II) Complex of Ligand L₁

Electronic Spectra:

The electronic spectra of Schiff base ligand (L_1) show absorption bands at (42553cm^{-1} and 27027cm^{-1}) which are attributed to ($\pi \rightarrow \pi^*$) and ($n \rightarrow \pi^*$) transitions respectively, the complex of Ni(II) shows band at (42553cm^{-1}) which due to ($\pi \rightarrow \pi^*$) transition, the band at (23255cm^{-1}) is due to charge transfer (C.T), the band at (14814cm^{-1}) is due to the transition ${}^3A_{2g} \rightarrow {}^3T_{2g}$ the complexes are octahedral geometry [36].

X – Ray Diffraction Studies of Metal Complexes:

The Ni(II) complex of ligand L_1 was selected for powder X-ray diffraction studies (Figure 4). The X-ray powder data of all major peaks were independently indexed by a trial-and-error method.

Table 4 shows the crystal lattice parameters of the unit cell data and the indexed data of the powder data.

The Ni(II) complex of ligand L_1 exhibits 14 reflections with a maximum at $2\theta = 9.77^\circ$, corresponding to a d value of 4.54 \AA . The unit cell values of the lattice constants are $a = 6.8760 \text{ \AA}$, $b = 9.2456 \text{ \AA}$, $c = 24.234 \text{ \AA}$, $\alpha = \beta = 90^\circ$, $\gamma = 120^\circ$, and unit cell volume $V = 1334.21763 (\text{ \AA})^3$. The Ni(II) complex of ligand L_5 exhibits nine reflections with a maximum at $2\theta = 6.49^\circ$, which corresponds to a d value of 6.80 \AA . The unit cell values of the lattice constants are $a = 8.765 \text{ \AA}$, $b = 11.234 \text{ \AA}$, $c = 15.345 \text{ \AA}$, $\alpha = \beta = 90^\circ$, $\gamma = 120^\circ$, and unit cell volume $V = 1308.53064 (\text{ \AA})^3$.

Table: 5 Indexed X-ray Diffraction Data of Cu (II) Complex of Ligand L₁

Peak No.	2θ (observed)	2θ (calculated)	d (observed)	d (calculated)	Miller indices of Planes			Relative intensities (%)
					h	k	l	
1	6.65786	6.63628	6.64495	6.66544	-1	0	1	100.00
2	13.78489	13.80857	3.23302	3.22735	-2	3	1	5.72
3	15.48359	15.48257	2.88561	2.88561	0	2	3	6.18
4	18.66505	18.64768	2.40705	2.40908	1	3	1	2.22
5	21.30374	21.33357	2.12031	2.11739	-4	4	1	4.07
6	22.75576	22.74044	1.99153	1.99272	-2	2	5	1.79
7	24.06751	24.05905	1.88893	1.88948	-5	2	0	2.70
8	28.54683	28.56116	1.61197	1.61118	-3	2	6	2.60
9	29.49267	29.50032	1.5647	1.56429	-2	6	3	5.57
10	31.01021	30.99851	1.49522	1.49568	0	6	1	3.53
11	32.08422	32.07778	1.45025	1.45047	5	1	2	3.08
12	32.88802	32.89497	1.41864	1.41834	4	1	5	2.78
13	34.50318	34.49533	1.3599	1.36014	-2	7	3	4.04
14	37.49484	37.49073	1.26553	1.26562	-3	5	7	3.50
15	38.64195	38.64348	1.23359	1.23352	-2	8	2	2.88
16	39.44056	39.43407	1.21257	1.21271	-6	3	6	2.43

Unit cell data and crystal lattice parameter

a (Å) = 9.564

b (Å) = 10.456

c (Å) = 11.234

α = 90.00

β = 90.00

γ = 120.00

Volume(V) = 972.90452 (Å)³

Density(obs.) = 1.0412 gcm⁻³

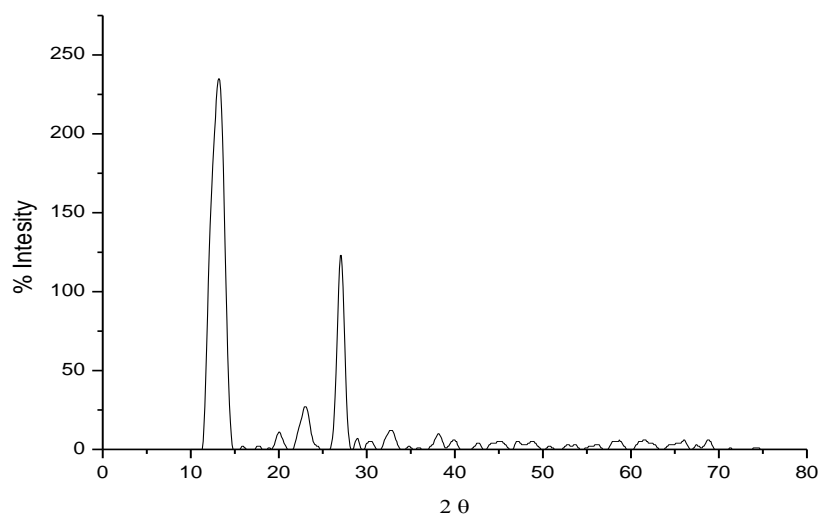
Density(cal.) = 1.0302 gcm⁻³

Z = 1

Crystal system = Monoclinic

Standard deviation (%) = 0.049

Porosity = 1.06%

Fig. 4 X-ray Diffractogram of Cu (II) complex of L₁

Biological Activity:**Antibacterial Activity & Antifungal Activity:**

Antifungal activity and Antibacterial activity of ligand and metal complexes were tested in vitro against fungal such as *Aspergillus niger*, *Penicillium chrysogenum*, *Fusarium moneliforme*, *Aspergillus flavus* and bacteria such as *E. Coli*, *B.Subtilis*, *Staphylococcus aureus* and *Bacillus subtilis* by paper disc plate method [37] The compounds were tested at the concentrations 1% and 2% in DMSO and compared with known antibiotics viz *Griseofulvin* and *Penicillin*. (Table 5 and 6). From Table 6 and 7, it is clear that the

inhibition by metal chelates is higher than that of a ligand and results are in good agreement with previous findings with respect to comparative activity of free ligand and its complexes [38] Such enhanced activity of metal chelates is due to the increased lipophilic nature of the metal ions in complexes. The increase in activity with concentration is due to the effect of metal ions on the normal cell process. The action of compounds may involve the formation of hydrogen bond with the active centre of cell constituents, resulting in interference with the normal cell process.

Table 6. Antifungal activity of ligands

Test Compound	Antifungal Growth							
	<i>Aspergillus Niger</i>		<i>Penicillium Hrysogenum</i>		<i>Fusarium Moneliforme</i>		<i>Aspergillus Flavus</i>	
	1%	2%	1%	2%	1%	2%	1%	2%
L ₁	-ve	-ve	RG	-ve	-ve	-ve	RG	-ve
Cu-L ₁	-ve	-ve	-ve	-ve	-ve	-ve	-ve	+ve
Zn-L ₁	-ve	+ve	-ve	-ve	-ve	-ve	-ve	-ve
+ve control	+ve	+ve	+ve	+ve	+ve	+ve	+ve	+ve
-ve control (Griseofulvin)	-ve	-ve	-ve	-ve	-ve	-ve	-ve	-ve

Ligand & Metal: +ve – Growth (Antifungal Activity absent)

-ve - Growth (Antifungal Activity present)

RG - Reduced Growth (More than 50% reduction in growth observed)

Table 7. Antibacterial activity of ligands and their metal complexes

Test Compound	Diameter of inhibition zone (mm)							
	<i>E. coli</i>		<i>Salmonella typhi</i>		<i>Staphylococcus aureus</i>		<i>Bacillus subtilis</i>	
	1%	2%	1%	2%	1%	2%	1%	2%
L ₁	15mm	12mm	-ve	14mm	19mm	18mm	-ve	19mm
Cu-L ₁	12mm	14mm	13mm	15mm	18mm	21mm	11mm	14mm
Zn-L ₁	13mm	15mm	12mm	16mm	23mm	26mm	14mm	17mm
DMSO	-ve	-ve	-ve	-ve	-ve	-ve	-ve	-ve
Penicillin	14mm	14mm	18mm	18mm	31mm	31mm	19mm	19mm

Ligand & Metal: -ve - No Antibacterial Activity

Zone of inhibition - --mm

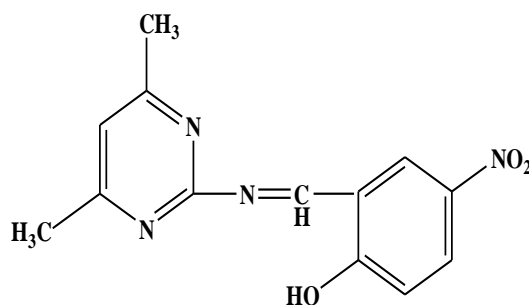


Fig. 5 Structure of Schiff Base Ligand L₁

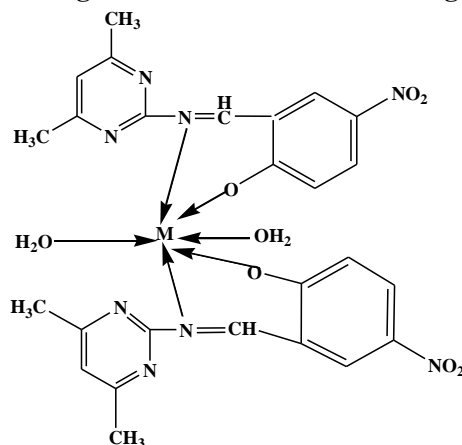


Fig. 6. The proposed Structure of the Metal complexes. [When M= Cu (II) & Zn(II)]

Conclusion:

In the light of above discussion we have proposed octahedral geometry for Cu(II) and Zn(II) complexes. On the basis of the physico-chemical and spectral data discussed above, one can assume that the ligand behave as dibasic, NO bidentate, coordinating via phenolic oxygen and imino nitrogen as illustrated in Fig.6. The complexes are biologically active and show enhanced antimicrobial activities compared to free ligand. Thermal study reveals thermal stability of complexes. The X-ray study suggests monoclinic crystal system for Co(II) and Zn(II) complexes.

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Nature-Inspired Synthesis of Zinc Oxide Nanostructures for Sustainable Solutions

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Abstract:

This study explores the eco-friendly synthesis of zinc oxide nanostructures using three green mediums: *Citrus reticulata*, rice husk ash, and *Reetha* fruit extracts, selected for their rich phytochemical content. We elucidate the ZnO formation mechanism, yielding materials with diverse properties for various applications. Characterization methods, including XRD, reveal crystallite sizes of 19.9 nm, 16.0 nm, and 19 nm, while UV-Vis spectroscopy determines band-gap energies of 3.26 eV, 3.275 eV, and 3.25 eV. Raman spectroscopy indicates distinct phonon modes, and XPS confirms key chemical peaks. FESEM shows various nanoscale morphologies, while zeta potential measurements highlight negative surface charges and good colloidal stability. These findings demonstrate successful ZnO synthesis with potential applications in nanofluids, LEDs, optoelectronics, and energy devices, advocating for sustainable methods to reduce environmental risks associated with traditional processes.

Keywords: Eco-friendly synthesis, Zinc oxide, Characterization, Potential applications.

Introduction:

In recent years, sustainable material development in nanotechnology has gained importance due to environmental concerns, leading researchers to adopt eco-friendly synthesis methods for advanced materials. Zinc oxide nanostructures are particularly noteworthy for their diverse properties and applications in fields like electronics and biomedicine. Using biogenic sources such as plant extracts and agricultural residues minimizes hazardous chemicals and energy use, while also enhancing biocompatibility and functionality in the resulting nanostructures [1,2]. This paper focuses on the eco-friendly synthesis of ZnO nanostructures and the comprehensive study of their properties. Specifically, we investigated the use of diverse biogenic sources including *Citrus reticulata*, rice husk ash (RHA), and *Reetha* fruit extracts. Each biogenic material is selected based on its rich phytochemical content and potential for sustainable nanomaterial

production. We employed advanced characterization techniques—XRD, UV-Vis spectroscopy, Raman spectroscopy, XPS, FESEM, and Zeta potential—to analyze the structural, optical, chemical, and morphological properties of the synthesized ZnO nanostructures. By promoting eco-friendly synthesis methods, this research supports sustainable development in nanotechnology and aims to enhance our understanding of the properties and applications of ZnO nanostructures for a greener future in material science.

Literature review:

The eco-friendly synthesis methods shown in Figure 1 offer significant advantages [2,3]. They are cost-effective, require minimal machinery, and can be conducted in a single pot at room temperature, with biogenic factors influencing the formation mechanisms (reduction, stabilization, capping, nucleation, and Ostwald ripening) [4,5].

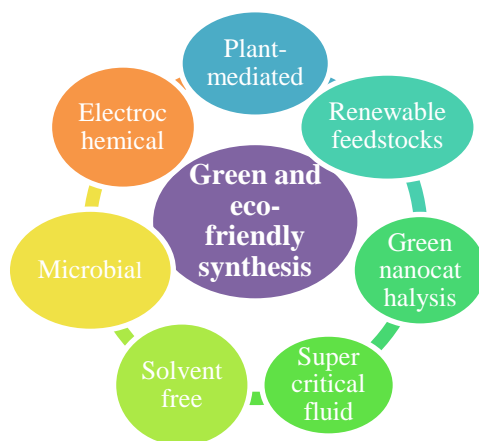


Figure 1: Eco-friendly synthesis method [2]

The plant-mediated synthesis approach was chosen for its use of abundant green materials often considered waste, promoting sustainability. The method involved collecting, washing with tap and distilled water, followed by drying, controlled incineration, and milling to enhance reactivity through improved surface-to-volume ratio [6,7]. According to the literature, various green-mediated agents show significant mineral compositions. *Daucus carota* has potassium (1954 mg/100g) and other minerals [8]. *Bambusa vulgaris* contains 78.13% silica, aluminum oxide, and iron oxide [9]. *Brassica oleracea* offers calcium (19.7 mg/g) and potassium (13.5 mg/g) [10]. *Solanum tuberosum* reveals potassium (42.73 g/kg) and trace elements [11], while *Allium cepa* and *Citrus reticulata* provide notable potassium and calcium levels [12]. *Eggshell extract* is rich in calcium oxide (76.9%) [13], and *Jonagold apples* show high potassium (724.9 mg/100g) [14] underscoring their potential in eco-friendly applications and nanotechnology.

A comprehensive analysis of the chemical composition of RHA was conducted [15] revealing that SiO_2 is the predominant component with an average of 91.43, followed by Al_2O_3 at 1.01 and Fe_2O_3 at 0.40, while CaO averages at 0.83. SO_3 has an average of 0.985, although some data points are unavailable, and P_2O_5 averages at 1.095 with similar missing records. MgO shows an average of 0.4375, and TiO_2 is minimal at 0.165. Na_2O averages 0.111429, with many data points not reported, while K_2O stands out at 2.15, indicating significant variation. Lastly, the loss on ignition (LOI) averages

at 5.17, highlighting the diverse chemical profile of rice ash.

The innovative research on synthesizing ZnO from rice husk ash examined its functionalization for mitigating urban air pollution. The study produced ZnO- SiO_2 hybrids by calcining zinc acetate at 600°C, achieving a 70% NO_x removal under sunlight, outperforming $\text{TiO}_2\text{-P}_{25}$. Additionally, rice husk activated carbon-supported ZnO nanocomposite was synthesized by mixing RHAC with $(\text{NH}_4)_2\text{CO}_3$ and zinc nitrate, revealing a varied composition including Zincite and Wurtzite [16], [17].

Reetha fruit, or soapnut, from the soapberry tree (*Sapindus mukorossi*), is a natural detergent valued for its surfactant properties in laundry and skincare. In the green synthesis of zinc oxide nanoparticles, its phytochemicals—saponins, tannins, and antioxidants—reduce Zn^{2+} ions and stabilize the nanoparticles, often working together. *Reetha* is also effective in synthesizing silver nanoparticles with antibacterial properties.

Table 1 provides a literature review from 2019 to 2023 on the green synthesis of ZnO using Citrus species, highlighting its biological applications and theoretical frameworks. These findings are crucial for developing the theoretical basis for this approach. Notably, the studies focused on the ZnO synthesis through an eco-friendly methods in diverse biological contexts and it is presented in this paper.

Table 1: Literature survey on synthesis of ZnO using Citrus

S/N	Eco-friendly synthesis	Cryst. Size	Applications	Ref.
1	Zn, Citrus peel extract	22.6nm	Optoelectronic sensors	[18]
2	Zn, Cr, Citrus leaf extract	19.3-24.3nm	Biological activity	[19]
3	Zn, Citrus Sinensis	11.2nm, 10.8nm	Strawberry preservation	[20]
4	Citrus reticulata leaf's extract	43.05nm-30.67nm	Photocatalysis, antibacterial	[21]
5	Zn, Citrus reticulata peel extract	40nm-81nm	Thin films, electrical study	[22]

6	Zn, <i>Citrus</i> peel	36nm	Study of physical properties of ZnO	[23]
7	Zn, <i>Citrus Sinensis</i>		UV blocking	[24]
8	Zn, <i>Citrus microcarpa</i>	13.1; 16.8; 39.7nm	Photocatalysis, optical properties	[25]

Materials, methods and synthesis:

Citrus reticulata, RHA, and *Reetha* fruits were sourced from Nashik in December 2022. After pretreatment to remove dust and impurities, a 200 ml aliquot of each biomaterial was extracted for synthesis, as shown in Figure 2 and referenced in [3,26]. For the synthesis, 10.97 g of Zn (CH_3COO)₂·2H₂O was dissolved in 100 ml of each biomaterial solution and stirred at 60°C for one hour. Then, 0.7 g of NaOH was added, resulting in a

whiter mixture. The mixture was sonicated for 15 minutes to control particle size, followed by precipitation and separation of the supernatant. The precipitate was washed with ethanol and deionized water, dried at 80°C for 48 hours, and calcined at 500°C for 2 hours. The resulting fine white powder of zinc oxide nanoparticles was stored in a 20 ml glass bottle for further studies, as illustrated in Figure 2

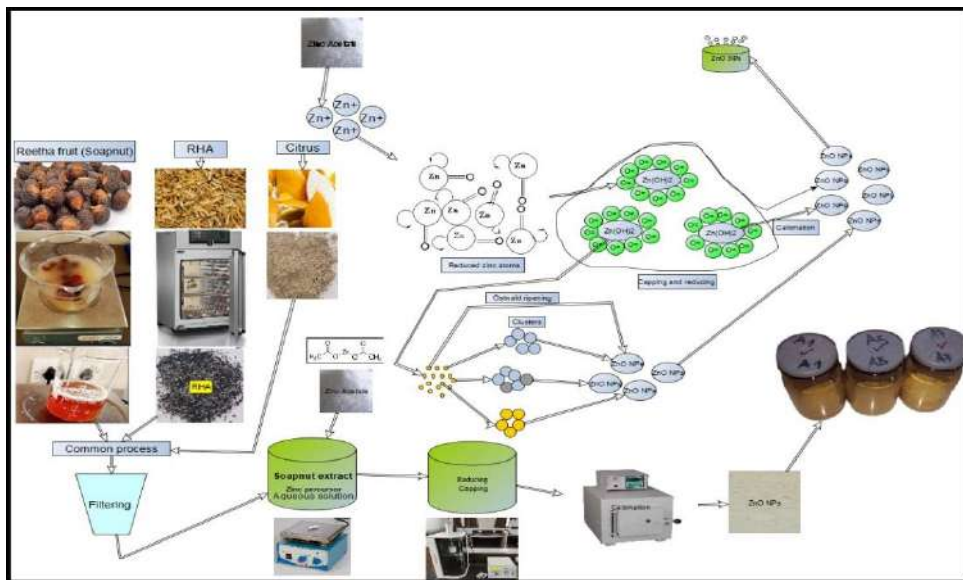


Figure 2: Eco-friendly ZnO Synthesis diagram using Citrus, RHA, and Reetha Fruit

Results and discussion:

X-Ray Diffraction

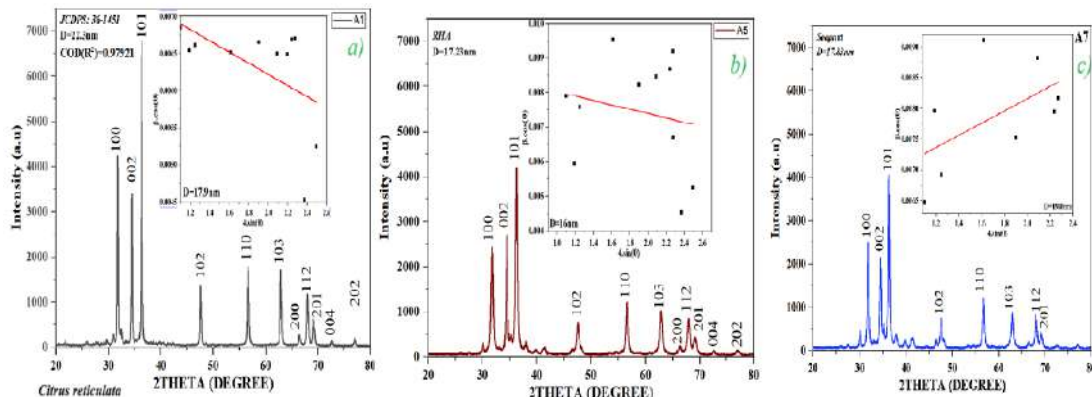


Figure 3: XRD pattens of ZnO using Citrus Reticula (a), RHA (b), Reetha fruit (c)

The three samples were characterized using a d8 Advanced XRD 40KV instrument, capable of analyzing up to nine samples. XRD measurements utilized Theta-2Theta geometry from 20° to 80°. Crystallite size differences arise from the Debye-Scherrer method's assumptions versus the Williamson-Hall method's consideration of microstrain. Using rice husk ash as a precursor also

affects the nucleation and growth of ZnO nanoparticles, resulting in size variations.

The distinct peaks at various 2θ angles, approximately 31.80972°, 34.45893°, 36.29215°, 47.59161°, 56.65774°, 62.92537°, 66.46065°, 68.02369°, 69.15906°, 72.65621°, and 77.03846°, signify the crystallographic planes of the ZnO, Figure 3. These findings provide crucial insights

into the structural characteristics of the synthesized material.

Using the Debye-Scherrer formula, the crystallite sizes of the three samples were determined as follows: 22.2 nm for *Citrus reticulata*, 17.23 nm for RHA, and 17.83 nm for *Reetha* fruit. Applying the W-H plot, the crystallite sizes were slightly smaller, with 17.9 nm for *Citrus reticulata*, 16 nm for RHA, and 19 nm for soapnut.

The discrepancies in crystallite sizes arise from the different assumptions of each method. The Debye-Scherrer formula assumes a perfectly ordered crystal lattice, while the Williamson-Hall method

accounts for microstrain in addition to crystallite size. The unique characteristics of the precursors—*Citrus reticulata*, RHA, and soapnut—also influence the nucleation and growth of ZnO nanoparticles, leading to variations in size observed through these analytical techniques.

The utilization of soapnut (*Reetha* fruit) introduces unique characteristics to the synthesis process, influencing the nucleation and growth of ZnO nanoparticles. This introduces variations in crystallite size observed through different analytical methods.

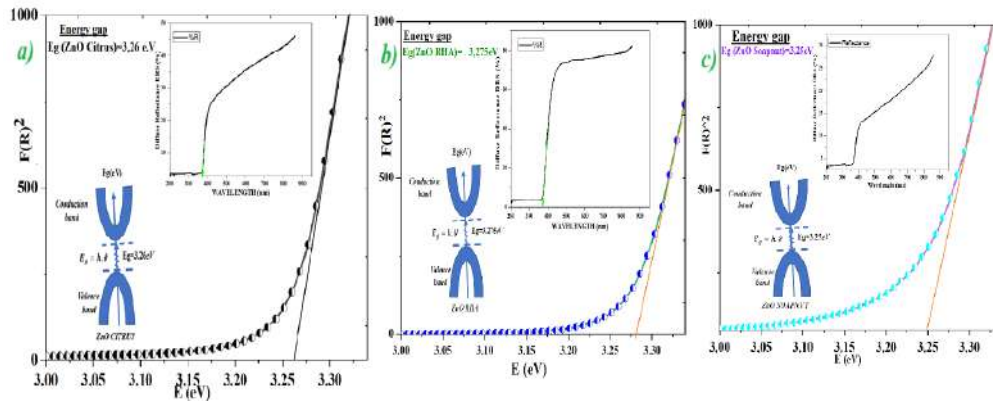


Figure 4: UV-Vis Spectrograph patterns of ZnO Citrus Reticula (a), RHA (b), Reetha fruit (c)

UV-Visible Spectroscopy:

Figure 4, presents the UV-Vis characterization of ZnO samples synthesized from *Citrus*, RHA, and Soapnut was conducted using a UV-VIS Spectrophotometer Vertex 70. Bandgap energies were quantified using the Kubelka-Munk method across 200 to 900 nm. Significant absorption peaks were observed at 366 nm for *Citrus*, 370 nm for RHA, and 365 nm for Reetha, indicating electronic transitions. Bandgap energies were 3.26 eV for Citrus, 3.275 eV for RHA, and 3.25 eV for Reetha, classifying them as wide-bandgap semiconductors suitable for optoelectronic applications. The distinct contributions of organic components influenced their optical properties, suggesting potential uses in photocatalysis and environmental remediation.

Raman Spectrography:

Figure 10, presents the Raman spectroscopy study of ZnO. For the sample synthesized using *Citrus reticulata*, notable peaks at 320.935 cm^{-1} (E_2

high mode), 429.904 cm^{-1} (E_2 low mode), and 561.436 cm^{-1} (A_1 (TO) mode) were observed. These peaks highlight the well-defined crystalline structure and oxygen atom movements within the crystal lattice [27] This understanding enhances the potential applications of this ZnO in areas such as sensors and optoelectronic devices. In contrast, the analysis of ZnO from Rice Husk Ash revealed peaks at 140.3 cm^{-1} , 172.389 cm^{-1} , 436.501 cm^{-1} , and 580.879 cm^{-1} , indicating a range of vibrational modes that provide insights into lattice dynamics and electronic properties. Lastly, the Raman analysis of ZnO synthesized using *Reetha* fruit extract showed peaks at 179.882 cm^{-1} , 322.272 cm^{-1} , 429.904 cm^{-1} , and 565.329 cm^{-1} . These findings indicate the material's crystalline structure. The vibrational modes suggest applications in environmental remediation and nanotechnology, revealing how precursor choice affects ZnO nanoparticle properties.

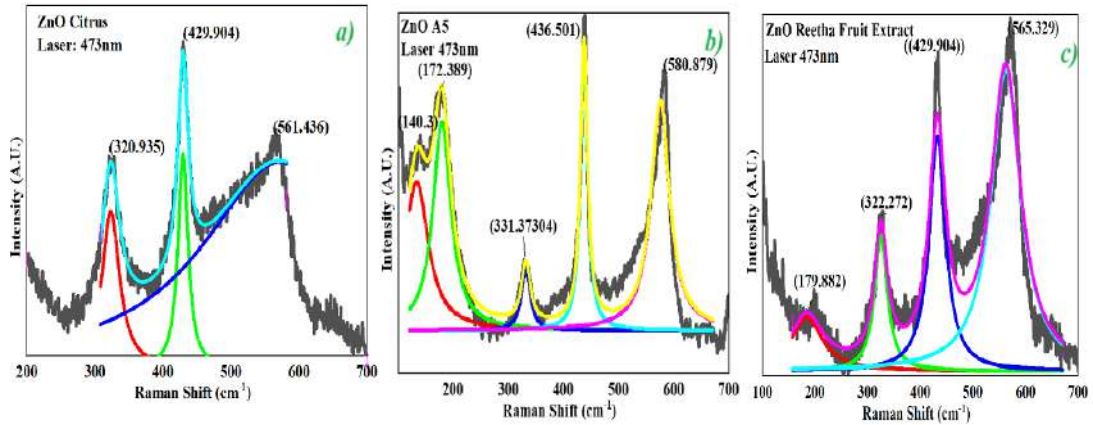


Figure 5: Raman Spectra of ZnO using Citrus Reticula (a), RHA (b), Reetha fruit (c)

X-Ray Photoelectron Spectroscopy

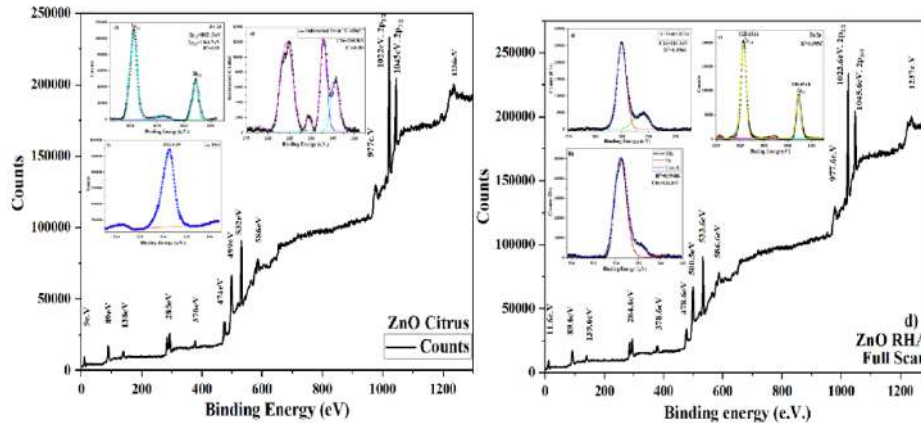


Figure 6: XPS of ZnO C1Ref, O1s, ZnO 2P and Full scan for Citrus and RHA

Samples were characterized also using X-ray photoelectron spectroscopy (XPS) with Al K-alpha X-rays. Measurements at 13 kV and 100 W revealed elemental composition, oxidation states, and chemical bonding. Discrepancies with theoretical values from Lebugle et al. [28] likely arise from differing instruments and the unique plant-mediated synthesis.

In the figures 6, the two intense peaks located at ~1022 eV and ~1045 eV were observed, which are attributed to the Zn 2p_{3/2} (1022, 0 eV) and Zn 2p_{1/2} (1045, 1eV), respectively, corresponding to Zn-O bonding within the hexagonal Wurtzite structure [29,30]. These reference data are reported in the core-electron binding energies of the first thirty elements. Additionally, Zn was observed at ~9.8 eV, with a reference value of (Zn 3d_{3/2} 9,77eV), 91,5eV with a reference value of (Zn 3p_{1/2} 91,4eV), ~140 eV with a reference value of (Zn 3s 142eV), and Zn (2s) (1206.00) [31].

In the spectrum, many other elements were identified, including 285.3 eV as (C 1s 285.0±0, 3), [32] for pure native elements, ~535 eV as (O1s 532

eV), and ~956 eV that might be related (Al 2s). Additionally, the peak at ~1070 eV might be related to Na (1s) (1071, 7±0, 7) [28,31,33–35].

Field Emission Scanning Electron Microscopy (FESEM)

The FESEM images in Figure 7 depict ZnO synthesized from *Citrus reticulata*, RHA, and Soapnut at various scales. Analysis using ImageJ revealed grain sizes for *Citrus* ranging from 7 nm to 205 nm, averaging 119 nm with a rod-like morphology, indicating organic compounds influenced their structure. RHA showed grain sizes, averaging 49.9 nm, with a transition from cloud-like to cluster-like forms, highlighting its role in shaping ZnO. Soapnut exhibited grain sizes from micro to nanoscale, averaging 36.75 nm, evolving from cloud-like to particle-like structures. These findings underscore the impact of the synthesis medium on ZnO morphology, with implications for applications in nanotechnology, optoelectronics, photocatalysis, and environmental remediation, enhanced by the presence of organic compounds that provide specific structural properties.

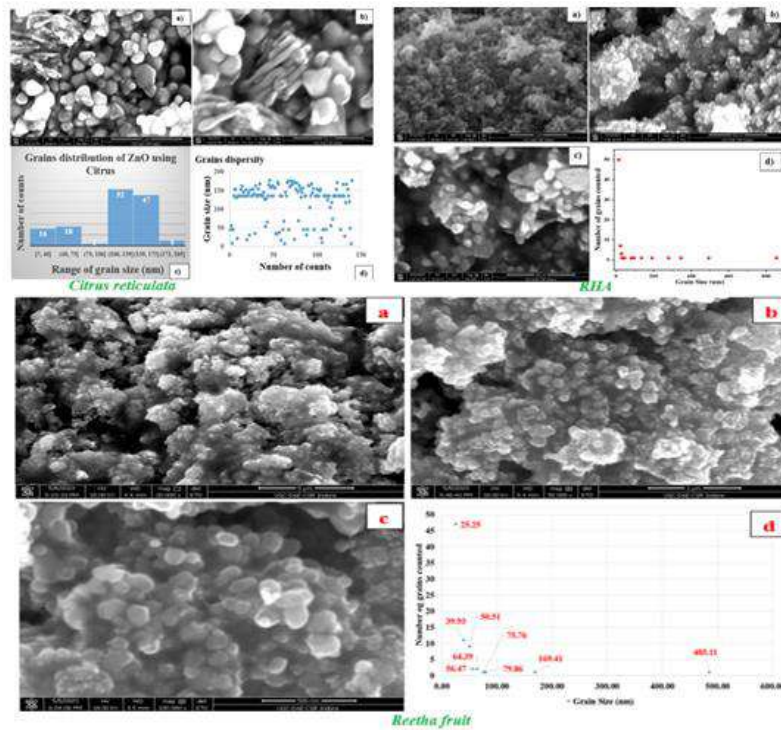


Figure 7: Zeta potential of ZnO synthesized using *Citrus reticulata*, RHA and Reetha fruit

Zeta potential:

Zeta potential measures electrostatic repulsion in colloidal dispersions, affecting stability. This section presents measurements for ZnO synthesized from *Citrus reticulata*, RHA, and *Reetha* fruit extracts. Literature indicates that values from 0 to ± 5 mV suggest rapid coagulation, ± 10 to ± 30 mV indicate instability, ± 30 to ± 40 mV reflect moderate stability, ± 40 to ± 60 mV suggest good stability, and values above ± 61 mV signify excellent stability [36] and [37]. For the measurement, 20 mg of ZnO was dissolved in 20 ml of deionized water (pH 7) and sonicated for 3 minutes, revealing that the particles exhibited a negative surface charge.

In the Figure 8, zeta potential analysis was conducted, ZnO synthesized from *Citrus reticulata*, Rice Husk Ash (RHA), and Reetha fruit extract exhibited values of -33.69 mV, -44.21 mV, and -45.04 mV, respectively. The *Citrus reticulata* sample indicates moderate stability, as its zeta potential falls within the range suggesting potential

coagulation. In contrast, RHA and *Reetha* fruit extracts show significant negative zeta potentials, indicating good to excellent stability due to enhanced electrostatic repulsion between particles, [36]. The high correlation coefficients ($R^2 = 0.99285$ for RHA and $R^2 = 0.99824$ for Reetha) further validate the precision of these measurements.

Varying zeta potential values highlight the synthesis medium's impact on the colloidal stability of ZnO nanoparticles. The lower potential for *Citrus reticulata* indicates higher aggregation risk compared to the more stable RHA and *Reetha* samples. The substantial negative charges in RHA and Reetha suggest enhanced repulsion and stability due to increased hydroxyl groups and organic compounds. These findings show that the choice of synthesis medium significantly affects ZnO surface characteristics and stability, influencing their suitability for applications in nanofluids, drug delivery, and industrial processes, [37, 38].

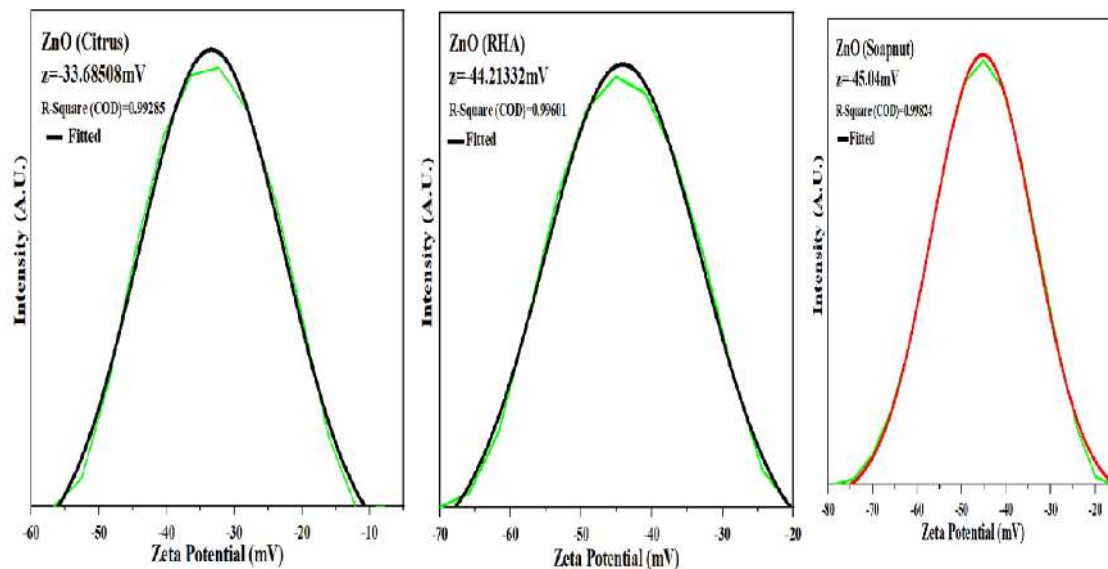


Figure 8: FESEM of ZnO synthesized using Citrus reticula, RHA and Reetha fruit

Conclusions:

In this study we synthesized and characterized Zinc Oxide using *Citrus*, Rice Husk Ash, and *Reetha* fruit extracts, revealing significant variations in crystallite size and structure. Raman spectroscopy showed distinct peak characteristics, while morphological studies indicated diverse nanostructures influenced by the green materials. Band gap variations emphasized how green synthesis enhances optical properties, and X-ray Photoelectron Spectroscopy confirmed elemental composition. The use of waste materials demonstrated substantial effects on ZnO properties, promoting sustainability in construction and geopolymer paste performance. This research highlights eco-friendly synthesis as a viable alternative to chemical-intensive methods, suggesting potential applications in nanofluids, LEDs, optoelectronics, and energy devices.

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Biodegradation of Crystal Violet Dye using Bacteria isolated from Wastewater Effluent

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Abstract:

Crystal Violet is a synthetic dye widely used in the textile industry. Despite its numerous applications, Crystal Violet poses significant environmental and health risks. Traditional physicochemical methods of treating this dye are costly and complicated. Therefore, we are focusing on bioremediation as a more sustainable and eco-friendly alternative. The objective of the present study is to isolate bacteria from polluted water samples that have the ability to degrade Crystal Violet and evaluate their efficacy for the biodegradation of Crystal Violet. Out of twenty-seven isolated bacterial strains, three strains, MM4, MM6, and MM8, showed per cent degradation ranging from 66.11% to 85.11% after 25 days. The bacterial isolates identified in this study have been shown to be effective and can be utilized by industries for bioremediation of textile wastewater treatment.

Keywords: Bioremediation, Crystal Violet, Decolourisation, Textile Dyes, Wastewater treatment

Introduction:

The textile industry is critical for the global economy and is responsible for generating 1 trillion dollars. The textile industries also play a significant role in global exports by contributing 7% of global exports and 27% of global export income. The textile industries utilise huge amounts of water, dyes, mordants, fixing agents, salts etc. They all have the potential to cause water pollution. Synthetic dyes have the most potential for causing pollution. Due to careless use of synthetic dyes, 15-50% remains unfixed during dyeing processes and remains recalcitrant decreasing light penetration. This affects photosynthetic rates for the aquatic flora which threatens the ecological balance (Tanaya et al., 2024). The improper management has led to a critical condition of the environment. The treatment of synthetic dyes can be done by physicochemical methods (Ahmed et al., 2024). However, physicochemical methods have many disadvantages as they are expensive, sophisticated methods of treatment. Thus, the superior method is bioremediation which uses bacteria for the degradation of synthetic dyes. Bioremediation has its advantages as it is a sustainable, eco-friendly, and cheaper method for treatment. Bacteria from different environments can be isolated and used for the biodegradation of dye at optimal conditions (Roy et al., 2020).

Crystal Violet, also named Gentian Violet, Methyl Violet, and Basic Violet has a molecular formula $C_{25}H_{30}N_3Cl$ with IUPAC name N-[4-[bis(4-dimethylamino)-phenyl]-methylene]-2,5-

cyclohexadien-1-ylidene]-N-methylmethanaminium chloride. Crystal Violet belongs to the class triarylmethane dyes. Crystal Violet has many applications. It acts as a pH indicator and turns from yellow to violet. It is used as a Gram stain in Gram staining and is also a potent bacteriostatic agent. It is used as a disinfectant in the case of humans and animals. It is used to print ink and paint in the paint industry. Most importantly, it is used as a purple-coloured dye in textile industries and dyeing cotton and silk. Crystal Violet causes various problems such as eye irritation, conjunctivitis, skin irritation, digestive tract problems, respiratory and kidney failure (Mittal et al., 2010). The present study will report isolated bacteria that have a role in the degradation of Crystal Violet and evaluate their efficacy for the biodegradation of Crystal Violet.

Materials and Methods:

Sample Collection

The wastewater samples from two locations, Motijheel, Motihari, Bihar, and Kathajodi river, Cuttack, Odisha, have been collected from stagnant waterbodies. The samples were named MS for Motihari Sample and OS for Odisha Sample. Collected samples were put into sterile falcon tubes and refrigerated at 4°C to preserve the sample for further experiments.

Bacterial Isolation and Characterisation:

Bacterial isolation

Both the collected samples were used for the isolation of bacteria. 1mL of each sample MS and OS were added to 100 mL sterilized water. The sample was added to the nutrient agar media plates

via the pour plate method. The petri plates were incubated at $35^{\circ}\text{C} \pm 2^{\circ}\text{C}$ for 24 hours. The bacteria were isolated and maintained at 4°C in the refrigerator.

Morphological Characterisation:

Bacteria can be distinguished based on morphology as it can be a characteristic property of a particular species. Visual observation of the colonies was based on specific characteristics such as shape, size, opacity, consistency, elevation, margin, and colour. Gram staining was performed to distinguish them to be Gram Positive or Gram Negative bacteria and the shape of the bacteria can be observed to be bacilli, cocci, coccobacilli, etc.

Biochemical Characterisation:

Biochemical characterisation helps with identifying the bacterial isolates by using Bergy's Manual of Systematic Bacteriology. Various biochemical tests such as Catalase Test, Carbohydrate fermentation test (Sucrose utilization test, Glucose utilization test), Starch Hydrolysis Test, Urease Test, etc. were carried out for this purpose.

Catalase Production Test

The catalase test is performed to check the ability of the bacteria to produce catalase enzyme. Catalase enzyme breaks down the excess amount of hydrogen peroxide in the bacterial cell and splits hydrogen peroxide into water and oxygen molecules. The slide-drop method protocol suggested by (Reiner, 2013) was followed. The positive results show the formation of effervescence and negative results show no effervescence.

Carbohydrate fermentation test

The carbohydrate fermentation test is performed to detect the ability of the bacteria to ferment certain carbohydrates. The fermentation results in the formation of either only acid or the production of both acid and gas. The protocol suggested by (Reiner, 2012) was used to perform carbohydrate fermentation tests. Both sucrose and glucose have been used to test carbohydrate fermentation properties. Positive result shows yellow colour for acid production and bubble in Durham tubes for gas production whereas, negative results show pink colored media.

Starch Hydrolysis Test

The starch hydrolysis test is performed to detect the ability of the bacteria to produce α -amylase and 1,6-glucosidase which break down the glycosidic linkage between two glucose present in

starch. Iodine acts as an indicator as it reacts with starch to form blue colour. The protocol suggested by (Archana & Naowarat, 2012) was performed for the Starch Hydrolysis Test. Formation of Halozone around the bacterial colony after pouring iodine shows Positive results, whereas negative results show no halozone.

Urease Production Test

The urease test is performed for the ability of the bacteria to produce urease enzyme. This enzyme is capable of hydrolyzing urea to produce ammonia and carbon dioxide. The protocol suggested by (Brink, 2010) was used to make Christensen's Urea media which is a modification to Christensen's Urea Agar. The Agar was omitted from the method to modify the media. Positive results showed change in color from yellow to pink and negative results showed no change in color.

Screening for Biodegradation

The bacterial isolates were screened for their ability to biodegrade Crystal Violet. Crystal Violet was used in different concentrations for screening. The dye was mixed to the minimal media at concentrations 100ppm, 250ppm and 500ppm. Minimal media was prepared which composed of Glucose (20g), Potassium dihydrogen Phosphate (4.002g), Sodium Hydrogen Phosphate (7.119g), Magnesium Sulphate (0.197g), Calcium Chloride (0.00077g), Iron Sulphate (0.00067g), Manganese Sulphate (0.00148g), Ammonium Chloride (1g), Sodium Chloride (0.5g), Na. EDTA (0.00148g), Agar (18g) and Distilled water (1L). The media containing different concentrations of dyes were autoclaved. The isolated bacteria were cultured by using streak plate method. The plates were then incubated at $35 \pm 2^{\circ}\text{C}$. The bacteria that can biodegrade form a clear zone.

Evaluation of Efficacy for Biodegradation

Minimal media containing 100ppm crystal violet was autoclaved and then, inoculated with screened bacteria. The uninoculated media was used as reference. The decolourisation or degradation rate was determined by examining the rate of reduction in absorbance. The samples were observed in equal intervals using a UV-VIS spectrophotometer by first centrifuging them at 5000rpm for 20 mins to remove biomass. The readings of absorbance for different samples with respect to reference were taken at 660nm. The rate of decolourisation or degradation can be calculated based on the equation (Roy et al., 2020).

$$\text{Dye Degradation}(\%) = \frac{\text{Initial OD} - \text{Final OD}}{\text{Initial OD}} \times 100$$

OD- Optical Density

Results and Discussion:**Isolation and characterisation of the bacterial isolates**

Microflora present in the wastewater effluent adapt to the environment and use the pollutants for their enrichment. These microorganisms could have the ability to degrade

dye thus, have to be isolated from the wastewater. Total of 27 isolates were isolated from both the wastewater sample. The visual observation was carried out based on shape, size, consistency, opacity, elevation, colour of the colony and margin, the result of which has been shown in Table 1.

Table 1. Visual observation of bacterial isolates

Bacterial Strain	Size	Margin	Shape	Opacity	Consistency	Elevation	Pigmentation
MM1	Small	Entire	Circular	Translucent	Slimy Smooth	Raised	Orange
MM2	Small	Lobate	Rhizoid	Opaque	Slimy Smooth	Flat	Cream
MM3	Small	Undulate	Irregular	Opaque	Slimy Smooth	Raised	Cream White
MM4	Small	Undulate	Irregular	Translucent	Slimy Smooth	Raised	White
MM5	Small	Entire	Circular	Opaque	Slimy Smooth	Flat	Light Yellow
MM6	Small	Entire	Circular	Opaque	Slimy Smooth	Raised	Cream
MM8	Small	Entire	Circular	Transparent	Slimy Smooth	Raised	Cream
MM10	Small	Entire	Circular	Opaque	Slimy Smooth	Raised	Cream
MM12	Small	Undulate	Irregular	Opaque	Slimy Smooth	Flat	Cream
MS111	Medium	Entire	Circular	Opaque	Slimy Smooth	Raised	Cream
MS112	Small	Entire	Circular	Translucent	Slimy Smooth	Raised	Cream
MS113	Medium	Entire	Circular	Translucent	Slimy Smooth	Raised	White
MS114	Small	Entire	Circular	Translucent	Slimy Smooth	Raised	Cream
MS116	Small	Undulate	Irregular	Opaque	Rough	Flat	Cream
MS121	Large	Undulate	Irregular	Translucent	Slimy Smooth	Raised	Cream
MS123	Small	Entire	Irregular	Translucent	Slimy Smooth	Raised	White
MS212	Small	Entire	Circular	Opaque	Slimy Smooth	Raised	Cream
OS112	Small	Entire	Circular	Opaque	Slimy Smooth	Raised	Cream
OS113	Small	Entire	Circular	Translucent	Slimy Smooth	Raised	Cream
OS114	Small	Entire	Circular	Opaque	Slimy Smooth	Raised	Lime Yellow
OS115	Small	Entire	Circular	Opaque	Slimy Smooth	Raised	Orange
OS116	Small	Entire	Circular	Opaque	Slimy Smooth	Umbonate	Orange
OS121	Medium	Entire	Circular	Translucent	Rough	Flat	White
OS122	Small	Undulate	Circular	Opaque	Rough	Flat	White
OS124	Small	Entire	Circular	Transparent	Slimy Smooth	Raised	Cream
OS127	Small	Entire	Circular	Translucent	Slimy Smooth	Raised	White
OS212	Large	Lobate	Irregular	Translucent	Slimy Smooth	Flat	White

Gram Staining was also carried out. Out of 27 isolates, Twelve were Gram-positive and Fifteen

were Gram-negative. Fifteen bacterial isolates had cocci shape and twelve had bacilli shape.

Table 2. Biochemical characterisation of bacterial isolates

Bacterial Strain	Gram Staining		Catalase Test	Starch Hydrolysis	Urease Test	Glucose Utilisation		Sucrose utilisation	
	Results	Morphology	Results	Results	Results	Acid Production	Gas Production	Acid Production	Gas Production
MM1	-	Cocci	+	+	+	+	No	+	No
MM2	-	Cocci	+	-	+	+	Yes	+	Yes
MM3	-	Cocci	+	+	+	+	No	+	No
MM4	+	Cocci	+	+++	+	+	No	+	No
MM5	+	Bacilli	+	+++	+	+	No	+	No
MM6	+	Bacilli	+	+++	-	+	Yes	+	Yes
MM8	+	Bacilli	+	-	++	-	No	+	No
MM10	-	Cocci	+	+	+	+	Yes	+	Yes
MM12	-	Cocci	+	++	-	+	Yes	+	Yes
MS111	-	Cocci	+	++	-	+	Yes	+	Yes
MS112	-	Bacilli	+	++	+	+	No	-	No
MS113	-	Cocci	+	-	-	-	No	+	Yes
MS114	-	Cocci	+	-	+	-	No	+	Yes

MS116	+	Bacilli	+	+++	+	+	No	+	No
MS121	+	Cocci	+	-	++	+	No	-	No
MS123	-	Bacilli	+	-	+	+	No	+	No
MS212	-	Bacilli	+	-	-	-	No	+	No
OS112	-	Cocci	+	-	-	+	Yes	+	No
OS113	+	Cocci	+	-	-	-	No	-	No
OS114	+	Cocci	+	+	++	-	No	+	No
OS115	-	Bacilli	+	-	+	-	No	+	Yes
OS116	+	Cocci	+	+	-	+	No	+	No
OS121	-	Bacilli	+	++	++	+	No	+	No
OS122	+	Bacilli	+	+++	++	+	No	+	No
OS124	+	Cocci	+	-	+	+	No	+	Yes
OS127	+	Bacilli	+	+	-	+	No	+	No
OS212	-	Bacilli	+	-	+	-	No	+	No

+ = Positive Result, - = Negative Result

Various other biochemical tests such as the catalase production test, carbohydrate fermentation test (glucose, sucrose), starch hydrolysis test, and urease production test help with identification using Bergy's Manual of Systematic Bacteriology. For catalase test, all the bacterial isolates were catalase positive. For carbohydrate fermentation test, both sucrose and glucose utilisation test were carried out. For sucrose utilisation test, eight showed negative results whereas from other nineteen bacteria six showed positive results for both acid and gas production and thirteen bacteria showed positive results for only acid production. For glucose utilisation test, three showed negative results whereas from other twenty-four bacteria nine showed positive results for both acid and gas production and fifteen bacteria showed positive results for only acid production. For starch hydrolysis test, twelve bacterial isolates showed negative results, and fifteen bacterial isolates showed positive results. For urease production test, nine bacterial strains were urease production

negative and eighteen of them were urease production positive. Biochemical tests have been tabulated in **Table 2**.

Screening for Biodegradation

Screening of the isolated bacteria was carried out to test the resistance and capability of biodegradation against Crystal Violet dye. The bacterial isolates were screened at different concentrations (100ppm, 250ppm, 500ppm) of crystal violet (Table 3). At 100ppm, out of twenty-seven bacterial isolates, twenty-five showed resistance out of which Ten were able to biodegrade Crystal Violet. At 250 ppm, nineteen isolates showed resistance, out of which seven were able to biodegrade Crystal Violet. At 500 ppm, Fifteen showed resistance and only three (MM4, MM6, MM8) were able to biodegrade Crystal Violet. As, MM4, MM6, and MM8 were able to show biodegradation at such a high concentration, they were chosen to evaluate the efficacy of biodegradation.

Table 3. Screening of bacterial strains against different concentrations of crystal violet

Concentration of Crystal Violet	Resistance	Clear Zone
100 ppm	25	10
250ppm	19	7
500 ppm	15	3

Values are number of resistant bacteria and showing clear zone at each concentration

Evaluation of Efficacy for Biodegradation

The bacterial isolates MM4, MM6, and MM8 showed the best results while screening for biodegradation was done at 500 ppm of Crystal Violet. These bacterial isolates were used for evaluating the efficacy of biodegradation of Crystal Violet. The biodegradation capability was measured for 25 days by using a UV-VIS spectrophotometer at 660nm. The bacterial isolates MM4, MM6 and MM8, after 25 days were able to degrade 66.11%, 85.11% and 75% respectively. The results for the rate of decolourisation have been tabulated in **Table 4** and shown in **Figure 1**. These findings are

considered to be relevant as they show similarities to previous research. (Roy et al., 2020) found 100% degradation of Crystal violet by *Enterobacter* sp. isolated from textile effluents. (Cao et al., 2019) found up to 97% decolourisation of Crystal violet by *Cedecea davisae* isolated from sludge samples. (Kwak et al., 2024) observed upto 70% decolourisation by isolated and identified bacteria which includes *Mycolicibacterium nivoides*, *Chryseobacterium* sp., *Agrobacterium rhizogenes*, *Pseudomonas crudilactis*, *Pseudomonas koreensis*, and *Stenotrophomonas maltophilia*. The study is considered to be relevant as the present finding

showed upto 85% of decolourisation of Crystal Violet which is in consistency with previous research findings.

Table 4. Evaluation of efficacy for biodegradation of Crystal Violet (in Percentage)

S. No.	Sample Name	Day 3	Day 7	Day 10	Day 14	Day 18	Day 21	Day 25
1.	Control	0 %	0 %	0 %	0 %	0 %	0 %	0 %
2.	MM4	14.11%	25.33%	38%	50.6%	59.66%	70.55%	66.11%
3.	MM6	17.11%	28.11%	40.8%	53.55%	64.27%	71.66%	85.11%
4.	MM8	16.55%	28.83%	42.11%	54.22%	67.77%	71.385%	75%

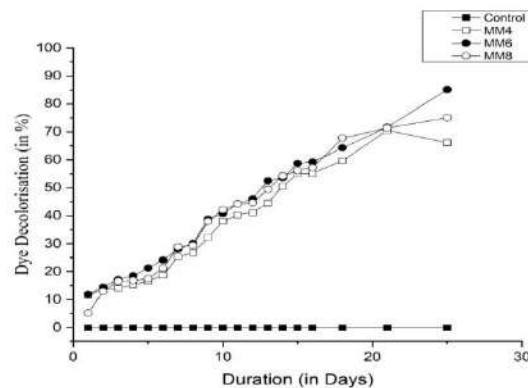


Figure 1. Shows the rate of dye decolorisation in Percentage

Conclusion:

Bioremediation is an efficient method for biodegradation of synthetic dyes. The present study demonstrates the efficiency of Indigenous bacteria for decolorisation of Crystal violet. Twenty-seven bacterial strains were isolated from Wastewater effluents. Three bacterial strains MM4, MM6, and MM8 showed results for 25 days which ranged from 66.11% to 85.11%. As these bacterial isolates are proven to be efficient by the present study so can be used by industries for bioremediating the environment. Thus, bacterial isolates showed remarkable results and can be used as an eco-friendly, sustainable, and economical method for the treatment of wastewater.

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Heterocyclic Compounds Containing Derivatives Act as Anti-Cancer Agent's

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Abstract:

Heterocyclic Compounds has various biological activities, including antitubercular, antibacterial, vasodilators, antifungal, cytotoxicity, anti-inflammatory, analgesic, hypolipidemics, and anticancer activities. The search for new anti-cancer agents will be a challenging task for medicinal chemists. This review has basic information about heterocyclic Compounds as anti-cancer agents and their activity; this review may help to develop a new heterocyclic Compounds as an anti-cancer agent.

Keywords: Heterocyclic Compounds, antibiotics, antimetabolites & anticancer activities.

Introduction:

Cancer is a disastrous group of various diseases or disorders characterized by rampant cell division. The afflictive disease insidiously attacks the people of all the cultures and ages. The cancer cells from malignant tumor are transported through the blood stream or lymphatic system where it establishes colonies (a process called metastasis) making the disease a challenge for both the physicians and the scientists.¹ In normal human body cell division is regulated by a number of regulatory processes. In case any damage occurs to the cell, apoptosis (programmed cell death) takes place and cell dies. But cancer cell do not die as it has lost touch with the natural environment. As a result it grows and forms tumor.

According to 2007 statistics cancer caused 7.9 million deaths worldwide and with 0.5% of the population being diagnosed with cancer annually the number is rising due to lifestyle changes occurring specially in the developed world.² Tobacco is associated with 90% of the lung cancer cases and causes 25-30% of the deaths due to cancer. Diet, Physical inactivity and obesity colligate approximately 30-35% of the cancer deaths.

Physical inactivity induces negative effects on immune and endocrine system making a person more prone to cancer.³ Infection caused mainly due to viruses accounts for approximately 18% of the cancer deaths with a high proportion of 25% in Africa to less than 10% in the developed globe. A substance that causes cancer is called a carcinogen. Carcinogens are broadly classified into three categories⁴ physical carcinogens include X-rays, asbestos, UV light and electromagnetic radiations.

DNA alkylating agents:

The alkylating agents are highly reactive compounds produce their effects by covalently linking an alkyl group to cell nucleophiles in nucleic acids or proteins. The majority alkylating agents are bipolar, and they contain two alkyl groups capable of reacting with DNA. The important classes of alkylating agents (Figure 2) utilized in cancer chemotherapy are nitrogen mustards (chlorambucil,⁵ melphalan,⁶ mechlorethamine⁷ and ifosfamide,⁸ ethylenimines (altretamine, thiotepa,⁹ methanesulfonates (busulfan),¹⁰ nitrosoureas (carmustine,¹¹ triazines (dacarbazine, procarbazine, temozolomide¹² and platinum complexes (e.g., cisplatin).¹³

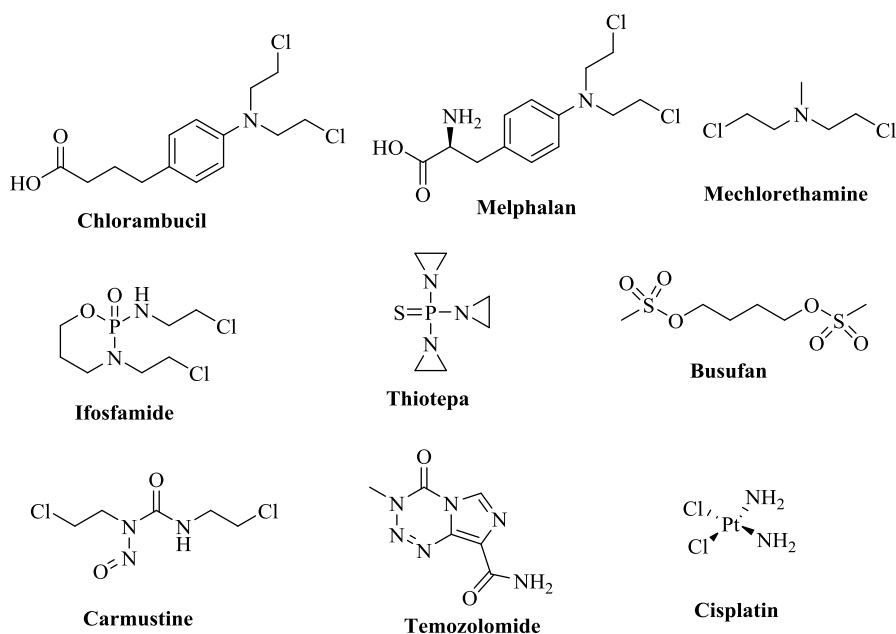


Figure 1: DNA alkylating agents

DNA Strand Breakers:

Some DNA-interactive drugs initially intercalate into DNA but then in certain conditions, react in such a way as to generate radicals. The reaction of these radicals with the sugar moieties leads to DNA strand scission.^{14,15}

Non-covalent and covalent minor groove binders:

Groove binding can be via the major or minor groove and covalently or non-covalently. Most DNA interactive proteins bind in the major groove, while small molecules of less than 1000 Da, including many antibiotics, binds in the minor groove.. The main motive for synthesizing a large number of analogues and conjugates of naturally occurring minor groove-binding agents, is to generate new lead compounds with potential anticancer properties and specific DNA sequence recognition.

These compounds are typically isohelical with B-DNA and fits snugly within the minor

groove, held in a position by a combination of hydrogen bonds, van der Waal forces and electrostatic interactions. Examples include distamycin¹⁶ (Figure 2), netropsin,¹⁷ lexitropsins and bis-benzimidazole (Hoecht 33258).¹⁸ Drugs which bind covalently to DNA are used to either add substituents onto base residues, or to form cross links between different sections of DNA. The first mechanism results in a base-pairing mismatch during DNA replication, and the DNA is ultimately fragmented by the enzymes which try to repair it. The second mechanism binds together the two strands of the DNA helix, preventing separation during the replication process. Electrophilic functional groups such as epoxides, aziridines, carbinolamines, imines and cyclopropanes are found in a variety of synthetic and natural products capable of covalent interaction with DNA. Examples include mitomycin, saframycins and pyrrolobenzodiazepines¹⁹ (anthramycin, Figure 2).

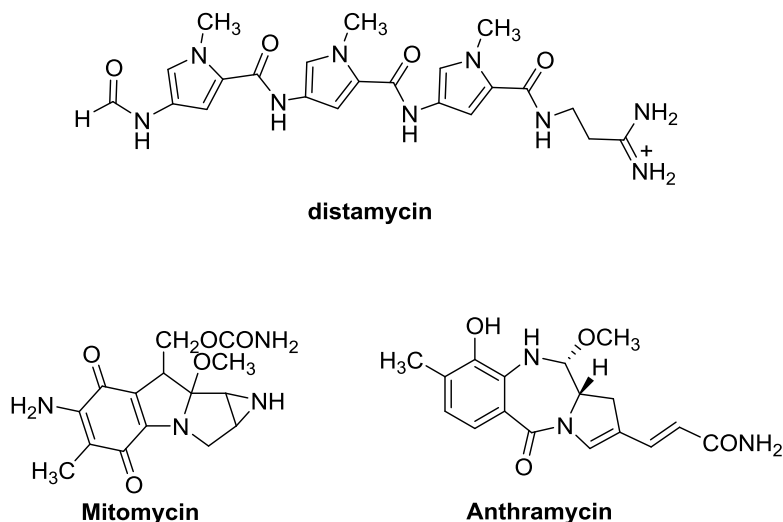
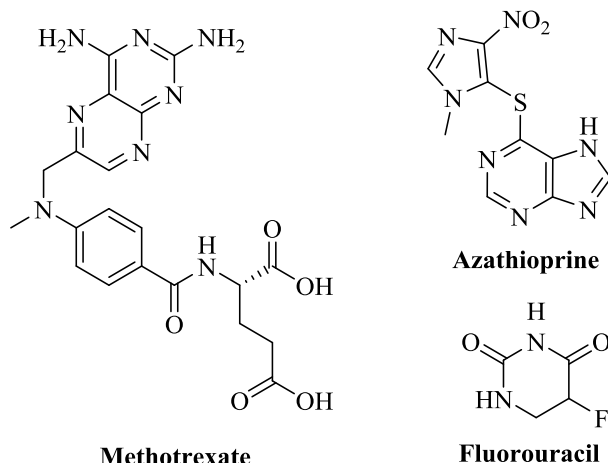
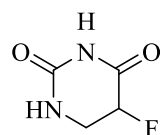


Figure 2: Covalent and non-covalent minor groove binding agents

Antimetabolites:

Antimetabolites are compounds similar in structure to naturally occurring substances such as amino acids or nucleosides needed for DNA synthesis (purines, pyrimidines and folic acid). Antimetabolites prompt apoptosis by interfering with some vital step in DNA synthesis. The majority of antimetabolites are phase-specific, performing

during the S-phase of the cell cycle. The antimetabolites can show toxic effects on cells, such as halting the reproduction (cell division and cell growth), so these compounds are used as chemotherapeutic agents for cancer. Further, they divided into three classes such as, antifolates (methotrexate),²⁰ (fluorouracil, Figure 3).

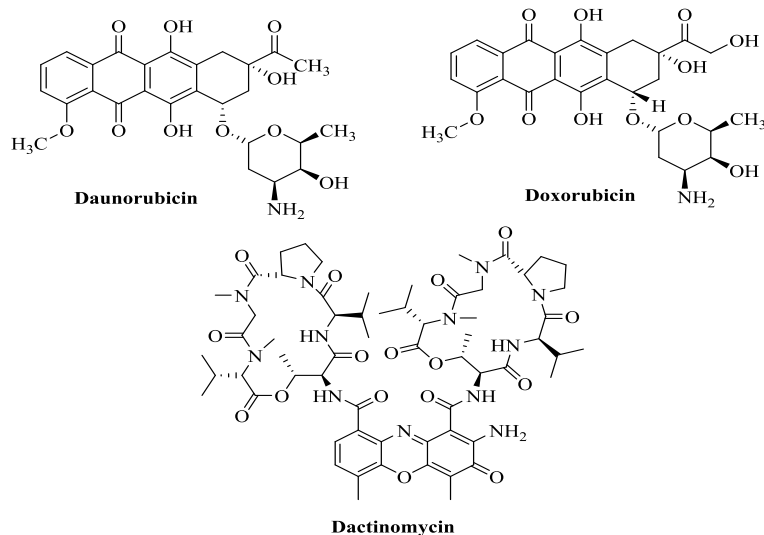
**Methotrexate****Azathioprine****Fluorouracil****Figure 3: Antimetabolites****Cytotoxic antibiotics:**

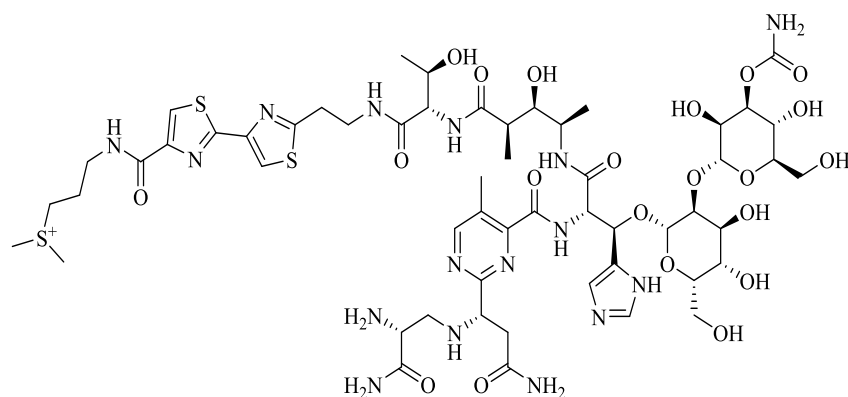
Several cytotoxic antibiotics are widely used as anticancer drugs. They include a group of anticancer drugs known as the anthracycline, dactinomycin and bleomycin antibiotics (Figure 4), which are isolated from soil bacteria of the genus *Streptomyces*.

Anthracyclines (daunorubicin and doxorubicin)^{21,22} intercalate with DNA leading to a disruption of DNA function. The drugs insert between adjacent base pairs in the DNA leads to blocking DNA and RNA synthesis. Furthermore, these compounds are also capable to inhibit the topoisomerase II enzymes causing breaks in supercoiled DNA, further inhibiting DNA synthesis. In addition, oxygen free radical production by anthracycline also plays a major role in their cytotoxicity. Examples include daunorubicin,

doxorubicin (Figure 4). Similarly to anthracycline, dactinomycin^{23,24} intercalates into the DNA minor groove forming a stable complex which interferes with inhibiting transcription of DNA and RNA polymerase. It is used in the treatment of gestational choriocarcinoma and Wilms' tumor.

Bleomycin²⁵ drug, unlike anthracycline, dactinomycin, is cell-cycle specific and it initially intercalate into DNA but then in certain conditions, react in such a way as to generate radicals. The reaction of these radicals with the sugar moieties leads to DNA strand scission and subsequent inhibition of cell reproduction (division and growth). Bleomycin is used mostly in the treatment of testicular cancers, as part of a combination of other anticancer drugs including vinblastine and cisplatin.²⁶

**Daunorubicin****Doxorubicin****Dactinomycin**



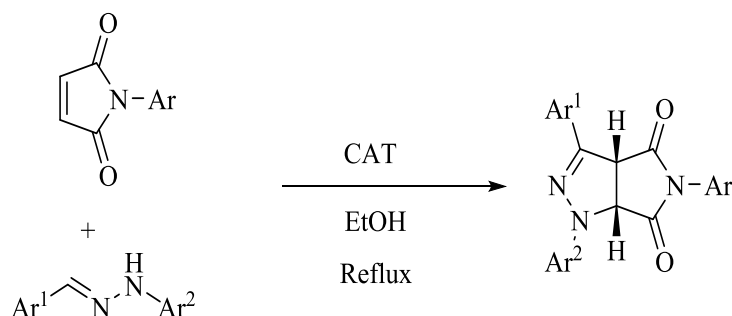
Bleomycin

Figure 4: Cytotoxic antibiotics

Application of 1,3-dipolar cycloaddition reactions

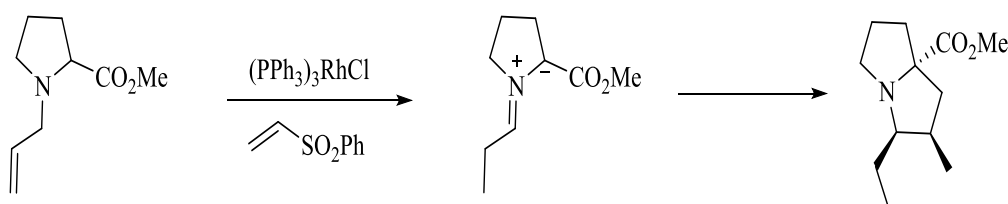
Rai and co-workers reported a new approach for the synthesis of pyrazoles via 1,3-DC of acetylacetone and *in situ* generated nitrile imines. Their reaction afforded the regioselective cycloadducts in good yield. Very recently Kumar

and co-workers reported the synthesis of 1,3,5-triaryl-4,6-dioxo-pyrrolo[3,4-*d*]-7,8-dihydropyrazoles that showed promising antibacterial, antifungal and antioxidant activities by Huisgen cycloaddition of *in situ* generated nitrile imines and *N*-aryl maleimides (Scheme 1).^{27,28}

Scheme 1: Synthesis of 1,3,5-triaryl-4,6-dioxo-pyrrolo[3,4-*d*]-7,8-dihydropyrazoles

Fused ring heterocycles were synthesised *via* the rhodium catalysed isomerisation/regio and

stereoselective 1,3-DC cascades in good yields (Scheme 2).²⁹

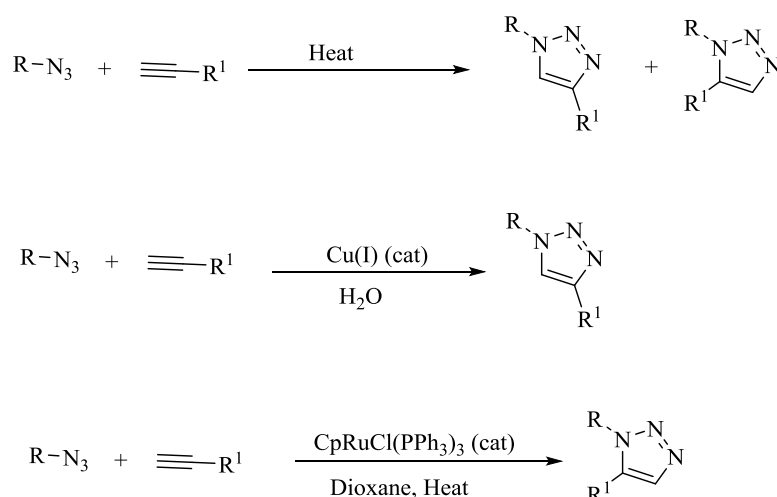


Scheme 2: Synthesis of pyrrolidines by using rhodium catalyst

Click chemistry:

The thermal Huisgen 1,3-dipolar cycloaddition of alkynes to azides requires elevated temperatures and often produces mixtures of the two regioisomers when using asymmetric alkynes. In this respect, the classic 1,3-dipolar cycloaddition fails as a true click reaction. A copper-catalyzed variation that follows a different mechanism can be conducted under aqueous conditions, even at room temperature. Additionally, whereas the classic Huisgen 1,3-dipolar cycloaddition often gives

mixtures of regioisomers, the copper-catalyzed reaction allows the synthesis of the 1,4-disubstituted regioisomers specifically. By contrast, a later developed ruthenium-catalyzed reaction gives the opposite regioselectivity with the formation of 1,5-disubstituted triazoles. Thus, these catalyzed reactions comply fully with the definition of click chemistry and have put a focus on azide-alkyne cycloaddition as an example click reaction (Scheme 3).



Scheme 3: Synthesis of 1,2,3-triazole

Introduction to spiro compounds:

Polycyclic heterocyclic molecules play an important role in drug discovery process and among the drugs in the clinical market, 68% are heterocycles. Therefore it is not surprising that research on the synthesis of poly functionalised heterocycles have received significant attention. Indole and Indolines are particularly important in this context as they are important moieties in large number of biologically active compounds. Some indolines that are spiro annulated with heterocycles at 3-position (spirocyclo-oxindoles) have shown

promising biological activity. The spirooxindole system is core structure of many pharmacological agents and natural alkaloids.³⁰ Moreover enantiomerically pure spiro-cyclopropane oxindoles are challenging synthetic targets due to their strained three membered rings with three contiguous stereogenic centers at least one of which is quaternary.³¹ Taking into account their wide spectrum of biological activities, the stereo selective synthesis of spiro-cyclopropane oxindoles is of high practical value.

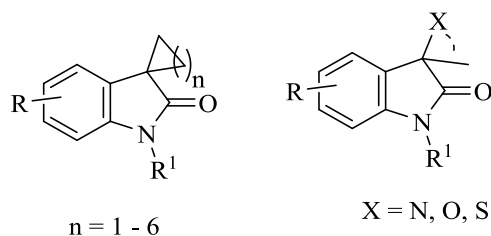


Figure 5: Carbo- and heterocyclic frameworks spiro-fused to 2-oxindoles

Spirooxindolines in natural products:

The sterically constrained spiro structure is present in many natural products, which means this class of compounds has various important biological properties. A prominent structural feature of the oxindole alkaloids of the Strychnos family and

related natural products is the presence of a Spiro [pyrrolidin-3,3'-oxindole] core. Additional oxindole alkaloids have been isolated from other plant sources exemplified by rynchophylline voachalotine oxindole containing similar structural features as Fig-6.

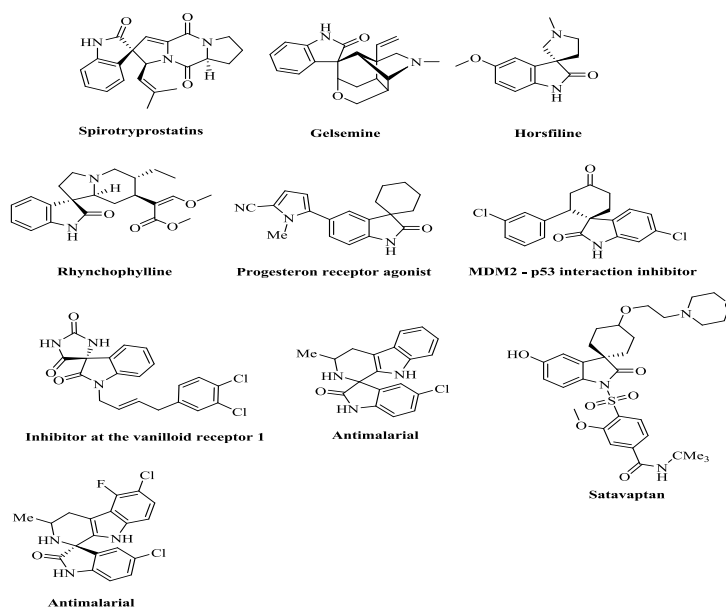


Figure 6: Selected biologically important spiro-cyclic compounds possessing 2-oxindole motif

Spirocyclopropane indolines in medicinal chemistry:

The poly substituted central atom common to the rings of spiro compounds confers on the overall molecular framework unique 3D properties that were recognised early on by medicinal chemists. The specific potent non-peptide small-molecule inhibitor mimics the alpha-helix recognition motif of the p53-MDM2 complex,

therefore efficiently reactivating p53 tumour suppressor activity by MDM2.³²

In addition to a very specific spatial arrangement of functional groups, the spiro moiety also brings a high degree of rigidity to the overall structure and reduces the number of rotatable bonds. The overall entropic price paid to reach the correct spatial arrangement in a ligand-target complex can potentially be decreased, and the probability of an acceptable oral bioavailability is increased.

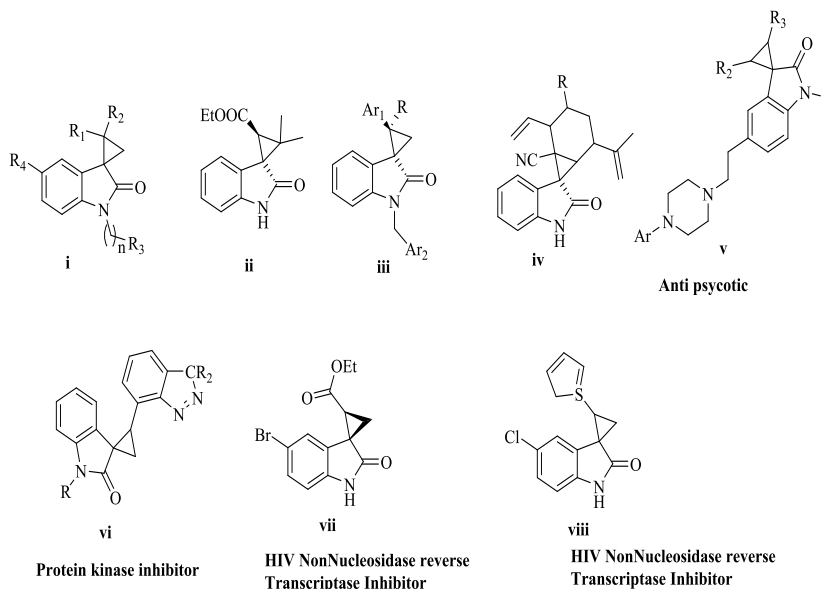


Figure 7: Biologically important spiro cyclopropyl oxindoles

Compounds of type (i) (Figure 7) are activators of AMP-activated protein kinase (AMPK) and which are useful in the treatment or prophylaxis of diseases that are related to AMPK regulation such as obesity, dyslipidemia, hyperglycemia, type 1 or type 2 diabetes. Spiroindole of type (ii) has been found as potent HIV-1 non-nucleoside reverse transcriptase inhibitor.³³ Spiroindole (iii) has exhibited significant antitumor, antiobesity and anti-

diabetic activity.³⁴ Spiroindoles (iv) have been reported as antagonists of vasopressin and are suggested valuable in treatment of congestive heart failure, hypertension, edema and hyponatremia.³⁵ Spirocyclopropyl oxindole (vii and viii) especially is a potent HIV-1 non-nucleoside reverse transcriptase inhibitor. The biological activity of many organic compounds is closely linked to stereochemistry, a phenomenon referred to as the lock-and key model.

Dr. Vitthal B. Makane, Mr. Vinod N. Kale

Because of the potent biological importance of these compounds, catalytic enantio and diastereo selective methods are needed for the synthesis of the spirooxindole framework in the future.

Conclusion:

The present review highlights that the heterocyclic moiety as a template for the development of newer anticancer agents. The modified heterocyclic containing moiety displayed the various biological activities. The heterocyclic compounds containing derivatives showed significant anticancer activities while compared with other activities. They may be used for the development of new drugs for the treatment of cancer diseases by researcher for developing new, innovative drugs

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To Study Insecticidal and Fungicidal Phytochemical and Toxicity of Arsenic metal oxides nanocomposites by using Abrus Precatorius seed extract

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Abstract:

The Abrus Precatorius are one of the most ornamental and beautiful seeds producing plants occur in India. It has pharmacologically active agents in the form of natural resources beneficiary to plants as well as animals. The Seed of this plants having much importance as one of deadly seeds. In this study, we studied the Insecticide and Fungicidal Phytochemical present of Abrus Precatorius plant seed extract. It is quite evident from this review that Abrus Precatorius contains a number of phytoconstituents which reveals its uses for various the rapetic purposes, looking upon wide prospects and potential for various purposes. The study can be tried on various fruit stores trict the action of fruit flies, bacteria or fungus and thereby enhancing their shelf-life. The commercial application of seed extract Abrus Precatorius, Plant of Abrus Precatorius has their chemical consistuent, in this plant poisonous but most powerful chemical is found in their seeds extract. In this seed extract some most poisonous chemical is present this extract treated with Arsenic metal nanocompoistes. In this study we carried out the work on seed extract prepared the chemical by natural source of the insecticide and fungicides base is present in Abrus Precatorius extract. The extract solution is present property; it is act as antibacterial, and antimicrobial. It is use in farming purpose, it is using the home-made paste control and it is present insecticide and fungicides property so it will use in farm.

Keywords: Abrus Precatorius, medicinal plant, *nano* antibacterial, insecticide and Phytochemical.

Introduction:

In India as well as Chaina are more wonderful herbs which having more important in common life. The Abrus Precatorius are one of the most ornamental and beautiful seeds producing plants occur in India . Plant contained different type of property, such as anticipated, antibacterial, anti-inflammatory, anticancer, antioxidants, etc. In plants there is most of plants include in alkoniods, glucoside Terpenoid, tannis etc (1) The Abrus Precatorius is one of most important plant. It is mostly found in all countries are available. It is evergreen plant. It is mostly found in tropical and subtropical Region. It is most useful for the pharmacological and medicinal uses (2). The Seed of this plants having much importance as one of deadly seeds. The uniform weight of the seed 1/10th gram. The plant is well known and propagated due to its seeds (3). The Common name of this plant Abrus Precatorius, Common name in world: Abrus Precatorius, Rosary pea, Abrus aureus. Indian name: Gunj, Gumchi, Chirmiri, Chanoti. Sanskrit name: Rati gunj (4).

The seeds are highly toxic due to presence of Abrin, a protein. It may be fatal if eaten. The primary symptoms include nausea, vomiting, severe abdominal pain and diarrhea, burning in throat; later ulcerative lesions of mouth and esophagus. Ingested seeds can affect the gastrointestinal tract, the liver, spleen, kidney, and the lymphatic system (5). Infusion of seed extracts can cause eye damage, conjunctivitis and even blindness after contact. The major symptoms of poisoning are acute gastroenteritis with nausea, vomiting and diarrhoea leading to dehydration, convulsions, and shock. Dehydration, as well as direct toxicity on the kidneys, could result in oliguria that might progress to death in uraemia (6). Abrin, which consists of abrus agglutinin, and toxic lectins abrans a, b, c and d are the five toxic glycoproteins found in the seeds (7). Abrin is a ribosome -inactivating protein which blocks protein synthesis and is one of the most deadly plant toxins known. The toxin is released only after broking of seeds.

Botanical name	Abrus Precatorius
Kindom	Plantar
Divison	Magnoliophyta
Family	Fabacea
Sub family	Faboideae
Genus	Abrus
Tribe	Abreae
Species	Abrus Precatorius Linn
Common name	Gunj, Gumchi



The plant is mostly found in South America, Maxco, Brazil, West-Indies, also found in India (8). Abrus Precatorius is grown for ornamental purposes, and intemperate climates, it is typically planted as a large flowering shrub or small ornamental tree standard in Garden sand parks(9). For Many years, missionaries and explorers have grown as a decorative plant in temples, residences, Schools, gardens, churches and by the sides of roads. Though

Experimental work:

1. Collection of Abrus Precatorius seed and Its Extract:

The fresh, seed of Abrus Precatorius were collected from botanical garden of our college, Talukamurtizapur Dis-akola. The plant materials of Abrus Precatorius seed were washed with tap water, shade Dried at room temperature and powdered by an Electrical blender.

The various methods are available for investigation and insect repellent phytochemical

widely cultivated in tropical and Subtropical are as of the world (10).

Now recently, we will study the phytochemical and some insecticidal a, fungicidal and pesticidal property. Some study the pest Control property and phytochemical property. We will find some what type of chemical present in the plant is found out.

properties of Abrus precatorius. These methods find the toxic chemicals in Abrus precatorius seeds which is useful to cure warm infection on crops. For this , we will used the simple distillation method. The method for extraction of Abrus precatorius seeds consist of a following steps :

1. Collection of Sample: The seeds of Abrus precatorius were collected from the botanical garden of our college botanical garden.



Fig 2.1 Collection of Abrus Precatorius seed:

2. Grinding of Seeds: Grind the dry seeds of Abrus precatorius and coarsely powdered with the help of mortar and pestle.



3. **Seam distillation Method:** Take 50 ml ethanol, 50 ml benzene and 50 ml chloroform as a solvent in R.B. which containing a Abrus

precatorius seeds powder and reflux it for 2-3 hours. After that cool the mixture for few minutes.



Fig 2.2. Steam Distillation

4. **Filtration:** Filtrate the mixture of Abrus precatorius seeds powder with the help of separating funnel. The filtrate or extract of Abrus

precatorius seeds powder are used further in various techniques.



FIG 2.3 Filtration of Seed extract

2. Synthesized of Arsenic Nanocomposites of Abrus Precatorius seeds extract:

In this method for synthesis of nanocompoistes of Arsenic metal, we used arsenic trioxides metal powder heated in hot oven upto 400

⁰C, Cool it and mixed it to Take 40 ml extract of Abrus precatorius seeds and add 2.5 gm of Arsenic trioxide into that extract. Continuously stirred the extract for 8 hour which containing As metal. For this stirring, we used the ultrasonic instrument.



FIG 2.4 Synthesized of Arsenic Nanocompoistes

3. Result and Dicussion:

Techniques: For separation of the chemicals, we used the following techniques.

1. Column Chromatography technique
2. Thin layer chromatography technique

1. **Column Chromatography technique:** Column chromatography technique is used to separate different chemicals from A. Precatorius extract. In this technique, we used Silica as the solid medium. In order to set up the column, a slurry consisting of the adsorbent along with an

appropriate solvent, usually a non-polar solvent, is mixed together. The column prepared by filling Silica gel resin then passed the extract of A. Precatorius seeds on it. We get two

chemicals or extract in the form of colour bands. In this band one is of white and another is light yellow extract which are collected in the test tube.

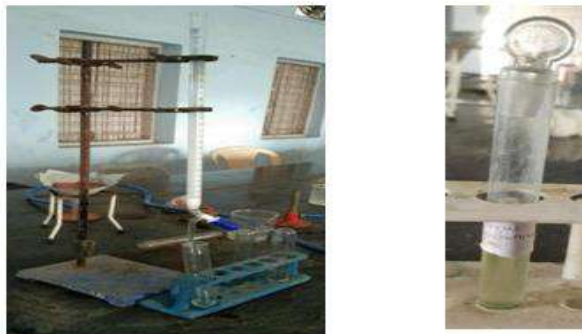


Fig 3.1 Column Chromatography technique

2. Thin layer chromatography technique: TLC used to help determine the number of components in a mixture, the identity of compounds, and the purity of a compound. We use TLC 3.5cm and add the seed extract drop A. Precatorius extract and seed extract and arsenic drop then TLC plate. Compose the mixture of ammonia, purified water and acetone. As solvent system on chromatogram applied the solution was applied the standard mixture of scopolamine hydrobromide and atropine sulphate was used out of which 10 u is applied.

Transfer to the solvent system and rest out, the spot is formed, then TLC plate is transferred to the UV-cabinette and mark the spot, and calculate the R_f value, after calculating the R_f value. TLC can be used to help determine the number of components in a mixture, the identity of compounds, and the purity of a compound. To perform the TLC, we used the A. Precatorius extract and A. Precatorius + Arsenic metal solution. The chromatogram was observed in visible light.

Solvent System: Chloroform: Acetone: Diethylamin (50:40:10)

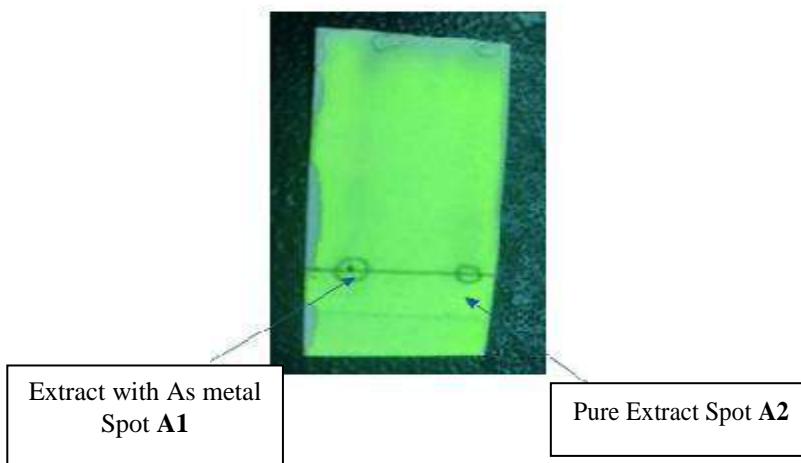


Fig 3.2 TLC technique

Observation and Calculation of R_f value:

Distance travelled by solvent = 3.1 cm

Distance travelled by A. precatorius extract = 1.2 cm

Distance travelled by A. precatorius extract with As metal = 1.3 cm

R_f value = Distance travelled by solute / Distance travelled by solvent

R_f value for A. precatorius extract (Spot A2) = 1.2/3.1 = 0.38

R_f value for A. precatorius extract with As metal (Spot A1) = 1.3/3.1 = 0.41

The standard R_f value of abrine is 0.40. The structure of abrine is given below

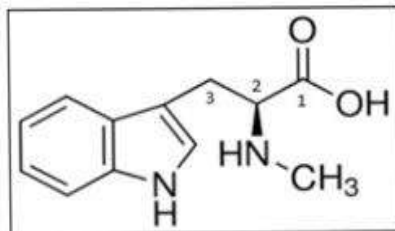


Fig 3.3 Reported abrine structure

So, from above data we conclude that, In the abrus Precatorius extract abrine chemical may be present which is most toxic chemical and abrine also may present in abrus precatorius extract which contains As metal. The identical spots were obtained in A1 with reference value (Rf) 0.41 whereas A1 showed absence of spot having Rf value 0.38, which could possibly be toxin found in the intact seed. The acute toxicity studies for A₁ and A₂ revealed that A₁ was more toxic, whereas A₂ was less toxic

Toxicity

Toxicity is the degree to which a chemical substance or a particular mixture of substances can damage an organism.

Methods of toxicity testing: Bioassay

Bioassay is made up of two words namely 'bios' meaning life and 'Assay' means determination. It is the determination of response of a chemical on living organism.

According to Finney (1952) bioassay means the measurement of the potency of any stimulus which may be chemical, physical or biological, by means of the reactions which it produces in a living organism (10).

We carried out our work to measured the Bioassay by using three standard method

1. **Direct exposure method:** The insects are exposed to materials without extraction. The toxicant may be picked up by insects by feeding, by contact or vapour. The mortality counts are made after specific period of time
2. **Aqueous solution method:** In this method measured quantity of insecticide mixed with water in a suitable container. Known numbers of insects are released into the container for a definite period and number of insects alive or dead are counted. This method is normally used for aquatic insects like mosquito larvae.
3. **Film or residue deposit method:** The insecticidal solution is deposited on glass surface or Petri dish. The test insects are then exposed to the film of the toxicant in the Petri dish. The insects pick up the toxicant through its tarsi and gets killed. The mortality is counted after a definite period.

Insecticidal Activity: To determine the insecticidal activity of the active ingredient and the formulated product under well-controlled conditions and against

Dr. D. B. Dupare

well characterized mosquito colonies for comparative purposes and, as part of research and development, to determine the suitability of the product for aircraft disinfections. The relationship between dose and mortality is analysed by log-dose probit regression. If mortality in the control group exceeds 20%, the test is rejected. If mortality in the control group is 0– 20%, the results with the treated samples are corrected with Abbott's formula:

$$\text{Mortality (\%)} = \frac{X-Y}{100-Y} * 100$$

Where X is the percentage mortality in the treated sample and Y the percentage mortality in the (untreated) control.

The data were recorded before incidence of attack or after 1st, 3rd, 5th, 7th and 10th days' the synthesized Arsenic metal nanocomposites of Abrus Precatorius seed extract and only freshly prepared Abrus Precatorius seed extract prepped seed extract of insecticides by counting the numbers of aphid per plant from 10 cm top portion of the terminal shoot on ten plants randomly selected in each treated and un-treated plots, respectively. After that, check the effectiveness of the tested insecticides was assessed based on the percent reduction population of aphids. Percent reduction population was calculated using the following formula

$$\% \text{ Population reduction} = \frac{X-Y}{100-Y} * 100$$

Case-1. Action of Abrus Precatorius seed extract on bringle plant-

1. **Direct exposure method:** applying pure extract on plant the 10 bringle plants results obtained The data were recorded before incidence of attack or after 1st, 3rd, 5th, 7th and 10th days' and dead the insect.

Case-2. Action of As Nanocomposites Abrus Precatorius seed extract on bringle plant-

As per the case 1 a applying As Nanocomposites Abrus Precatorius seed extract on plant the 10 bringle plants results obtained. The data were recorded before incidence of attack or after 1st, 3rd, 5th, 7th and 10th days' and dead the insect.

2. **Aqueous solution method:** as per the direct method same case-1 and case-2 were perform for measured quantity of insecticide mixed with water in a suitable container. Known numbers of insects

are released into the container for a definite period and number of insects alive or dead is counted. This method is normally used for aquatic insects like mosquito larvae.

3. Film or residue deposit method: as per the direct method same case-1 and case-2 were performed for applying As Nanocomposites Abrus Precatorius

seed extract and pure Abrus Precatorius seed extract deposited on Petri dish. The test insects are then exposed to the film of the toxicant in the Petri dish. The insects pick up the toxicant through its tarsi and gets killed. The mortality is counted after a definite period, 1st, 3rd, 5th, 7th and 10th days’.

Table 3.1 Toxicity Index for As Nanocomposites Abrus Precatorius seed extract and pure plant seed extract

Toxicity/ Days	Direct exposure method:		Aqueous solution method		Film or residue deposit method	
	Case-1 Mortality%	Case-2 Mortality%	Case-1 Mortality%	Case-2 Mortality%	Case-1 Mortality%	Case-2 Mortality%
1 st	0	1.2	0.5	2.6	0.8	2.6
2 nd	1	2.6	0.8	3.4	1.3	3.4
3 rd	1.8	3.6	1.1	4.8	1.9	4.8
4 th	2.3	4.8	1.4	5.5	2.4	5.7
5 th	2.5	5.3	2.4	5.7	2.6	6.2
6 th	2.8	6.7	2.9	6.9	2.8	7.9
7 th	3.2	7.8	3.6	8.6	3.7	8.9
8 th	4.3	9.2	4.8	10.8	5.2	10.8
9 th	4.5	10.2	5.3	17.6	5.8	12.6
10 th	4.8	11.4	6.4	18.8	6.9	15.8

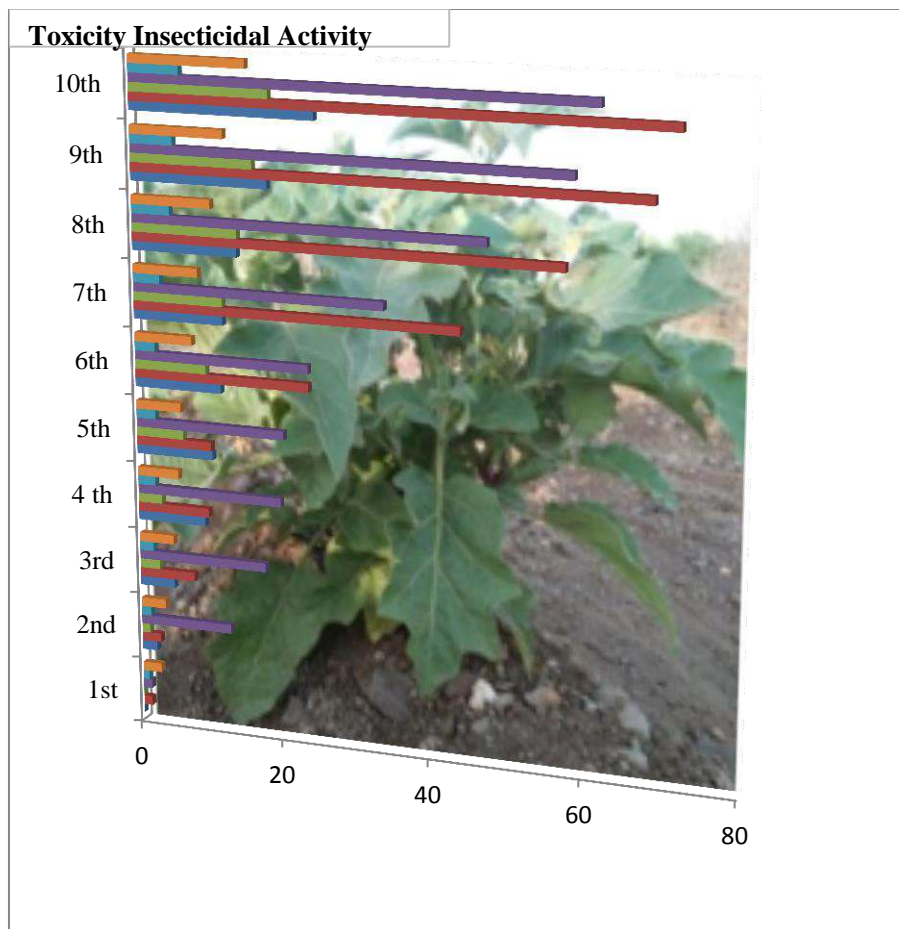


Fig.3.4 Graphical presentation of Insecticidal Activity

Antibacterial susceptibility test. –Solomon et al,

Bauer et al, (1966) was used to screen the antibacterial activity. In-vitro antibacterial activity was screened by using Muller Hinton Agar (MHA) obtained from Himedia (Mumbai). The MHA plates were prepared by pouring 15ml of molten media into sterile petriplates. The plates were

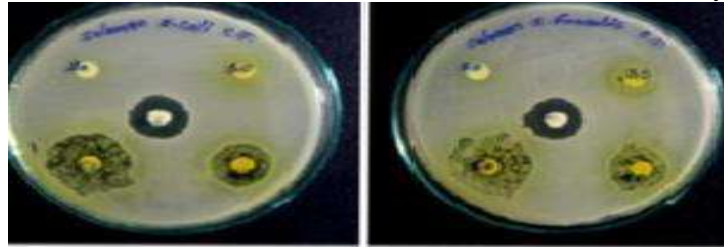
Dr. D. B. Dupare

allowed to solidify for 5 minutes and 0.1% inoculum suspension was swabbed uniformly and the inoculums were allowed to dry for 5 minutes. The compound of concentration 5mg/ml, 10mg/ml, 20mg/ml, 30mg/ml, 40mg/ml and 50mg/ml were loaded on 6 mm sterile disc. The loaded disc was placed on the surface of medium and the Compound

was allowed to diffuse for 10 minutes and the plates were kept for incubation at 37°C for 24 hrs. At the end of incubation, inhibition zones formed around the disc were measured with a transparent ruler in millimeter. Standard antibiotic chloramphenicol of concentration 1mg/ml was used as positive control [5].

Antimicrobial activity

The antimicrobial activity of Arsenic metal extract obtained from Abrus Precatorius was tested against bacterial species of Escherichia coli, Enterobacter Aerogenes, Proteus vulgaris and fungal species of Escherichia coli, and Penicillium spp. Better antimicrobial activity was observed with the extracts showed maximum activity against E.coli.(6).



1) Escherichia coli, 2) Penicillium spp

Fig 3.5 Antimicrobial Activity of Plant Extract

Table 3.2 antimicrobial Index for As Nanocomposites Abrus Precatorius seed

Antimicrobial / Days	conc. Mg/lit	1) Escherichia coli,		2) Penicillium spp	
		Case-1 %	Case-2 %	Case-1 %	Case-2 %
1 st	5	0	1.2	0	1.2
2 nd	5	2.1	2.6	1.1	12.6
3 rd	5	4.8	7.6	2.8	17.6
4 th	5	9.3	9.8	3.3	19.8
5 th	5	10.5	10.3	6.5	20.3
6 th	5	11.8	23.7	9.8	23.7
7 th	5	12.2	43.8	12.2	33.8
8 th	5	14.3	57.2	14.3	47.2
9 th	5	18.5	68.2	16.5	58.2
10 th	5	24.8	71.4	18.8	61.4

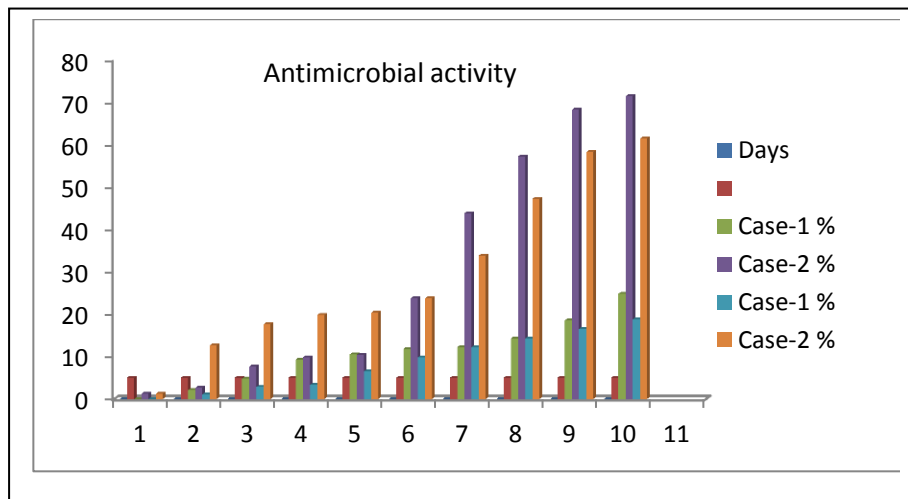


Fig 3.6. Graphical Presentation of Antimicrobial activity

Antimicrobial activity on fungus:

The prepared both the solutions pure with the metal are spread on the fungus on brad Separately and then observed the change with the microscope study: For analysis of antimicrobial activity, spread a extract of A. Precatorius with As metal on the fungus and observed it. After spring a extract which contains a

As metal, we observed the fungus in which extract with As metal are stopped the growth in large portion of the fungus because of As metal are more toxic chemical. So, The rate of growth of fungus of extract with As metal are decreases than simple extract of Abrus Precatorius.



Fig 3.7. Result Action of Abrus Precatorius extract on fungus on brade

Table 3. 4 case study the spraying action on fungus

Population reduction / Days	conc.Mg/lit	Fungs on Brade	
		Case-1 %	Case-2 %
1st	10	00	00
2 nd	10	0.1	1.6
3 rd	10	1.8	7.6
4 th	10	6.3	9.8
5 th	10	10.5	10.3
6 th	10	11.8	23.7
7 th	10	13.2	33.8
8 th	10	14.3	45.2
9 th	10	19.5	67.2
10 th	10	24.8	78.4

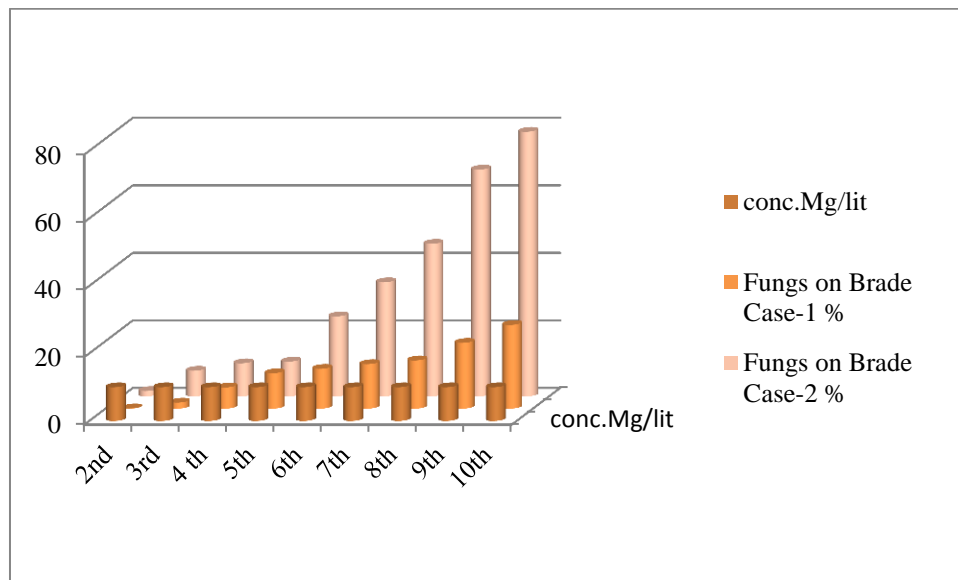


Fig 3. 8. Graphical Presentation of Population reduction

Applications:

- The seeds are also used to treat diabetes and chronic nephritis.
- The leaves are used for their anti-suppurative properties. They are ground with lime and applied on acne sores, boils and abscesses.
- The plant is also traditionally used to treat tetanus, and to prevent rabies. Various African tribes use powdered seeds as oral contraceptives.
- Paste of roots is administered to cure abdominal pains and tumors. This paste is also taken orally as a single dose once only for abortion.

- Grinded roots of Abrus precatorius are taken with pure clarified butter thrice a day for four days to cure cough.
- For graying of hair, a paste of leaves and seeds is made and juice is extracted. It is applied on hair as oil once a day one hour before taking bath.
- Dry seeds of Abrus precatorius are powdered and taken one teaspoonful once a day for two days to cure worm infection.
- In veterinary medicine, it is used in the treatment of fractures.



Conclusion:

It is work that the investigation of Phytochemical which is responsible to and insect repellent Phytochemical properties of *Abrus precatorius* is the most important method to find a toxic chemicals which is useful for control the growth of insect on crops. We also found the extract of *Abrus precatorius* seeds with arsenic trioxide which is also used to control warm infection on crops and also used to control the growth of fungus. The present work provides information of its Phytochemical properties and antimicrobial activity of *Abrus precatorius* extract which may be useful for the further study of Ayurvedic drugs of medicinal practice of present era.

The plant *Abrus precatorius* Linn produced different pharmacological activity eg. Antimalarial, Anidiabetic, Anti-inflammatory, etc. the plant also have traditional value such as aphrodisiac, remove biliousness, useful in eye diseases, cures leucoderma, itching, skin diseases and wounds. From Result and observation it clear that the toxicity or mortality rate of this plant seed is more in Aqueous solution method of Arsenic Trioxides Nanocompoistes as compared to pure plane seed extract. The toxicity rate also more in Film or residue deposit method but it less than aqueous method. We observed antimicrobial Index for As Nanocomposites *Abrus Precatorius* seed on *Escherichia coli*, good result obtain to reduce the population rate. Antimicrobial activity on fungus on brade its cleared that the As metal nanocompoistes of *Abrus precatorius* seed extract is a powerful tool in farming and Gardening purpose. In future there is wide scope to developed nanocompoistes of plant seed extract.

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A Thematic Analysis of B. R. Ambedkar Views on the Concept of One State, One Language with Respect to Culturally Diversified India

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Abstract:

Unity in diversity, India is a nation that is famous in the world for its diverse cultural trends. But this diversity has led to many conflicts in India. Mainly due to linguistic and ethnic diversity in the country, regional conflicts have become the reason for an imbalance in national security and unity in recent times. The issue of nation-building in the post-independence days posed several challenges to the then Indian government. Among them, the most complicated issue was to divide the hereditary territories on a linguistic basis to make a fully structured and functioning democratic nation through democratic governance. During this time, the demand for separate state based on linguistic identity emerged across India. Ambedkar elaborated his thoughts on the subject in his writings, "Thoughts on Linguistic States." Ambedkar's main argument was that states should be divided mainly on the basis of one state, one language, and this would treat the people of the country culturally, socially, politically, and economically as equals and control the cultural, social, and political oppression of multilinguals. Based on Ambedkar's formula of division of states based on language, a committee headed by Fazal Ali in 1955 was influential in giving a report on division of states based on languages.

The present research paper aims to analyse the formation of linguistic states and the recommendations of the committees during the post-independence period, the role, and relevance of Dr. B.R. Ambedkar's ideas in the creation of linguistic states and the ideologies for redistribution of states and balanced development of the country. Along with the significance of small states in India and linguistic and cultural factors influencing development.

Keywords: Regional Disparity, Cultural Diversity, Demand for Separate State, One state one language.

Introduction:

The demand for division of states on the basis of language started as early as 1895, during the pre-independence British Indian administration. As a result, in 1936, the Bihar region was divided, and the present-day Orissa state was carved out for the Oriya speakers. This continued, and after independence in 1949, movements started across the country for the formation of the states on the basis of language. Hence, the central government formed the JVP committee for in-depth study with detailed recommendations.

Its recommendations were partially accepted, but those recommendations failed to safeguard the interests of all in a vast and diverse India. In the year 1953, the Committee was constituted to submit a detailed report on the partition of states under the leadership of Justice Fazal Ali. Before this committee started its work, B.R. Ambedkar put forward the principles of partition of states through his several articles to the government. These formulas and ideas of his have analysed the consequences of the partition of the country that India was facing at that time and the

problems that India may face in the future and presented their ideas.

As a result, primarily, the state of Andhra Pradesh emerged on a linguistic basis by dividing the then 16 Telugu-speaking districts in the northern part of Madras province in the southern part of the country. Then in 1954, the small state of Bilaspur was added to Himachal Pradesh in the northern part of the country. Then in 1956, based on the recommendations of a committee headed by Supreme Court of India Justice Fazal Ali, the 7th Amendment to the Constitution was passed, re-dividing the four states into 14 core states and six Union Territories. But at that time, people who were still linguistically and culturally different in several areas continued to fight for a separate state.

Later in 1960, Gujarat was carved out of Bombay, Haryana and Himachal Pradesh were created out of Punjab in 1966, Manipur and Tripura were given statehood in 1971, Meghalaya was created out of Assam, and Arunachal Pradesh and Mizoram were also formed as Union Territories. In 2000, the states of Jharkhand were bifurcated from Bihar, Chhattisgarh from Madhya Pradesh, and Uttarakhand from Uttar Pradesh. Then in 2014,

Andhra Pradesh state was divided and Telangana state was separated, indicating that the division of states on the basis of development is inevitable in the governance system of India. Even at present, several states in the country, which are large in population and land area, as well as regions with linguistic and geographical diversity and disparity in development outlook, are demanding and fighting for a separate state. In such a situation, this article mainly analyses how the ideas given by Ambedkar are advantageous to the current situation.

Review of Literature

B. R. Ambedkar's (1953) writings on "Thoughts on Linguistic States" It has been mentioned in the article that at the beginning of independent India, the country faced several severe problems. One of the most complicated issues is the redistribution of states. During the redistribution of these states, Ambedkar's original wish was that the states should be reconstituted through his theory that one language is one state and no state or language should control the politics of the country. Elaborating his desire in this treatise, he elaborated on the future development of the country and equal opportunities for all its citizens during the reorganization of the states.

Ranjana Sarkar's (2020) article accounts on "why Ambedkar demanded "one state, one language" and an overview of his "thoughts on linguistic states." In the problem of nation-building in the post-independence decade, redistribution of states was a major issue at the same time as the tragedy of partition. Having understood such a problem, Ambedkar should redistribute the states based on the principle of One State Online and thereby protect the rights and opportunities of all the speakers of all communities and play an important role in their socio-cultural political and economic development. The author describes the post-independence conditions in the state and the impact of Ambedkar's ideas on the redistribution of states in the country after that based on his principles.

Asha Sarangi's (2006) article titled "The Concepts of Ambedkar and the Linguistic States: A Case for Maharashtra" has mentioned that Ambedkar argues the creation of new states should be done in a democratic sense along with political and cultural soiling during the formation of states. The author has mainly given importance to the population size of the state in this article. In his ideas, he suggested the creation of the present-day states of Uttarakhand, Jharkhand, and Chhattisgarh. One state based on one language is the concept of a state that should aim primarily for development, justice, social equality, and freedom of untouchables.

Aaditya Trivedi's (2020) article titled "What were Dr. B. R. Ambedkar's views on the formation of linguistic states?" highlights his recognition of the importance of unity while acknowledging the

significance of language and cultural identity. Ambedkar supported the separation of states on the basis of language, which was conducive to the development of a strong and united nation. Importance of Language Ambedkar, who supported the aspirations of various linguistic communities, has been analyzed in detail in this article for their suggestions in solving the major problem facing India in the post-independence period regarding the formation of linguistic states.

Objective of the Study

- To analyse the formation of linguistic states and the recommendations of the committees during the post-independence period.
- To review the role and relevance of Dr. B. R. Ambedkar's ideas in the creation of linguistic states.
- To analyse the relevance of Dr. B. R. Ambedkar's ideologies for redistribution of states and balanced development of the country.
- To analyse the significance of small states in India and linguistic and cultural factors influencing development.

Methodology and Data Source:

The present study is mainly based on secondary sources of information gathered from Dr. B. R. Ambedkar's writings, reports of the Human Development Index, research articles, newspapers, internet sources, and survey reports.

Study employs a qualitative methodology based on secondary data analysis. Key data sources include Dr. B. R. Ambedkar's writings, which provide foundational insights, and Human Development Index reports from UNDP for quantitative metrics. Peer-reviewed research articles will be accessed through academic databases, while reputable newspapers will offer contemporary perspectives. Internet sources will supplement findings with relevant statistics and discourse. Additionally, survey reports from credible organizations will inform socio-economic contexts. Data will be analysed thematically and comparatively to assess the intersection of Ambedkar's philosophies with human development indicators, ensuring source credibility and academic integrity throughout.

Analysis of the data:

The struggle for separatism of the states in the country that grew up with the independence of India is still going on today as a manifestation of cultural diversity and ethnic differences in India. On this issue, Ambedkar, through his article Gendered States in 1953, suggests to the Indian government that the states in India should be divided mainly on the basis of languages. Also, his first strategy was to democratize the polity that the country inherited from British rule and some states. At the time of redistribution of state boundaries, language should be the main criterion. Because a linguistically

unified nation is culturally, socially, and politically organised. The states in the northern part of India have larger populations and cover more land area than the states in the southern part of the country. Also, states in the northern part of India have a larger population and a larger land area than the states in the southern part of India.

According to the 1951 census, Ambedkar criticized the creation of the state of Uttar Pradesh, which had a population of 16 percent of the country's population of six crores, and lamented that six to eight states could be divided out of the six-crore population. The northern states, with their larger populations, primarily sought division based on population size. Even if the states are divided on the basis of languages, there may be anarchy in the country.

Ambedkar's vision was that a multilingual community could gain political and cultural control over linguistic minorities. Ambedkar's position was that the southern states, though having a vast land area, were controlled and small and linguistically diverse, so they should not be politically and culturally linguistically unjust. When a state is redistributed from a particular point of view, the people of that state are already emotionally attached to it. As a result, there is a lack of support and

cooperation for their stand and ideas in national politics.

Also, Ambedkar's strong position was that a large population would cause a setback in terms of national unity and development from an administrative point of view. Mainly, he described the population and land conditions of the northern and southern states, and the country adopted a semi-federal system. In order to achieve the security and administrative organization of the country, it is essential that there be an equal distribution of population and land areas among the states. It was Ambedkar's idea that it plays an important role in terms of development and unity.

The states of America have fully accepted the confederation model because of the very diverse cultural and social lifestyles that are not comparable to the division of the US states. Ambedkar was of the opinion that the states of India are politically, culturally, socially, and economically diverse because of their diversity.

The formation and necessity of language-wise states are depicted as follows Map of India, after 1956 language-wise state formation (**Image-1**), Region-wise map of majority language states (**Image-2**), and States administrative Languages of the Indian States (**Image-3**).

Image 1: Map of India After States Reorganization in 1956



Source: <https://en.wikipedia.org/>

Ambedkar's "One Language, One State" formula:

Ambedkar tries to explain the advantages and limitations of the classification of snails while describing the division of trees on the basis of language on the boundaries of states in the country. First of all, any common language inculcates a strong sense of linguistic fraternity in its people and helps in inculcating its cultural ownership in the people as well as making cultural ideas compatible

Manjunath Pujar, Suresh N. Hullannavar

with each other in its people. As a result, communal consciousness develops and forms unity among the people of that language. As a result, competition with other cultural or linguistic communities naturally develops. While explaining this, Ambedkar gives the example of the colonial states of Austria and Turkey, whereas the concepts of democracy grew, the occupied multilingual and mixed culture areas split up and emerged as

monolingual powers like Germany and France today.

Explaining the second basic point, Ambedkar states that a multilingual state usually leads to dissent. In a democratic type of government system, the sentiments among the people inspire cultural, social, and political diversity while running the administrative system smoothly. As a result of this, there may be chaos in the entire administrative system. Ambedkar describes the consequences of the bitter hatred between the Marathas and Gujaratis that could lead to the failure of democracy, explains the inevitability of Gujarati and Maratha separation, and advises on the control of violent struggle.

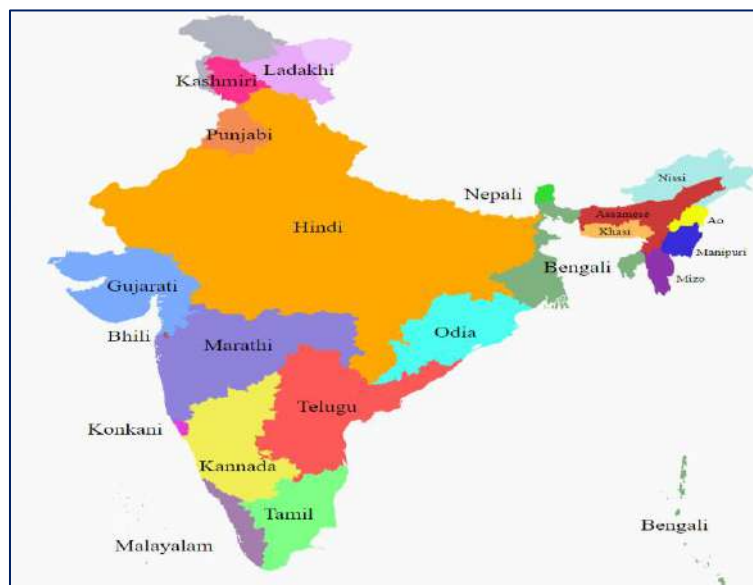
Explaining the third point, Ambedkar states that the social and cultural differences between any two culturally distinct communities develop as a function of forced integration in political and economic activities. It spoils the relationship with each other. Over time, this would lead to conflict between positions and conflict, which would lead to anarchy in the country, contrary to the basic wishes of the Constitution.

Ambedkar's one-language concept of a state suggests that if democracy is to function smoothly and successfully, it should be the primary duty of the rulers to eliminate cultural and social contradictions and create cultural and social unity among the people. Additionally, Ambedkar outlines the framework for states based on language and

advocates the principle that each state should have one language. According to him, each linguistic group should have its own separate state in the country. To further simplify Ambedkar's point, we have to refer to the theory of partition of northern and southern states as recommended by the Justice Fazal Ali Committee. This is because Ambedkar criticizes the political dominance of the states of the Hindi-speaking community, which is linguistically the largest in the country. This is because the decision to make Hindi the national language was announced earlier due to only one vote in the process between the two groups in the voice vote on whether Hindi should become the national language.

In other words, by mentioning this issue, Ambedkar makes it clear that this process will have an unimaginable impact on the future political conditions and processes of the country. This is because multilingual communities often have the expected influence and control over decisions taken by the central government. As a result, control and influence will provide greater opportunities and benefits to the northern states of the country. Ambedkar analysis that the southern states and all other states of linguistic minorities will suffer injustice due to such a situation. Supporting the recommendations of KM Panicker's committee, he recommends dividing Uttar Pradesh into small parts to avoid political and cultural control of the multilinguals.

Image 2: Map of India Showing Linguistic Areas



Source: <https://en.wikipedia.org/>

Further, Ambedkar explained the warning he gave when he interviewed C. Rajagopalachari that it was reasonable to give equal representation to all regions in India. Ambedkar lamented that otherwise it would be unfair to the southern states and other minority-speaking states that the selection of the Prime Minister and President would always be dominated by Hindi speakers.

Ambedkar then goes on to explain that, although it is difficult to determine the standard size of a state, expanding states based on population and geographical conditions can contribute to political stability and cultural harmony. He suggests that to overcome such political antagonism, the then large states of Uttar Pradesh, Bihar, and Pradesha could be divided into smaller states, reducing political

stability in the country under the control of the majority Hindi-speaking community.

Ambedkar primarily proposed dividing Uttar Pradesh into three states, with Meerut, Kanpur, and Allahabad serving as the centres of the respective new states. These states have a population of approximately two crores as per the

1951 census. In addition, it is said that it will help in smooth footing and effective administration. Also states that Jharkhand region should be separated from Bihar state, and they will be part of and states respectively as their capitals, and their population will be about one and a half crore people, which will facilitate effective administration.

Image 3: Map of India with Recognized Official Languages



Source: <https://www.google.com/>

Ambedkar proposed the division of Madhya Pradesh into two parts: a northern Madhya Pradesh, which would include the regions of Vindhya Pradesh and Bhopal, and a southern Madhya Pradesh, comprising the entire state of Indore and fourteen states from the Mahakosal region. However, his arguments were considered premature and not aligned with future political stability. The modern state of Jharkhand, which separated from Bihar, holds significant importance among newly formed states. In the context of Madhya Pradesh's division, the present-day state of Chhattisgarh occupies a distinct political position and territory.

Then Ambedkar suggests that Maharashtra should be divided into four parts while discussing the political contradictions of Maharashtra, another large state. First, they argue that the city of Bombay and its surrounding areas should be constituted as a separate state, i.e., a city-state, and its taxation and revenue powers should be kept independent. Secondly, he states that Nagpur should be the centre of the region, indicating Eastern Maharashtra, i.e., present-day Vidarbha province. Central Maharashtra, i.e., the state of the original Marathi-speaking region centered on present-day Marathwada Region. Then Western Maharashtra. Ambedkar analyzed their idea to be a state of the original Gujarati-speaking community, mainly comprising present-day Gujarat, i.e., Saurashtra. Another important reason for making Maharashtra into four main parts was to eliminate the educational

Manjunath Pujar, Suresh N. Hullannavar

disparity that existed in East West and Central Maharashtra at that time. His aim was to raise educational standards with the cooperation of individual governments by dividing it into states.

Role of caste in formation of states:

Explaining the relationship between the majority and the minority on the basis of caste along with language-based states, he advocates that we should systematically manage political conservation mainly as a basis of social structure like languages. Proposing this idea, Ambedkar said that every region has its own majority and minority caste system and groups. Secondly, the small-caste people have to depend on the economic system of the majority, which controls them socio-economically and culturally. Finally, he argues that this system systematically creates deep inequality in society and that majority and minority caste communities can be portrayed as small nations if assimilated in this way. Socially, Ambedkar describes the political system between the majority and the minority in this caste system, describing the outcome of elections and elections where the larger caste people usually form the majority, where the selection is based on social support and caste rather than popularity, reflecting India's cultural base.

It can also lead to political instability in the same way that majority languages have political and cultural effects on minority speakers. That is why Ambedkar argues that dividing the states of the large linguistic community into small states and

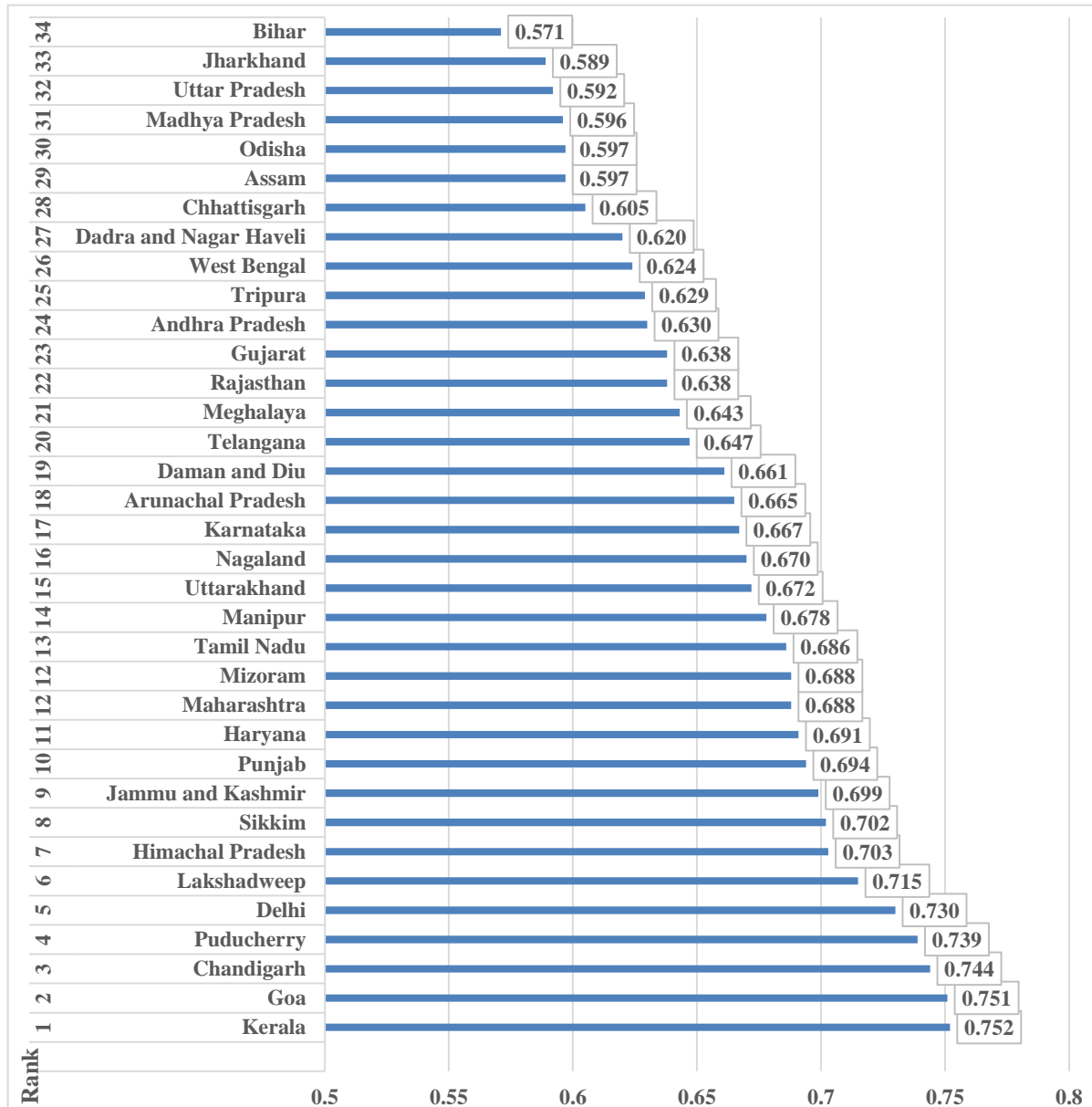
dividing the states of the large linguistic community into small states by identifying the large number of caste people in that region can give a strong foundation to the democratic system and union of India.

Relevance of Ambedkar's Ideas of Separation of the Large States

Today, we use the Human Development Index (HDI) as a benchmark to determine development from local to national levels by surveying various dimensions of a country's socio-

economic and educational sectors. According to the HDI, backward areas isolated from the mother state in 2000 have scored a higher rank than the mother state in the same Human Development Index of 2019, reflecting Ambedkar's vision of development. **Bar Graph 1** shows the ranking of all states in the 2019 Human Development Index, with southern states generally ranking higher due to population control and efficient use of human and natural resources with health and education.

Bar Graph 1: Human Development Index Score at 2019

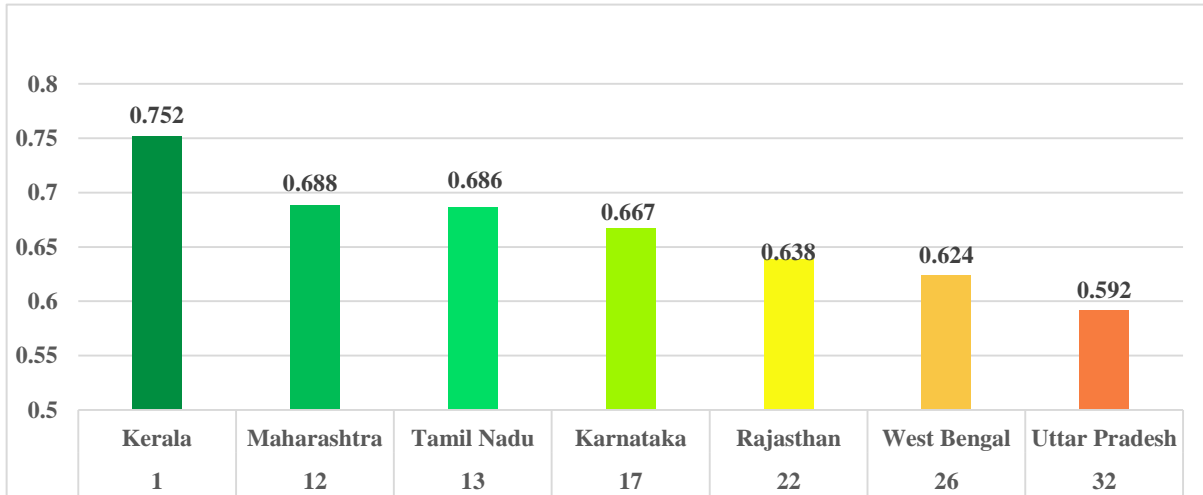


Source: Human Development Index, 2019

Below **Bar Graph 2** shows a general comparison of the largest states by population and area. Uttar Pradesh, West Bengal, Rajasthan, and Bihar states with the highest population density in

this figure are a few positions, while the southern states of Kerala, Maharashtra, and Tamil Nadu are at the top, as well as Karnataka in the middle position.

Bar Graph 2: Human Development Index Score of Major States at 2019

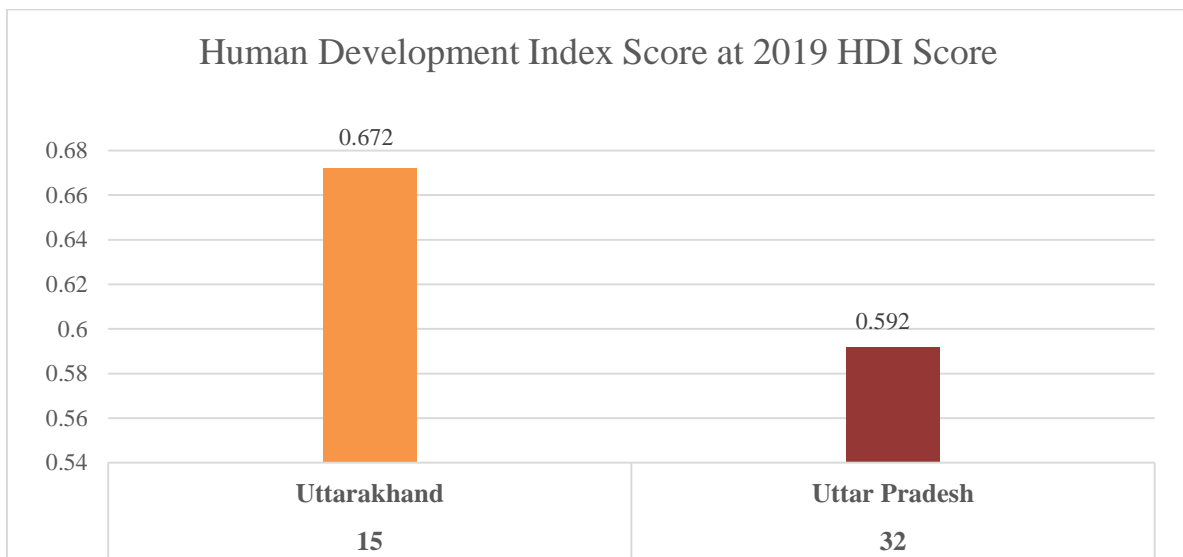


Source: Indian HDI Report, 2019.

The Below **Bar Graph 3** explains that the state of Uttarakhand, which was separated from Uttar Pradesh in 2000, scored highest in the 2019

Human Development Index. This means that we can identify the improvement in the standard of living and social conditions there through the ranking.

Bar Graph 3: Comparison the Human Development Index Score Between Divided Uttarakhand and Uttar Pradesh States

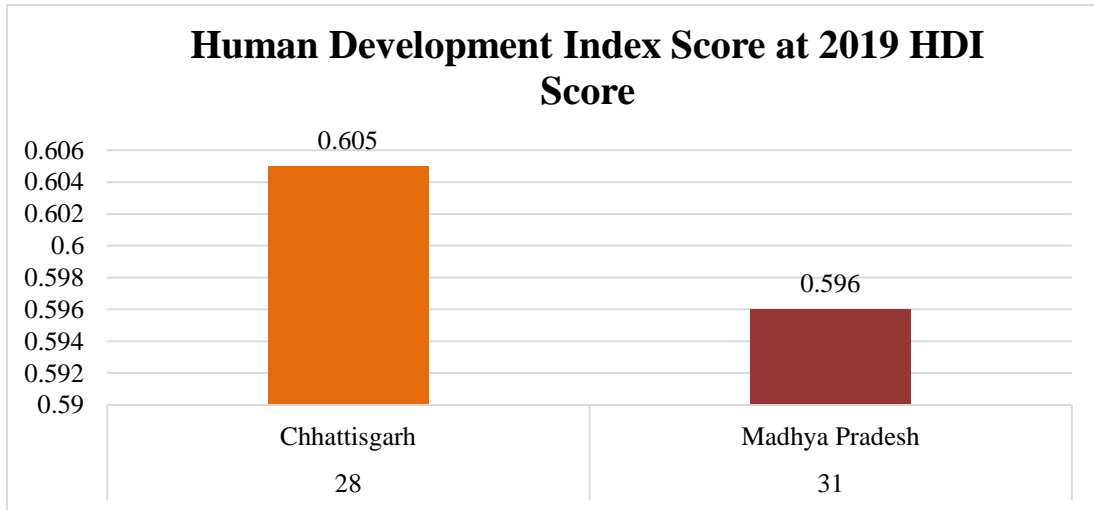


Source: Indian HDI Report, 2019

Chhattisgarh state, isolated from Madhya Pradesh state in **Bar Graph 4**, has achieved more than its motherland, which determines that a small

state helps in providing effective and objective governance.

Bar Graph 4: Performance of Human Development of Divided Madhya Pradesh and Chhattisgarh States

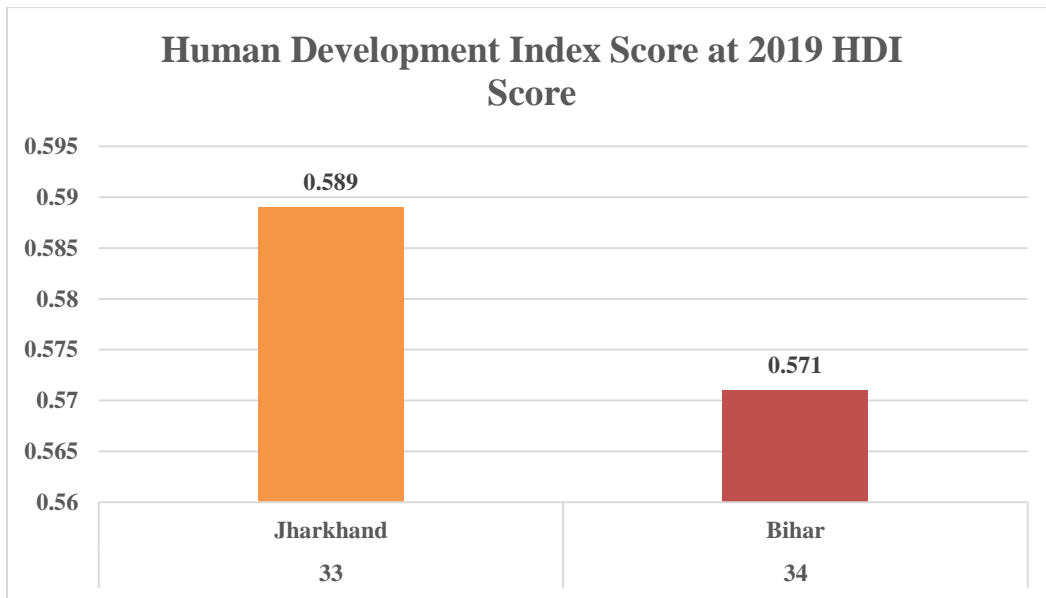


Source: Indian HDI Report, 2019.

By observing the HDI 2019 report, the researcher realizes that the state of Jharkhand, which was separated from Bihar in the year 2000 in **Bar**

Graph 5, has fared better than its motherland in terms of social development and employment opportunities for the youth.

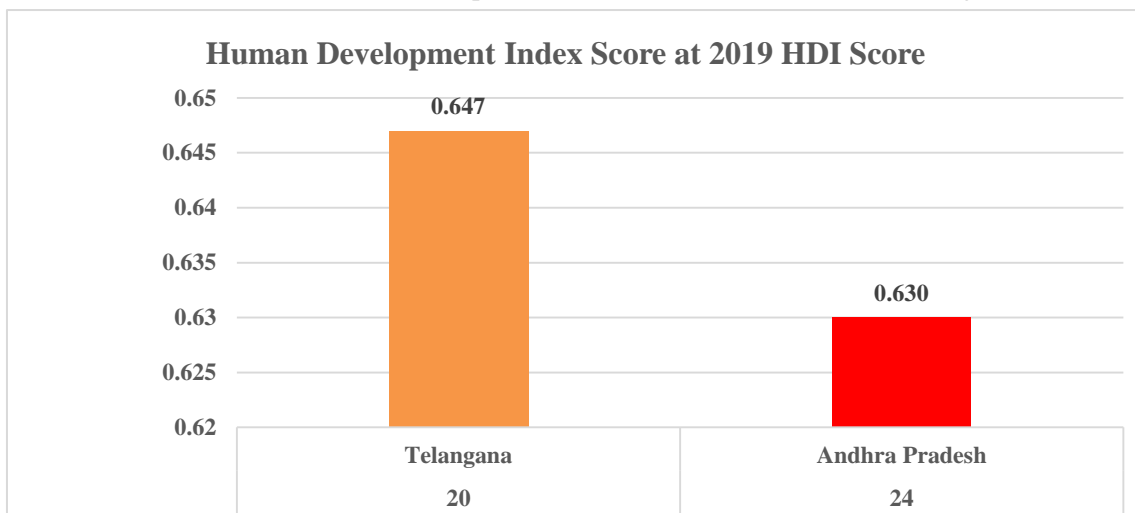
Bar Graph 5: 2019 Human Development of Divided Bihar and Jharkhand States



Source: Indian HDI Report, 2019.

In **Bar Graph 6**, Telangana, a state separated from Andhra Pradesh in 2014, is the most backward region. But the fact that it has scored

higher as compared to Andhra Pradesh in the Human Development Index published in just five years shows its improvement in development.

Bar Graph 6: 2019 Human Development of Divided Andhra Pradesh and Telangana States

Source: Indian HDI Report, 2019.

Proposed New States and Dr. B. R. Ambedkar Thoughts:

Ambedkar's motto was that North India, especially the majority Hindi-speaking regions, should not exercise political control and oppression over the rest of the country. Ambedkar foresaw that religious and social majorities would gain political control over the minorities and the minority states, and the politics and economy would come under the grip of the majority, leading to political and economic inequalities between the princely states. As a matter of fact, there may be political calculations in the stand of Mayawati, the former Chief Minister of Uttar Pradesh, who proposed to divide Uttar Pradesh into four more states as Uttarakhand state is already development-oriented. But surely it can help in upholding the democratic values of the country in terms of economic and social development.

Reason: It is clear that dividing Maharashtra into four states, as stated by Mayawati, is necessary in today's politics and development perspective. With a total of 80 Lok Sabha constituencies, more than 30 Rajya Sabha seats, and more than 400 assembly constituencies, Uttar Pradesh comprises a total of 75 districts and 18 revenue divisions. At the time of bifurcation of a state with a population of around 24 crores into four states, providing a language and cultural base, it seems appropriate to separate it.

The Bundelkhand region is a geographically and culturally diverse region with a population of 5.6 million Bundeli dialect speakers as per the 2011 census. The proposed plan was to make the region into a state consisting of a total of 13 districts, mainly comprising four districts of Chitrakoot division of Uttar Pradesh, three of Jhansi division, one of Gwalior division of Madhya Pradesh, and five of Sagar division, with Jhansi as its capital.

Also, according to the 2011 census, one of the major proposals was to make the eastern region, which has a Bhojpuri-speaking majority of 51 million, a separate state. The area consists of a total of 29 districts, comprising mainly Allahabad, Azamgarh, Basti, Devipantha, Faizabad, Gorakhpur, Mirzapur, and Varanasi revenue divisions.

Awadh Pradesh, which has a multilingual Awadhi community as per the 2011 census, has a population of 3.85 Awadhi dialect speakers in a total of 13 districts in 3 revenue divisions, namely Kanpur, Lucknow, and Faizabad revenue divisions. This means that if this population is estimated, it will be a bigger state than today's Kerala state.

Then, Harit Pradesh, which has a Braj speaking majority, is a huge province consisting of 26 districts mainly from Agra, Aligarh, Bareilly, Meerut, Moradabad, and Saharanpur divisions. That means it was bigger than the present-day state of Andhra Pradesh.

Similarly, the struggle for secession of Vidarbha and Marathwada regions in Maharashtra has the historical background. The state of Maharashtra with a total population of 12 crores currently consists of 36 districts, the highly sought-after Vidarbha region mainly comprising five districts of Amravati and six districts of Nagpur with Nagpur as the centre. The struggle for the creation of a separate state has been going on for decades. Also, another very backward region of Maharashtra is the Marathwada province, mainly comprising eight districts of Aurangabad district, where the cry for a separate state of Marathwada is very common. If we talk about Karnataka, as per the estimate of 2024, in Karnataka, which has a population of more than 7.5 crores and has a total of 31 districts, North Karnataka, which consists of 14 districts, is the most backward region. As a result of the failure of our governments to effectively implement the recommendations made by the Dr. D.

M. Nanjundappa Committee in 2002, the struggle for separate statehood in North Karnataka erupted during elections and budget allocation. Similarly, discussions about this are coming to the fore in several states, like Saurashtra in Gujarat and Maru Pradesh in Rajasthan. Ambedkar gave advice and instructions for such modern problems during the formation of the first government of the country; his foresight and political skill about the unity and development of the country is a testament to his knowledge.

Conclusion:

Ambedkar's general vision of ideas and observations indicating cultural and social equality is gaining importance, even in present-day India. The article pinpoints its focus on the advice given by Ambedkar at the time of independence and his ideas, mainly about the formation of language-based states. He stressed the importance of providing social and economic equality based on development and demands for separate states, which is still relevant in the present-day political climate, which Ambedkar had addressed almost 70 years ago. Ambedkar's greatest contribution to the country was the idea of bringing people together on the basis of language and contributing to the unity of the nation, even though the redistribution of states on the basis of language was a complex problem. Ambedkar's ideas on language-based state structures and separate state formation are still relevant today.

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Sustainable Green HRM Practices: Paving the Way for a Greener Future

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Abstract:

Sustainable Green Human Resource Management (Green HRM) practices represent a transformative approach that integrates environmental management into the HRM framework. This comprehensive article explores the multifaceted aspects of Green HRM, including its definition, key components, benefits, challenges, and future directions. Emphasizing the importance of sustainability in today's business environment, it delves into the strategies and practices that organizations can adopt to foster an eco-friendly workplace. Through a detailed examination of green recruitment, training, performance management, compensation, and employee relations, this article highlights the pivotal role of Green HRM in promoting environmental stewardship, enhancing corporate reputation, and driving long-term success.

Keywords: Sustainable, Green, HRM, Practices, Environmental, Corporate Sustainability

Introduction:

The concept of sustainability has gained significant traction in the business world, driven by increasing environmental concerns, regulatory pressures, and the growing demand for corporate social responsibility. As organizations strive to align their operations with sustainable practices, Human Resource Management (HRM) has emerged as a critical area for embedding environmental consciousness. Sustainable Green HRM (Green HRM) practices focus on integrating environmental management principles into HRM functions to promote sustainable use of resources and foster a culture of environmental responsibility.

Objectives of the Research Article:

1. To understand the concept of Green HRM.
2. Key Components of Green HRM Practices
3. Green Training and Development
4. Benefits of Green HRM Practices
5. Challenges of Implementing Green HRM Practices

Definition of Green HRM:

Definition 1: Green HRM refers to the incorporation of environmental management into HRM practices to enhance sustainability within an organization. It involves adopting policies, procedures, and practices that encourage employees to embrace environmentally friendly behaviors, reduce their carbon footprint, and contribute to the organization's sustainability

goals. Green HRM encompasses various aspects of HRM, including recruitment, training, performance management, compensation, and employee relations, all aimed at promoting environmental stewardship.

Definition 2: Green Human Resource Management (Green HRM) is the adoption of environmentally sustainable practices within the HRM framework to promote eco-friendly behaviors and practices among employees. It involves integrating environmental management principles into HR functions such as recruitment, training, performance appraisal, and rewards to reduce the organization's carbon footprint and enhance its commitment to sustainability.

Definition 3: Green HRM refers to the systematic inclusion of environmental sustainability initiatives into human resource policies and practices. It aims to cultivate a green organizational culture by embedding eco-friendly values into HR processes like hiring, training, performance management, and employee engagement. Green HRM seeks to minimize environmental impact while maximizing the efficiency and sustainability of the workforce.

Definition 4: Green Human Resource Management (Green HRM) involves the incorporation of environmental sustainability goals into traditional HR practices. This approach emphasizes the role of HR in fostering environmental responsibility, promoting green

behaviors, and supporting the organization's overall sustainability objectives. Green HRM practices include green recruitment, green training and development, green performance management, and green employee relations, all aimed at achieving a sustainable and eco-conscious workplace.

Key Components of Green HRM Practices:

The key components of Green HRM practices encompass a variety of strategies designed to embed environmental sustainability into human resource management. These include green recruitment and selection, which focuses on attracting candidates with strong environmental values and utilizing eco-friendly hiring processes; green training and development, which involves educating employees about sustainable practices and enhancing their green skills; green performance management, where environmental objectives and responsibilities are integrated into performance appraisals and key performance indicators (KPIs); green compensation and rewards, offering incentives and benefits that promote eco-friendly behaviors; and green employee relations, which encourages active participation in sustainability initiatives, fosters green teams and maintains open communication about environmental issues. Together, these components work to create a culture of sustainability and environmental responsibility within the organization.

Green Recruitment and Selection:

- **Eco-friendly Job Advertisements:** Use digital platforms for job postings to reduce paper usage and emphasize the organization's commitment to sustainability.
- **Green Criteria:** Incorporating environmental criteria into the selection process to attract candidates with a strong commitment to sustainability.
- **Green Orientation:** Introducing new employees to the organization's environmental policies and practices during the onboarding process.

Green Training and Development:

Green training and development focus on equipping employees with the knowledge and skills necessary to support and engage in sustainable practices within the organization. This involves offering environmental awareness programs that educate staff on the importance of sustainability and the impact of their actions on the environment. Additionally, it includes specialized training sessions on green technologies and practices relevant to their roles, promoting continuous education on environmental issues, and encouraging employees

to adopt eco-friendly behaviors both at work and in their personal lives. By fostering a culture of sustainability through ongoing learning and development opportunities, organizations can enhance their overall environmental performance and ensure that employees are active participants in achieving sustainability goals.

- **Environmental Awareness Programs:** Offering training sessions on environmental management practices, sustainability, and green skills to increase awareness among employees.
- **Skill Development:** Providing opportunities for employees to learn about sustainable practices and technologies that can be applied in their roles.
- **Continuous Education:** Encouraging ongoing education on sustainability issues and developments in green practices.

Green Performance Management:

Green performance management integrates environmental objectives into employee evaluations by setting eco-friendly goals and using green Key Performance Indicators (KPIs). It involves assessing and rewarding employees based on their contributions to sustainability initiatives, thus aligning individual performance with organizational environmental goals and fostering a culture of ecological responsibility.

- **Eco-friendly Objectives:** Including environmental goals and responsibilities in employee performance appraisals to align individual performance with organizational sustainability objectives.
- **Green KPIs:** Establishing key performance indicators (KPIs) that measure an employee's contribution to the organization's environmental objectives.
- **Regular Feedback:** Providing regular feedback on environmental performance and recognizing achievements in sustainability.

Green Compensation and Rewards:

Green compensation and rewards involve offering incentives such as bonuses or recognition for employees who actively contribute to sustainability goals. This can include eco-friendly benefits like public transport allowances or subsidies for green products, aligning compensation structures with the organization's environmental objectives, and encouraging sustainable practices among staff.

- **Sustainability-linked Incentives:** Offering bonuses, recognition, or other rewards for employees who contribute significantly to the organization's green initiatives.

- **Eco-friendly Benefits:** Providing benefits such as public transport allowances, carpool incentives, and subsidies for green products.
- **Recognition Programs:** Implementing programs to recognize and reward employees' contributions to sustainability efforts.

Green Employee Relations:

Green employee relations focus on fostering engagement in sustainability efforts through initiatives like recycling programs and energy conservation projects. It encourages forming green teams and maintaining open communication about environmental issues, creating a collaborative atmosphere where employees are motivated to contribute to the organization's eco-friendly goals and practices.

- **Employee Engagement:** Encouraging participation in green initiatives, such as recycling programs, energy conservation projects, and community clean-up drives.
- **Green Teams:** Forming teams dedicated to sustainability efforts within the organization, fostering a collaborative approach to environmental challenges.
- **Open Communication:** Maintaining open channels of communication to discuss environmental issues and encourage feedback from employees.

Benefits of Green HRM Practices:

Green HRM practices offer numerous benefits, including enhanced corporate image by showcasing the organization's commitment to sustainability, which can attract environmentally conscious consumers and investors. They also lead to cost savings through reduced energy consumption and waste. Additionally, Green HRM improves employee satisfaction and retention by aligning workplace values with personal environmental concerns. Furthermore, it ensures regulatory compliance with environmental standards and fosters innovation, providing a competitive advantage by encouraging the development of eco-friendly products and processes.

1. **Enhanced Corporate Image:** Organizations committed to sustainability are viewed more favorably by stakeholders, including customers, investors, and the community. A green reputation can enhance brand loyalty and attract environmentally conscious consumers.
2. **Cost Savings:** Sustainable practices often lead to significant cost reductions. For example, reducing energy consumption, minimizing waste, and optimizing resource use can result in lower operational costs.

3. **Employee Satisfaction and Retention:** Employees are increasingly seeking workplaces that align with their values, including environmental responsibility. Green HRM practices can boost employee morale, satisfaction, and retention by creating a purpose-driven work environment.

4. **Regulatory Compliance:** As governments and regulatory bodies impose stricter environmental regulations, Green HRM practices ensure that organizations remain compliant, avoiding penalties and legal issues.

5. **Innovation and Competitive Advantage:** Fostering a culture of sustainability encourages innovation, as employees are motivated to develop eco-friendly products and processes. This can provide a competitive edge in the market.

Challenges of Implementing Green HRM Practices:

Implementing Green HRM practices presents several challenges, including significant initial investments in training, technology, and infrastructure. Organizations may face resistance to change from employees and management, complicating the adoption of new practices. Measuring the impact of green initiatives can also be difficult, requiring robust metrics and evaluation systems. Balancing sustainability with traditional business goals can strain resources, making it essential to integrate green practices without compromising profitability or operational efficiency.

- **Initial Investment:** Implementing Green HRM practices often requires substantial initial investments in training, technology, and infrastructure. Organizations may face financial constraints and resistance to change from stakeholders.
- **Measuring Impact:** Quantifying the impact of Green HRM practices can be challenging, as it involves tracking both direct and indirect environmental benefits. Developing effective metrics and measurement systems is crucial for assessing progress.
- **Resistance to Change:** Employees and management may resist adopting new practices and procedures, especially if they perceive them as disruptive or unnecessary. Overcoming resistance requires effective communication and change management strategies.
- **Balancing Sustainability with Business Goals:** Striking a balance between sustainability initiatives and traditional

business objectives can be difficult. Organizations must ensure that green practices align with overall strategic goals and do not compromise profitability.

Strategies for Overcoming Challenges:

To overcome challenges in Green HRM, organizations should invest in continuous education to build awareness and commitment to sustainability. Strong leadership support is crucial for driving change and overcoming resistance. Setting realistic goals and regularly monitoring progress can help manage expectations and ensure effective implementation. Additionally, fostering collaboration and engaging employees in the development of green practices can enhance buy-in and streamline the integration of sustainability initiatives.

- **Education and Awareness:** Continuous education and awareness programs are essential for fostering a culture of sustainability. Organizations should invest in training employees at all levels on the importance of Green HRM practices and their benefits.
- **Leadership Commitment:** Strong leadership commitment is critical for the successful implementation of Green HRM practices. Leaders should demonstrate their dedication to sustainability through their actions and decisions, setting an example for employees.
- **Setting Realistic Goals:** Organizations should establish achievable sustainability goals and monitor progress regularly. Setting realistic targets helps maintain momentum and encourages continuous improvement.
- **Collaboration and Engagement:** Engaging employees in the development and implementation of Green HRM practices fosters a sense of ownership and commitment. Collaboration across departments and with external partners can also enhance the effectiveness of sustainability initiatives.

Future Directions of Green HRM Practices:

Future directions for Green HRM practices include leveraging advancements in technology to enhance sustainability efforts and streamline green initiatives. Global collaboration will play a key role in sharing best practices and addressing environmental challenges. Developing comprehensive sustainability policies and fostering continuous innovation will be crucial for adapting to evolving environmental demands. Emphasizing the integration of green practices into core HR functions will ensure long-term commitment and effectiveness in achieving sustainability goals.

- **Technological Integration:** Advancements in technology offer new opportunities for enhancing Green HRM practices. Digital tools and platforms can streamline processes, improve data collection and analysis, and facilitate remote work, reducing the organization's carbon footprint.
- **Global Collaboration:** Global collaboration on sustainability issues is becoming increasingly important. Organizations can benefit from sharing best practices, participating in international sustainability initiatives, and learning from successful green HRM practices implemented by others.
- **Policy Development:** Developing and implementing comprehensive sustainability policies is crucial for guiding organizational behavior and ensuring long-term commitment to environmental goals. Policies should be regularly reviewed and updated to reflect evolving environmental challenges and regulatory requirements.
- **Continuous Innovation:** The future of Green HRM lies in its ability to adapt to changing environmental demands and integrate new technologies and innovations. Organizations should foster a culture of continuous improvement, encouraging employees to develop and implement innovative solutions to environmental challenges.

Conclusion:

Sustainable Green HRM practices are essential for organizations striving to balance profitability with environmental stewardship. By integrating environmental management principles into HRM functions, organizations can create a sustainable work environment that benefits employees, the organization, and the planet. Despite the challenges, the adoption and enhancement of Green HRM practices will be critical in shaping a sustainable and prosperous future for all. Through education, leadership commitment, realistic goal setting, and continuous innovation, organizations can pave the way for a greener future, driving long-term success and contributing to global sustainability efforts.

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Role of Information Technology in Environment Healthcare

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Abstract:

Information Technology (IT) plays a crucial role in advancing environmental healthcare by enabling better data collection, analysis, and dissemination. The integration of IT in healthcare systems facilitates real-time monitoring of environmental factors that impact public health, such as air and water quality, chemical pollutants, and climate change. Through Geographic Information Systems, remote sensing, and data analytics, healthcare professionals can track the spread of diseases linked to environmental conditions and predict potential health crises. IT also aids in managing large datasets from environmental health research, allowing for more efficient analysis and decision-making. Moreover, telemedicine and mobile health applications are increasingly used to provide healthcare services in areas affected by environmental degradation, where access to traditional healthcare is limited. IT systems also improve communication between healthcare providers and environmental agencies; fostering collaboration for rapid response during Information Technology plays a transformative role in environmental healthcare by enhancing the management, monitoring, and improvement of environmental health. IT tools such as Geographic. Information Systems, remote sensors, and mobile health applications enable efficient data collection and real-time tracking of environmental hazards, thereby improving public health surveillance and facilitating early detection of risks. This technological advancement supports the creation of data-driven policies aimed at mitigating environmental health threats. Furthermore, IT fosters global collaboration by enabling the sharing of research, best practices, and environmental data, and raises public awareness through digital platforms that encourage sustainable behaviour's. Despite its benefits, challenges such as data security, equitable access to technology, and the need for robust infrastructure must be addressed to fully harness its potential.

Keywords: Information Technology, GIS, Environment, Healthcare.

Introduction:

Information technology (IT) has emerged as a powerful tool in addressing global environmental health challenges. Environmental healthcare focuses on the interactions between the environment and human health, addressing issues such as air and water quality, chemical exposures, and climate change. IT plays a crucial role by enabling more efficient data collection, analysis, and dissemination, facilitating informed decision-making and enhancing healthcare interventions. One of the key contributions of IT in this field is through environmental monitoring systems, which use sensors, satellite data, and geographic information systems (GIS) to track environmental hazards. These technologies provide real-time data on pollution levels, climate conditions, and potential health risks, allowing public health officials to respond quickly to emerging threats.

Furthermore, IT enables the development of predictive models that can forecast environmental changes and their potential health impacts. These models help policymakers design proactive interventions, mitigating health risks before they escalate. Telemedicine and mobile health

applications have also expanded access to healthcare, particularly in remote or underserved areas where environmental health risks may be higher. Overall, the integration of IT in environmental healthcare enhances the capacity to monitor, analyse, and respond to environmental health challenges, ultimately promoting a healthier and more sustainable future for communities worldwide. Information technology has tremendous potential in the field of environment education and health as in any other field like business, economics, politics or culture. Development of internet facilities, Geographic Information System (GIS) and information through satellites has generated a wealth of up-to- date information on various aspects of environment and health. (© 2024 Himachal Pradesh PCS Free Notes • Powered by Generate Press Role of Information Technology in Environment and Human Health Article shared by: Pooja Mondal. 2024 Global Threat Report.

Discussion:

For two million years, humans have evolved in direct and intimate contact with their environment and the microbes that it contains. Our physiology is therefore adapted to this environment;

our bodies respond to the challenges placed upon them by pathogens, and benefit from the services provided by commensals (Rook et al., 2014; Von Hertzen et al., 2011; Rook, 2009) Humans have evolved under constant exposure to environmental microbiota (Warinner et al., 2015). Characterization of land resources and generation of geospatial information on land resources and crop production at village administrative unit enable to assess human carrying capacity. However, in many cases it is difficult for the local administration to implement the resource management plans at a time in the entire tehsil. Hence, prioritization (Dongare, et al 2013; Bhagat R. S. and Bisen D.K. 2015; Kudnar N.S., 2015; Zolekar, R. B. and Bhagat, V. S., 2015) Information technology is expanding rapidly with increasing applications and new avenues are being opened with effective role in education, management and planning in the field of environment and health. As per the Merriam Webster dictionary, environment is defined as 1: The circumstances, objects, or conditions by which one is surrounded. The complex of physical, chemical, and biotic factors (such as climate, soil, and living things) those act upon an organism or an ecological community and ultimately determine its form and survival; the aggregate of social and cultural conditions that influence the life of an individual or community (<https://www.merriamwebster.com/dictionary/environment>). Health, on the other hand, can be interpreted in various ways. There is no one strict definition of health till now and that makes the concept complex. To a medical practitioner, health is only about being free from any illness or disease.

Conclusion:

In conclusion, IT is vital for addressing environmental health challenges, improving risk management, and promoting sustainability in healthcare delivery. However, overcoming barriers to its implementation is essential for maximizing its impact in this field. Information Technology (IT) is integral to the advancement of environmental healthcare, offering innovative solutions to address the growing health challenges posed by environmental changes. Through data collection, real-time monitoring, predictive analytics, and enhanced communication systems, IT enables healthcare providers and environmental agencies to collaborate effectively, ensuring more timely and accurate responses to environmental health risks. It empowers both healthcare systems and communities to better understand and mitigate the impacts of environmental degradation on public health. Additionally, IT contributes to the sustainability of healthcare facilities, promoting energy-efficient practices that reduce the environmental footprint of the health sector itself. As environmental factors such as climate change and pollution continue to

influence health outcomes worldwide, the role of IT in environmental healthcare will only expand, offering new tools and approaches to enhance public health resilience and ensure a healthier future. The on-going integration of IT into environmental healthcare is not just a technical advancement but a necessity for global health and sustainability.

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DFT Study of Methanol with Catechol and Hydroquinone molecule

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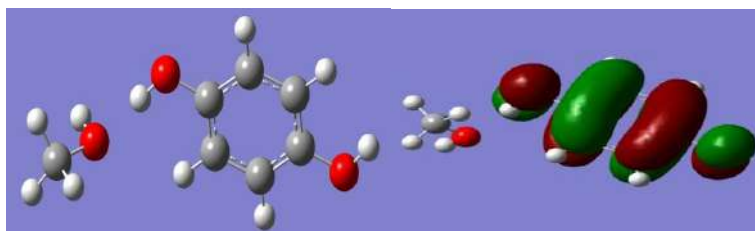
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Abstract:

Computational study using Gaussian 09W software, DFT method, B3LYP 6-31(G)d as basis set was performed on Window-7, Intel core i5 system. Theoretical study of experimental molecules and their combinations were optimized to understand the fundamental interactions between methanol with Catechol and hydroquinone. Data obtained is applicable in the field of solution chemistry.

Keyword: DFT, Gaussian, Methanol, Catechol, Hydroquinone.



Introduction:

Gaussian software is now very important tool in theoretical chemistry for interpretation of structure of various organic molecules [1, 2]. Hence we used this software for explaining interactions between molecules. Phenolic compounds were reported as antibacterial activity in various plants. Catechol and pyrogallol are allelochemicals which belong to phenolic compounds synthesized in plants

The HOMO-LUMO energy gap shown in Table-1 and Fig.1 are calculated by equation:

$$\text{Energy Gap} = E_{\text{LUMO}} - E_{\text{HOMO}} \quad \dots(1)$$

Where E_{LUMO} is energy of LUMO in eV and E_{HOMO} is energy of HOMO in eV.

Electrochemical properties: E_{HOMO} describes the charge density i.e. higher the E_{HOMO} energy the greater the ability of the molecule to donate electrons. Large $E_{\text{HOMO-LUMO}}$ energy difference means electronic excitation required high energy i.e. electron have less tendency to move to the excited state and such molecules are chemically more inert. [9, 10]

[3]. In synthetic organic chemistry Catechol is use as precursor, polymer and dyes industries [4]. The antimicrobial property of arbutin and hydroquinone as the active metabolite is responsible for antimicrobial activity [5, 6]. Solvent-solvent and solvent-solute interactions of electrolytes are extremely important for the synthesis, design of processes and simulations of unit operations [7, 8].

According to Koopman's theorem, global reactivity descriptor such as:

$$\text{Electronegativity } (\chi) = -1/2 (E_{\text{HOMO}} + E_{\text{LUMO}})$$

$$\text{Chemical potential } (\mu) = 1/2 (E_{\text{HOMO}} + E_{\text{LUMO}})$$

$$\text{Global hardness } (\eta) = 1/2 (E_{\text{LUMO}} - E_{\text{HOMO}})$$

$$\text{Electrophilicity index } (\omega) = \mu^2 / 2\eta$$

$$\text{Ionization energy } (I) = - E_{\text{HOMO}}$$

$$\text{Electron affinity } (A) = - E_{\text{LUMO}}$$

All these values are summarised in Table-2.

Experimental Sections:

Material: Chemicals used in all experiments was supplied by

Name of Chemical	Name of supplier	Percentage purity	Standard
Methanol	Merck, Darmstadt, Germany.	≥99.8%	G.R.
Catechol	Sigma-Aldrich co.	≥99%	Reagent Grade
Hydroquinone	Sigma-Aldrich co.	99%	Reagent Grade

Procedure: Theoretical study of experimental molecules and their combinations were optimized

on Window-7, Intel core i5 system. Computational study using Gaussian 09W software, DFT method,

B3LYP 6-31(G)d as basis set was performed to understand the fundamental interactions between

solvent-solvent and solute-solvent molecules. [11-13]

Table 1-HOMO, LUMO energies and Energy Gap between LUMO-HOMO
Calculated by DFT method at B3LYP level (d) using 6-31G basis set

System	Phase/Media	HOMO (eV)	LUMO (eV)	LUMO-HOMO Energy gap (eV)
C	Gas	-5.624	0.219	5.843
	Water	-8.179	-4.047	4.132
H	Gas	-5.412	-0.062	5.350
	Water	-5.536	-0.174	5.361
M	Gas	-7.198	2.047	9.246
	Water	-7.281	2.283	9.564
MC	Gas	-5.539	0.247	5.787
	Water	-5.703	0.109	5.812
MH	Gas	-4.914	0.370	5.283
	Water	-5.321	-0.039	5.282

Figure1-HOMO, LUMO structures with LUMO-HOMO Energy Gap

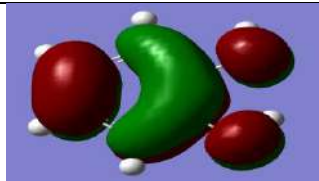
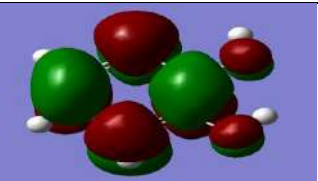
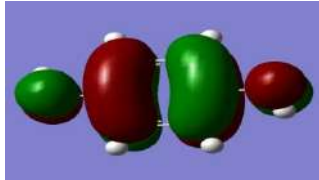
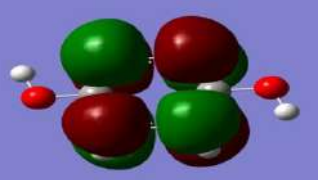
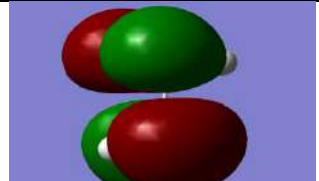

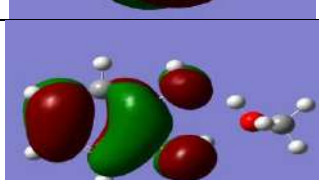
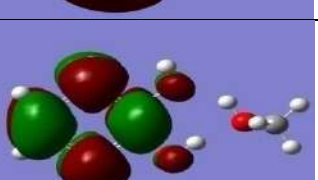
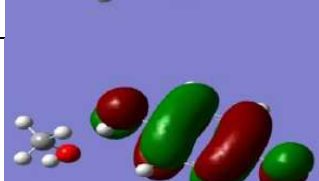
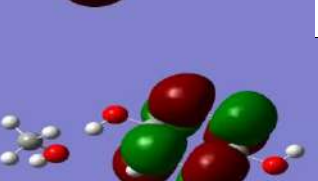
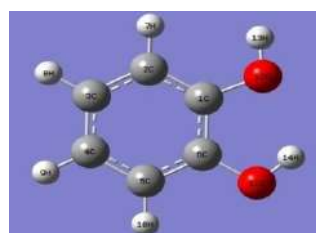
Molecule	HOMO	L-H E.G. (eV)	LUMO
C		Gas 5.843	
		Water 4.132	
H		Gas 5.350	
		Water 5.361	
M		Gas 9.246	
		Water 9.564	
MC		Gas 5.787	
		Water 5.812	
MH		Gas 5.283	

Table 2- Global chemical reactivity indices

[Chemical Hardness (η), Chemical Softness (δ), Electronegativity (χ), Electrochemical potential (μ), Global electrophilicity index (ω), Electron affinity (A), Ionization energy (I)]

Molecule	Phase/ Media	η (eV)	δ (eV)	χ (eV)	μ (eV)	ω (eV)	A (eV)	I (eV)
C	Gas	2.92	0.34	2.70	-2.70	1.25	-0.22	5.62
	Water	2.07	0.48	6.11	-6.11	9.04	4.05	8.18
H	Gas	2.68	0.37	2.74	-2.74	1.40	0.06	5.41
	Water	2.68	0.37	2.86	-2.86	1.52	0.17	5.54
M	Gas	4.62	0.22	2.58	-2.58	0.72	-2.05	7.20
	Water	4.78	0.21	2.50	-2.50	0.65	-2.28	7.28
MC	Gas	2.89	0.35	2.65	-2.65	1.21	-0.25	5.54
	Water	2.91	0.34	2.80	-2.80	1.35	-0.11	5.70
MH	Gas	2.64	0.38	2.27	-2.27	0.98	-0.37	4.91
	Water	2.64	0.38	2.68	-2.68	1.36	0.04	5.32

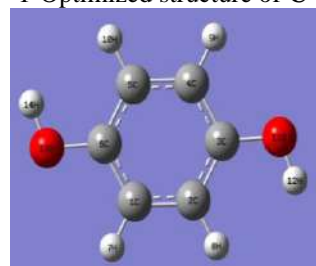
Figure 2-Optimized structures of solute, solvents combinations by DFT method at B3LYP level using 6-31G(d) basis set



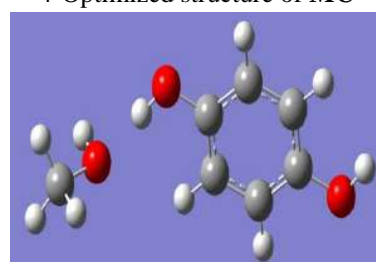
1-Optimized structure of C



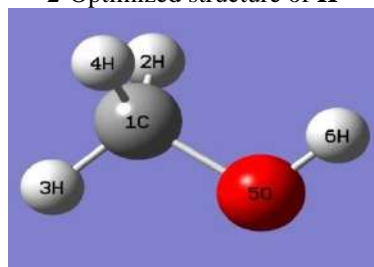
4-Optimized structure of MC



2-Optimized structure of H



5-Optimized structure of MH



3-Optimized structure of M

Solute: Catechol, Hydroquinone
(Fig.1,2)

Solvent: Methanol (Fig.3)

Combinations: Catechol-methanol
(Fig. 4)

Hydroquinone-methanol (Fig.5)

Table 3- Theoretical Thermodynamic functions calculated by DFT/B3LYP method at 6-31G (d) basis set

Molecule	Phase/Media	E (RB3LYP) a.u.	Zero point vibrational energy Kcal/mol.	Nuclear Repulsion Energy Hartrees	Total Energy (a.u.)		
					E(Thermal) Kcal/mol.	C _v cal/mol .Kelv.	S cal/mol. Kelv.
C	Gas	-382.68162	68.29475	350.698	72.536	26.54	80.44
	Water	-382.68967	68.16156	350.5293	72.399	26.57	80.39
H	Gas	-382.678	68.1481	343.8718	72.406	26.712	80.57
	Water	-382.688	67.9844	343.6457	72.251	26.775	80.631
M	Gas	-115.71441	32..29795	40.21749	34.364	8.668	56.74
	Water	-115.71943	32.24812	40.15408	34.326	8.72	56.82
MC	Gas	-458.41185	102.3131	521.1904	109.24	39.146	106.22
	Water	-458.42285	102.0336	520.0871	108.95	39.280	105.30
MH	Gas	-498.408	101.8813	498.5584	109.117	39.960	110.628
	Water	-498.422	101.7442	498.7914	108.904	39.857	108.497

Results and Discussions:

Computational study using Gaussian 09 software, with DFT, B3LYP, 6-31(G)d method was performed to understand the fundamental interactions between solvent-solvent and solute-solvent molecules. First, the structures of the solvent were optimized and stable conformers were obtained. The optimized structure of water then interacted with solute molecule as shown in Fig.2. Total energy, heat capacity at constant volume, entropy, zero-point vibrational energy and nuclear repulsion energy are given in Table 3. This data is used for the selection of proper solvent for the solute.

HOMO-LUMO energy gap gives information of reactivity of molecules. When the energy gap is more molecule is less reactive/may be inert for electronic excitation and vice versa less energy gap shows more reactivity.

Conclusion:

Thermochemical parameters as given in Table-3, shows solute molecule increases energy in combination with solvent molecules and hence increase of reactivity. Same result is observed in HOMO-LUMO energy gap decrease hence reactivity increase as shown in Table-1 and Fig.1. These thermochemical parameters are total energy, heat capacity at constant volume, entropy, zero-point vibrational energy and nuclear repulsion energy can provide valuable information about these molecules for further study when these compounds consider as starting materials in new reactions.

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Dr. Chandrakant S. Aher

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Survey study on the impact of COVID-19 lockdown on health

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Abstract:

This study outlines the impact of the COVID-19 lockdown on the weight-related behaviour and psychological well-being of individuals in the 18-30 age group in Mumbai, India. It highlights how lockdown measures, such as home confinement and the disruption of daily routines, led to changes in eating habits, physical activity, and sleep patterns. The study revealed key findings regarding weight fluctuations, with some participants experiencing weight gain due to increased consumption of sweets and emotional eating, while others lost weight due to healthier food choices and increased physical activity. Psychological stress during the lockdown also played a significant role in lifestyle changes. The DASS21 scale was used to measure mental health, indicating elevated levels of depression, anxiety and stress among a portion of the study population. This stress, combined with disruptions in exercise and food consumption, contributed to weight gain or loss. The study's conclusions emphasize the importance of healthy diets, physical activity, and mental health care during crisis situations, and it suggests that public health efforts should focus on providing reliable information and support to mitigate the negative effects of future pandemic-like conditions.

Keywords: Health, Pandemic, Corona Virus, Covid-19.

Introduction:

A severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has led to the pandemic of COVID-19. SARS-CoV-2 virus was apparently carried from animals to humans. The corona virus affects the respiratory system resulting in symptoms of fever, sore throat, dry cough, diarrhoea, abdominal pain, headache and fatigue or myalgias. Individuals with chronic medical conditions and the elderly were at higher risk and more likely to develop serious complications. The virus can be transmitted through nose discharges or droplets of saliva from an infected person. Therefore, primary prevention measures such as practicing respiratory etiquette, hand hygiene and social distancing required to be adopted (Wang C., *et al.* 2020). As per WHO recommendations implementation of isolation, quarantine, social distancing and community containment at different magnitudes at global level in order to lessen its impact on medical resources and reduce its spread (Leila I., *et al.* 2020). The COVID-19-induced lockdown or home confinement measure was applied in many countries in order to limit the virus's spread. People were forced to stay at home, practice remote working and online learning from home and practice physical distancing. All the remaining working activities were suspended or turned into smart working at home (Pelligrini M., *et al.* 2020). The government also closed Indoor and

outdoor sports facilities such as gyms, parks, public swimming pools, sport grounds were closed by the government. (Noara A., *et al.* 2020) Like other countries, on 25th March 2020 Prime Minister of India announced countrywide lockdown with social distancing restriction in March 2020 with severe restrictions such as closing of schools, shops, sport activities, etc in order to limit the spread of virus. (Kumar M., *et al.* 2020)

Forcing people to stay at home had exerted a drastic as well as sudden change in their lifestyles. Many researchers have postulated lockdown to have far reaching consequences on lifestyle habits by forcing to stay home for prolonged period and disrupting one's routine. Such a situation may lead to a change in dietary habits, addictions, physical activity, and sleep patterns, psychological state. Disadvantaged individual already suffering from medical conditions like diabetes, thyroid, obesity were at a greater risk to infection due to comprised immunity (Kumar M., *et al.* 2020).

Hadia R., *et al.* (2021) reported the impact of reduction in physical activity on increased body weight. Galali Y., *et al.* (2021), carried out survey of the impact of COVID-19 lockdown on Kurdish population in Iraqi and reported decreased frequency of physical activity. While majority of people from African regions did not engage in physical activity and spent majority of time watching screens. Similarly, people that were

surveyed from United Arab Emirates, Spain, Italy were reported to have decreased physical activity (Leila I., *et al.* 2020; Hadia R., *et al.* 2021; Martinez O., *et al.* 2020; Renzo L., *et al.* 2020). Population surveyed from India suggested that lockdown affected their physical exercise habit due to change in their daily routine. (Kumar M., *et al.* 2020).

Hypothesis:

The major changes that occurred when people were not able to practice normal daily life and forced to stay home during COVID-19 crises included lowered physical activity and unhealthy eating behaviour of individuals. Hence it is hypothesized that lockdown period may have cause discontinuities in food choice habits, physical fitness and other weight-related behaviours that ultimately results in increase or decrease in individual's weight.

Objective of the Study:

The survey research study aimed to assess the effect of COVID-19 lockdown on individual's weight related behavior such as eating habits, food consumption, mental health, physical activity and more selected variables. Further the study aimed at checking the impact of all the variables on the weight on individuals surveyed during the study.

Methodology:

Study Method: Cross-sectional, observational survey study

Ethical Permission: Consent was taken from all participants at the beginning of the questionnaire forwarded to them.

Survey period and method: The survey data collection was initiated on 3rd April 2021 and closed on 5th April 2022. A self-prepared semi-structured anonymous questionnaire was used to record the responses of participants. The questionnaire was prepared after the literature review and current news information in order to check relevance and make necessary changes according to study requirements. Questionnaire mainly contained 3 sections namely- Socio-demographic information, Physiological analysis and psychological analysis (DASS21). DASS21 is a scale to measure mental health score. Each scale has seven items and its total score is calculated with the sum of the items belonging to that scale and varies between 0 and 21 points. A higher score indicates a higher participant symptomatology. Items 1, 6, 8, 11, 12, 14, and 18 belong to the stress scale, items 3, 5, 10, 13, 16, 17, and 21 to the depression scale, and items 2, 4, 7, 9, 15, 19, and 20 to the anxiety scale. Questionnaire was prepared through Google forms and was sent to people via WhatsApp application.

Sampling technique: Probability systemic sampling technique

Sample Size: 100

Study population: People in the 18-30 years of the age group who lived in their homes due to COVID-19 lockdown in Mumbai, Maharashtra state, India.

Survey form:

1. Demographic information: Name, Age (in years), Sex, Occupation.

2. Physiological aspect-Food consumption and exercise levels: Height, Weight before lockdown, after lockdown, Addiction and illnesses status, mental illnesses, Sleep

3. Eating behavior in lockdown: Type of food and frequency of intake of food and water consumption before and during lockdown.

4. Physical Activity and Psychological aspect: Forms and frequency of exercise, Energy levels

Result and Discussion:

Out of 200 sent links to people in the age group of 18 to 30, 125 responses were received. 100 responses with complete answers were selected and 54% responses received were from females while the remaining 46% were from males from age group between 21 to 23 years. 67 % participants were students while employed were 25% and the remaining 8% were non-employed. Similarly, majority of participants neither had additions of smoking nor alcohol consumption. When asked about medical conditions and illnesses, majority of participants did not have any of them. 7% of the participants had PCOD/PCOS, while 3% had either thyroid or obesity. Remaining had both thyroid and obesity.

Majority of participants who noticed decrease in their weight after lockdown were reported to consume increased amounts of vegetables followed by fish, meat, eggs and fruits and decreased amounts of sweets and fried foods during lockdown as compared to before lockdown. Similarly, participant who noticed increase in their weight after lockdown were reported to consume increased amounts of sweets and sugary items and fried foods. Majority of participants who experienced increase in their weight showed increased emotional eating, meal skipping, night snacking and stress eating during lockdown as compared to before lockdown. Noara A., *et al.* (2020) reported the importance of healthy diet for the management of inflammatory response to coronavirus.

During the period of lockdown, 59% of participants reported neutral energy levels while 37% revealed low energy levels. When asked about the frequency of household chores during lockdown as compared to that of before lockdown, majority of people agreed to have increased frequency of doing household chores during lockdown. Remaining of the study population either agreed to have decrease or no change in the frequency of doing household chores. During the lockdown, majority of the study population (49%) noticed increase in their sleeping

hour per day as compared before lockdown while 48% of participants noticed decrease in their sleeping hours per day. People in United states were reported to have disruptions in sleeping patterns and difficulty to concentrate during COVID-16 lockdown (Son C., *et al.* 2020).

Regarding water consumption, majority (59%) of participants had consumed same amount of water before and during lockdown. 37% of participants noticed increase in their water consumption during the lockdown. **Fig.1 and 2.** Depicts the body mass index and frequency of physical activity of study population during the lockdown period. Out of participants that experienced decrease in their weight after lockdown, 75% of them were reported for doing regular exercise during the lockdown whereas out of participants that experienced increase in their weight after lockdown, 40% of them were reported for doing no exercise during lockdown.

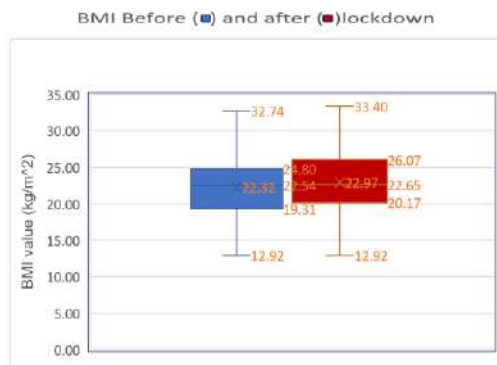


Fig.1. Body Mass Index before and after lockdown of study population

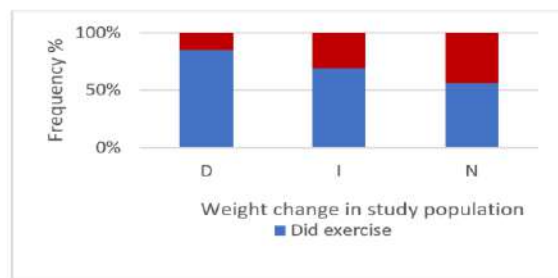


Fig. 2. Impact of physical activity during lockdown on weight of study population (D – Decreased weight, I – Increased weight, N – No change in weight)

Conclusion:

The results of the present study suggest that the COVID-19 pandemic triggered a variety of unhealthy lifestyle changes and psychological problems. Majority of the study population was reported to have increase in their weight due to increased stress, anxiety, depression, and decreased physical activity. The provision of reliable health and healthy diet proved to be essential psychological support during the pandemic. The survey study emphasizes that maintaining a healthy diet, engaging in regular physical activity and prioritizing mental well-being are critical pillars for enhancing overall health and resilience, especially in the face of unforeseen pandemic situations.

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Ranjana Ganesh Khade

The psychological analysis of study population during COVID-19 lockdown was analyzed with the help of Depression Anxiety Stress Scale (DASS21) and 11% had extremely severe depression, 9% had severe depression while the remaining 80% of the participants had normal to moderate levels of depression. Similarly, 14% had extremely severe level of anxiety while 7% were reported to have severe level of anxiety. Remaining 79% were reported to normal to moderate anxiety levels. Regarding stress levels, 7% of study population was reported to have extremely severe levels of stress and 2% had severe stress levels. The remaining 91% of study population had normal to moderate stress levels. Range of score of depression was found to be 0 to 36 while that of anxiety and stress was found to be 0 to 28 and 0 to 39 respectively. Higher level of stress as reported in people surveyed from UK and was further linked to weight gain/loss and BMI of the individuals. (Eric R., *et al.* 2021).

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Geomorphic Effect of Groyne Type Bunds and Their Impact on Varsoli Creek, Alibag, Maharashtra

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Abstract:

Coasts are very dynamic areas and they are constantly changing. This change is due to three main processes such as erosion, transportation and deposition which operate at the coast. A groyne is a method of coastal defense against erosion. Groynes are low walls built outwards from the coast into the sea, to prevent the continuous movement of waves and sediments from other parts of the area.

Due to the construction of groyne the accumulation of sediment into creek was minimized and accumulation of sand on either side of the bunds resulted in extension of beaches. After the construction of groyne the boats of the fishermen could be easily transported to the bank of the creek. Fishing activity has since then flourished again and has helped the local fishermen to survive.

The beach levels in post monsoon and pre monsoon months were compared to understand the overall cut and fill areas developed on the coast south and north of the groyne. The northern and southern sectors have suffered from seasonal cutting and filling in monsoon and fair weather, but the general tendency of beach extension is recorded since 2002 along north and south of the groynes.

Fishing is the major primary activity in Varsoli village though some villagers are engaged in farming. Dried fish are sent to vary parts in Pune, Mumbai, Kolhapur and Kankavli. Before the construction of groyne fish production was 538 to 1162 tones. After the construction of groyne fish production has increased from 608 to 1847 tone.

Keywords: Coastal Protection Methods, Solid Structures, Accumulation of Sediment, Construction of Groyne, Geomorphic Impact of Groyne, Beach Erosion and Deposition, Channel Dredging

Introduction:

Coastal protection methods are used to protect coastal lands from erosion. There are three main groups of solid structures, which protect land or beaches. 1) Structures built parallel to the shore (Seawalls, bulkheads, revetment) 2) Structures built at right angles to the shore (groynes and jetties) 3) Offshore structures like offshore breakwaters. Erosion of the coast depends on many natural factors like storms, wave, wind, tides, near-shore currents, slope processes, vertical land movements.

Groynes are cross-shore structures designed to reduce longshore transport to open beaches or to deflect nearshore currents within an estuary. Rocks, concrete, timber are the most common used materials for the construction of groynes.

Study Area:

The study mainly concentrates on groyne type bunds at Varsoli creek. The creek is located on west coast of Maharashtra, in Alibag Tahsil of Raigad District. Village Varsoli is situated at sea shore to the North of Alibag. Varsoli, a small creeklet about 80 m wide is situated in between villages Varsoli and Chalmala. The area lies between 18°35' to 18°45' North latitude and 72°50'

to 72°55' to East longitude. The catchment area of the creek is about 3150 hectares.

Aim and Objectives:

The main aim of this work is to assess the geomorphic impact of groyne type bunds built at Varsoli on the coastal stretch near Varsoli. To achieve this, following objectives were identified: -

- To study the coastal configuration before and after the construction of groynes.
- To identify the patterns in cutting and filling of beach sectors.
- To assess the change in longshore drift and its impact on erosion and deposition.
- To forecast the future trends in beach fill and beach erosion in the nearby areas.

Methodology:

The methodology consists of actual beach survey, beach profiling, collection of samples, mapping of erosional and depositional areas etc. Field visits were undertaken for measurement of longshore currents and littoral drift and wave heights. The toposheet and hydrographic chart of the area was then procured and mapping and DEM was generated using GIS software, to get the idea of submarine relief near the mouth of Varsoli creek.

Google earth images were used to study and map the temporal changes in coastline indicated as per the daily tidal phase. The images were also used to map the changes within the creeklet and along the northern and southern shore of Varsoli.

Problem At Varsoli And Construction Of Groynes:

A small creeklet about 80 m wide is situated in between Varsoli and Chalmala. The erosional material moved inside and was deposited in the creek in fair weather. The large amount of sediment got accumulated into the creek during high tide. The boats of the fishermen stuck into it. Sometimes the boats sank in that material. It was quite difficult to drag their boats towards the banks of the creek. The transportation from the creek stopped completely because of accumulation of such huge sediment. Sometimes the fishermen had to leave their boats filled with fishes in the creek and try rush to save their own lives. Due to the accumulation of sediment into the creek the business of local fishermen suffered from heavy losses.

Since 1980 the fishermen, the villagers and local political leaders in the area asked State Government of Maharashtra to pay attention to this problem and to save the local fishermen. To solve the problem, Government surveyed Varsoli creeks area and confirmed cause of the problem. This problem was referred by the Govt. of Maharashtra to the Central Water and Power Research Station (CWPRS), Pune, for detailed design of construction of necessary groynes. CWPRS submitted the detailed plans for the construction of groynes to the Govt. of Maharashtra. Government sanctioned the plan and groyne type bund was constructed at Varsoli creek between the years of 2002 - 2005.

Geomorphic Effects Of Varsoli Groynes

Groynes are normally built for the purpose of bank and shoreline protection and to maintain navigability during low-water periods. They are constructed transverse to the main flow direction in rivers or along coastlines. They deflect the flow away from banks and shores and confine its lateral extent with strong impact on sediment transport and deposition/erosion patterns. Groynes reduce the cross-sectional area for the free-flow and thus increase the main channel flow velocities.

The sediment samples were also collected from along the profile. The samples were mechanically sieved and plotted to get an idea of general characteristics of the sand and its distributional properties. The amount of suspended matter in the water samples collected from northern and southern sectors give a clear idea about the supply of sediments via longshore drift to the beach. The northern beach gets relatively more amount of

sand as compared to the southern beach. In fact, just near the tip of southern groyne the filling is not conspicuous. It is more significant some distance more to the south.

The beach profiles were found to be uniform and indicated an overall filling tendency especially just close to the northern and southern groyne. In 3 years, between December 2002 and December 2005, northern beach shows a distinct tendency of fill near the northern groyne. There is a slight fill to the southern groyne. Northern beach is distinctly erosional. The southern however shows pocket of erosion and deposition spread up to a distance of about 900 m. 1.7 km long stretch of beach to the north of northern groyne and a 1.4 km long stretch of beach to the south of southern groyne was found to be affected by the construction of groynes.

Conclusion:

After the construction of bund in 2002 the accumulation of sediment into creek was minimized and the boats of the fishermen could easily move to the bank of the creek. Fishing activity flourished again and helped the local fishermen to survive. Today due to the powerful sea waves most part of bund has been damaged and has not been repaired till today. In course of the research work it was found that there are definite changes in the erosional and depositional pattern due to the construction of groyne type bund at the site.

Shifting of creek mouth is difficult to explain because of weak northward drift and no major nearby source of supply of sand. Closure of earlier mouth can be due to choking caused by sediment drifting from Mumbai located to the north or from the catchment itself. This might have induced northward shift. Such a shifting of tidal mouths is very common on east coast but is not reported from the west coast of India.

The beaches on Chalmala and Varsoli side will soon stabilize at the tip of groynes. A 3 m depth section at the head of groyne in the initial period has started shallowing. It will progressively reduce in depth in future. For sustenance of the channel the dredging is essential. Larger beach length to the north and south of the groynes will also be affected in future and it will be even necessary to increase the length of groynes in future.

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***Achyranthes aspera* – A Homemade Prepared Apamarga Kshara Extract of the Whole Plant is used as an Effective Antifertility Agent**

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Abstract:

The widespread use of herbal medicinal plant products and supplements around the world has indeed sparked important discussions regarding their safety and effectiveness, which are crucial public health concerns. The *Achyranthes aspera* Linn belongs to the family Amaranthaceae and is mostly found in tropical and warmer regions as a weed. The plant contains various phytochemical constituents that have been isolated from different parts of the plant. These constituents possess activities such as anti-inflammatory, antiperiodic, antiparasitic, diuretic, purgative, laxative, antiasthmatic, wound healing, hepatoprotective, anti-allergic, anti-cancer, anti-fungal, antibacterial, antiviral, antioxidant, anticoagulant, and antidepressant properties. Additionally, it has dose-dependent contraceptive and antifertility properties in rats. Apamarga Kshara is an alkaline and hygroscopic substance derived from the water-soluble ash of the entire plant of *Achyranthes aspera*. This study focused on the Homemade preparation of Apamarga Kshara and understanding their Efficacy as an Antifertility Agent for male contraceptives.

Keywords: *Achyranthes aspera*, Apamarga Kshara, Effective, Antifertility.

Introduction:

The widespread global use of herbal medicinal products raises concerns about their safety and efficacy, which are important for public health. In India, extensive research has been conducted on medicinal plants to explore their potential as contraceptives and for their anti-fertility effects. The increasing population presents considerable difficulties, placing pressure on economic, societal, and environmental resources. Although oral contraceptives have contributed to lowering infertility rates, their associated side effects frequently restrict their utilization.

Current Antifertility treatments have not been very successful due to these side effects, leading some patients to seek alternative medicine for antifertility purposes. Recent Research interest in traditional herbal medicine has sparked rapid development and studies of numerous herbal remedies for their antifertility properties[1]

The use of traditional medicine to control fertility is based on the folk use of various anti-fertility herbs, and one of these is *Achyranthes aspera*. Many plants are known to have anti-fertility effects by acting on the hypothalamic-pituitary-gonadal axis or by directly affecting reproductive organs, which inhibits steroidogenesis [2].

Achyranthes aspera is a plant with a wide range of medicinal properties. The entire plant and

its various parts have been extensively researched for their pharmacological activities and are considered a versatile plant with a broad spectrum of medicinal benefits. The plant exhibits numerous therapeutic and pharmacological activities, including spermicidal, antiallergic, cardiovascular, nephroprotective, abortifacient, cancer antiparasitic, hypoglycemic, analgesic, and antipyretic properties. It is used in the treatment of various ailments such as boils, bronchitis, colds, coughs, colic, debility, dropsy, dysentery, and headaches [3].

Lately, there has been a significant increase in the use of herbal plants and formulations in both developed and developing nations. This has led to a heightened interest in natural products on a global scale. Nowadays, many plants and their products are being evaluated for their potential medicinal properties and for the discovery of new drug molecules based on their traditional uses. One such plant under assessment for its therapeutic effectiveness is Apamarga, also known as Chirchita in Hindi and Prickly Chaff Flower in English. It possesses several medicinal properties and is used as a spermicidal (Shukra Stambhan), antipyretic (Jwarghan), and cardiovascular agent (Hridaya) [4].

Apamarga Kshara is a white crystalline alkali obtained from the whole plant of *Achyranthes aspera*. It is a hygroscopic substance obtained from the water-soluble ashes of the plant.

Several *Ksharas* have been explained in Ayurveda and *Apamarga kshara* is one among them[5]. There are various method of preparation in *Sushruta Samhita* [6] *Rasa tarangini* [7], and *Ayurveda Sara Samgraha* [8] were widely described. However, In this article, the basic protocol for the preparation of kshara from the whole plant of *Achyranthes aspera* is described, taking into consideration the easiest method of preparation at low cost and without the loss of any chemical constituents. This homemade Apamarga kshara from the whole plant is effective and safe to use as an antifertility contraceptive for males without any side effects.

Scientific Classification of *A.aspera* [9]

Kingdom – Plantae

Subkingdom - Tracheobinota

Super Division - Spermatophyta

Division - Mangoliophyta

Class - Mangoliopsida

Subclass – Caryophyllidae

Order – Caryophyllales

Family - Amaranthaceae

Genus - *Achyranthes*

Species – *Aspera*



Figure 1 : *Achyranthes aspera*

Materials and Methods:

Isolation of Apamarga Kshara (alkalies) from the corresponding medicinal plant was obtained by following procedure given in the Ayurvedic texts with certain modification to facilitate the basic methods of preparation [10].

Processing of Whole Plant Materials and Preparation of Apamarga Kshara (Alkalies)

Identification & Collection of Plant: *Achyranthes aspera* Linn was freshly collected during Nov- Dec, 2022. The plant was authenticated identified by the Head of the, Department of Botany and voucher specimen (Herbarium number BOT-442A) was preserved.

Method of Preparation: The fresh plants, including all parts, were collected and cleaned with water to remove excess soil and dirt. The plants were then dried completely in the shade and carefully packed. After the plants were completely dried and weighed,

they were burned in an iron vessel in open air until ash was obtained.

The weight of the ash was recorded, and it was then transferred to a glass container to which four times the amount of water was added based on the weight of the ash. The mixture was stirred well with a glass rod and left overnight. The solution was filtered using ordinary filter paper or muslin cloth, passing the supernatant solution for filtration at least 4-5 times. The clear filtrate was collected in a clean vessel. This filtrate was passed to slowly evaporate until all the water completely evaporated.

During this process, it is important to keep stirring the mixture with a glass rod to avoid the formation of lumps. The mixture was dried to obtain the white crystalline Apamarga kshara. Since the kshara is hygroscopic, it was stored in a tightly closed glass bottle.



Figure 2: Preparation of Apamarga kshara of *A.aspera*
 1. Collection of Plant and washed to remove soil & dirt, 2. Dried in shed, 3-4. Burn till the ash formed, 5. Add water & stirred, 6. Filtered 4-5 times, 7-.Evapouration, 8. White Apamarga Kshara

Discussion:

Several methods have been explored over an extended period to induce infertility, including chemical, hormonal, and immunological approaches. However, none of these methods have proven to be both effective and free from side effects. There is a need to develop new fertility-regulating drugs from medicinal plants. Throughout history, humans have relied on plant-based products as sources of drugs and therapeutic agents. In recent times, due to their low toxicity and long-standing history of use, these drugs are being utilized in ethnic medicine systems such as Ayurveda [11-12]. In the present study, preparation of *Aparmarga Kshara of whole plant of Achranthes aspera* has been carried out as per reference Sushruta Samhita Suthrasthanam with certain basic modification which was prepared as easiest homemade method.

Various studies have been conducted on Apamarga kshara as an antifertility drug. The oral administration of Apamarga kshara from *A. aspera* whole plant results in changes in body weight and fertility of male albino rats at a certain dose level. Ingestion of 1g/kg body weight per day for 7, 14, and 21 days causes antifertility activity and a slight change in hematological parameters. Hence, study of the whole plant is needed to identify and isolate the active compounds in order to develop a new, effective, potent, and safe antifertility agent [13]. It has been widely reported that the total alkaloidal fraction of *A. aspera* L. shows an antifertility effect on male albino rats in a dose-dependent manner, without any toxic side effects at the tested dose levels. Therefore, further research is needed to study the total alkaloidal fraction in order to identify and isolate the active compounds for the development of new, effective, and safe antifertility compounds [14].

Aasiya Syed, Dr. Archana Nerkar

It has been reported that, the effect of methanolic leaf extract of *Achyranthes aspera* on the blood of Swiss albino mice was observed that ingestion of doses of 500mg/kg, 1500mg/kg, 3000mg/kg, and 4000mg/kg did not produce observable acute toxicity within the stipulated observation period. The hematological parameters of the albino mice showed a significant increase in lymphocyte and platelet counts. This suggests that the plant's leaf extract may have the potential to be effective in treating diseases caused by thrombocytopenia and lymphocytopenia in mammals [15].

Further research revealed an intriguing correlation between the 50% ethanolic extract of *Stephania hernandifolia* leaf and *Achyranthes aspera* root. The study demonstrated a significant decrease in sperm viability, rendering it nonviable after 30 minutes when exposed to the composite extract at a concentration of 0.32 g/mL. The findings indicate that this composite plant extract possesses potential contraceptive spermicidal activity in In-vitro studies [16]. Thus the, Several literature reviews highlight the significant medicinal properties of *A. aspera*, making it a versatile medicinal and antifertility agent that plays a crucial role in treating various ailments.

Conclusion:

The increasing population and the associated challenges it presents, such as pressure on resources, likely contribute to the motivation for researching herbal contraceptives and antifertility options. Herbal remedies are easily available and may have fewer side effects compared to synthetic antifertility agent. Several studies have been conducted on different parts of the *A. aspera* plant to evaluate its efficacy and safety. However, the effectiveness of these herbal products remains

largely unestablished, and further research is needed to address the public health concerns raised. Comprehensive, evidence based evaluations and appropriate regulatory oversight will be crucial in ensuring the safe and effective use of any herbal medicinal products for these purposes. Therefore, further research is needed to identify the active compounds and constituents responsible for the plant's biological activity, and understand their precise mechanism of action on fertility. Additionally, utilizing the whole plant to make Apamarga Kshara as a homemade drug requires further investigation, as the kshara is hygroscopic and alkaline in nature.

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To Conserve the Biodiversity for the inter-relationship with other Countries

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Abstract:

This paper deals with the study of biodiversity conservation, in Marathwada. Lot of biodiversity is located in the Hingoli district, i.e. first spot means Aundha. If in our country biodiversity is reached then other tourists will be attracted to our country and maintain the relationship. Marathwada (Maharashtra) has been attributed with natural beauty and is covered by forest area with thick vegetation which contains a variety of plants like herbs, shrubs, climbers, trees etc. This diversity of plants attracts the pilgrims and peoples. In this forest flora consists of a large number of medicinal plants. Now a day also *Abrus precatorius*, *Acylopha indica*, *Annona squamosa*, *Barleria cristata*, *Butea monosperma*, *Buchnanan lanzan*, *Cleome viscosa*, *Clitoria ternatea*, *Cocculus hirtus*, *Clerodendron serratum*, *Digera muricata*, *Dioscorea bulbifera*, *Dolichandron fulcata*, *Evolvulus alsinoides*, *Emblica officinalis*, *Ficus bengalensis*, *Gloriosa superba*, *Helicterus isora* etc. Also there is diversity in fauna which consists of animals like cat, wild pig, fox, deer, Peacock, eagle, crow, sparrow, different types of snakes, frogs etc. But in some part of this region there is cutting of valuable plants and hunting of some animals and birds, also by some natural scarcity of water, food which leads to migration or death. Due to this bad activity of human being and natural events, biodiversity of this region becomes loose which is very hazardous for this area. For this we want to take a step to aware the peoples and Government must be involved for the protection of biodiversity. Aundha Nagnath is a holy place due to Lord Jyotirlinga and pilgrims visited throughout the year. Majority of peoples depends on forest for their needs. They gradually become food growers. They make a small patch in the forest to grow food. Peoples depend on the forest for timber, fuelwood, medicine, fodder, leaves etc. Fuel Wood: For the rural population wood is an important source of energy for cooking and heating. Some people cut the trees and sell in the market as a fuel wood. Fodder: Fodder from the forest are important source for cattle and other grazing animals. There are many varieties of grasses. Fencing: Fences created with trees, shrubs and thorny plants are preferred to the farms. Shelter: Forest material like stem, leaves are used to make a house. Fruit: Fruit trees are an important source of income of this people. Ex. *Annona squamosa* L., *Annona reticulata* L. Medicine: Peoples have been depending on the forest to cure them of various ailments. Even today man is dependent on the forest for herbs and plants to fight against disease.

Keywords: Medicine, Fodder, Fencing, Biodiversity, Forest, Food chain. Pilgrims

Introduction:

Human being and other animals, birds, plants, herbs, shrubs show a variety of existence but live together. From two hundred crore years a lot of living organisms are evolved on the earth. Out of them a number of organisms are not identified. Some are disorganized and some are added in the diversity. A variety of species are adopting with different environments, like yeast, bacteria. Some living organisms use oxygen and some live without oxygen. Means that any type of organism has an opportunity to live in any type of environment on the earth. For the study human being is classified and from that classification we get information related to biodiversity. We know well, in the universe earth is a planet on which living organisms are from ancient. No evidence that living organisms are not found on any other planet except earth. On the earth at tropical, temperate and frozen regions living organisms are poor. Different colors, shapes, diversity of natural cycles and their

interrelationship, adaptations earth becomes a picturesque universe.

Objectives of Biodiversity/Material and Method:

- To study what is biodiversity and how it is related with human being.
- To realize due to biodiversity earth, living organisms exist on earth and hence human society and environment relationship should be confirmed.
- To discuss if biodiversity is not existed and their hazardous effects on the human life.

Result and Discussion:

Domesticated Biodiversity- In our house domesticated plants, animals also show biodiversity. Man also produced genetically modified plants and animals which show more diversity. **Micro organisms Biodiversity -** On the tip of a needle we observe a number of microorganisms. These are observed under a microscope, also enter in

animals, plants body by infection and causes different types of diseases. In food chain producers, consumers, decomposers are included which shows diversity in them. Biodiversity means all the living organisms on the earth. In the universe different types of biodiversity like Genetic Biodiversity – In this type we know information about living organisms on the basis of heredity. Transfer of genes from one generation to another generation is responsible for biodiversity. Due to heredity we get different types of characters in the same species. Species Biodiversity – living organisms are different from each other and they struggle for existence. Ecosystem Biodiversity –Ecosystem biodiversity means all the living organisms and their interrelationship with environmental factors like light, temp., pressure, soil, water.

Nature of Indian Biodiversity – In our India different types of soil, environment, temperature, habits, deserts are observed .I f we think related to plants, in our India near about 45000 different types of trees are observed. 7 % types of flowers,15000 species of flowering plants are observed.51 types of grains,104 types of fruits, 27 types of condiments, 55 types of fruit and leafy vegetables, 24 types of fibers, 12 types of oil seeds, tea, coffee, tobacco, sugarcane cash crop also observed. In India 81000 types of animals 57000 insects2546 fishes, 204 aquatic animals, 428 creeping,1228 birds 372 vertebrates, 20000 invertebrates are observed. 850 bacteria and 12500 fungal types are in existence. No of organism are not steel identified. But for the development of country biodiversities are destructed due to lack of space, pollution of soil, water and atmosphere. Unplanned development, non awareness regarding biodiversity, modern industrialization, weak rules and laws, biodiversity should be in future. Biodiversity should be conserved because no of families are depend for earning source on these biodiversity. For the conservation we want to understand aesthetic value, economic value, ecological factors, religious and cultural factors.

For the conservation of biodiversity international biotic conservation policy, national biotic conservation policy, Environmental protection Act(1986),1897 Fish farming Act, 1927 forestAct, 1972 Wild life Conservation Act, from these Acts hunting of animals is restricted and rare plants are also conserved under these acts. National parks, sanctuaries, zoo parks should be established

Conclusion:

It is observed that in developed countries biodiversity is decreased .Global Warming, Conservation of Biological diversity and Intellectual Property Rights and Patent Acts these three units are influencing on the existence of human being. For the self development of human being , he exploited the nature. From the study it is observed that due to

decrease in biodiversity existence of human being is in the danger zone. We should think about the existence of human being than the development of country. Therefore it is necessary to stop the decreasing percentage of biodiversity.

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Biodegradation of Petrol by Bacteria isolated from Petroleum-contaminated Soil

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Abstract:

Petroleum contamination, resulting from various industrial and human activities, poses significant environmental and health risks. It affects microbial communities, plant life, and broader ecosystem functions. Bioremediation offers a promising approach to mitigate these impacts, aiming to restore soil health and ecosystem stability. This study investigates the potential of bioremediation as an eco-friendly approach to address petrol-contaminated soil. The research focuses on isolating, characterizing, and screening bacterial strains from petroleum contaminated soil samples. Among 18 bacteria tested, the most promising isolates were evaluated for their petrol degradation efficacy over a 14-day period using spectrophotometric method. The bacterial isolates exhibited up to 70% degradation ability. These findings suggest that the isolated bacterial strains have significant potential for petroleum hydrocarbon degradation and may be valuable candidates for developing effective bioremediation strategies for petrol-contaminated soils in the region.

Keywords: Biodegradation, Bioremediation, Contamination, Petroleum hydrocarbon

Introduction:

Petroleum hydrocarbon, also known as crude oil, is a highly flammable liquid naturally found deep within the Earth's crust. It is primarily composed of hydrogen and carbon, with small amounts of nitrogen, sulfur, oxygen and other materials (Varjani, 2017). Petroleum is crucial for various industrial applications, including fuel for vehicles and aircraft, lubricants, electricity generation, and the synthesis of organic compounds (Eneh, 2011). The release of petroleum hydrocarbons into the environment is a result of human activities such as municipal waste disposal, oil and fuel dumping, offshore and onshore petroleum industry operations, drilling and exploration, storage, transportation, processing, refining, unplugging of oil wells, and accidental oil spills. These activities lead to widespread contamination of soil, groundwater, and oceans. Petroleum hydrocarbon pollution significantly affects soil properties and functions by altering physical and chemical compositions, reducing crop yields, disrupting microbial interactions, impacting nutrient cycling, affecting organic matter decomposition, altering soil structure, water infiltration, and aeration, and reducing soil fertility (Adipah, 2019). Petroleum contamination impairs plant root function, leading to reduced nutrient and water uptake, stunted growth, chlorosis, and plant mortality. It also causes nutrient deficiencies or imbalances, alters soil pH affecting nutrient

availability and microbial activity, and contaminates groundwater, posing risks to human health and wildlife (Ahmed et al., 2024). Various physical and chemical methods have been developed to address petroleum pollution. However, these approaches often have limitations such as high cost, limited effectiveness, and lack of eco-friendliness (Tanaya et al., 2024). Bioremediation of petrol-contaminated soil is an environmentally friendly approach that utilizes microorganisms to degrade and detoxify pollutants. This method relies on naturally occurring microorganisms that degrade hydrocarbons over time. Petroleum contamination in the soil also favours certain hydrocarbon-degrading bacteria while inhibiting others (Mitter et al., 2021). Bioremediation reduces petroleum hydrocarbon concentrations to comply with regulatory standards or safe levels for environmental health, restores soil properties to promote plant growth and ecosystem function, and establishes a sustainable approach to soil management. The present study focuses on the isolation, characterization, and screening of bacterial strains from soil samples collected from Motihari, Bihar and to evaluate the efficacy of these isolated bacterial strains in the degradation of petrol.

Material and Methods:

Collection of soil sample

The soil was dug 15-20 cm deep from different sites contaminated with petroleum hydrocarbons in Motihari, Bihar, India. Three (03) petroleum-contaminated soil samples were collected

in sterilized plastic polybags and were kept in a refrigerator at 4°C for further experiments.

Physico-chemical analysis of soil samples:

pH of soil: For pH measurement, 5g of soil was weighed, and then 25 ml of water was added to a reagent bottle and mixed thoroughly. pH was then measured using a digital pH meter (Eutech pH700).

Moisture content: For the determination of the moisture content of the soil sample, 10g of soil was measured in a petri plate and wet weight of soil was taken. After keeping the soil sample in a hot air oven for 24 hours at 100°C the dry weight of the sample was weighed. The moisture percentage was calculated by the following formula

$$\frac{\text{wet weight of soil} - \text{dry weight of soil}}{\text{dry weight of soil}} \times 100$$

Electrical conductivity: Soil and water solution was prepared at a 1:5 ratio and was mixed using a vortex mixture. After homogenizing the soil water solution, the electric conductivity was measured by a digital electric conductivity meter (Cystronics conductivity meter 304).

Isolation of bacteria from soil samples:

The bacteria were isolated from petroleum-contaminated soil samples. 1g of soil sample was weighed and added it to 100 ml of autoclaved distilled water. The mixture was homogenized thoroughly. Serial dilution was performed to obtain appropriate concentrations for plating. The viable count method was used to isolate bacteria on nutrient agar medium.

Morphological characteristics of bacteria:

Morphological characteristics of isolated bacterial colonies were assessed based on the shape, size, margin, elevation, consistency and opacity of bacterial colonies.

Biochemical test:

A series of biochemical tests were conducted to identify and characterize the isolated bacteria. These included Gram staining, Catalase test, Urease test, Carbohydrate utilization test, Methyl Red-Voges Proskauer (MRVP) test, Starch hydrolysis test, Citrate utilization test, and Casein hydrolysis test. These tests were performed according to standard microbiological protocols to

elucidate the biochemical properties of the isolated bacterial strains.

Screening of bacteria for petroleum oil hydrocarbon degradation

Screening for Petroleum Hydrocarbon Degrading Bacteria was carried out on a screening medium. 3.27 g of Bushnell Hass (BH) broth media was dissolved in 1000 ml distilled water. The solution was mixed well with gentle heating. 0.01 g of 2,6-dichlorophenolindophenol (DCPIP) indicator was added to the BH medium and homogenized. Then 1 ml of bacterial culture broth was inoculated into the prepared medium. Petrol was added at concentrations of 1%, 2%, and 3% (v/v). The inoculated broth was incubated at 35±2°C and 150 rpm. Positive screening was indicated by a color change from blue to colorless.

Evaluation of efficacy for degradation of petroleum hydrocarbon:

The Bushnell Hass media and DCPIP indicator and petroleum oil were used for bacteria to degrade the petroleum hydrocarbon the color change from blue to colorless which indicates positive result for degradation. The observation and reading on spectrophotometer were taken at 600nm for 14 days.

Result and Discussion:

Physico-chemical analysis of soil samples

Soil pH, moisture content and conductivity play a crucial role in soil health, plant growth and microbial activity. The pH of the petroleum contaminated soil sample was slightly alkaline and ranged from 7.52 to 7.65. The pH range of the contaminated soil was higher than normal garden soil. The moisture content in the percentage of Sample-1, Sample-2, Sample-3, and Normal Soil was 12.10 %, 3.41%, 7.18%, and 8.34% respectively. Electrical conductivity (EC) is used to find out the soluble salt concentration of the soil when the EC value exceeds the recommended value, In the present study it ranges from 0.79 dS/m to 0.86 dS/m. The EC of sample-1, sample-2, and sample-3 were 0.79 dS/m, 0.80 dS/m, and 0.86 dS/m respectively which is less than normal soil EC i.e. 1.12 dS/m.

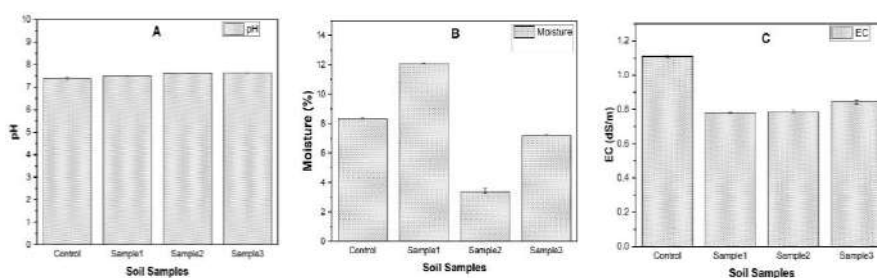


Figure 1. Physico-chemical analysis of soil samples

Figure1. Physico-chemical analysis of soil samples (A) pH (B) Moisture content and (C) Electrical conductivity

Morphological and biochemical characterization of isolated bacteria:

A total of eighteen morphologically distinct bacterial isolates were obtained from the soil samples. The isolates exhibited diverse characteristics in terms of Gram staining and cellular morphology. Out of eighteen bacteria, ten isolates (55.6%) were Gram-positive and eight

isolates (44.4%) were Gram-negative. The eleven isolates exhibited a coccus shape, and seven isolates (38.9%) displayed a bacillus shape. The external morphology of the bacterial colonies showed significant diversity. Each of the eighteen isolates presented distinct colony characteristics based on various parameters. These morphological features were used as criteria for initial differentiation and isolation of the bacterial strains. The detailed morphological characteristics of each isolate are presented in Table 1.

Table 1. Morphological characterization of isolated bacteria

Bacteria	Consistency	Color	Shape	Size	Margin	Elevation	Opacity
TT1	Smooth	Cream	Circular	Moderate	Entire	Convex	Opaque
TT2	Smooth	Light Yellow	Circular	Small	Entire	Raised	Translucent
TT3	Rough	Cream	Circular	Moderate	Entire	Flat	Translucent
TT4	Rough	Light Yellow	Irregular	Small	Scalloped	Raised	Translucent
TT5	Smooth	White	Round	Medium	Scalloped	Crateriform	Opaque
TT6	Smooth	White	Round	Small	Entire	Raised	Opaque
TT7	Smooth	White	Round	Medium	Entire	Crateriform	Translucent
TT8	Rough	White	Round	Small	Scalloped	Raised	Opaque
TT9	Smooth	Cream	Round	Medium	Entire	Umbonate	Opaque
TT10	Smooth	White	Round	Medium	Entire	Umbonate	Opaque
TT11	Smooth	White	Round	Medium	Entire	Raised	Opaque
TT12	Smooth	Light Yellow	Round	Small	Entire	Convex	Opaque
TT13	Smooth	Light Orange	Round	Small	Entire	Convex	Opaque
TT14	Smooth	Bright Orange	Round	Small	Entire	Umbonate	Opaque
TT15	Smooth	Orange	Round	Medium	Entire	Umbonate	Opaque
TT16	Smooth	Cream	Irregular	Medium	Undulate	Flat	Translucent
TT17	Smooth	Light Yellow	Round	Small	Entire	Flat	Opaque
TT18	Smooth	White	Round	Medium	Entire	Raised	Opaque

Biochemical test has been done to characterized the bacteria, gram staining, catalase test, urease test, carbohydrates utilization test,

MRVP test, starch hydrolysis test, citrate test, casein test (Table 2).

Table 2. Biochemical test characterization of bacteria

Bacteria	Gram staining	Catalase	Urease	Methyl Red	Voges-Proskauer	Starch hydrolysis	Citrate	Casein	Carbohydrates test			
									Glucose		Sucrose	
									Acid	Gas	Acid	Gas
TT1	+	+	+	-	+	-	+	-	+	+	+	+
TT2	-	-	-	-	+	-	-	+	-	-	-	-
TT3	-	+	-	-	-	+	+	-	+	-	+	-
TT4	+	+	-	-	-	+	+	-	+	-	-	-
TT5	+	+	-	-	-	-	+	-	-	-	-	-

TT6	-	+	-	-	-	-	-	+	-	-	+	-
TT7	+	+	-	-	-	+	-	-	+	-	-	-
TT8	+	+	+	-	-	-	-	-	-	-	-	-
TT9	-	+	-	-	-	+	+	-	-	-	-	-
TT10	+	+	-	-	-	+	-	-	+	+	+	+
TT11	-	+	-	-	-	-	-	-	+	+	-	-
TT12	-	+	+	+	-	-	+	-	+	+	+	+
TT13	-	+	-	-	-	+	+	-	+	-	+	-
TT14	+	+	-	-	-	-	-	-	-	-	-	-
TT15	+	+	-	-	-	+	-	+	+	-	+	-
TT16	+	+	-	-	-	+	-	-	+	-	+	-
TT17	+	+	-	-	-	+	+	-	-	-	-	-
TT18	-	+	-	-	-	+	+	-	+	+	+	+

+ = Positive, - = Negative

Screening for Petroleum Hydrocarbon Degrading Bacteria:

Screening of isolated bacteria was conducted using Bushnell-Haas medium supplemented with 2,6-dichlorophenolindophenol (DCPIP) as an indicator and varying concentrations of petroleum oil (1%, 2%, and 3%). A colour change from blue to colourless was interpreted as a positive result, indicating bacterial growth and potential hydrocarbon degradation. Among the 18 isolates tested, seven demonstrated positive results at 1% petroleum oil concentration, five isolates showed positive results at 2%, and three isolates showed positive results at 3% concentrations. The observed decrease in positive results at higher oil concentrations is consistent with previous findings suggesting that elevated petroleum oil levels can inhibit bacterial growth. This inhibition may be attributed to the accumulation of oil on the medium surface, which can reduce oxygen availability and subsequently impair the degradation process (Dwivedi et al., 2019). These results underscore the importance of considering optimal oil concentrations when selecting bacterial strains for potential bioremediation applications.

Evaluation of Petroleum Hydrocarbon Degradation Efficacy:

The efficacy of petrol degradation was evaluated using three bacterial isolates (TT8, TT11, and TT12) over a 14-day period, employing

spectrophotometric analysis. The isolates demonstrated degradation percentages of 63.47%, 69.25%, and 60.36%, respectively (Figure 4). These findings align with previous research indicating that various bacterial species can utilize hydrocarbon compounds as a carbon energy source when exposed to such environments (Pandolfo et al., 2023). For instance, *Delftia sp.* isolated from an Algerian oil field exhibited the capacity to degrade over 66.76% of diesel within 7 days (Lenchi et al., 2020). Similarly, *Bosea sp.* has been identified as part of a diverse population of alkane-degrading rhizobacteria capable of hydrocarbon degradation and biofilm production (Rodríguez-Urbe et al., 2021). *Rhodococcus qingshengii* and *Pseudomonas sp.* are widely employed in petroleum oil bioremediation due to their active hydrocarbon degradation and biosurfactant production capabilities (Rodríguez-Urbe et al., 2021). *Microbacterium* strains, recognized as common hydrocarbon degraders in petroleum-contaminated soils, have demonstrated the ability to degrade up to 78% of petroleum hydrocarbons (Hazaimeh et al., 2024). Additionally, *Sphingomonas sp.* is noted for its high degradation potential across various aromatic compounds (Wei et al., 2021). The bacterial isolates in the present study exhibited up to 70.0% petrol degradation, which is consistent with previous findings and suggests their potential significance in petrol hydrocarbon remediation.

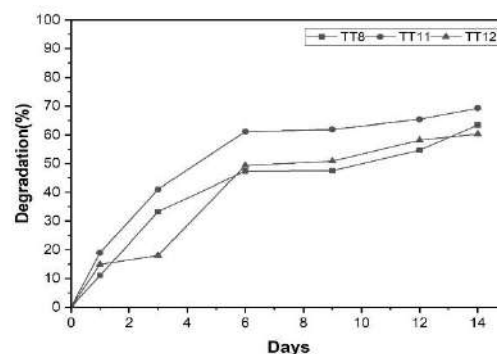


Figure 2. Evaluation of Petroleum Hydrocarbon Degradation Efficacy

Conclusions:

In conclusion, this study demonstrates the significant potential of indigenous bacterial strains for the bioremediation of petrol-contaminated soils. A total of 18 bacteria were isolated from the contaminated soil. The identification and characterization of these effective bacterial isolates represent a crucial step towards developing targeted, eco-friendly bioremediation strategies for petrol-contaminated soils. The isolated strains, particularly TT8, TT11, and TT12, exhibited remarkable petrol degradation capabilities, with efficacy rates ranging from 60.36% to 69.25% over a 14-day period. While the study provides promising results, further research is needed to optimize degradation conditions and assess the strains' performance in diverse environmental conditions.

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A Study on impact of gender discrimination on Male employee performance in Chandrapur City

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Abstract:

In general gender equality discussions often engage mainly women, but actually men have a crucial role to play. In order to achieve gender equality, we need to be committed to address challenges for both sides. While most gender inequalities disadvantage women, there are also important issues to address that primarily affect men, ranging from higher suicide rates to lower levels of achievement in education and lower engagement in caring for children and other household duties.

This paper investigates the impact of gender discrimination on male employee performance in educational institutions. Gender discrimination, a pervasive issue, undermines equal opportunities, affecting employees' motivation, productivity, and overall well-being. The paper examines how biased practices, unequal treatment contribute to a decline in job satisfaction, morale, and performance. Using both qualitative and quantitative methodologies, the study highlights the various forms of discrimination and their effects on employee engagement, creativity, and institutional output.

The universe of the study covers whole Chandrapur city as its population. The sampling is selected by using convenient sampling and the sample size is confined as 60.

Keywords: Gender Discrimination, Employee Performance, Educational Institutes, Work Environment

Introduction:

From a wider perspective, it is not only fair, but also important that men are engaged in gender equality. “We need to involve more men in the creation of a more equal society by raising awareness about their role and demonstrating how gender equality can benefit their lives too

Most people still see gender issues as women’s issues, even though the strict definition of gender encompasses male, female and other gender identities. Very few percentage of the men reported being subjected to at least one of the following behaviors from coworkers or supervisors: ridicule and insulting teasing, verbal abuse, rumors and gossips spread about themselves, offending remarks, recurring reminders on blunders, hostility or silence when entering a conversation Although such acts and conducts are common and experienced by most organization members now and then, they may significantly impair psychological health and well-being as well as overall job satisfaction when occurring consistently and systematically. Significant correlations were found between exposure to harassment and both job satisfaction and psychological health and well-being. Strong correlations were found between exposure to harassment and dissatisfaction with co-worker interaction.

The concept of gender equality in the workplace is often celebrated in theory, but in practice, it remains an elusive goal. Although there have been significant strides in promoting women's rights and representation in the workforce, issues such as the gender pay gap, underrepresentation in leadership positions, and workplace harassment persist it further complicates the experiences of many women, leading to unique challenges that are often overlooked in mainstream discussions

Gender discrimination refers to the unequal treatment or perceptions of individuals based on their gender, typically affecting women disproportionately. In educational institutes, where fostering an equitable environment is paramount, gender discrimination can significantly influence the performance and morale of employees. This paper explores how gender biases in educational settings affect employee productivity, career progression, job satisfaction, and institutional outcomes.

Significance of the Study:

Educational institutes serve as a critical foundation for social and intellectual development. Yet, gender discrimination within these settings compromises the productivity and growth of educators and administrative staff, which can ultimately affect the quality of education delivered to students. Understanding these dynamics is

essential to creating equitable institutions where all employees, regardless of gender, can contribute fully and effectively.

About Chandrapur:

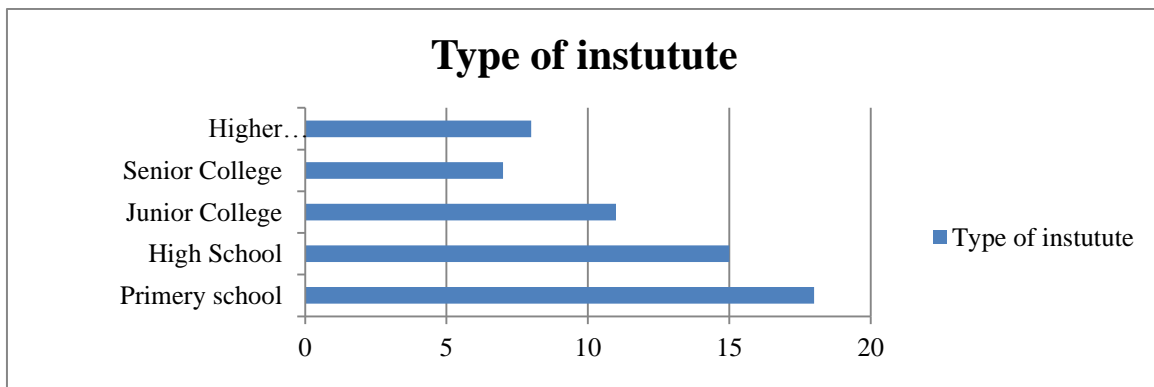
Fort city of Chandrapur is of historical importance, it was set up by Gond King Khandkya Ballal Shah in 13th Century. The city is situated on the banks of Irai river on one side and Zarpat river on the other. It is the district headquarters of Chandrapur district. It is famous for TADOBA National TIGER RESERVE just a 37 kms from heart of the city. The area of Chandrapur is rich with Coal, Lime Stone as well as other important minerals and High quality Bamboo forests. The important industries in this region include Ballarpur Industries Limited (BGPPL), Aditya Birla Group Cement Factory, ACC Cement, Gujrat Ambuja Cement, ManikGargh Cement (a house of Basant Kumar Birla) to name a few. Earlier Chandrapur was a Nagar Palika now it is a Muncipal Corporation with a population around 3, 50,000.

Review of literature

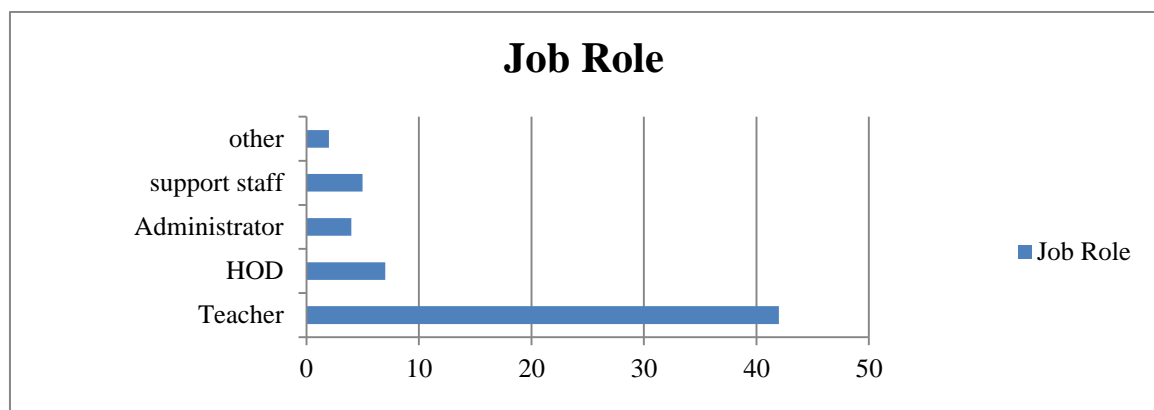
1. **Bullying and Harassment in the Workplace**
By Stale Einarsen, Helge Hoel, Dieter Zapf, Cary Cooper
2. **Sexual Harrassment at Work Place** By Indira Jaising

Data Analysis:

1. Type of educational Institute



2. Job Role



Objective of the Study

1. To study the Specific challenges faced by employees
2. To study the gender bias at the work place
3. To Study the impact of gender bias on performance

Need for the study:

The difficulties that men face in professional life are analyzed by carrying out a survey.

Hypothesis

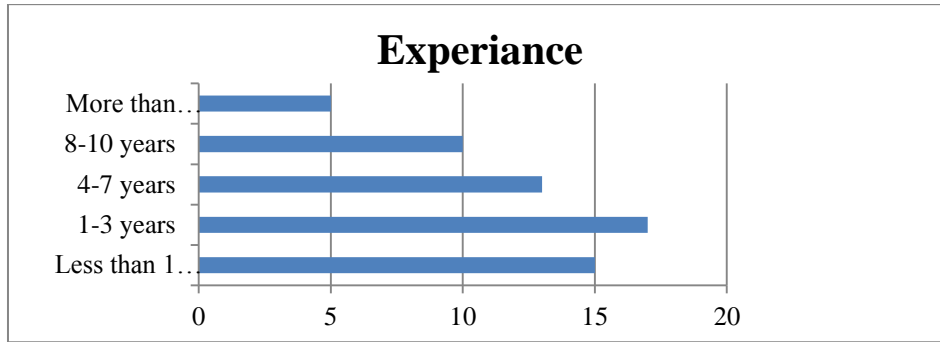
1. Male employees face gender related discrimination
2. There is relationship between Gender discrimination and employee performance

Research Methodology:

The study under taken is descriptive in nature, for the collection of data different recourses were used. Primary data collection methods can be divided into two groups: quantitative and qualitative. Primary data was collected through close ended questionnaire.

Sampling: - The universe of the study covers whole Chandrapur city as its population. The sampling is selected by using convenient sampling and the sample size was confined to 60.

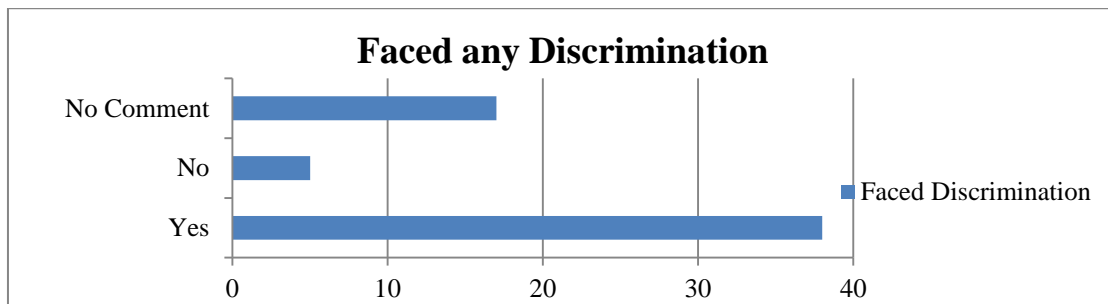
3. Experience in years



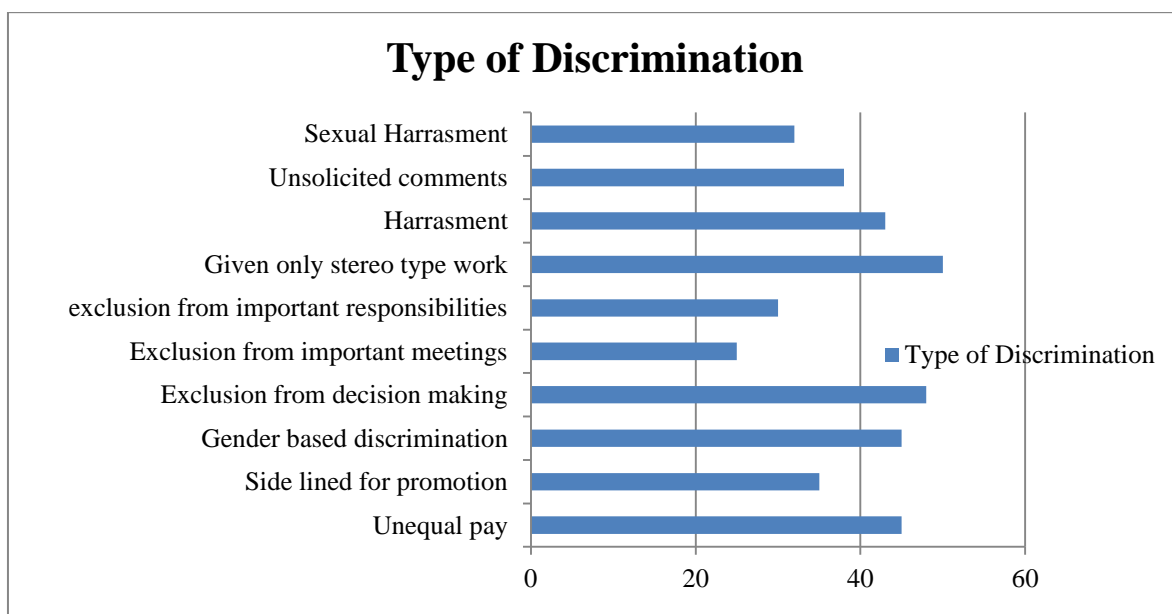
4. Are satisfied with present Work Environment?



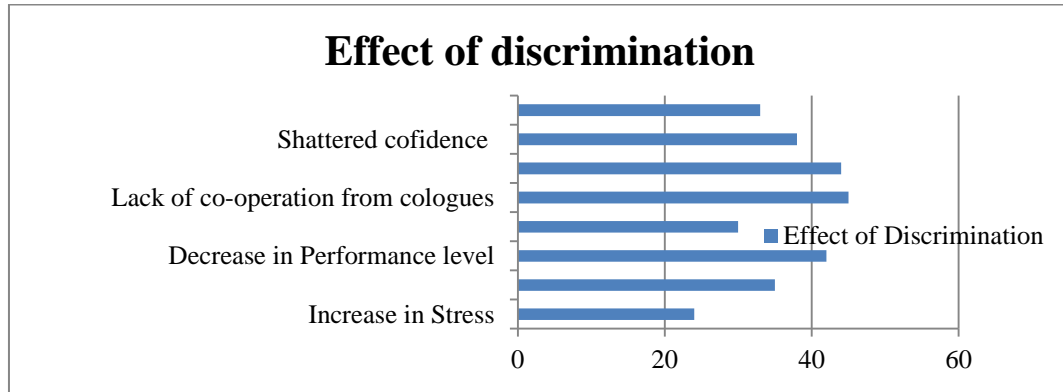
5. Did you face any Gender discrimination?



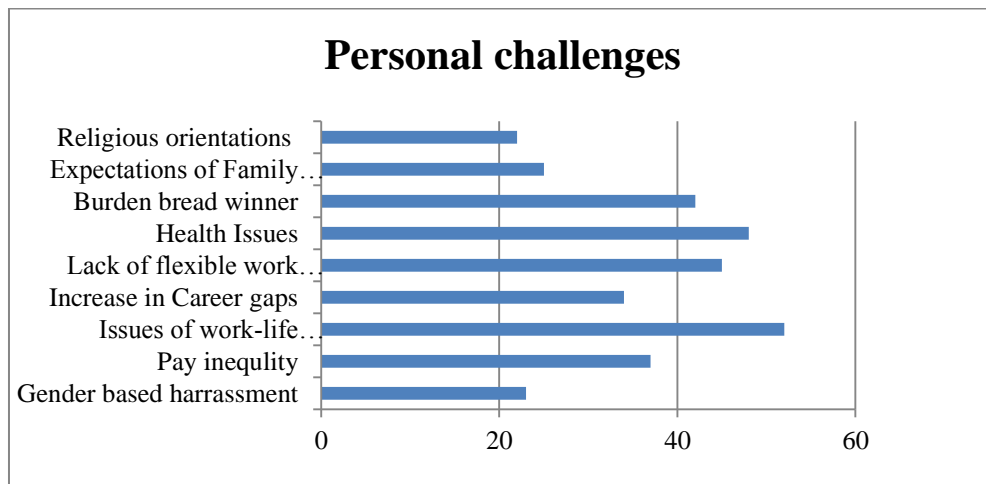
6. What form of discrimination prevails at the work place?



7. What is the effect of discrimination?



8. Personal challenges



Findings

Work place discrimination:

- Men in Educational institute do face discrimination
- Basis of harassment is mostly gender based.
- Very few opportunities to prove their caliber.
- Male feel that they have less opportunities in Primary school and High school
- At times they feel that they must leave this career

Adverse effect of discrimination:

- Hostile Work Environment
- Increase in stress level
- Increase in health related problems
- Performance level graph going in downward direction
- Lack of co-operation from colleagues
- Disturbed family environment
- Less interest in skill enhancement

Conclusion:

Men do face discrimination on the basis of gender

Addressing issues regularly faced by men in the work place requires a multifaceted approach that involve not just employees but also policy makers and society at large. By promoting gender equality and creating inclusive work environment, solid strategies must be formulated to mitigate

discrimination and foster a more inclusive work environment in educational settings.

Then we can ensure that men have equal opportunities to succeed and thrive in their chosen careers. This in turn benefits individuals and society as a whole, creating more prosperous future for all. The paper suggests strategies to mitigate discrimination and foster a more inclusive work environment in educational settings.

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4. <https://blog.ipleaders.in/sexual-harassment-of-men-at-workplace-need-for-a-legal-framework/>



Morphological Studies on Amphora (Bacillariophyceae) From Girna River near Jalgaon Region Maharashtra, India

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Abstract:

A study was performed to better understand the taxonomy and diversity of the diatom genus *Amphora* (Bacillariophyceae) from Girna river near Jalgaon regions of Maharashtra, India. Sample were taken from three locations at Girna river near Jalgaon region. Eight *Amphora* species were observed under Light microscopic (LM). Four were identified to the species level, and four to the variety level. The aim of this investigation is to improve the knowledge of diatoms in Jalgaon region. All *Amphora* species were taxonomically determined and are described for the first time from these areas. They were listed and presented with morphological descriptions, dimensional information and photographic information.

Keywords: Girna, *Amphora*, taxonomically, Jalgaon, investigation.

Introduction:

Diatoms one of the unicellular algae which have main components being the diatoms are dinoflagellates, blue greens and some other photo-flagellates. Diatoms occupy different types Viz., pelagic, benthic and surface for living and nonliving substrates. Diatoms are essential members of the phytoplankton communities in the fresh water as well as marine environment and very often from a dominant component of macro and micro planktons Fogg, G. E. (1982).

Girna river water is perhaps the most vulnerable habitats and are most likely to be changed by the activities of man. This essential resource is becoming increasingly scarce in many parts of the river due to the severe impairment of water quality. This river originates in the western hills of Kalwan subdivision of Nasik district. Total length of Girna river in Jalgaon district is approximately around 174 km. Now-a-days this river has also got polluted. Diatoms are a large and diverse group of single-celled algae. They are distributed throughout the world in nearly all types of aquatic systems and are one of the most important food resources in marine and freshwater ecosystems. There are many thousands of taxa with diverse ecological requirements, their siliceous remains are used extensively as environmental indicators in studies of climate change, acidic precipitation and water quality (Stoermer & Smol, 1999).

Diatoms not only the most important primary producers on the Earth, but also important tools for monitoring environmental conditions of the past and present. Especially the benthic diatoms are

very useful tools in the interpretation of past environmental conditions as well as the understanding of the present ecosystem in river area. The genus *Amphora* was first time described by Ehrenberg (Ehrenberg 1832) and genus nomenclature of *Amphora* was also first used by Ehrenberg himself (Ehrenberg 1840). Taxonomy is the science of classifying, naming, describing organisms and it also shows the status of population, conservation of specific species. In advance biological researchers can't find better result without classification, as the taxa of their organism are not specified for nomenclature. The oncoming student or researchers are confused instead of getting benefit of the research work. In this paper we given morphological description, scatches and photographs of total 8 taxa, in which there are 4 species, 8 variety, of genus *Amphora*.

Materials and Methods:

Algal materials were collected in specimen bottles at the beginning of the experiment. Filamentous form were collected with the forceps or by hand, while for phytoplankton forms surface water were collected between 8 to 9 am., epiphytic form were collected by scraping or squeezing the hydrophytes.

Algal sample were collected at monthly interval, during January 2007 to December 2008. The attached epiphytic and floating form of algae were collected in acid washed container bottles, and transferred to the laboratory for the immediate preservation in the 4% formalin for further taxonomic investigation.

The permanent slides of the diatoms were prepared by treatment method (Sarode and Kamat, 1984). Diatom frustules were prepared by boiling the sample in the mixture of concentrated sulphuric acid (20.25 ml preserved sample + 20.25 ml conc. H₂SO₄). The diatomaceous remain were then washed in distilled water until acid free and centrifuged samples were preserved in 70% alcohol.

Systematic account:

Genus- *Amphora* Ehrenberg, 1840

Amphora coffeaeformis Agardh v. *bhusavalensis* sarode and Kamat

Frustules elliptic lanceolate, 15-20µ long, 7-9µ broad; valves 15-20µ, long, 3.8-4.4µ, broad, actuate on the dorsal margin; and slightly concave or more or less straight vertical margin; ends constricted on dorsal side, slightly constricted on

Amphora maharashtrensis Sarode and Kamat

Frustules elliptic; valves 12.4-14.5µ long, 4-5µ broad, strongly convex on the dorsal side and more or less straight on the ventral side with inwardly bent rounded ends; raphe thin, close to the ventral margin, more or less straight, terminal

Amphora nagpurensis Sarode et Kamat

Valves 22-24µ long, 5.2-5.6µ broad, lunate with strongly convex dorsal margin and biarcuate ventral margin with a slight median depression; ends constricted and capitate; raphe thin, close to the

Amphora normanii Rabh.

Cleve-Euler 1953, p. 97, f. 683.

Frustules elliptic lanceolate with constricted capitate ends in girdle view; valves 28-32µ long, 4.5-8µ broad, acute, narrowed towards the ends;

Amphora ovalis Kuetz. v. *pediculus* Kuetz

Hustedt 1930, p. 343, f. 629

Frustules 12.5-17.5µ, long, 8.5-10.5µ, broad, broadly elliptic with rounded ends in girdle view; valves lunate with strongly convex dorsal and straight or slightly concave ventral margin; ends broad, rounded; raphe thin and slightly acute; axial area narrow; central area very large, reaching the

Amphora ovalis Kuetz. v. *affinis* Kuetz.

Gandhi 1959b, p. 321, f. 40.

Frustules linear elliptical with truncate ends in girdle view; valves 32.7-33.6µ long, 6.5-7.8µ broad, lunate with ventral margin slightly inflated in the middle and narrowed rounded ends; raphe thin and arcuate with central pores reflexed towards the dorsal side in a graceful arc, terminal fissures

Amphora ovalis Kuetz. v. *gracilis* (Ehr.) Cleve

Cleve-Euler 1953, p. 91, f. 667 b.

Frustules 61-68 µ, long, 25.5-28µ, broad, elliptic with truncate ends in girdle view; valves lunate with convex dorsal side and concave ventral side with rounded ends; raphe arcuate with dorsally bent central pores; axial area very narrow; central

Amphora veneta Kuetz.

Hustedt 1930, p. 345, f. 631.

Frustules broadly elliptic with somewhat subtruncate ends in girdle view; valves 14.2-21.3µ,

Frustules were eventually mounted in Canada balsam for microscopic examination. Photographs taken by Nikon camera and sketches were made by using camera lucida. Identification of diatoms was mostly based on the key given by Hustedt (1930), Venkataraman (1939), Cleve-Euler (1955), Krishnamurthy (1954), Ganghi (1958, 1960, 1998) and Sarode and Kamat (1984).

(Pl. 1, fig. 1; Pl. 2, fig. 3)

ventral side and beak like, ventrally directed; raphe thin more or less straight, slightly directed to the entirely side towards the ends; striae about 22-24 in 10µ, clearly punctuate in the middle and indistinct towards the ends; ventral side structureless.

(Pl. 1, fig. 2; Pl. 2, fig. 2)

fissures very slightly directed towards the ventral margin; axial area narrow; central area large with a small longitudinal band surrounded by striae; striae 22-26 in 10µ, coarsely punctuate in the middle, very finely punctuate and closely set towards the ends.

(Pl. 1, fig. 3; Pl. 2, fig. 4)

ventral margin; axial area narrow; central area small striae about 18 in 10µ, clearly punctuate, slightly closely set towards the ends; ventral side structureless.

(Pl. 1, fig. 4; Pl. 2, fig. 1)

ends capitate; raphe thin; axial area very narrow; central area with distinct fascia; striae 20-22 in 10µ, punctuate.

(Pl. 1, fig. 5; Pl. 2, fig. 6)

ventral margin and almost dorsal margin; striae 10-12 in 10µ, radial, punctuate, convergent at the ends on the ventral side.

Bombay (Ganghi 1955; 1960b). Kolhapur (Ganghi 1958b) Lonavla (Ganghi 1962) Jalgaon, Satara

(Pl. 1, fig. 6; Pl. 2, fig. 8)

ventrally bent; axial area very narrow; central area very large, reaching the ventral margin and on the dorsal side quadrate, bounded by striae; striae 13-14 in 10µ, radial on the dorsal side, on the ventral side radial in the middle and convergent at the ends; striae clearly lineate, lineations arranged irregularly.

(Pl. 1, fig. 7; Pl. 2, fig. 5)

area large, quadrate, reaching the ventral side; striae 12-13 in 10µ, coarsely punctuate, radial on the dorsal side and radial in the middle and convergent at the ends on ventral side.

(Pl. 1, fig. 8; Pl. 2, fig. 7)

long, 4.2-4.8µ, broad, strongly convex on the dorsal side and slightly concave on the ventral side with

inwardly bent rounded ends; raphe thin, very close to the ventral margin with central pores dorsally directed; striae 22-24 in 10 μ , clearly punctuate in the middle and very finely punctuate and rather indistinct towards the ends, radial throughout, ventral margin very margin very strongly punctuate.

Kolhapur (Ganghi 1956b, 1958b; Panhalgad (Ganghib 1959c). Bombay (Gandhi 1962a). Loanvda (Gandhi 1962b), Jalna (Sarode and Kamat 1983b). Nagpur, Amravati, Dhule.

Plate-1: Scatches of *Amphora*

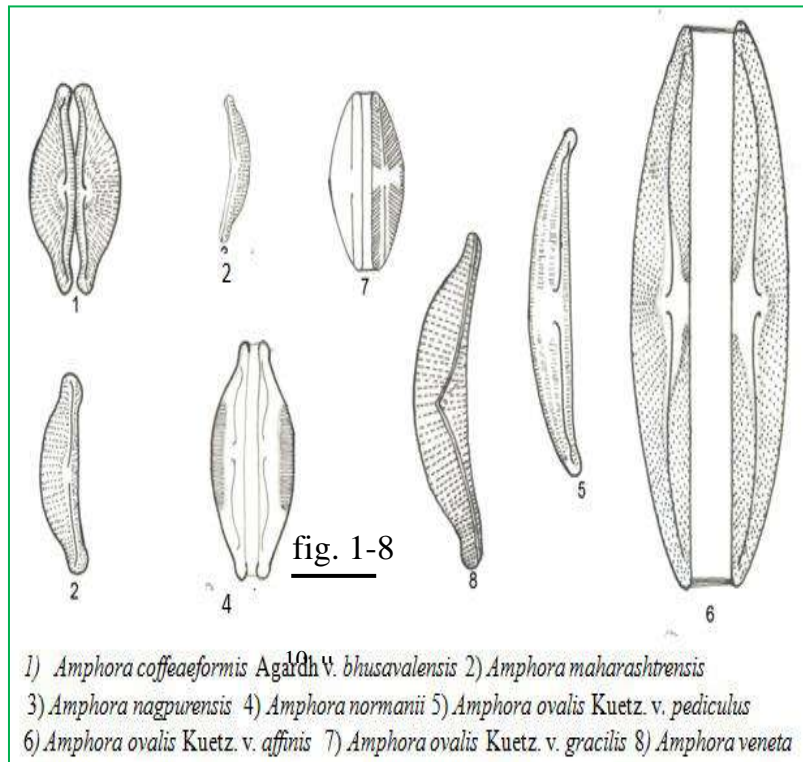
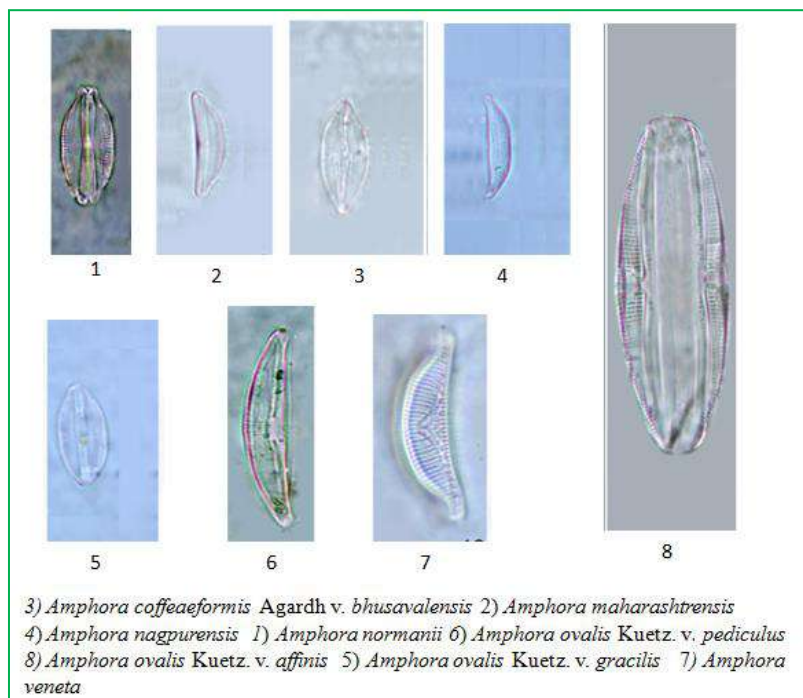


Plate-2: *Amphora* Photographs under Light microscope (LM)



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Exploring the Applications of Fractional Differential Equations in Advancing Science and Technology

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Abstract:

Fractional differential equations (FDEs) generalize traditional calculus by extending derivatives to non-integer orders. This flexibility allows for more accurate modelling of complex systems exhibiting memory, hereditary effects, and non-local behaviour. This paper explores various applications of FDEs across multiple fields, including physics, engineering, biology, and finance, highlighting their significance in addressing real-world problems.

Keywords: Fractional differential equations, memory effects, anomalous diffusion, control systems, viscoelasticity, financial modelling.

Introduction:

Fractional differential equations (FDEs) have emerged as a powerful generalization of classical calculus, extending the notion of derivatives and integrals to non-integer (fractional) orders. This mathematical extension enables a more precise modelling of complex systems that exhibit memory, hereditary properties, and non-local behaviour—phenomena that are difficult to capture using classical integer-order models. Unlike traditional differential equations, FDEs are particularly adept at describing systems with anomalous diffusion, fractal-like structures, and long-range dependencies.

The unique ability of FDEs to incorporate historical dependence makes them a valuable tool across a wide range of scientific and technological disciplines. In physics, they are used to model anomalous diffusion processes in disordered materials, viscoelastic behaviour in complex fluids, and wave propagation in heterogeneous media. In engineering, fractional-order control systems improve the performance and robustness of

Riemann-Liouville Derivative:

$$D^\alpha f(t) = \frac{1}{\Gamma(n-\alpha)} \frac{d^n}{dt^n} \int_a^t f(\tau)(t-\tau)^{n-\alpha-1} d\tau$$

Where α is a non-integer order, $n = \lceil \alpha \rceil$, and Γ is the Gamma function.

Caputo Derivative:

$$D^\alpha f(t) = \frac{1}{\Gamma(n-\alpha)} \int_a^t f^{(n)}(\tau)(t-\tau)^{n-\alpha-1} d\tau$$

This definition is particularly useful in physical applications because it allows for initial

industrial processes, while fractional signal processing tools enhance radar, telecommunications, and image processing techniques.

Beyond physics and engineering, FDEs find applications in biology, where they describe neural dynamics, tissue diffusion, and pharmacokinetics with greater accuracy. In finance, they model long-range dependencies in asset prices and improve risk management strategies. As research into fractional calculus continues, its applications are rapidly expanding, offering new ways to understand and address complex, real-world problems. This paper aims to elucidate the various applications of FDEs in science and technology, showcasing their ability to model intricate dynamics that classical approaches may overlook.

Definitions:

Fractional Derivative

A fractional derivative is defined as a generalization of the traditional derivative to non-integer orders. The most common definitions of fractional derivatives include:

conditions to be specified in terms of integer-order derivatives.

Fractional Differential Equation

A fractional differential equation is an equation that involves derivatives of non-integer order. It can be expressed in the general form:

$$D^\alpha y(t) + p(t)y(t) = g(t)$$

Where D^α represents the fractional derivative or order α , $p(t)$ and $g(t)$ are functions of t , and $y(t)$ is the unknown function to be solved.

Methods of Solving Fractional Differential Equations:

Several methods have been developed for solving FDEs, including:

Analytical Methods

Fractional Transform Methods:

Techniques such as the fractional Laplace transform and the fractional Fourier transform can be employed to solve FDEs by transforming the equation into a simpler algebraic form, which can then be inverted to obtain the solution in the original domain.

Variation of Parameters:

This method extends the traditional variation of parameters technique to fractional orders. It involves finding particular solutions to non-homogeneous FDEs by expressing them in terms of solutions to the corresponding homogeneous equation.

Numerical Methods

Finite Difference Method:

This method discretizes the FDEs using fractional difference approximations. It provides a numerical solution by approximating derivatives at discrete points, making it suitable for various applications.

Adomian Decomposition Method:

This approach decomposes the solution into a series of functions, allowing for the analytical solution of nonlinear fractional differential equations.

Applications of Fractional Differential Equations:

Anomalous Diffusion in Physics

Anomalous diffusion occurs in various physical systems, where particle movement deviates from classical Brownian motion. FDEs effectively model sub-diffusion and super-diffusion, prevalent in porous materials and turbulent flows. For instance, the fractional diffusion equation, characterized by a fractional time derivative, allows researchers to describe the diffusion process in complex media more accurately than traditional models.

Viscoelasticity in Engineering

Viscoelastic materials demonstrate both viscous and elastic behaviour, often exhibiting time-dependent properties. Fractional models of viscoelasticity, such as the fractional Zener model, utilize FDEs to describe the stress-strain relationship, capturing the material's response to applied forces over time. This application is

Mr. Umesh Ramrao Sukalwad

particularly valuable in engineering and materials science, where accurate predictions of material behaviour are essential for product design.

Control Systems

In control theory, fractional-order controllers offer improved performance over traditional integer-order controllers. Fractional PID controllers, which include fractional derivatives and integrals, provide additional tuning parameters that enhance system response and stability. These controllers are beneficial in various engineering applications, such as robotics, aerospace, and industrial automation, where precise control is critical.

Quantum Mechanics

In quantum mechanics, fractional differential equations are employed to describe quantum systems exhibiting non-local behaviour. For instance, fractional Schrödinger equations can provide a framework for modelling quantum states with memory effects, enhancing the understanding of phenomena such as tunnelling and entanglement.

Biological Systems

In biology, many processes exhibit complex dynamics that classical models fail to adequately describe. For example, nutrient diffusion in biological tissues can be modeled using FDEs to account for the anomalous diffusion observed in these systems. This approach is crucial for understanding how substances move through complex environments, such as cellular structures.

Financial Market Modelling

In finance, asset prices often exhibit long-range dependencies and memory effects that traditional models overlook. Fractional differential equations can model these behaviours, leading to improved predictions of price movements and volatility. The fractional Black-Scholes model, for example, incorporates memory effects to enhance option pricing accuracy.

Epidemiology

In epidemiology, FDEs are used to model the spread of infectious diseases, capturing complex interactions between populations. By incorporating fractional derivatives, researchers can better account for the memory effects and non-local interactions that influence disease dynamics, leading to more accurate predictions and improved public health strategies.

Challenges and Future Directions:

Despite the many advantages of fractional differential equations, several challenges remain:

1. **Complexity of Solutions:** Many FDEs do not have closed-form solutions, requiring

sophisticated numerical methods for practical applications.

2. **Interpretation of Results:** The physical interpretation of fractional derivatives can be non-intuitive, leading to difficulties in applying FDEs to real-world problems.
3. **Computational Issues:** Numerical solutions can be computationally intensive, particularly for higher-order FDEs or in multidimensional spaces.

Future research should focus on developing more efficient numerical methods, enhancing the theoretical understanding of FDEs, and exploring new applications in emerging fields such as artificial intelligence and materials science.

Conclusion:

Fractional differential equations serve as crucial tools for modelling complex phenomena across various scientific and technological fields. Their ability to incorporate memory, non-local behaviour, and anomalous dynamics enables a more profound understanding of systems that traditional integer-order models fail to capture. As research continues to explore the applications of FDEs, their potential for solving real-world problems will only expand, paving the way for advancements in physics, engineering, biology, and finance.

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Mother-Daughter Relationships: A Psychoanalytic Perspective in *Villette* and *Clear Light of Day*

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Abstract:

This research paper explores the complex dynamics of mother-daughter relationships in *Villette* by Charlotte Brontë and *Clear Light of Day* by Anita Desai, using psychoanalytic theory as a lens. It dives deeper into how maternal figures, both absent and present, structures the emotional and psychological development of the protagonists. The analysis focuses on key psychoanalytic concepts such as ambivalence, emotional dependence, and individuation, with attention to cultural contexts. The paper aims to provide a comparative analysis, contributing to the discourse on gender, identity, and familial bonds in literature.

Keywords: Mother-daughter relationship, Psychoanalytic Approach, Women's Psychological Development.

Introduction:

Psychoanalytic study of the mother-daughter relationship has shown us a lot about how people grow and how society works. This paper will look at two major works, *Villette* by Charlotte Brontë and *Clear Light of Day* by Anita Desai, to see how the ties between the mother and daughter are shown in more detail. This paper will try to explore the emotional tensions, symbolic meanings, and relational patterns constructed in the life of characters and their ways with maternal figures from a psychoanalytic perspective. Born out of some vastly different cultural and historical settings, these novels, however, reveal similar themes as far as this aspect of the mother being formative for a woman's psyche is concerned. Both books, in different ways, touch the connection, although thickly made and full of emotional connotations.

Literature Review:

The bond between mothers and daughters has traditionally been perhaps one of the most emotionally evocative and multi-dimensional dynamics within not only psychoanalytic theory but also literary stories. This bond has been approached by scholars from a myriad of perspectives: psychological, feminist, and cultural—and it is through these diverse perspectives that unique insights into emotional sentiments and tensions that seem to make an appearance in such a bond can be realized. The bond between a mother and daughter has been used a lot in literature to talk about identity, independence, mental dependence, and how the family shapes a person's growth. The next part is a summary of the most important literary and

psychological studies on the subject. These studies will be used as a basis for analysing *Villette* by Charlotte Brontë and *Clear Light of Day* by Anita Desai.

Psychoanalytic Perspectives on Mother-Daughter Relationships:

Psychoanalysis works wonderfully in explaining the complex emotional dynamics involved in relationships between mothers and daughters. Sigmund Freud's earlier work, particularly the Oedipal complex, had paved the way for further study in family relationships. Freud said, "The solution to this conflict in girls is successful identification with the mother." This means that the daughter builds a relationship with her mother that is both attachment and rivalry, which can lead to problems. Freud's work was mostly about the relationship between a father and son, but it paved the way for more study into the relationship between a mother and daughter. Melanie Klein was a major figure in psychoanalysis. Her theory of object relations, in particular, helped us understand the relationship between a mother and a child. She said that a child's early ties with caretakers, especially the mother, were very important in shaping their minds. It is from Klein that the mother is the first "object" in the child's world through the process known as splitting, which makes the child view the mother at once as "good" and "bad." Emotional duality—the mother as a caring figure and source of frustration defines ambivalence, central to relationships involving mothers and their daughters. This theory is really crucial in grasping how a character such as Lucy Snowe and Bim

perceive their maternal figures in the novels *Villette* and *Clear Light of Day*, respectively. Nancy Chodorow's book, *The Reproduction of Mothering* in 1978 went even further into the psychoanalytic discourse of mothers and daughters to highlight the aspects of emotional relationships between the mothers and daughters. Chodorow argues that a daughter is likely to identify with her mother, and that this holds the implication both of continuity in the emotional realm and of conflict; it also often functions as a mirror in the reproduction of gender roles and emotional patterns across the generations. Chodorow's feminist psychoanalytic framework is particularly useful for literary study because it provides a lens through which literary scholars might interrogate how the mother-daughter relationship is constructed in fiction and what that says about larger structures in society. Jessica Benjamin wrote *The Bonds of Love* in 1988 and focuses her work on the attempt to gain autonomy within relational interactions. The tension between connection and separation and ways of expressing it in intimate relationships - particularly between mothers and their daughters - was the concern of Benjamin. According to Benjamin, this very tension stems from the individuation wishes of the daughter and the part played by the mother either in promoting or inhibiting such individuation (Benjamin 65). The work is a great source for the analytical study of characters who are subdued by emotional conflict, dependency, and a struggle for autonomy that could be confronted and shared with maternal figures surrounding them, such as Lucy Snowe in *Villette* and Bim and Tara in *Clear Light of Day*.

Relationships of Mother-Daughter in Literature:

The subject got a lot of attention from experts a long time ago, especially works written by women. In *Villette*, Charlotte Brontë writes about the difficult subject of mother-daughter ties through the eyes of her main character, Lucy Snowe. Lucy's relations with surrogate maternal figures - Madame Beck and Mrs Bretton represent inner conflicts within Lucy regarding dependence versus autonomy and emotional connection versus separation. Sandra Gilbert and Susan Gubar have thus analysed how Brontë's depiction of these maternal figures resonate with Victorian anxieties over female independence and emotional restraint. In their famous work *The Madwoman in the Attic* (1979), Gilbert and Gubar say that Lucy's lack of a biological mother in *Villette* shows how she feels alone and how she tries to hide her maternal desires.

Lots of people have pointed out that Lucy's mixed feelings about maternal figures show bigger issues in Brontë's writing, like hiding emotions, feeling alone, and the fight between being independent and needing help. Equally, this study will take note of the impact that Brontë's life story

has on her work, specifically in terms of the bond which she had with her own mother and other maternal figures. For instance, it is mentioned in her *Charlotte Brontë and Sexuality*, published in 1987, that "Angela Leighton argues that Lucy's ambivalence arises from her inborn conflict between repressed emotion and a yearning for maternal care and connection and yet represents some wider Victorian anxieties about gender and authority" (Leighton 54).

Clear Light of Day by Anita Desai is an even more modern and culturally rich rendering of the mother-daughter relationship against the background of post-colonial India. Family responsibility, emotional desertion, and the role of memory in the shaping of identity are major concerns of the author. The novel's framework relates to the Das sisters—Bim and Tara—and their always-absent mother. Through the sisters' lives, Desai explores how the lack of a mothering figure impacts emotional development, family structure, and identity formation. Critics, such as Ruvani Ranasinha and Rajeswari Sunder Rajan, explored how Desai's creation of her vision of the absent mother matches up with the Indian cultural and social realities and reflects a larger post-colonial, or post-independence themes. In "Motherhood and Autonomy in Anita Desai's *Clear Light of Day*," Ranasinha argues that the fractured connections of the Das family reflect greater themes of post-colonial disintegration and individual quest for identity. Bim's acting out as a mother when her own mother is away reflects a bitter and emotional dragging, defining the contours where the lines are blurred between a sense of obligation and personal liberty. At the same time, Tara's mixed feelings about her mother pose questions about inner conflict between a sense of duty to the family and a wish for a departure and emotional freedom.

Rajeswari Sunder Rajan, in her article *Real and Imagined Women: Gender, Culture, and Postcolonialism* (1993) says that Desai's imagination of an absent mother questions the Indian and antique notion of family and motherhood. Rajan says that in the absence of her mother, her emotional absence forces Bim and Tara into their identities. The situation metaphorically above simulates an even broader socio-political scenario where the very fabric of family life was shattered by social and political changes.

A Look at *Villette* and *Clear Light of Day* Side by Side:

Both *Villette* and *Clear Light of Day* are set in very different cultures: Victorian England in *Villette* and post-colonial India in *Clear Light of Day*. However, they both deal with problems that affect all mother-daughter relationships. Both main characters had to deal with being emotionally alone, repressing their feelings, and having to find their

own way in the world without a mother figure to care for them. The psychoanalytic themes of uncertainty, emotional dependence, and individuation are what connect the two books so that they can be compared.

In this way, Lucy Snowe's mixed feelings about her substitute mothers in *Villette* show how she is struggling to be independent in a society that tries to keep women from being independent. In the same way, Bim's anger at her mother for leaving and her refusal to leave the family home in *Clear Light of Day* show how she feels torn between her sense of duty and her desire for personal freedom. There are deep psychological conflicts in both characters that are shaped by the emotional absence or neglect of their moms. These conflicts affect how they grow emotionally and in their relationships.

Scholars have also said things about the differences in culture when it comes to mothers in both books. In *Villette*, motherly characters like Madame Beck play strong women who seem to represent Victorian women as ideal moral guards and caregivers. In *Clear Light of Day*, on the other hand, there is the mother in the present, who is often emotionally cold because she has to take care of her family in post-colonial India. There are many cultural differences between the two books that can be researched from a feminist and a psychoanalytical point of view. Both books show how the mother-daughter relationship can be shaped by larger cultural, social, and historical factors.

Research Questions:

This paper explores the following major questions:

In what ways are psychoanalytic concepts like the Oedipal complex, ambivalence, and individuation embedded in mother-daughter relationships in both *Villette* and *Clear Light of Day*?

To what extent has the near-absence or symbolic presence of the mother determined the psychological development of the protagonists in these novels?

How have cultural differences shaped and shored up the maternal relationship in *Villette* and *Clear Light of Day*?

Scope and Limitations:

Drawing from the novels *Villette* by Charlotte Brontë and *Clear Light of Day* by Anita Desai, this research paper places the dynamic of the mother-daughter relationship under the psychoanalytic lens. Given the fact that these texts belong to different cultural worlds and are placed against the background of Victorian England and post-colonial India, the common psychoanalytic themes in these texts offer a rich area for comparison. But its scope is restricted to these two texts only and does not develop ideas that could be generalized concerning maternal representations

outside of these texts and other works of the same authors or within their respective literary traditions.

Concept of Mother-Daughter Relationship:

One of the most complex and formative relationships in human development that impacts identity, emotional regulation, and patterns of relating is the mother-daughter relationship. This relationship often represents the main template for emotional and psychological development in the psychoanalytic worldview. Theories developed by Sigmund Freud, Melanie Klein, Nancy Chodorow, and Jessica Benjamin supply the most crucial frame in pointing out deep emotional connections and tensions which characterize this bond. The mother-daughter relationship becomes a powerful influence over their emotional lives and personal trajectories in both Charlotte Brontë's *Villette* and Anita Desai's *Clear Light of Day*, though mothers, in these works, are present or else symbolically depicted through surrogates. Central to the two novels are psychodynamic themes of ambivalence, dependency, autonomy, and emotional conflict and reveal the universal yet contextually unique nature of mother-daughter relationships.

Psychoanalytic Foundations: Theories of Mother-Daughter Relationships:

The early psychoanalytic theories of Sigmund Freud, although indeed first coming into existence as such with an emphasis on Oedipal conflict and patriarchal paternity, laid the groundwork for an appreciation of family life in terms of unconscious desires and conflicts driving development. In Freud's concept of the "pre-Oedipal phase," the mother becomes the key player as the first object of the child's desire. For the daughter, this will produce two pictures: identification and rivalry. The daughter's initial bonding to the mother plus her desire for individuation and distinction of her own identity creates ambivalence—a love-hate-resistance syndrome (Freud 102).

Melanie Klein furthered Freud's theories through object relations theory, which highlights the child's emotional experience with its first object—the mother. According to Klein, every infant splits the mother into "good" and "bad" objects: the good one is present when the mother succeeds in offering nurturing feelings, while the bad one is associated with frustration or deprivation (Klein 25). This early emotional duality influences how daughters view their mothers later in life. Klein's theories relate best to the ambivalence in the mother-daughter relations in *Villette* and *Clear Light of Day*. In each novel, it is the case of the protagonists feeling an emotional conflict towards maternal figures: between the need for maternal comfort and the hatred for or resentment at control or absence.

Feminist psychoanalytic theory developed further than Klein over the peculiar character of the mother-daughter bond in Nancy Chodorow's work.

She articulated such argument in her work published in 1978, *The Reproduction of Mothering*. According to Chodorow, identification with mother results in emotional continuity but dependency for the daughter. In many cases, the daughter learns to internalize her mother's values, emotional responses, and behaviours so that she reproduces similar patterns in her own relations. More overtly positive identification can also bring about conflict, since only loosely can a daughter establish and then continue to maintain her own personal autonomy separate from her mother (Chodorow 187). Chodorow's work is critical in understanding how Lucy Snowe in *Villette* and Bim and Tara in *Clear Light of Day* handle her own identity formation in the absence of or relation to her mother.

Jessica Benjamin's *The Bonds of Love* (1988) focuses on the tension between autonomy and dependence in relational dynamics. On Benjamin's account, people, especially daughters, are meant to finally be capable of reconciling their need for attachment with emotional interdependency and the desire to become independent of the mother. In their interactions with the mother, daughters see this conflict intensely due to the close bond and identification with the mother at an unconscious level. This model works especially well in understanding characters like Lucy, Bim, or Tara - each of whom present internal battle lines between their desire for autonomy and their affectional impulses towards powerful maternal figures.

Mother-Daughter Relationships in *Villette* and *Clear Light of Day*:

The mother-daughter relationship remains centrally located in the psychological development of the protagonists even though, in both *Villette* and *Clear Light of Day*, it is generally subject to the mother's physical absence. The relationship is often symbolically rendered through surrogate figures: in one case, Madame Beck and Mrs. Bretton of *Villette* or caretaker roles Bim takes up in *Clear Light of Day*. Surrogate maternal figures complicate the emotional worlds of the protagonists, who must navigate their dependence on these figures as they long for autonomy and unchained emotional freedom.

Maternal figures assume an ambivalently disturbing quality for Lucy Snowe in *Villette*. Not only are the motherly types Lucy approaches in some ways socially unavailable to her, but she is also in an existential state of emotional isolation owing to her lack of a biological mother. Her relationships with surrogate mothers like Madame Beck resemble the psychoanalytic ambivalence Klein theorized. Madame Beck represents control, discipline, as well as emotional reserve and is all the things that infuriate Lucy while at the same time she depends emotionally on her. It is this simultaneous need for a motherly figure while holding resentment

against the power such figures wield that informs Lucy's psychological development. This process illustrates Freud and Klein's thinking regarding ambivalence and the connections to maternal figures as both nourishing and frustrating objects in a daughter's emotional life.

The contrast that Lucy offers with Mrs. Bretton, who yet is another maternal substitute, with her relation to Madame Beck can be also pointed out. Mrs. Bretton is a more nourishing "good" mother; however even at this level, distance and emotional restraint mark its character. Lucy finds herself ill at ease in holding onto affectionate bonds with these mother figures, which hide her deeper psychological struggle: while a desire to receive motherly care and protection rules her psyche, the pressure to keep one's emotions free remains in constant competition with this desire. The loss of a biological mother combined with Lucy's emotional restraint was shining a spotlight on what in psychoanalytic terms can be considered as a case of maternal deprivation and all that entailed in creating insecure attachments.

Clear Light of Day is a novel that offers a brand of maternal absence by Anita Desai. The mother of the Das family spends much of the novel away from home, making Bim and Tara responsible for their own emotional lives, sans maternal intervention. Bim internalizes all that responsibility that falls under motherly care, while Tara finds comfort elsewhere. Her resentment at her mother's unavailability and reluctance to leave the family home disclose the inner conflict between obligation and personal freedom. Using psychoanalytic perspective, Bim's emotive attachment to the role of the mother prevents her from being fully individuated and pursuing her identity as a different identity from the family structure. This internal conflict is according to the postulate of Chodorow's theory regarding identification with the mother by a daughter. Often, this identification may result in the repetition of maternal patterns.

Tara, on the other hand, symbolizes the attempt to flee from the maternal vacuum. Her decision to live out of the family house and efforts to distance herself from the burdens Bim assumes may be seen as a move of individuation, wherein she distances herself from the maternal role and the emotional burden associated with the role. Yet, Tara's feeling of guilt and bonding still resounds from her towards her family members, signifying the fact that she has not transcended her connection with the psychological leverage of the missing mother. Desai explains how sisters behave differently towards the mother's absence, which phenomenon vividly describes the ambivalence, emotional conflict, and dependency that characterize many mother-daughter relationships.

Cultural and Social Factors Impacting Mother-Daughter Bonds:

While *Villette* and *Clear Light of Day* have dealt with such wide psychoanalytic themes regarding the mother-daughter relationship, they have also been severely conditioned by their respective cultural and social setting. In *Villette*, it is the Victorian ideals of womanhood—a structure that works around domesticity, repressed emotion, and moral purity—which gives shape to the ideals of the maternal figures. This would therefore imply that strict societal pressures put on women during this time often led to emotional repression, especially in family relationships. Ambivalence towards mother figures reflects these societal pressures about expected rigid gender roles while trying to be individually emotionally expressive.

Against this backdrop, *Clear Light of Day* is a story of family life against the numerous contradictions of post-colonial Indian society, where tradition and modernising currents are given to confront each other. The non-appearance of the mother in the Das family symbolizes a larger sense of fragmentation and loss within post-colonial Indian families, where the impact of colonialism has overridden the regularity of social and familial boundaries. Desai's representation of the Bim-Tara relationship with the estranged mother is, therefore, a psychoanalytic study and a social and cultural critique of the alterations that take place in family life in post-colonial India.

The Psychoanalytic Concept of Ambivalence in Mother-Daughter Relationships:

Ambivalence in the mother-daughter relationship is one of the most prominent psychoanalytic themes in both the novels. Coexistence of love and resentment, Melanie Klein defines that a daughter may have against her mother. This ambivalence acts as the nucleus of an affective conflict inside the protagonists in both *Villette* and *Clear Light of Day* as dependence on the maternal figures tugs at the desire for autonomy.

In the case of *Villette*, Lucy's ambivalence thus focuses on two alternative conceptions of maternal care: Madame Beck controlling and emotionally unavailable, Mrs. Bretton comforting but inaccessible. Her emotional life is deeply informed by this ambivalence: She both needs to have a Mother for comfort but resents the control and authority they exert over her. Similarly, in *Clear Light of Day*, Bim's ambivalence is reflected as a mixture of feelings, which she deep down nurtures towards her mother's absence and simultaneously towards the maternal role within her family. Tara also belongs to the same category; she yearns to escape emotions but at the same time remains emotionally bound with her family.

In both novels, the psychology of the protagonists is developed with respect to this

ambivalence. Dependence and autonomy; love and resentment form the emotional contour and determine the self-relations and relations with others.

Text Analysis:

***Villette* by Charlotte Brontë**

In *Villette*, the relation to motherly figures is perpetually ambiguous and laden with tension in Lucy Snowe. The novel's lack of a biological mother for Lucy has her dealing with surrogate versions of this aspect of her life, such as Madame Beck. Madame Beck is an authoritative figure who assumes discipline and presents as being disciplinary rather than nourishing. Lucy's views on these figures of authority—which vary from resentment to dependence—parallel psychoanalytic ideas concerning the "bad mother" and the ambivalence that surrounds individuation.

Finally, the complexity of Lucy's relation to her femininity and maternal urge runs the same trace as psychoanalytic themes, as her repression is traceable to a defence mechanism against the losses to her mother and abandonment; it shows how deep the trait of a nonnurturing mother figure really impacts her personality.

Anita Desai's *Clear Light of Day*

Identity, memory, and family obligation issue from the broken mother-daughter relationship in the Das family through the novel *Clear Light of Day*. Tara and Bim's relationship and their attitude toward the absent mother forms a very important part of the psychological development of the two sisters. The writer shows resentment and anger toward her role as the caretaker in the absence of their mother. Tara, on the other hand, idealizes several maternal figures from afar but does not allow this to keep her grounded in her sense of inadequacy.

Psychoanalytically, the behaviour of sisters is contradictory to each other as coping mechanisms towards the emotional void left by the negligence of the mother. Bim's reluctance to leave the family house could be interpreted as fixation on the maternal environment. Tara's desire to run away must then reverberate in her as a desire to cut oneself loose from the maternal bond.

Conclusion:

Psychoanalytically speaking, the mother-daughter relationship is bound to become a multifaceted, emotionally charged dynamic both in Charlotte Brontë's *Villette* and in Anita Desai's *Clear Light of Day*. The analysis of these relationships in their specific contexts reveals deep psychological patterns: issues of identity formation, emotional dependence, ambivalence, and the struggle for autonomy. Both texts portray mothers as strong influences on the inner lives of the protagonists, whether through a powerful physical

presence, chronic emotional absence, or symbolic presence.

In *Villette*, Lucy Snowe's confounded and often ambivalent emotions toward surrogate maternal figures mirror inner emotional struggles. The absence of the biological mother creates a void that nudges Lucy into trying to find maternal surrogates, for example, Madame Beck, who embodies control instead of nurturing. Using a psychoanalytic approach, particularly Melanie Klein's object relations theory and Nancy Chodorow's reproduction of mothering framework, we come to understand that Lucy is an oppressed and ambivalent character based on unphased emotional struggle involving mutual dependence and independence. Lucy's struggle is not only with the external maternal figures, but also the representations from within of that mother figure that mark out her emotional life. The emotional isolation running through her life could be understood, in this sense, as a protective mechanism—a way of securing herself against the possible pain of loss of the maternal tie.

In *Clear Light of Day*, the fractured relationships within the Das family, especially Bim and Tara and their missing mother, illustrate the void of emotions created by maternal negligence. A psychoanalytic interpretation would also demonstrate sisterly responses to their mother's absence, in the form of Bim's deep-seated anger as a refusal to leave the family house and Tara taking refuge and idealism of maternal figures. As a stand-in mother, Bim is simultaneously a care-giver and an anger-source, captive of her emotional commandments, and not quite freed enough to break free from them. The two sisters, Bim and Tara, having lacked a nurturing mother figure, are left with unresolved feelings concerning inadequacy, abandonment, and dependency, all of which make up the central part of psychoanalytic interpretations of maternal relationships. Bim's ultimate resolution with her past and acceptance of her role is a psychological journey toward individuation, as in both the psychoanalytic theory and the novel contextualizes in its cultural atmosphere.

The relationship between mothers and daughters forms a critical framework to understand the psychological and emotional lives of the characters in both novels. It is precisely the psychoanalytic concepts of ambivalence, object relations, and individuation that unpack the emotional conflicts experienced by Lucy, Bim, and Tara. Whether it is the inward repression of the emotions of *Villette*'s Lucy Snowe or the underlying resentment in *Clear Light of Day*, both texts evidence how deeply the influence, whether present or absent, of a mother influences the interiority of the daughter.

Cultural differences also strongly play a role in the mother-daughter dynamics of the novels. For example, in *Villette*, the oppressive society of Victorian England complements Lucy's isolation and repression of her maternal desires. The contrast is quite striking in the post-colonial setting of *Clear Light of Day*, where traditional family obligations against which Bim and Tara struggle run into contrary tides of modern individualism. Despite these advances, however, each novel depicts maternal absence-or emotional neglect -as the source of deep psychological scarring that complicated daughters' quests for autonomy and emotional satisfaction.

Maternal and Daughter relationships in both novels depict broader societal expectations and gender roles. In *Villette*, for example, the maternal characters were often portrayed as enforcing social norms, which frequently restricted Lucy's self-concept of personal liberty. In *Clear Light of Day*, the absence of the nurturing aspect by an angelic mother figure in the family makes the sisters emotionally drift, which underlines cultural compulsion on women to adopt the role of caretaking emotions. All these depictions reflect the contradiction between the socially sanctioned role and the actual desire, which may be deep within the psychoanalytic interpretations on issues pertaining to family dynamics.

Through this psychoanalytic approach, the paper provides a glimpse into why literature portrays mother-daughter relationships in such light deep into the psychodrama. In this respect, both novels established a very prominent position of mother in life for the daughters such that her absence also warranted her impact on psychological and emotional developments of the daughters. Universality of emotional dependency, ambivalence, and impossibility of achieving independence is common for both Victorian and postcolonial contexts in the representation of persistence of mother-daughter relationships in forming a personal identity.

The love-hate mother-daughter relationship in *Villette* differs from the *Clear Light of day* because it is highly ambivalent, comprising love, resentment, dependence, and the urge to become more independent. This ambivalence is, in psychoanalytic theory, the major feature of complex emotional ties between mothers and daughters. Such complicated relations subject the protagonists to their most hideous fears, desires, and emotional conflicts, and this makes the mother-daughter bond a central element in their psychological journeys toward selfhood.

Mother-daughter relations in *Villette* and *Clear Light of Day* should be looked upon as a source of value since they hold better prospects for the discovery of universal and culturally conditioned

contours in the realms of filial relationships. The psychoanalytic approach throws light on how these relationships shape processes of identity formation and emotional development in the ongoing tension between dependence and independence. Absence or presence of the mother, literal or symbolic has played the formative role in the emotional lives of characters reflecting broader impacts of the societies and cultures. Thus, these novels also offer a very rich terrain to be psychoanalytically analysed, besides echoing their voices through this timeless complexity about mother-daughter relationships across the garb of time and place.

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Exploring Heritage Tourism in Nashik District, Maharashtra: A Framework for Tourist Information Systems

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Abstract:

This paper explores the potential of heritage tourism development in Nashik District, Maharashtra, through the lens of a Tourist Information System (TIS). Nashik, known for its rich cultural heritage and historical significance, attracts numerous tourists seeking to experience its temples, vineyards, and natural landscapes. However, the effective management and dissemination of tourist information remain critical for enhancing visitor experiences and promoting sustainable tourism practices. The study analyzes the current state of heritage tourism in Nashik, identifying key attractions and existing information gaps. It proposes a comprehensive framework for a Tourist Information System tailored to the district's unique heritage offerings. This framework emphasizes user-friendly digital platforms, real-time information access, and integration with local businesses and cultural sites. By leveraging technology and enhancing collaboration among stakeholders, the proposed TIS aims to improve tourist engagement, promote lesser-known heritage sites, and foster community participation in tourism development. Ultimately, this research underscores the importance of strategic information systems in preserving cultural heritage while stimulating economic growth in Nashik, ensuring that both tourists and local communities benefit from the rich heritage tourism landscape.

Keyword: Tourism, geographical information, economic development.

Introduction:

Heritage tourism plays a vital role in promoting cultural exchange and economic development, particularly in regions rich in history and tradition. Nashik District, Maharashtra, is a prime example, renowned for its diverse heritage, including ancient temples, historic sites, and vibrant festivals. Despite its potential, the district faces challenges in effectively managing tourist information and enhancing visitor experiences. This paper investigates the current landscape of heritage tourism in Nashik and highlights the need for a robust Tourist Information System (TIS) that can bridge information gaps and facilitate informed travel choices. By integrating technology and fostering collaboration among local stakeholders, the proposed framework aims to optimize the dissemination of information about heritage sites and related services. Through this approach, the study seeks to enhance tourist engagement, promote sustainable practices, and ultimately contribute to the preservation and appreciation of Nashik's rich cultural heritage.

Study Region:

Nashik District, located in the state of Maharashtra, India, is a prominent heritage tourism

destination known for its historical and cultural significance. Geographically, the district extends between latitudes 19.4° N to 20.1° N and longitudes 73.5° E to 74.0° E, covering an area of approximately 15,582 square kilometers. The region is characterized by a diverse landscape, including hills, rivers, and vineyards, making it not only a cultural hub but also a natural paradise. Nashik is home to several significant heritage sites, such as the Kumbh Mela, the ancient Panchavati temple complex, and the historical forts of Anjneri and Harihar. The district's rich tapestry of traditions, festivals, and culinary delights further enhances its appeal. However, effective management of tourist information and infrastructure is essential for maximizing the potential of heritage tourism and ensuring sustainable development in this vibrant region (*Fig. 1*)

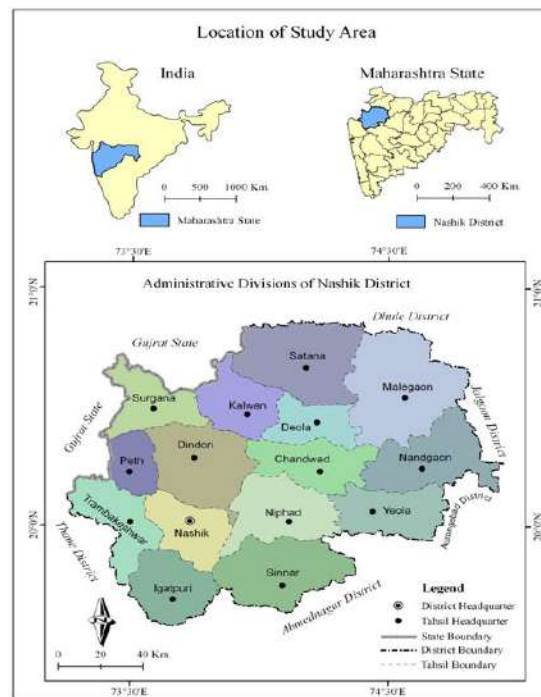


Fig. 1

Objectives:

- To assess the current state of heritage tourism in Nashik District, including key attractions, visitor demographics, and existing challenges in information dissemination, in order to identify areas for improvement.
- To develop a comprehensive framework for a Tourist Information System (TIS) tailored to Nashik's heritage sites, aimed at enhancing visitor engagement, promoting lesser-known attractions, and facilitating sustainable tourism practices.

Database and Methodology:

In order to understand the Tourism Potential of Nashik district, the methodology adopted for the present study is divided into three phases namely pre-field work phase, field work phase and post field work phase. In the first phase i.e. pre-field work phase literature review i.e. previous work carried out by other researchers will be obtained from various journals and internet, visit to the MTDC resort to know about annual tourist flow, collection of Survey of India toposheet (SOI) having scale 1: 250000, Atlas, Gazetteers, District Census Handbook, Village and Town Directory, Tourist maps, etc. use for collection of information, District Resource map of Nashik district published by Geological Society of India, Government published map of Nashik district P. W. D. map, Digital Elevation Model, Terrain slope map, Shaded relief map and others will be completed with help of S.O.I. toposheets. Questionnaire will be prepared for the actual fieldwork with the help of a supervisor and consultant in the tourism field. In the second phase i.e. fieldwork phase extensive field surveys will be undertaken, to existing tourist places and

newly found tourist places. The questionnaire will be completed in this phase. During this field surveys tourist facilities regarding destination photographs, GPS reading altitude and the related information will be noted which is also useful to tourism potential of tribal region study. The potential of various places of district to emerge as the tourist centre shall be analysed on the basis of scenic beauty, economic importance of the basis of tourist visits, connectivity levels of the tourism spots. As observed different researchers, performances of tourism is dependent upon the quality of services provided as well as the socio- economic and socio-cultural background of the tourists. The collected data will be classified and tabulated by using statistical tools. It will be analysed through tables, charts, maps and diagrams as per required. Post-fieldwork: In the third phase i.e. laboratory work will be carried out. Interpretation of collected/generated data, weighted maps and computed charts, graphs and diagrams are conducive for solving the research problems. To find out the tourism clusters around the existing tourism centres multiple ring buffers were created in GIS environment. These buffers show how many different tourist spots are grouped near the tourism centre within a specific areal distance, which are supported for growth of tourism. To find out the development status of study area, we calculate the weighted scores for demographic, social and economic factors using Suryawanshi and Sawant method (2014).

Results and Discussions:

The study revealed several key findings regarding heritage tourism in Nashik District. First, visitor surveys indicated that while major attractions

like the Kumbh Mela and Panchavati draw significant footfall, many lesser-known heritage sites remain underexplored. This presents an opportunity for targeted promotion through a Tourist Information System (TIS). Second, data analysis highlighted gaps in current tourist information dissemination, with many visitors relying on informal sources or social media for information. A significant portion of respondents expressed interest in a centralized digital platform that could provide real-time information about attractions, events, and local services. Additionally, stakeholder interviews underscored the need for collaboration between local authorities, tourism boards, and community members to ensure that the TIS effectively reflects local culture and offerings. The proposed framework emphasizes user-friendly access, mobile compatibility, and multilingual support to cater to diverse tourist demographics.

Overall, the findings suggest that implementing a robust TIS can enhance the heritage tourism experience, promote sustainable practices, and foster economic growth in Nashik District while preserving its rich cultural heritage. Nashik District is rich in heritage tourism, featuring a variety of sites that reflect its historical, cultural, and religious significance. Here are some key heritage tourism places in the district:

1. **Kumbh Mela:** Held every 12 years, Nashik is one of the four holy cities that host this major Hindu pilgrimage. The event attracts millions of devotees who come to bathe in the sacred Godavari River.
2. **Panchavati:** This ancient pilgrimage site is famous for its temples, including the Kalaram Temple, dedicated to Lord Rama. The area is steeped in mythological significance, being associated with the Ramayana.
3. **Saptashrungi:** A prominent hill shrine dedicated to the goddess Saptashrungi, this site is not only a religious destination but also offers breath-taking views and trekking opportunities.

4. **Anjneri Fort:** Known for its historical importance, this fort is believed to be the birthplace of Lord Hanuman. It features ancient ruins and scenic landscapes.
5. **Harihar Fort:** This fort is renowned for its unique architecture and is a popular trekking destination. The climb offers panoramic views of the surrounding region.
6. **Pandav Leni Caves:** These ancient rock-cut caves date back to the 1st century BC and are notable for their intricate carvings and historical significance.
7. **Nashik Vineyards:** While not traditional heritage sites, the vineyards represent the region's growing wine culture and offer tours that highlight the fusion of history and modernity.
8. **Nashik City:** The city itself is home to several colonial-era buildings, temples, and markets that reflect its diverse heritage.

These sites collectively enhance Nashik's appeal as a heritage tourism destination, attracting visitors interested in spirituality, history, and natural beauty.

Tourist Information System Trimbakeshwar:

The Tourist Information System in Trimbakeshwar provides visitors with essential details about the region's attractions, accommodations, and local services. Located near the ancient Trimbakeshwar Temple, a Jyotirlinga site, the system helps tourists navigate the area's religious significance, nearby heritage sites, and festivals like Kumbh Mela. It also offers information on transportation, lodging options, and guides, ensuring a well-rounded experience for pilgrims and tourists alike. The details of the important tourist centers in and around are given in tourist information system (*fig 2*).

Tourist Information System Trimbakeshwar

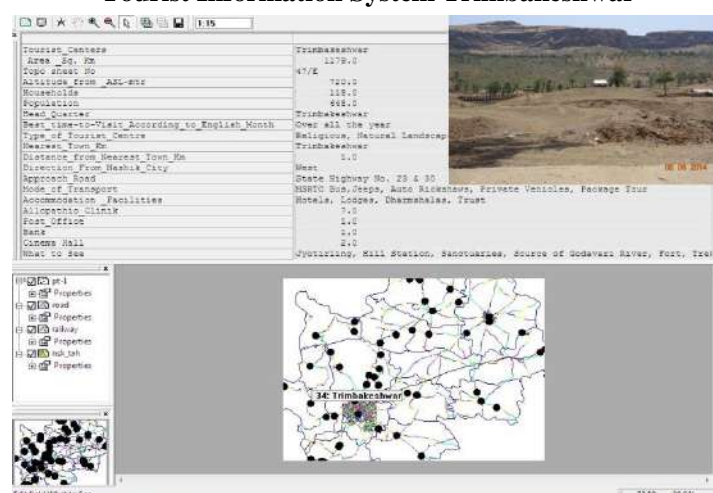


Fig. 2

Present Status:

The present status of Nashik district as a tourist center comes under the developing category. Pandav Leni caves has a great potential for ecotourism development and MTDC give more attention to provide infrastructure facility in Pandav Leni caves. However serious attempts are needed to develop tourism in this region. The district's diverse attractions, including pristine religious places, dense forests, and tribal villages, offered a unique experience for visitors seeking natural beauty and cultural immersion. The district had seen an increase in tourist arrivals in recent years, driven by improved accessibility and promotional efforts. However, infrastructure and amenities for tourists were still developing, with some areas lacking proper facilities for accommodation, transportation, and information dissemination. The local government and tourism authorities were actively promoting Nashik as an tourism destination, highlighting its rich biodiversity, cultural heritage, and sustainable tourism practices. Efforts were also being made to involve local communities in tourism activities, ensuring their participation and benefiting them economically. Overall, while Nashik district had great potential for tourism development, there was still room for improvement in terms of infrastructure, services, and sustainable tourism practices to fully realize this potential and ensure a positive impact on the local economy and environment.

Major problems faced by tourists:

The tourist opinions, complaints were collected during the field work. MSRTC buses frequency is very less and buses are not in good condition, there is a load shedding problem of electricity, except irrigation department rest house hardly find hotels, restaurants and lodges for accommodation, tourist guide, parking, sewage and drainage system, toilets, communication, medical facility are not in well condition.

Remedies to overcome the problem:

To overcome the challenges faced by tourism in Nashik district, several remedies can be implemented. Improve infrastructure for transportation, accommodation, and basic amenities to enhance the overall tourist experience and encourage longer stays. Establish more Tourist Information Centers equipped with maps, guides, and information about local attractions, accommodations, and activities to help tourists navigate the area easily. Involve local communities in tourism planning and development, ensuring they benefit economically and culturally from tourism activities. Increase promotion and marketing efforts to raise awareness about Nashik as a tourism destination, targeting both domestic and international tourists. Implement sustainable tourism practices to preserve the natural environment and

wildlife, ensuring that tourism activities do not have a negative impact on the ecosystem. Provide training and capacity building programs for local communities and tourism stakeholders to enhance their skills in hospitality, guiding, and sustainable tourism practices. Diversify tourism offerings to include cultural experiences, adventure tourism, and agro-tourism, providing a wider range of activities for visitors. Foster partnerships between the government, private sector, and local communities to jointly develop and manage tourism initiatives, ensuring a sustainable and inclusive approach. Implementing these remedies can help overcome the challenges faced by tourism in Nashik district and unlock its full potential as a vibrant and sustainable tourism destination.

Conclusion:

In conclusion, Nashik District presents a unique blend of cultural, historical, and natural attractions that significantly contribute to its heritage tourism potential. This study highlights the importance of enhancing visitor experiences through the development of a robust Tourist Information System (TIS) that addresses current information gaps and promotes lesser-known sites. By leveraging technology and fostering collaboration among local stakeholders, Nashik can improve the dissemination of information, ultimately encouraging sustainable tourism practices and greater community involvement. The proposed framework aims to create a user-friendly platform that caters to diverse tourist needs, ensuring that both visitors and local communities benefit from the rich heritage the district offers. As Nashik continues to evolve as a heritage tourism destination, it is essential to balance preservation with development, ensuring that its cultural richness is celebrated and safeguarded for future generations. This approach will not only boost the local economy but also enhance the overall visitor experience.

Acknowledgment:

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A Study on Petiole anatomy of *Priva cordifolia* (L.f) Druce (Verbenaceae)

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Abstract:

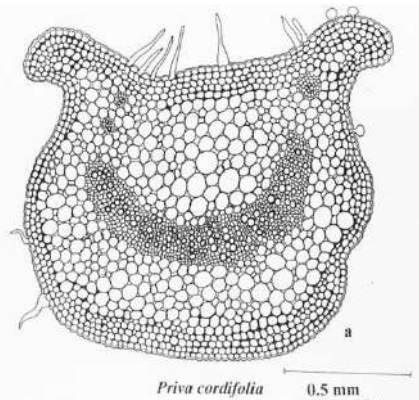
Anatomy of the petiole of *Priva cordifolia* (L.f) Druce is investigated. It is naturally distributed in many parts of Maharashtra and Marathwada. In this study the aim was to investigate the anatomical characters of petiole of this an ethno-medicinal plant. As a result of study, it was discovered that the mechanical tissue in the form collenchyma or sclerenchyma occurs in petiole. The xylem elements are additionally mechanical in function. The vascular tissue in the form of distinct bundles or an arc shaped strand is observed.

Keywords: Anatomy, Petiole, Mechanical tissue, *Priva cordifolia*.

Introduction:

The leaves of *Priva cordifolia* are aromatic, Vermifuge and are efficacious in dispelling inflammatory swellings of the glands, in acute rheumatism and sprained joints. The vasculature of petiole has long been of considerable importance in systematic investigation. Grew (1675) was the first botanist to recognize the different patterns of vascular bundles in a petiole. Earlier work on the

structure of the petiole in certain members of the Verbenaceae are mainly Solereder (1908) exhibited a variation in the vasculature of petiole. Metcalfe and Chalk (1950), and Hufford (1992). Since the petiole anatomy in the family has received little attention. The present account deals with such a study on petiole of *Priva cordifolia* of family Verbenaceae.



Materials and Methods:

The Plant material of *Priva cordifolia* Was locally collected and serial sections of petiole and Petiolule were taken. Sections were stained in safranin (1%) and fast green (1%) and mounted in Canada balsam after the customary dehydration. Some of the hand sections were also examined in glycerin. Sudan IV was used to demarcate the cuticle. Phloroglucinol and aniline sulphate tests were carried out for the lignified tissues.

Observations:

It is more or less circular in out line with two small adaxial wings and a small groove adaxially. The cells of epidermis are small with thick walls and thick cuticle. Trichomes are variable. Stomata are

few. The epidermis is followed by 2 to 5 layered collenchymas. The wing has more amount of collenchymas. The rest of the ground tissue is parenchymatous. The vascular tissue consists of a central large arc shaped strand and 2 to 3 or four small cortical bundles which Lie adaxially.

Discussion:

- In T.S. the petiole shows various shapes like circular, oval, flat, triangular lobed and concave or convex adaxially.
- In some cases it has two short or well developed lateral wings. A longitudinal median groove is seen a *Holmskioldia*. Two longitudinal

channels are formed on the adaxial surface in *Duranta*.

- The petiole structure may easily be compared with the primary tissue of the stem. There is a close similarity between the petiole and the stem, petiole, the rachis and the stem in regard to the structure of epidermis. The ground parenchyma of the petiole is like that of stem cortex in arrangement of cells.
- The mechanical tissue in the form of collenchyma and sclerenchyma are distinct in the leaf axis of presently investing taxa.
- The xylem elements are additionally mechanical in function. Sometimes parenchymatous cells become thick walled collenchymatous and thus it becomes difficult to distinguish.
- The distribution of collenchyma is significant. It occurs in all the species. Generally a continuous ring of collenchyma in hypodermal region is recorded. However, the amount of layer is variable in different taxa. Generally adaxial and abaxial side exhibit more amount of it. Continuous Sclerenchyma develops close to the arc shaped vascular strand in *Phyla*. In other taxa like *Lantana*, *Stachytarpheta*, *Priva*, *Verbena*, *Duranta*, *Holmskioldia*, the sclerenchyma is not associated with vascular tissues.
- The vascular tissue is an arc shaped in *Priva*, *Stachytarpheta*, *Phyla*, *Duranta*, *Lantana*, *Verbena*, and *Holmskioldia*.
- The development of cortical and medullary bundles is significant. Two cortical bundles are known in *Lantana camera*, *Holmskioldia*, *Stachytarpheta*. The number of cortical bundles may increase in some taxa like three in *Priva*, Four bundles in *Verbena* and six bundles in *phyla*. Two cortical bundles extend in the wing in case of *Stachytarpheta* while four cortical bundles and arc shaped strand occur in one row in *Phyla*. In addition 2-3 medullary bundles are also recorded in *Duranta*, *Lantana camera*. It is to be noted here that *Lantana indica* has arc shaped strand and only two medullary bundles.
- The present study indicates that petiole has principal vascular tissue and accessory vascular bundles- cortical and /or medullary. The cortical bundles are reported in all the taxa except *Lantana indica*. The cortical bundles are invariably developed adaxially. Certain plants have both accessory bundles- cortical and medullary i.e. in *Duranta*. *Lantana camera*, while *L. indica* has only medullary strands.
- The variation in the distribution of various mechanical tissues is found to be significant in taxonomic delineations and will be seen later.
- Perrot and Hubert (1922, 1923) made detailed study on medullary bundles in the leaf axis of the family.
- Anatomy is one of key tools of evodevo (evolutionary developmental) research. Indeed, analyses of gene expression patterns are performed using anatomical techniques.
- More importantly, developmental biology of plants explores functioning of plant meristems and aspects of cell and tissue differentiation, the topics that have a long history of research in the framework of plant anatomy.
- Anatomy provides detailed information of the developmental processes in extant and extinct plants. Obviously, the detailed knowledge assembled through centuries of anatomical research has great perspectives of use in evolutionary developmental biology.
- Many theories developed in plant anatomy can be tested using molecular tools (e.g. Povilus et al., 2020). Anatomy is one of the disciplines of plant science, and there is a huge amount of accumulated knowledge.
- At the same time, anatomy is highly important as a linking medium between several important branches of modern plant science.
- The use of anatomy is one of most efficient ways of increasing the number of characters in data sets employed to link fossil and extant plants.

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Assessment of the Impact of Climate Change on Marine Ecosystems: A Survey Study

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Abstract:

Climate change significantly impacts marine ecosystems, disrupting biodiversity, habitats, and the delicate balance of ocean life. The survey study aimed to investigate public awareness of climate change impacts on marine ecosystems and fisheries, emphasizing their interconnectedness with food security and the broader implications for communities reliant on these resources. The survey revealed that the majority of the participants agree that human activities, such as fossil fuel combustion, deforestation and global warming act as primary drivers of climate change. According to the respondents ocean warming, sea level rise, and coral bleaching are the critical effects on marine environments. The findings also highlighted a strong public consensus on the importance of conserving marine ecosystems, with many emphasizing that their constant efforts can play a major role to conserve marine ecosystems. Participants also expressed the need for international cooperation to address climate change challenges effectively. Overall, the results highlighted a growing understanding among the public regarding the significance of protecting marine environments in the face of climate change and the necessity for proactive efforts to ensure sustainable fisheries and resilient coastal communities.

Keywords: Survey, climate change, marine ecosystems, public awareness, conservation

Introduction:

Over the past few decades, climate change and food security have emerged as interconnected global issues. Human activities, particularly industrialization and rapid population growth, have led to the degradation of natural environments and the pollution of ecosystems. The ocean plays a critical role in regulating climate and supporting biodiversity. It covers over 70% of the Earth's surface, significantly influencing global weather patterns and serving as home to a diverse array of marine life. However, increasing greenhouse gas emissions, primarily from the burning of fossil fuels, have triggered alarming changes in oceanic conditions, which in turn impact marine ecosystems and human livelihoods (Gedney et al. 2006; Halpem et al. 2008).

The burning of fossil fuels releases carbon dioxide into the atmosphere, which is a primary driver of global warming. This, alongside other human activities like livestock farming, aerosol release, and the use of nitrogen-based fertilizers, has contributed to the accumulation of greenhouse gases (IPCC, 2001). The ocean, absorbing much of this excess atmospheric CO₂, faces three major consequences: warming, acidification, and declining oxygen levels. Warmer ocean waters not only increase sea levels but also force fish populations to migrate to cooler areas, altering traditional marine

habitats (IPCC, 2001). In addition, the ocean's absorption of CO₂ leads to acidification, disrupting marine organisms' ability to form shells and skeletons (Byrne and Fitzer 2019). Furthermore, warmer waters hold less oxygen, exacerbating the formation of hypoxic or dead zones, where life struggles to survive (Pershing *et al.*, 2018). Whitney et al. (2007) also observed a warming trend accompanied by a decrease in oxygen levels in the subarctic Pacific Ocean, extending to depths of 370 ± 44 meters.

The shifting chemical and physical makeup of the ocean has profound implications for marine biodiversity. Many marine species, particularly fish, are sensitive to slight variations in environmental factors such as temperature, salinity, and oxygen levels. The impact of warming waters on species distributions is already evident. It has been observed that fish species like pollock and cod have shifted their geographic range northward in search of cooler waters (Mills et al. 2023). These changes in environmental factors such as temperature, salinity, wind speed and direction, ocean currents, upwelling strength, UV-B radiation, pollution, shrinking wetlands, and nursery areas, as well as shifts in predation patterns, can significantly disrupt food chains and affect fish population abundance (IPCC 1996, 2001; Ji et al. 2007). The effects of climate change are particularly pronounced in mid- and

high-latitude regions, where species invasions and local extinctions are becoming more common as thermal barriers break down (Change, 2007).

The economic impact of these changes is deeply felt in regions where fisheries are a cornerstone of local economies. In countries like India, where millions depend on fisheries for their livelihoods, climate-induced alterations in fish populations are already creating hardships. Additionally, the increased frequency of extreme weather events, such as tropical cyclones, further exacerbates the plight of coastal communities. Cyclones, fueled by warmer sea temperatures, have caused widespread destruction in coastal regions, including damage to boats, shelters, and fishing infrastructure. For example, Cyclone Fani in 2019 and Cyclone Amphan in 2020 wreaked havoc on India's eastern coastline, leading to significant economic losses for fish farmers and leaving millions without homes or income (Chhotoray et al., 2019, Ghosh et al., 2020).

The impact of climate change on marine ecosystems and fisheries has become an urgent global issue. From the disruption of marine biodiversity to the economic hardships faced by coastal communities, the intricate link between climate change and food security calls for immediate, comprehensive action at both local and global levels. In light of this, the survey study was conducted to assess public awareness and understanding of these challenges, aiming to capture the general public's perspective and knowledge of the pressing effects of climate change on marine environments.

Objective of the Survey:

The objectives of the survey study were twofold. First, it aimed to evaluate public awareness and understanding of the impacts of climate change on marine ecosystems, focusing on the public's knowledge of how climate change affects marine biodiversity, species distribution, and ecosystem health. Second, the survey sought to assess public perception of the of climate change on coastal communities and fisheries and enhance awareness among them.

Methodology:

Study Method: Cross-sectional, observational study

Ethical Permission: Consent was taken from all participants at the beginning of the questionnaire forwarded to them.

Survey method: A self-prepared, semi-structured, anonymous questionnaire was used to gather responses from participants. The questionnaire was developed following a comprehensive literature review and an analysis of current news on climate change, ensuring its relevance and alignment with the study's objectives. It comprised three main sections: the first focused on general awareness of climate change, the second on its effects on the marine ecosystem and ocean health and coastal communities, and the third on potential actions to mitigate the impacts of climate change. The methodology began with an extensive literature review, followed by the development of the questionnaire using Google Forms. The form was then distributed to the general public via social media platforms. Data collection started on May 6, 2021, and ended on May 8, 2021.

Sampling technique: The survey employed a probability systematic sampling technique to ensure a representative and unbiased selection of participants.

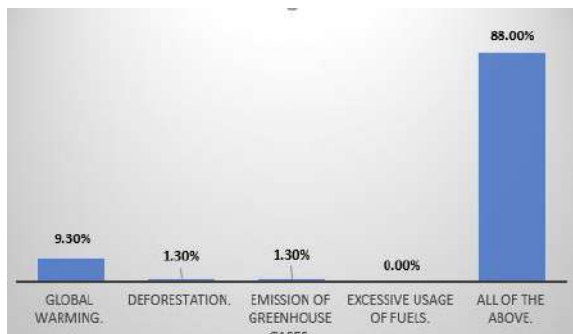
Sample Size: A total of 102 individuals participated in the survey.

Study population: The study focused on the general public.

Result and Discussion:

Overall 102 participants' responses were collected, offering valuable insights into public opinions regarding climate change and its impact on marine ecosystems. The survey results show that 88% of participants identified the primary causes of climate change as global warming, deforestation, greenhouse gas emissions, and excessive fuel usage as shown in Figure 1. Deforestation, coupled with the emission of aerosols and greenhouse gases, plays a significant role in global warming and climate change (Driga & Drigas, 2019, Nema et al., 2012, Sivaramanan, 2015). A smaller portion (9.3%) singled out global warming as the main driver, while 1.3% attributed the cause solely to deforestation, and another 1.3% pointed to greenhouse gas emissions. When asked who they believed was primarily responsible for climate change, 94.7% of respondents held humans accountable, signifying a strong public recognition of human-induced environmental damage.

Figure 1. What are the main causes of climate change?



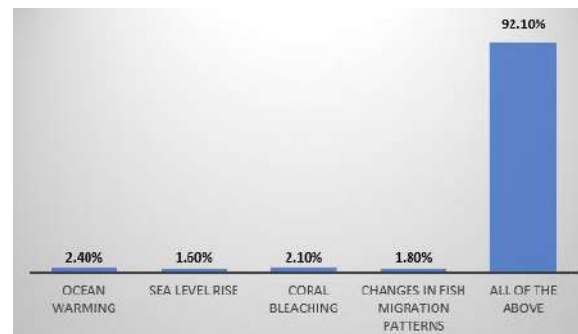
A significant 78% of respondents acknowledged the importance of marine ecosystems for humans and coastal communities. Figure 2 shows that 92.1% of participants identified ocean warming, sea level rise, coral bleaching, and changes in fish migration patterns as the direct effects of climate change on marine ecosystems. 67% of the participants noticed observable changes in their local marine environments, suggesting that many are witnessing these impacts firsthand. Furthermore, 89.3% of respondents believed that daily human activities contribute to climate change and the subsequent exploitation of marine ecosystems, while only 1.3% disagreed.

In terms of the specific impacts on marine life, 82.7% of participants recognized species extinction and biodiversity loss as key consequences of climate change. When asked about the potential for species extinction, 65.3% believed that certain species would go extinct, while 30.7% remained optimistic, believing that marine ecosystems might still survive in the coming years. Respondents (78.5%) also acknowledged that species extinction would affect overall ocean health, and 89.5% agreed that climate change could lead to a decline in fish populations. A further 72.1% expressed concern that the nutritional quality of marine food sources might be negatively impacted.

In response to the question about conserving and protecting marine ecosystems, an overwhelming 93.3% of participants emphasized the importance of these efforts, citing reasons such as the ocean's role as a food source, its contribution to medicinal resources, and its utility in providing corals and livelihood. However, 98.4% believed that coastal communities are not adequately prepared to handle the impacts of climate change.

When asked about the degradation of marine ecosystems as a result of modern life, 49.3% agreed and 26.7% strongly agreed, indicating a growing awareness of the environmental consequences of human activities. Moreover, 92.8% emphasized the importance of conservation and protection of marine ecosystems, with 97.2%

Figure 2. Which of the following do you believe are direct effects of climate change on marine ecosystems?



expressing a willingness to contribute to reducing the effects of climate change. A majority (73.1%) felt that strengthening regulations on waste discharge and investing in renewable energy could help protect marine resources. Additionally, 65% recognized the role of technology in mitigating climate change's effects on marine ecosystems, although 20% felt it was less important. A resounding 95.4% supported the need for international cooperation to combat the effects of climate change on marine ecosystems.

Finally, when considering the potential complications resulting from the destruction of marine ecosystems, 92% of respondents believed it would lead to reduced seafood productivity, a loss of raw materials used in medicine production, and a negative impact on tourism and livelihood.

Conclusion:

The survey results indicated a rising public awareness of the significant impacts of climate change on marine ecosystems. A significant majority of respondents recognized that human activities—ranging from excessive fuel consumption to deforestation and greenhouse gas emissions—are primary drivers of climate change. The public is increasingly aware that this environmental crisis poses severe threats to marine biodiversity, with species extinction, habitat loss, and declining fish populations being among the most pressing concerns.

Moreover, the results emphasize a strong consensus on the importance of conserving marine ecosystems, with respondents citing their critical roles in conservation. The majority also acknowledged that marine ecosystem degradation is a direct consequence of modern life, yet they expressed a willingness to contribute to climate change mitigation efforts, and stricter regulations and investment in renewable energy should be promoted.

Most importantly, the survey reveals that there is a widespread belief that international cooperation is essential to address the impacts of climate change on marine ecosystems. The public's

recognition of this urgent need for collective action, along with their readiness to participate in conservation efforts, offers hope for a more sustainable future. Immediate, coordinated efforts are crucial to protecting our oceans and the vital services they provide.

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Science Educators: Teachers as Bridges between Science and Young People's Everyday Lives

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Abstract:

Science education is struggling to engage many young people, especially in areas with socio-economic challenges. This paper looks at science education as a practice that tries to bridge the gap between young people's everyday lives and scientific practices. The "connectionist" approach suggested here recognizes the knowledge, culture, and history of young people in their communities as a way to help them understand science better. The paper explores how science teachers experience and handle the connections and disconnections between what they teach and what students experience in their daily lives. This exploration is part of a collaborative effort with teachers working in disadvantaged areas. Drawing from the "funds of knowledge" literature, the paper questions some aspects of science education in light of this connectionist view. Methods are used to help teachers reflect on their practices. First, teachers ranked statements and showed their passion for science and their care for students, but they also noted that many young people don't see much science outside of the classroom and don't view their own experiences as relevant to science learning. Case studies from collaborative research highlight that teachers see a disconnect between science education and young people's lives. However, teachers were pleasantly surprised when they saw evidence of scientific thinking in students' everyday activities. These findings suggest that the role of science education as a bridge between science and students' lives is an important area for further research.

Keywords: Parental involvement; Professional Development; Mediation, etc.

Introduction:

There is ongoing concern across the World about young people's disengagement from science education. Contributing factors include the weak connection between science practices and science education, the gap between teachers' life experiences and those of their students, and the dominant narratives shaping students' perceptions of science. This paper reevaluates science teachers' practices in relation to science, science education, and young people.²

1. Science encompasses knowledge, processes, and practices related to the physical and natural world. These practices include problem-solving, questioning, reflective thinking, expert knowledge, information processing, and reasoning.³ they are embedded in everyday activities, not just in research laboratories. While "science" may seem straightforward, it often conceals more complexity. Additionally, science involves relationships and positions. Science processes connect theories and models with real-world applications.⁴ In discussing connectionist science education, we use the term "science practices" to refer to all forms of scientific thinking and activity impacting the world.

2. Science education can be viewed as a series of practices that include people, their experiences,

curricula, pedagogy, assessment, expectations, and educational discourses that negotiate value. It encompasses teacher education and training, collegiality, competition, various institutions, and specific time management. All these elements have developed historically in response to socio-cultural and economic changes.⁴

3. Young people's everyday lives consist of practices shaped by their communities, parental work and education, aspirations, peer influences, and various aspects of human life, such as health, economic status, disability, and community involvement. This perspective challenges conventional views, framing their lives as practices formed and negotiated throughout their trajectories. In considering the nature and purpose of science education, we examine the relationships among the practices of science, science education, and young people's everyday lives.⁵

Science education serves as mediation between young people's community lives and scientific practices, rather than being solely a set of practices with its own purpose. It acts as a tool for young people to engage with science and scientific thinking, providing a lens to interpret their everyday experiences. Similarly, the knowledge, histories, and

cultures of young people help to make sense of science.

In contrast, conventional views of science education are often narrow.⁶ Notes that we mistakenly see science lessons as isolated learning experiences, ignoring the sociocultural factors—such as students' beliefs, attitudes, values, and identities—that shape their achievement in science. This paper focuses on the role of science teachers within this framework, leading to the research question: How does teacher's experience, interpret, and mediate the connections and disconnections between science education practices, science, and young people's everyday lives?

Theoretical Perspectives:

Understanding science education as mediation requires exploring the relationships among the practices of science, science education, and young people's everyday lives. Many definitions of engagement in science education overlook the complexities of young people's lives. Those with less science capital have fewer chances to see science in their daily practices or future aspirations. The 'funds of knowledge' perspective offers valuable insights, viewing families and communities often seen as deficient as rich sources of scientific thinking.⁷ Recognizing this can help bridge the gap between students in these contexts and the practice of science. Notable examples, such as Bouillon and Gomez, advocate for pedagogical designs that connect students' social experiences with science learning through real-world problems relevant to their communities.⁸

This perspective highlights the social aspects of science education, emphasizing the contextualized agency of young people and their experiences with science in media, leisure, health, and more. It contrasts with traditional views that see the teacher's role as facilitating negotiations between students' everyday experiences and scientific knowledge (Driver et al., 1994), which often position science as opposed to everyday life. Such views reinforce the stereotype of scientists as experts, creating a perception that science is difficult and exclusive.⁹

Buxton (2006) suggests that science teachers in underperforming schools should leverage 'teachable moments' for authentic scientific inquiry. He advocates for curricula that connect to family and community while allowing flexibility for inquiry. We aim to help teachers link these connections to enhance meaningful science learning. Acknowledging students' funds of knowledge promotes flexibility in lessons and encourages inquiry in everyday contexts rather than isolating it in traditional science labs. The concept of 'authentic science' opens up possibilities for integrating scientific practices into science education but does not directly address the relationship between science

and everyday life.¹⁰ Propose focusing on the productive resources students possess for understanding scientific concepts. This approach, rooted in the 'funds of knowledge' perspective, is essential for facilitating young people's participation in science. They need recognition of their agency and opportunities to apply scientific thinking to their everyday lives and vice versa.¹¹

Methodology:

To explore how teachers mediate connections between young people's everyday lives and science education, we partnered with high school teachers in disadvantaged contexts, coining the term 'connectionist science education' to guide our participative inquiry. We utilized collaborative methods, including classroom observations, interviews, co-teaching, and process analysis. Our inquiry group focused on pedagogy, allowing us to identify links and gaps between science education and students' experiences. We developed pedagogical tools like participative photography and mapping to facilitate dialogue that connects students' lives to science.¹²

For example, Sameera's photography project encouraged students to capture science in their daily lives, fostering engagement. Another teacher noted that intimate contexts facilitated student connections during discussions. We also created pictorial 'job cards' for students and parents to classify jobs related to science, sparking meaningful discussions. Our collaboration involved adapting the curriculum to include appealing contexts for students, often requiring trial and error. This flexible approach promoted solidarity among teachers and revealed how they positioned themselves in their practice. Many were mediating science education but lacked the vocabulary for reflection, resulting in contradictions with their existing methods.¹³

We used a triangle framework to guide our research, employing Q-methodology to examine teachers' experiences. We created statements reflecting the three practice sets and asked eight teachers to rank them. Additionally, we conducted case studies to explore variations in science education contexts, highlighting teachers' beliefs, backgrounds, and practices, which deepens our understanding of connectionist science education.¹⁴

Discussion:

How do teachers perceive and mediate the connections between science education, science, and young people's everyday lives? Evidence from both the Q sort and case studies shows that teachers recognize significant disconnections between science education and students' lives, but their interpretations vary based on their alignment with existing educational practices. Teachers who align with traditional practices may overlook potential connections, while those who are more critical are

more likely to see the educational value of these links. Regardless, teachers often express surprise and pleasure when they discover the scientific thinking and practices that students engage in daily. This suggests that, despite a curricular emphasis on how science works, teachers do not typically expect students to recognize or apply scientific thinking in their everyday lives, as indicated by negative responses in the Q sort.¹⁵

However, teachers also show an awareness of a more connectionist approach to their practice and classroom knowledge. We suggest that when teachers shift from a position of authority to acknowledging their limited knowledge of students' everyday practices, it opens up possibilities for dialogue about the relevance of science.¹⁶ This dialogue can help realize the mediating role of science education. This paper presents a critical framework that challenges certain entrenched aspects of current science education practices and encourages teachers to reflect on their approaches. It raises important questions for further research and invites comments and dialogue from others regarding the issues discussed.

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The Concept of A New Woman in Mrs. Warren's Profession: A Feminist Perspective

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Abstract:

Irish dramatist and critic George Bernard Shaw, who popularized social realism on the British stage, wrote *Mrs. Warren's Profession* in 1893. The poem, which defies traditional Victorian conventions, is a social satire that was first presented in London in 1902. The play advanced the feminist movement while also reflecting Shaw's feminist ideas. The —New Woman‖ figure, who defies nineteenth-century male-centered customs and conventional female depictions, is introduced in *Mrs. Warren's Profession*. The play's central theme is prostitution, a contentious taboo subject. Shaw uses the two unconventional female characters to emphasize this line of work. Vivie is a self-reliant, highly educated lady who criticizes her mother for her occupation, while Kitty Warren is a bold mother who runs a brothel to give her daughter a better life and schooling. *Mrs. Warren's Profession* emphasizes that women chose this career path because of the moral, social, and economic injustices in society. Using a feminist perspective, this essay examines how the idea of the —New Woman‖ is portrayed by examining the connections between these two unconventional figures. This essay also looks at the ways in which these characters rebel against the conventional roles that are assigned to them as women in order to establish their own identities in society. As a result, this work illuminates contemporary feminism and dismantles the notion of the "Angel in the House," the ideal Victorian lady, via the lens of these two female characters.

Keywords: *Mrs. Warren's Profession*, The —New Woman‖ concept, —Angel in the House,‖ feminism, female representation

Introduction:

The founder of contemporary drama is regarded as Irish playwright, literary critic, and socialist George Bernard Shaw (1856–1950), who won the Nobel Prize in 1925. Shaw wrote more than sixty plays for the Western theater, including *Man and Superman* (1903), *Major Barbara* (1905), and *Pygmalion* (1913), and five novels, including *Cashel Byron's Profession* (1882–83) and *An Unsocial Socialist* (1883), many of which were influenced by the Norwegian dramatist Henrik Ibsen. ..Shaw was well-positioned to include this topic into his plays because, as a writer of the nineteenth century, he believed that class distinction—particularly the gap between the affluent and the poor—was the biggest concern facing society. Shaw portrayed female characters from a range of social and economic origins, including the middle and upper classes (Ahmad, 2018, p. 23). Shaw adhered to Ibsenist principles, which he outlined in *The Quintessence of Ibsenism* (1891); he expressed his opinions in the prefaces to his works and incorporated social consciousness as well as cultural and political themes in his plays to increase audience understanding. His writings therefore frequently resemble didactic plays in this way.

Mrs. Warren's Profession is a modern satire that reflects Shaw's feminist, socialist, cultural, and moral beliefs. It is full with odd characters. William Mackintire Salter describes the play as "one of the most impressive, one of the most moral plays" in his article "Mr. Bernard Shaw as a Social Critic" (1908, p. 452). Shaw expressed his opinions on the play in a letter to actress Ellen Terry dated 1897. He wrote, "It's much my best play; but it makes my blood run cold: I can hardly bear the most appalling bits of it." Well, I guess I had some courage when I wrote it (Shaw, 1897, as reported in John, 1949, p. 193).

The drama is set in a small rural village in Victorian England, in Southern Surrey, just south of Haslemere. In addition to addressing issues of women's rights, moral decay, poverty, and social, economic, and gender-based inequality, the play primarily focuses on prostitution—a contentious and taboo subject. Shaw uses the two unconventional female characters to emphasize this line of work. Daring Kitty Warren, a former prostitute, is now operating a network of brothels around Europe in order to give her daughter higher social and educational standards. Vivie, her daughter, is a 22-year-old independent lady with a Cambridge education. After earning honors in mathematics from university, she goes home to get to know her

mother, whom she hardly knows. When Vivie learns her mother's occupation is a secret, it shocks her and makes her feel guilty for her life decisions. The focus of the play is conversations across generations and the steadily deteriorating ties between these two ladies. Throughout the play, Mrs. Warren attempts to reconcile with her daughter in order to justify; in doing so, she denounces the reasons why she chose this life, as well as the economic inequalities and hypocrisy. Vivie's complex sentiments and shaky behaviors towards her mother produce a confusing metaphor inside the drama from time to time.

Mrs. Warren's Profession, the third play in the Unpleasant book of Plays Pleasant and Unpleasant, was originally published in 1898. It was written in 1893, during the early years of Shaw's career. The performance of the play produced turmoil among the people and in the press owing to its content. Because of its content, the play was first outlawed by Lord Chamberlain in 1893 (*A Noise Within*, 2017–18, p. 16). It was initially presented at London's private theater, The New Lyric Club, in 1902. The drama made its premiere in public in New York in 1905. Police intervened during this performance because they believed the piece to be offensive (*A Noise Within*, 2017–18, 7). The play was harshly and provocatively criticized; moralistic and sexist viewpoints were among the many critical angles it attracted. Bernard Shaw presents a satirical account of the chaos and consequences following the play's opening night in London in —The Author's Apology, which comes before the play. Shaw writes, After a mere eight years, Mrs. Warren's Profession has finally been performed; and I have again shared with Ibsen the triumphant amusement of startling all but the strongest-headed of the London theatre critics clean out of the practice of their profession (Shaw, 1894, p. 5). Shaw (1894) responds to the criticism directed towards his characters as follows:

I assert that the surprising way in which my characters behave like human beings rather than following the romantic logic of the stage is the true explanation of the cynicism and inhumanity of which shallower critics accuse me of... I am accused of neglecting human feeling, not state reasoning, since I have tossed this logic mercilessly overboard.
Page 19

As mentioned in John Corbin's —Introduction to Shaw's —Apology, entitled —The Tyranny of Police and Press, the play was explicitly described in the *New York Herald* as an —an insult to decency since it —defends immorality, —glorifies debauchery, and —pictures children and parents living in calm observance of most unholy relation (1905, p. 7). The drama was described as "wholly evil" and "grossly unsuitable for stage treatment" by *St. James' Gazette* (as mentioned in Laurence, 1970-74, p. 255). Shaw tells

his readers in his "Apology" not to defend or apologize for writing about such a sensitive subject that caused such a tumultuous situation, but to make clear what he truly meant to convey with the characters he skillfully built.

Rather of placing the blame on Mrs. Warren, Bernard Shaw charges the Victorian society's social, moral, and economic decay for encouraging women to choose careers in prostitution:

It is notorious of society to provide such possibilities, even if it is quite normal and RIGHT for Mrs. Warren to select what she believes to be the least immoral option. Because there are two types of immorality instead of morality and immorality presented as choices. To put it as gently as possible, the man who fails to recognize that malnutrition, excessive labor, filth, and illness are as anti-social prostitutes, that they are the vices and sins of a nation, and not only its tragedies, is (Shaw, 1894, p. 23).

Shaw highlights in his "Apology" (p. 64) that "the only way for a woman to provide for herself decently is for her to be good to me man that can afford to be good to her," and in his "Everybody's Political What's What?" Shaw (1944) restates the economic fact that prostitution is "an underpayment of honest women so degrading" (p. 196). As a result, the Victorian system's social, economic, and commercial injustices that gave preference to males and excluded women inspired some women to rebel against it, sparking the feminist movement and opening the door for the emergence of the "New Woman."

Method:

Socialist playwright George Bernard Shaw explores the economic causes of prostitution in Mrs. Warren's Profession and places the blame squarely on Victorian society's capitalist structure. Through the perspective of feminism, this paper presents a critical aspect in which Vivie and Kitty, two nonconformist female characters, embody the notion of the —New Woman. Through a thorough analysis of the text, it is suggested that these two characters fight against the male-centered society's imposition of stereotyped female roles and instead strive for an independent and self-sufficient way of life in order to survive and establish an identity within the Victorian community. In this sense, the paper explores how Mrs. Warren's Profession's —New Woman type upends the myth of the —Angel in the House, the perfect Victorian woman, by both feminism's late Victorian turning point and its illumination of contemporary feminism.

"Angel in the House" gave way to "The New Woman" Women have historically faced several obstacles in their quest for social advancement. Many historical archives contain accounts of women activists who challenged gender

norms and male-dominated practices. They also campaigned for voting rights and equality in order to obtain social rights like equal pay and employment opportunities, as well as an independent and respectable position in the political, academic, social, and professional spheres of society. Actually, feminist activism goes all the way back to the Middle Ages. The foundation for contemporary feminism was established by poets and authors who are regarded as early feminists, including Aphra Behn in the seventeenth century and Margaret Kempe and Christine de Pisan in the fourteenth. Behn, for instance, was a middle-class lady who wrote like a male to support herself.

The groundbreaking essay *A Vindication of the Rights of Woman: With Structures on Political and Moral Subjects* (1792) by Mary Wollstonecraft, whose ideas were progressive for the eighteenth century, had a significant influence on proponents of women's rights. The British suffragette movement, which began in Boston in the 1860s and persisted until the 1920s, brought about a significant shift in the direction of women's emancipation and new identities in the early twentieth century. Women who seek independence and self-sufficiency through their work have always been seen less favorably and faced more disadvantages than their male competitors, despite the pioneer feminists who opposed the practices of female classification, labelling them as mother, daughter, prostitute, and mistress. The man has been favored, while the female has been imprisoned according to the patriarchal norms.

In her 1949 book *The Second Sex*, a detailed agenda of feminist theory, Simone de Beauvoir, a French writer, theorist, and feminist, addresses female oppression and the representation of femininity. She suggests that 'our societies are patriarchal and a woman must break the bonds in order to be herself as a human being' (1973, p. 125). As De Beauvoir states as well:

From the beginning of the fourteenth century until the twentieth, women's legal standing remained largely constant, while their real circumstances did improve for those in the favored classes. Regardless of gender, the independent Italian Renaissance was a time when strong personalities could emerge. Women were formidable rulers, combatants and commanders in the armed forces, composers, authors, and painters... Later centuries saw the same A license identified wealthy or aristocratic women who were able to elude the strict common morals of the day. Beauvoir (1973), page 136

Beauvoir's ideas suggest that women's standing is contingent upon their social class and the prevailing conditions of the time. Victorian civilization was the height of patriarchy, restricting women's social, economic, and intellectual opportunities. Women were restricted to the home and domestic sphere by Victorian ideals. The ideal Victorian woman is forced to marry and care for her husband and children under the oppressive shadow of patriarchal power; she is also denied the ability to vote, financial security, and ownership of their land and income.

The idea of the "Angel in the House" alludes to the traditional Victorian woman; it was inspired by the 1854 narrative poem of the same name by British poet Coventry Patmore. The lines "Man must be please; but him to please / Is woman's pleasure; down the gulf / Of his condoled necessities / She casts her best / she flings herself" (Patmore, 1-4) describe the ideal Victorian wife who is supposed to nurture her children and satisfy her husband. Comparably, the —Angel in the House is described by British modernist and feminist writer Virginia Woolf as follows:

As very charming, empathetic, and self-centered... Every day, she gave herself up...Most importantly, she was pure. Her greatest beauty was considered to be her purity, her magnificent face, her blushes. Every home had an Angel during those latter years of Queen Victoria's reign. (Barrett, 1979, p. 59, citing Wolf, 1942)

Woolf further explains how she killed her own "Angel" by stating, "When I was writing reviews, she [the Angel in the House] used to come between me and my paper." I finally murdered her because she was the one who annoyed me, squandered my time, and tortured me (Woolf, 1942, as stated in Barrett, 1979, p. 59). The idea of the "New Woman," which emerged in the late nineteenth century and had a significant impact on the twentieth, describes liberal women seeking radical social change, equality, and acceptance. This word was originally used by Irish novelist Sarah Grand. Grand claims that the "New Woman" declared for herself what was wrong with "Home-is-the-Woman's Sphere" and prescribed the treatment in her book "The New Aspect of the Woman Question" (1894, p. 271).

The concept of the "Angel in the House" has its roots in the anti-suffrage postcard *St. Valentine's Greeting* (1909), which has a woman's sphere in the HOME. Figure 1 shows the picture of the young woman knitting at —HOMEI.



Figure 1

St. Valentine's Greeting—Women's Sphere is in the HOME (1909)

As the antithesis of the Victorian "Angel in the House," the New Woman symbolizes the feminist ideals of the fin-de-siècle from a feminist standpoint. In her book *The New Womanhood*, American writer Winnifred Cooley makes the claim that "the new woman seeks only to be a free individual" (1940, p. 40). Additionally, Cooley explains the concept's contradiction by using historical examples of various kinds of women:

[t]The phrase "new woman" is loaded with connotations, yet it belies itself since there are more sophisticated women than ever before—women who take action and seek to be more than just being. She has periodically shown herself throughout history as a Greek poetess, a scholar, a queen, an inspired warrior, or a gifted speaker or organizer. The aged lady with fresh chances is the new woman! The fact that there are so many beacon lights now is astounding considering how physically constrained and socially repressed women were in the past. Cooley (1940), pages 15–16

Barbara Watson also says, "The New Women of Shaw's creation are all ultra-feminine feminists," in reference to Bernard Shaw's portrayal of the "New Women" on stage in *A Shavian Guide to the Smart Woman* (1964, pp. 178-179). Therefore, in contrast to the traditional Victorian "Angel in the House" imagery, Kitty and her daughter Vivie Warren embody the "New Woman" archetype, standing as feminist, self-reliant, strong, and masculine figures despite coming from different social classes. It would thus be beneficial to examine the text from a feminist standpoint.

A Feminist Examination of Mrs. Warren's *Career* Shaw presents Mrs. Warren and Vivie, two of her clever, bold, and smart female characters, as the faces of the —New Woman_ movement in Mrs. Warren's *Profession*. Within the corrupt social, economic, and moral norms of Victorian society, these characters fight to be self-sufficient and refuse to fit into the stereotypical roles of women. They make their own money in a male-centered group.

At twenty-two years old, Vivie Warren is a mature, intelligent, and driven lady who attended

boarding schools and was raised apart from her mother. Her qualities are complimentarily portrayed by the narrative voice: she is a lovely example of the capable, intelligent, and well-educated young Englishwoman from the middle class. 22 years old. prompt, powerful, self-assured, and possessive (I, p. 31). As Alkan observes, Vivie, a Cambridge graduate who is very proficient in mathematics, exemplifies the "New Woman" type as opposed to the traditional female type, who is seen to be too dim to comprehend the complexity of public affairs during the Victorian era (2021, p. 602). Vivie pays her mother, whom she barely knows, a visit. When her mother makes a decision, Vivie first accepts it and says, "My dear mother, you are a wonderful woman. You are stronger than all of England." And are you genuinely not even the slightest bit hesitant, humiliated, or suspicious? (II, page 64) Then after that, Mrs. Warren defends herself by taking a broader view that includes all women who are forced to make similar decisions. She acknowledges the corrupt social and economic systems as well as the hypocritical behaviors of British culture.

Being embarrassed about it is just polite; a lady should be expected to do so. Women have to act as though they have strong emotions that they don't. Saying one thing when everyone knows I mean something else is intolerable to me. What use does such hypocrisy serve? It is useless to pretend that the world is set up differently if people make it that way for women. To be honest, I was never at all ashamed. (Page 65, II)

Mrs. Warren tells her daughter that the reason these ladies took this profession was because of the conditions for working women. She mocks the conventional public mindset that pretends women are valued and revered. The dramatic justification for Mrs. Warren's self-defense is society's hypocrisy. She believes she has nothing to be embarrassed of as a result. and that she declines to provide an apology for the circumstances. Kitty, an independent woman against the patriarchal society, conveys her disapproval of her daughter's lack of self-respect by asking questions about it.

How could you maintain your dignity while living in such squalor and servitude? And without self-respect, what is a woman worth? What is life worth? Why, while other women who had equally wonderful prospects are in the gutter, am I independent and able to provide my kid with an excellent education? because I've always known how to take care of and respect myself. (II, page 64)

This is Kitty's way of responding to her daughter's disregard for her line of work. Since being a prostitute is linked to a loss of self-respect in society, her answer is ironic. She therefore implies that her sense of self-respect is equivalent to her social and economic independence, expressing that, as a result, she is better off than other women.

The revelation of her mother's extremely lucrative career to Vivie causes a rupture in their mother-daughter relationship. When Vivie returns home, Mrs. Warren finds herself in a fierce conflict with her daughter over decisions she has made in life: You assume I was raised the same way you were? Capable of selecting my own lifestyle? Do you believe that I made the decisions I did because I enjoyed them, felt that they were appropriate, or didn't want to go college and become a woman if given the chance? Oops... Do you want to know the details of my situation? (II, page 60)

Mrs. Warren tries to justify her choice by explaining the situation she was in, but Vivie begs her not to criticize her. She seems to be implying that she had no choice. She also highlights that she has given her financial assistance so that she may go to college and have the chance to select her own career. Vivie, on the other hand, will not put up with her mother's justifications; her response perfectly captures their differences. She blatantly ignores the ways in which her mother expresses herself: People constantly attribute their situations to what they are. I don't think that situations exist. Those who wake up and hunt for the conditions they want—and, if they can't find them, manufacture them—are the ones who succeed in this world (II, pp. 60–61). Vivie's portrayal as the "New Woman" reflects her rebellious understanding of the conditions that are governed by men. Vivie, a strong and self-assured woman who is ready to start her profession in finance in London, is one of the few well educated women in Victorian society.

Vivie is characterized as lovely, yet her appearance and way of living are very masculine. The narrator flaunts her contemporary wardrobe, which consists of simple yet stylish professional attire. She has a chatelaine around her waist, on which are pendants for a paper knife and a fountain pen (I.p. 31). The term "fountain pen," which connotes a refined woman, represents her "new womanhood." Additionally, Praed affirms her virtues out loud, saying, "I declare you to be the most splendidly courageous woman I have ever

met" (IV, Page 88). In an unusual move, a male character defines her as a "courageous woman" and praises her. Additionally, Vivie discusses her future plans to engage in the following male activities: I plan to establish offices within the city. and labor at actuarial computations and conveyancing. I'll practice law while keeping a constant watch on the Stock Exchange (I, p. 35). She confronts the workplace circumstances that are dominated by men in this way. Vivie also demonstrates her male ways in her demeanor and way of living. Act I opens with her saying, "I like working and getting paid for it," to Praed in a private conversation. I enjoy nothing more after work than curling up with a decent book with a nice detective tale in it, a cigar, and a little scotch (I, p. 35). The picture of Vivie holding a mystery novel, a cigar, and some alcohol symbolizes the traits of a young, macho lady. According to J. Ellen Gainor, the —New Woman‖ was portrayed as follows: —The New Woman was recognized for her independence of spirit and action; [Vivie] declined to follow the traditional, male-determined code of feminine behavior... This internal daring expressed itself outwardly in such unwomanly pursuits as cigar smoking‖ (1991, p. 15). Here, Vivie is shown as a contemporary, self-reliant woman with masculine traits who can also manage her social and professional lives.

Although Vivie acknowledges the patriarchal nature of the contemporary environment, she is also indignant with women who submit to male dominance and do not show sympathy for them. Aware of her place in the patriarchal culture, she criticizes other women and their way of living. Vivie's ambitions for the future also reflect her worldview. She declines the marriage proposals from George Crofts, an affluent nobleman who co-owns brothels with Mrs. Warren, and Frank Gardner, a foppish and attractive 20-year-old who wants to marry a wealthy lady, as she has no intention of finding a spouse. Vivie refuses marriage because she values her social and individual liberty more.

Vivie, an outspoken lady who questions traditional gender norms, screams at her mother, saying, "Mother, you want a daughter and Frank wants a wife." Neither a husband nor a mother are things I desire. When I sent him about his work, I spared neither Frank nor myself (IV, p. 95). Mrs. Warren reflects the image of the "New Woman" as well. She was once attractive, dressed extravagantly in a bright hat and a colorful shirt that hugged her bust and had trendy sleeves on either side (I, p. 37). She is between the ages of 40 and 50. She therefore has a very contemporary look.

Vivie, on the other hand, rejects this and tells her mother that she is going to make her own way in her own business and with her own friends after learning that she is still operating the brothel. You'll

go your own way (IV, p. 92). She accuses her by saying, "You are a traditional mother at heart," out of pity. I am saying goodbye to you now because of this (IV, p. 96). Their connection is distorted by the conversations between the mother and her daughter.

Gladys Shaw's skill in creating character conflicts is highlighted by Margaret Crane in her essay, saying that his production of character conflicts "meshes perfectly with his conflict of ideas" (1983, p. 30). De Beauvoir (1949) notes that there are generational differences in the incompatibilities that arise between mothers and daughters. She notes that the mother's attitude toward her adult daughter is ambiguous and that she sees a double in her daughter. The duplicate is a suspicious figure who kills [her] original... As a result, the girl sentences her mother to death by growing up. Page 559

Regarding the mother-daughter struggle, Beauvoir contends that a mother and daughter's connection is unbreakable and characterized by complex reciprocal processes that produce ambivalence. Even when a daughter refuses to see her mother as a role model, she may discover her other self in her mother.

Act IV shows this when Vivie compares herself to her mother and says, "I am my mother's daughter." Like you, I have to be employed and have a higher income than my expenses. However, my method is not your way, and my labor is not your job. We had to split up (IV, p. 95). This is Vivie's explanation on why they ought to split up. Mrs. Warren responds to the injustice that has transpired in an effort to justify herself:

Oh, how unfair it is—how unfair, how unfair! Being a good lady has always been my goal. I attempted honest labor and was forced to work like a slave till I loathed the day I learned about honest labor. I raised my daughter to be a decent lady, and even though I was a wonderful mother, she treats me like a leper. How I wish I could experience my life over again! (IV, page 96)

Mrs. Warren also asks herself why she didn't decide to become a regular worker. These conversations between Mrs. Warren and her daughter highlight the conflict between their divergent perspectives and philosophies about life. Shaw thereby illuminates the reasons why working-class women, raised in poverty and misery, chose prostitution as a career in the late nineteenth century through the vivid personalities and the captivating dialogues between her two female protagonists.

Discussion and Results:

In Mrs. Warren's *Profession*, I contend that despite Vivie and Kitty's differing socioeconomic backgrounds and lifestyles, they both embody the—New Woman| archetype from various perspectives, subverting the Victorian gender conventions and customs. Educated and well-

respected, Vivie works outside the home and declines Frank and Crofts' marriage proposals as well as taking care of her mother. In this way, Vivie embodies the spirit of an unbreakable woman and a kind of feminist. Similarly, Mrs. Warren is shown as a self-sufficient, single mother who overcame numerous obstacles to become a successful entrepreneur, despite feeling a sense of maternal care for her daughter and adhering to certain customs, such as recommending potential suitors. As a result, Mrs. Warren bravely practices her job and makes an effort to fit in with her community. Consequently, these two ladies may be regarded as Shaw's most unconventional female characters since they forgo taking care of their families, make a living through employment, and decline to become the "domestic angels" of the Victorian homes.

Shaw is notable for having supported the individual, social, and economic independence of women as well as the newly developing feminist principles, which preceded the modern suffragette and feminist movements. Shaw believed that "the position between the rich and the poor" was one of the most important issues of the 19th century (Ahmad, 2018, p. 23). Shaw actually challenges the capitalist system that benefits wealthy men, arguing that "poor women without chastity are less dangerous in modern society than rich men without conviction" (Klaus et al., 1995, p. 646). Dorothy A. Hadfield points out that George Bernard Shaw wrote more about women than anyone else, and that his progressive views on the "woman question" made him a well-known supporter of early feminism. Hadfield (2010) highlights how Shaw focuses on women's issues perfectly. Since the play provides the ideal reader with a broad source with a wide variety of interpretation options, analyzing the text and investigating Shaw's two female characters from a feminist viewpoint would essentially open up additional routes for modern critique.

The polar characteristics, such as "conventional" and "unconventional," "new" and "old," and "educated" and "uneducated," clash in Mrs. Warren's *Profession* play. The drama centers on two female characters from different socioeconomic levels who get together at one point to become the —New Woman,|| who challenges male-centric customs outside of the home and patriarchal environment. In this way, Shaw discredits the "Angel in the House" and introduces the idea of the "New Woman" to the British theater through these two characters. The play's unique and difficult quality is its ability to make readers think critically about moral and societal concerns. It is demonstrated throughout the play that women have few options for surviving in society due to moral decay, hypocrisy, and economic and social injustices. A drama ahead of its time, Mrs. Warren's

Profession defies Victorian sexism and unconventionalizes the portrayal of women.

When considered critically in the context of feminist critique, I contend that Shaw deftly exposes the modernist era that would follow by challenging and uprooting the depiction of women in order to increase knowledge and consciousness within Victorian society. Shaw's writings in this regard advance the idea of the "New Woman," not just in the Victorian but also in the Modernist canon. It plays a significant role in redefining and substituting women's standing in society. The new woman, according to Blanche Lane (1896, p. 124), is "an evolution from all previous types, and represents in her fullest growth the nineteenth century phase of womankind." She does not, however, represent an aberrant excrescence of the social system. Although the —New Woman‖ notion is mostly associated with the years 1890–1920, it may always be reinterpreted and rediscovered in light of the significant advancements of contemporary feminism that are taking place now. Without a doubt, Mrs. Warren's Profession is still a singular book that seems to be sparking new discussions and providing readers with current and postmodern perspectives on contemporary critique. Thus, the —New Woman‖ archetype that Shaw brought to the British theater might be seen as the precursor to contemporary feminism.

Recommendations:

Undoubtedly, one of the main topics throughout George Bernard Shaw's plays is the status of women in society. It is important to read Mrs. Warren's Profession by George Bernard Shaw from a feminist standpoint. It is possible to navigate the ways in which the play's two female characters, Kitty Warren and Vivie Warren, symbolize the idea of the "New Woman" by analyzing Shaw's play in the context of modern feminist theories. It is said that these two characters, "Angel in the House," subvert the notion of the perfect Victorian lady by rebelling against the stereotypes of women that are put upon them. In order to establish an identity within Victorian society, they strive for both financial and social independence. Despite being written almost a century and a half ago, when such topics were considered taboo, the drama tackles the contentious subjects of modern-day modernism and feminism.

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K₂S₂O₈ Catalyzed Cascade Green Synthesis of Sulfoximines & It's Derivatives under Microwave Irradiation

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Abstract:

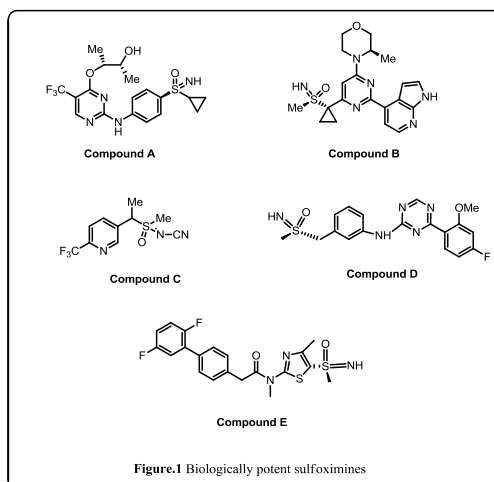
Sulfoximines are well known nitrogen and sulphur containing organic compounds which are found to exhibits different biological and pharmacological importance. Biological and medicinal importance sulfoximines was the main key factor for attracting the attention of many organic chemist towards synthesis of sulfoximine motif. We have given the most convenient and efficient protocol for the synthesis of sulfoximines using K₂S₂O₈ as green catalyst under microwave irradiation.

Keyword: Sulfoximines, K₂S₂O₈, microwave irradiation, Biological and pharmacological activity.

Introduction:

Sulfoximines are well known nitrogen and sulphur containing organic compounds which are found to exhibits different biological and pharmacological importance. The motif which bearing sulfoximine group are used as ligands and auxiliaries in the asymmetric synthesis.¹ Sulfoximines motif emerged in the area of medicine shows wide range of pharmacological activities. Sulfoximines is the functional group chemically stable aza analog of sulfones.² Extra nitrogen in the motif facilitate for the scope for new stereo center at sulfur which provide an additional substitution that can be used to enhance and alter the biological application of the synthesized novel motif. Sulfoximines functional group containing motifs are utilized for the wide range of organic transformation as auxiliaries, chiral ligand, directing group and catalyst.³⁻⁸ There were many sulfoximine containing motifs emerged in the drug discovery on the trail basis.⁹ Literature survey reveals that there

was so many drug motif emerged in the market as pharmacological agent. The first biologically potent compound entered in the clinic was Bayer's pan-CDK inhibitor BAY100039.¹⁰⁻¹¹ After successful development drug motif Bayer's pan-CDK inhibitor BAY100039 further more number of drug discoveries had done such as AY 1143572, a PTEFb inhibitor, also from Bayer,¹¹⁻¹² and ceralasertib (AZD6738) an ATR kinase inhibitor from Astra Zeneca.¹³⁻¹⁵ Organic compound that bears sulfoximine motif are found to be immense biological importance results in the wide application in the medicinal field. Some biological active sulfoximine containing motif are known such as compound **A** & **B** shows protein kinase inhibitor activity, compound **C** is acts as commercial insecticide, and compound **D** acts as PTEFb inhibitor and compound **E** acts as antiviral¹⁶ **fig.1**. Sulfoximines act as PYK2 Inhibitor,¹⁷ adrenergic receptor blocker,¹⁸ anti-allergic active-ty¹⁹ and anti-tumor.²⁰



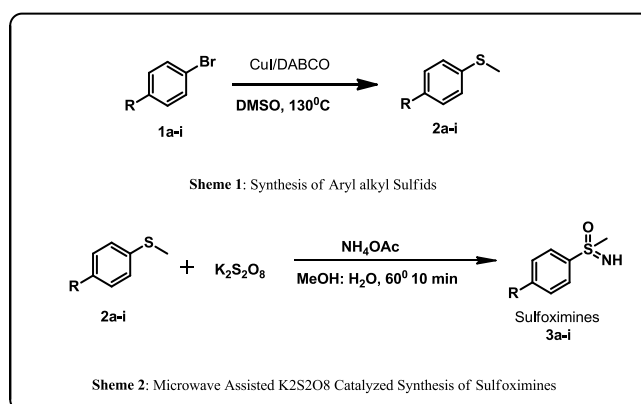
There are numerous methods had been used in the past for the synthesis of sulfoximines such as using electrophilic and nucleophilic sulfur containing reagents,²⁰⁻²⁸ Sulfoximines was generally synthesized from the sulfoxide by the transfer of Nitrogen group.²⁹⁻³⁰ Sulfoximines was also prepared by using different transition metal catalyst reagent iminoiodinane reagents, Rhodium, silver and iron catalyzed reaction, using hypervalent iodine etc. From literature review it reveals that there are numerous methods were adopted by the researcher to construct the sulfoximine motif. Immense use of sulfoximines in the medicine and organic synthesis is the main reason for involvement of many organic chemist in the developing novel strategies for synthesis of novel sulfoximine motifs³¹⁻³⁹. In recent number of synthetic methodologies are known for the synthesis of sulfoximines initiated from the various starting materials such as sulfides and sulfoxide and metal catalyst, as well sulfoximines,⁴⁰⁻⁴³ are used as chiral ligand for asymmetric synthesis.⁴⁴⁻⁴⁵ Reported method literature involves halogenation, chalcogenations. sulfoximines undergo bromination and chlorination with NBS and NCS.⁴⁶⁻⁴⁷

By considering the importance of sulfoximines we are in search of an easy convenient as well as green cost effective synthetic route for the synthesis of sulfoximines. In the present study we have mentioned the $K_2S_2O_8$ catalyzed cascade green synthesis of sulfoximines & its derivatives under microwave irradiation.

Result & Discussion:

Numerous methods for the synthesis of sulfoximines was reported in the literature. In the present study we have developed the environment

being convenient synthesis of sulfoximines under the microwave irradiation by using green $K_2S_2O_8$ as a catalyst. For achieving the highest product yield we have developed the simple, convenient greener protocol for the synthesis sulfoximines starting from sulfides. The starting motif aryl or alkyl sulfide is synthesized from the known method reported by the Ghosh, K. et al.⁴⁸ A convenient method for the synthesis of aryl methyl sulfides via Cu(I)-mediated methylth-iation of haloarenes with DMSO. In a typical reaction substituted haloarenes (**1a-i**) reacts methylating agent DMSO in the presence of CuI and DABCO results 87% yield of the respected aryl methyl sulfides (**2a-i**). **Scheme1** After getting successful result in hand the synthesized aryl methyl sulfides or various derivatives of sulfides i.e. (**2a-i**). After having all the starting material (**2a-i**) in hand the attempt for synthesis of sulfoximines began. To synthesize sulfoximine derivative optimization study was conducted by changing different catalyst and solvents. To make protocol greener, easy and cost effective reaction was tried by using water. But in pure water solvent very less yield of sulfoximines were obtained but after using $H_2O:MeOH$ system the yield of sulfoximines was extensively enhanced. Reaction proceed very smoothly with all aromatic sulfides having both electron donating as well as withdrawing groups (Table 1).The pure product obtained was confirmed by its spectral data. The 1H NMR spectra of the compound (**3a-i**) showed a singlet at δ 8.60 integrating for 1 H's was assigned to CH_3 of sulfoximines NH, a multiplet between δ 7.70- 7.20 integrating for 5 H's was assigned to benzene protons and a singlet at δ 2.20 integrating for 3 H's was assigned to CH_3 of sulfoximines.



All the reactions with different sulfides were very clean, carried out at $H_2O:MeOH$ under microwave irradiation at temperature about $50-60^\circ C$ and completed within 5 to 10 minutes of reaction time. All the sulfoximines (**3a-i**) were purified by column chromatography, using silica gel (60-120 mesh) as stationary phase and ethyl acetate-hexane mixture as mobile phase and the products obtained

in 85 to 95%. All the products were confirmed by their 1H -NMR, IR and mass spectroscopy analysis.

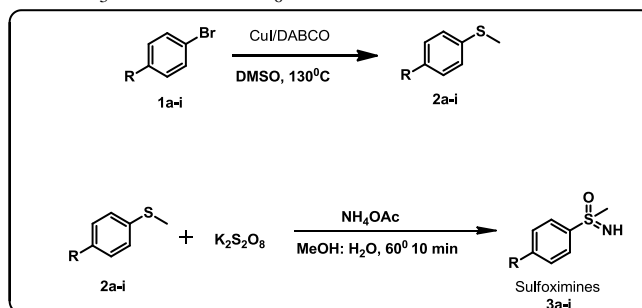
Materials and Methods:

Reagents and solvents were purchased from commercial sources and used without further purification unless otherwise specified. Melting points were determined in open capillary tubes and are uncorrected. Formation of the compounds was checked by TLC on silicagel-G plates of 0.5 mm

thickness and spots were located by iodine and UV light. All compounds were purified by recrystallization/ slicagel (100-200 mesh) gravity column with suitable organic solvents. Mass spectra were recorded on Shimadzu GC-MS-QP-2010 model using direct inlet probe technique. ^1H NMR, ^{13}C NMR was determined in CDCl_3 and DMSO-d_6

solution on a Bruker Ac 200 or 400 MHz spectrometer. The results are in agreements with the structures assigned.

Table 1: $\text{K}_2\text{S}_2\text{O}_8$ catalyzed cascade green synthesis of sulfoximines and its derivative under microwave irradiation. (**3a-i**).



Entry	Sulfide (2a-i)	Sulfoximines (3a-i)	Time (min)	Yield (%)
1			10	95
2			10	88
3			10	86
4			10	89
5			10	91
6			10	84
7			10	86
8			10	82

Experimental:

General procedure: To a stirred mixture of sulfide (1 mmole), ammonium acetate (1 mmole) in H_2O : MeOH (1:1) (10 ml) was added $\text{K}_2\text{S}_2\text{O}_8$ (10 mol%). The resulting reaction mixture was kept in sealed glass tube and irradiated in microwave oven at 60°C . for 10 minutes. After completion of the reaction as indicated by TLC, the reaction was quenched with water and sodium bicarbonate and organic layer was separated and dried over sodium sulphate and concentrated under reduced pressure to

obtain the crude product, which were purified by column chromatography using silica gel 60-120 mesh and eluted with ethyl acetate-hexane mixture (EA/Hexane 1:1) in 1:1 ratios. All the products were confirmed by their spectral data and compared with literature reports.

Spectral Data:

(*S*-methylsulfonimidoyl) benzene (**3e**):

Solid, m.p. $118-120^\circ\text{C}$, IR ν_{max} (KBr, cm^{-1}): 3480, 3372, 3065, 2837, 2768, 2413, 2141 cm^{-1} ; ^1H NMR (400 MHz, CDCl_3): δ 8.60 (s, 1H), 7.70 –

7.20 (m, 5H), 2.20 (s, 3H); ^{13}C NMR (100 MHz, CDCl_3): δ 149.2, 129.3, 125.8, 124.1, 123.0, 121.3, 119.0, 114.4, 76.6, 76.0, 75.2, 23.0

1-Bromo-4-(S-methylsulfonyl) benzene (3f):

Solid, m.p. 122-124 °C, IR ν_{max} (KBr, cm^{-1}): 3458, 3060, 2942, 2848, 2730, 2562, 2223 cm^{-1} ; ^1H NMR (400 MHz, CDCl_3): δ 7.60 (d, $J = 8.0$ Hz, 2H), 7.20 (d, $J = 8.1$ Hz, 2H), 2.30 (s, 3H); ^{13}C NMR (100 MHz, CDCl_3): δ 168.4, 162.4, 156.0, 152.6, 146.2, 127.4, 125.5, 123.3, 114.4, 75.2, 73.0, 67.4, 23.2.

Conclusion:

In conclusion, we have developed a simple convenient greener and efficient protocol for the synthesis of sulfoximines using $\text{K}_2\text{S}_2\text{O}_8$ as catalyst under microwave irradiation which facilitate and fasten the reaction by providing homogenous heating rather than conventional heating as well as instead of using expensive poisonous metal catalyst we have used $\text{K}_2\text{S}_2\text{O}_8$ as a green catalyst which results in the reduction in reaction time as well as enhancing the yield of product. In this method, catalyst was used in 10% mole and carried out in H_2O : MeOH (1:1). This methodology offers advantages like mild reaction conditions, easy isolation of products and operational simplicity. The scope and generality of this protocol was illustrated with respect to various sulfides.

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Sustainable Alternatives to Synthetic Dyes: The Role of Bio-based Colorants

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Abstract:

This research paper investigates the use of bio-based colorants as sustainable alternatives to synthetic dyes in India, focusing on the benefits and challenges of adopting eco-friendly dyeing methods. Synthetic dyes, widely used in the textile industry, contribute to environmental pollution and health hazards due to the toxic chemicals involved in their production. This study reviews literature on the environmental impact of synthetic dyes, explores bio-based alternatives, and examines successful initiatives within India. By combining a mixed-methods approach of surveys and interviews with textile manufacturers, policymakers, and environmental activists, the study assesses the awareness and willingness to adopt natural dyes. Findings suggest that bio-based dyes have the potential to significantly reduce pollution, though barriers such as cost, scalability, and market demand hinder widespread adoption. The paper concludes with strategies to promote bio-based dyes, including policy incentives, improved supply chains, and consumer education. Future research should explore long-term sustainability and economic viability of bio-based dyes in the textile industry.

Keywords: Bio-based Colorants, Synthetic Dyes, Sustainable Textiles, Natural Dyes, Environmental Impact, India, Textile Industry, Policy Implementation, Eco-friendly Practices

Introduction:

The textile industry in India, one of the largest globally, plays a crucial role in the country's economy but also contributes to significant environmental degradation. Synthetic dyes, which dominate the industry, are known for their harmful impact on ecosystems due to the release of toxic effluents into water bodies. These dyes are not biodegradable and contain hazardous chemicals that pose health risks to workers and consumers alike.

As awareness of environmental sustainability grows, there is increasing interest in bio-based colorants as a greener alternative to synthetic dyes. Derived from natural sources such as plants, insects, and minerals, bio-based colorants are

biodegradable, non-toxic, and eco-friendly. Integrating these into the textile industry can reduce pollution and promote a circular economy. However, challenges such as limited availability, higher costs, and resistance to change must be addressed for a successful transition.

This paper explores the potential of bio-based dyes in India, evaluating their environmental benefits and examining the practicalities of incorporating them into mainstream textile production. The research also highlights the importance of government policies, consumer awareness, and industry support in promoting sustainable dyeing practices.

Literature Review:

Sr. No	Name of the Author	Year of Publications	Description
01	Khatri A., Peerzada M.H., Mohsin M., White M.	2015	Reviews developments in dyeing cotton fabrics with reactive dyes to reduce environmental pollution, highlighting cleaner production methods.
02	Kasiri M.B., Safapour S.	2014	Discusses the environmental benefits and antimicrobial properties of natural dyes, providing sustainable alternatives to synthetic dyes.
03	Gebert B., Saus W., Knittel D., Buschmann H-J., Schollmeyer E.	1994	Investigates the use of supercritical carbon dioxide in dyeing natural fibers, offering an eco-friendly solution for the textile industry.
04	Khattab T.A., Gaffer H.E., Klapötke T.M.	2016	Explores the synthesis and application of pH-triggered smart dyes, contributing to sustainable textile production with potential applications in responsive materials.
05	Kan C.W., Lo C.K., Man W.	2016	Reviews environmentally friendly aspects in textile coloration, focusing on sustainable dyeing processes and innovations that reduce the ecological footprint.

Research Methodology:

This study uses a mixed-methods approach to explore the role of bio-based colorants in the Indian textile industry. The research combines both qualitative and quantitative methods to provide a holistic understanding of the current situation and future potential.

- **Qualitative Methods:** Conducted interviews with textile manufacturers, dye producers, policymakers, and environmental activists to gain insights into the feasibility, challenges, and market trends of bio-based dyes.
- **Quantitative Methods:** Distributed structured questionnaires to 200 participants, including textile professionals, manufacturers, and environmental experts. The survey gathered data on awareness, adoption rates, and

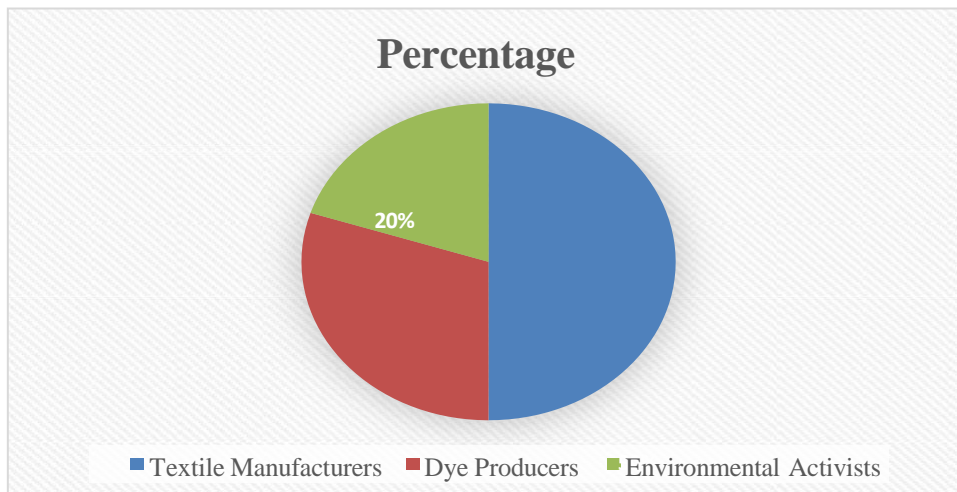
perceived benefits of bio-based dyes compared to synthetic ones.

Data Collection: The data was collected from textile hubs across India, including regions like Gujarat, Tamil Nadu, and Maharashtra, which are major players in the textile industry. Purposeful sampling ensured diverse perspectives from different sectors of the industry.

Data Analysis & Interpretations:

Sure, here's an example of how to display statistical data for the research in a tabular style. The data shown below is fictional and intended to demonstrate the sort of information that may be acquired and analyzed in research on incorporating entrepreneurship and skill development into the Home Science curriculum.

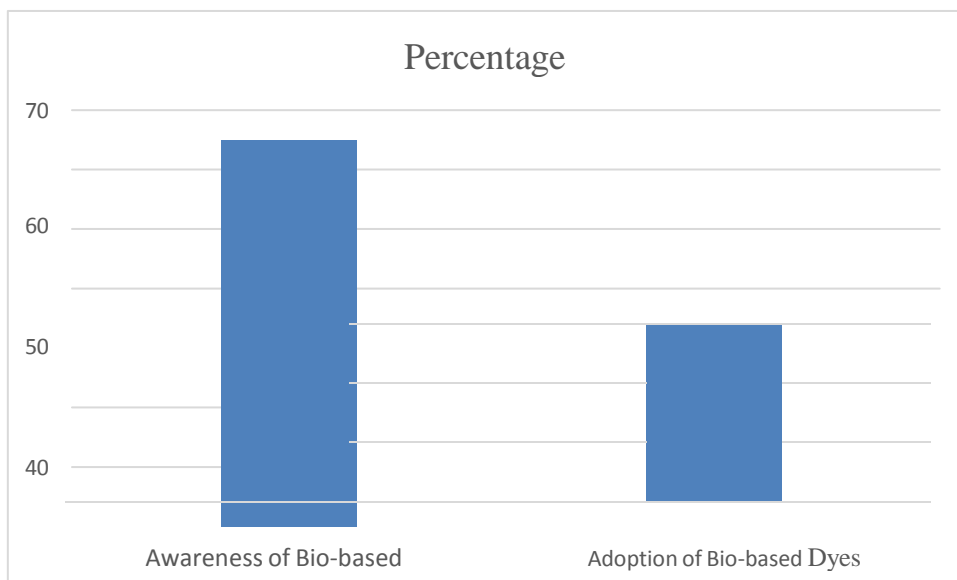
1. Demographic Survey



The study included 200 participants: 50% were textile manufacturers, 30% dye producers, and 20% environmental activists. This broad spectrum

of viewpoints provided insight into the adoption of bio-based dyes in India.

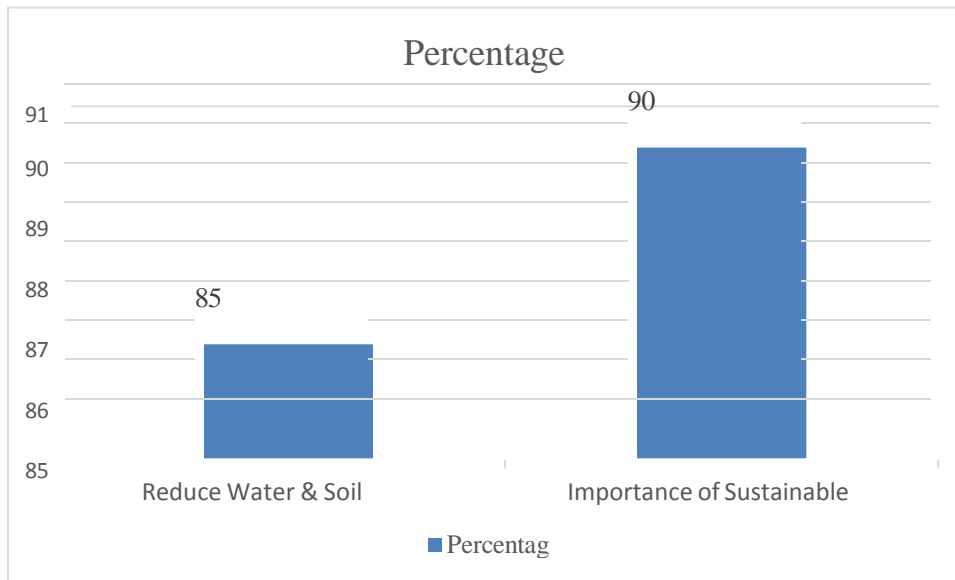
2. Adoption of Bio-based Dyes



Surveys revealed that 65% of textile manufacturers were aware of bio-based dyes, but only 30% had implemented them in production. The

low adoption rate was mainly attributed to high costs and limited scalability.

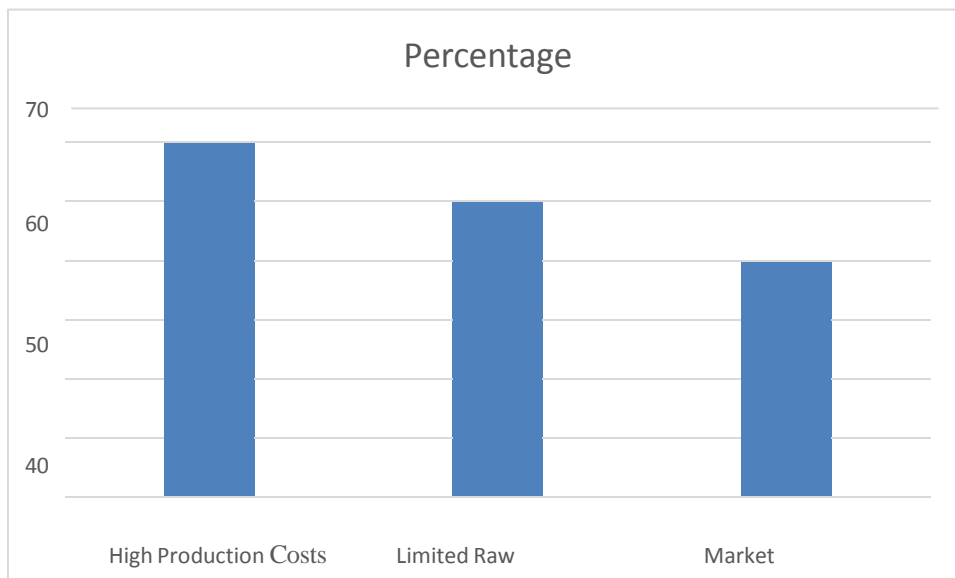
3. Environmental Impact



85% of participants agreed that bio-based dyes could significantly reduce water and soil pollution caused by synthetic dyes. Among

environmental activists, 90% emphasized the critical importance of transitioning to sustainable alternatives.

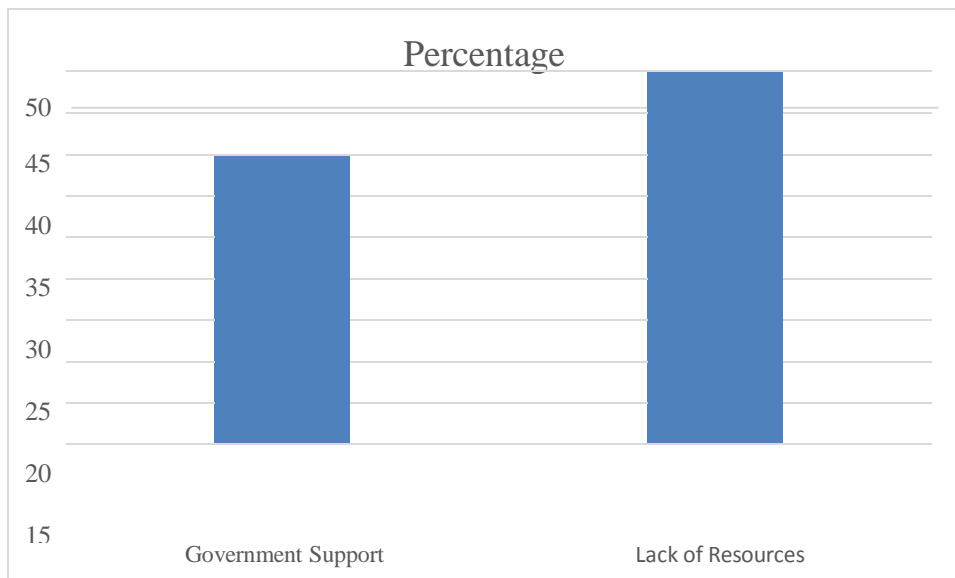
4. Barriers to Adoption



Key barriers included high production costs (60%), limited availability of bio-based raw

materials (50%), and market resistance to higher-priced eco-friendly products (40%).

5. Policy and Resource Availability



Only 35% of manufacturers reported receiving government support or incentives for adopting sustainable dyes. Additionally, 45% lacked adequate resources, such as training programs and raw material suppliers, for bio-based dye production.

Success Rates of Case Study Programs:

"Project Anar" in Gujarat, which promotes natural dyeing using pomegranate peels, was highlighted as a successful case study. It demonstrated increased environmental benefits and rising consumer demand for eco-friendly textiles.

The "Project Anar," based in Gujarat, is a sustainable dyeing initiative that promotes the use of pomegranate peels as a natural colorant in textile production. The project focuses on utilizing bio-waste from pomegranates to produce eco-friendly dyes, offering a sustainable alternative to synthetic dyes, which are harmful to the environment. By using locally sourced, natural materials, Project Anar reduces water pollution and chemical waste, while also supporting local farmers by providing a new revenue stream for pomegranate waste. The initiative has gained attention for its environmental benefits and has sparked consumer demand for eco-friendly textiles. Additionally, the project's success demonstrates the potential for natural dyeing techniques to scale up in India's textile industry, fostering a greener future.

Suggestions:

Based on the research findings, the following suggestions are made to encourage the adoption of bio-based colorants in India's textile industry:

1. **Government Incentives:** Implement policies that provide financial support, tax breaks, and subsidies for manufacturers switching to bio-based dyes.
2. **R&D Investment:** Increase research funding to

improve the scalability and cost- efficiency of bio-based dyes.

3. **Supply Chain Enhancement:** Develop better sourcing strategies and partnerships with agricultural sectors to ensure a steady supply of raw materials for natural dyes.
4. **Consumer Awareness Campaigns:** Launch nationwide awareness campaigns to educate consumers on the environmental benefits of bio-based textiles, which could increase demand.
5. **Industry Collaboration:** Foster collaborations between government agencies, textile manufacturers, and environmental NGOs to support bio-based dyeing initiatives.
6. **Training Programs:** Create comprehensive training modules for textile workers and manufacturers on how to integrate bio-based dyes into their processes.

Conclusion:

The adoption of bio-based colorants is emerging as a sustainable alternative to synthetic dyes, particularly in India's textile industry, which is a major contributor to environmental degradation. Natural dyes are derived from renewable resources and are less harmful to ecosystems, offering advantages such as reduced water pollution and lower chemical usage. However, the transition to bio-based colorants faces several challenges, including higher production costs, limited scalability, and fluctuating market demand.

To overcome these barriers, it is essential for the government to provide policy support and financial incentives that encourage manufacturers to switch to eco-friendly dyes. Strengthening supply chains to ensure a steady and reliable source of natural dye materials is also critical. Consumer awareness campaigns can play a pivotal role in increasing demand for sustainable products, aligning

market incentives with environmental goals.

Future research should focus on improving the cost-effectiveness and scalability of bio-based colorants. Additionally, long-term studies are needed to fully understand the environmental impact of natural dyes, particularly in large-scale industrial applications. With these strategies, India has the potential to lead in creating a more sustainable and environmentally friendly textile industry.

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Assessment of Microbiological Pollution in Dhanora Water Reservoir: An Analysis of MPN Data

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Abstract:

This study aims to assess the microbiological pollution in the Dhanora Water Reservoir near Bhokar, Maharashtra, by analyzing the Most Probable Number (MPN) of coliform bacteria. Freshwater systems like Dhanora Reservoir are crucial for local communities, and monitoring microbial contamination is vital for maintaining water quality. MPN data from June 2023 to May 2024 are examined to evaluate seasonal and site-specific variations in contamination levels. The results highlight the water reservoir's microbial status, serving as a foundation for future water quality management strategies.

Keyword: Most Probable Number (MPN), Dhanora water reservoir

Introduction:

Freshwater ecosystems are vital for both environmental balance and human usage, providing drinking water, agricultural irrigation, and recreational activities. However, these water bodies are increasingly subjected to microbial contamination due to urban runoff, agricultural waste, and sewage, leading to a rise in waterborne diseases. The Dhanora Water Reservoir, located near Bhokar, Maharashtra, is one such ecosystem facing these issues. The Most Probable Number (MPN) method is widely used to estimate the concentration of coliform bacteria, an indicator of fecal contamination and microbial water quality. This study focuses on the microbiological pollution of the Dhanora Water Reservoir from June 2023 to May 2024, analyzing MPN data to reveal seasonal fluctuations and potential contamination sources.

Objectives

- To evaluate the microbial contamination of the Dhanora Water Reservoir using MPN data.
- To identify seasonal and site-specific variations in microbial pollution.
- To provide recommendations for better water quality management based on the findings.

Materials and Methods:

Study Area

The Dhanora Water Reservoir is situated near Bhokar, Maharashtra, and serves as a crucial freshwater source for the surrounding communities. Four sampling sites (S1, S2, S3, and S4) were selected for MPN testing to cover different parts of the reservoir, ensuring comprehensive monitoring.

Sample Collection

Water samples were collected monthly from June 2023 to May 2024 at all four sites.

Samples were taken in sterile containers and transported to the laboratory for MPN analysis within 24 hours. The collection process followed standard protocols for microbiological testing to avoid contamination.

MPN Test

The MPN test was conducted to estimate the concentration of coliform bacteria. The test involves inoculating a series of test tubes containing a lactose broth medium with water samples. The development of gas within the tubes after incubation indicates the presence of coliforms, and the MPN value is then determined using a statistical table.

Results

MPN Data Analysis

The MPN values across the four sampling sites (S1, S2, S3, S4) were recorded for each month. The following graph (Figure 1) displays the MPN values for each site from June 2023 to May 2024.

In general, the data show that:

- The highest MPN values were recorded during the monsoon season (July to September), with peaks observed at Site S3.
- The lowest MPN values were found during the winter months (December to February), suggesting reduced microbial activity during colder temperatures.
- Site S3 consistently had the highest MPN values, indicating potential localized contamination sources.

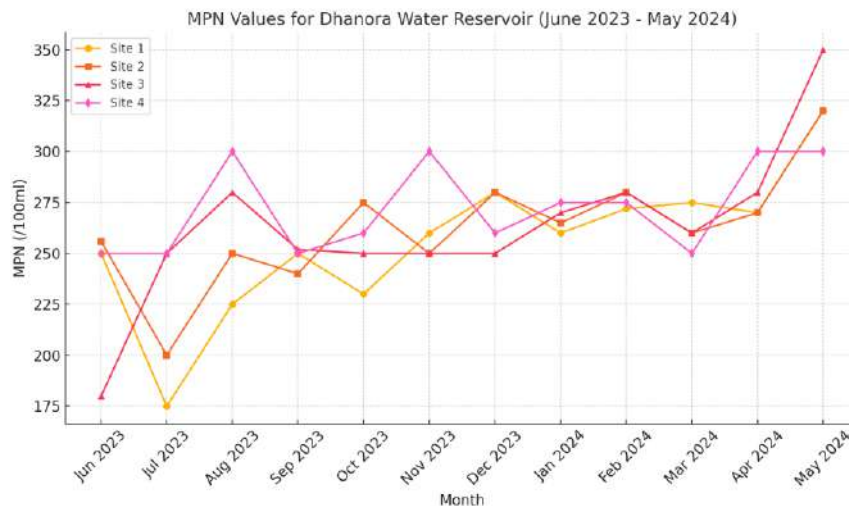
Seasonal Variations:

As seen in the graph, microbial pollution peaks during the monsoon season, possibly due to increased surface runoff carrying pollutants into the reservoir. The reduced MPN values during the winter may be attributed to lower temperatures and reduced bacterial growth.

Site-Specific Observations:

- **Site S3** consistently exhibited higher MPN values compared to other sites, indicating a potential point source of contamination, such as sewage discharge or agricultural runoff.

- **Site S1** showed moderate contamination levels throughout the study period, while **Site S4** demonstrated relatively lower MPN values.

**Discussion:**

The results suggest that microbial pollution in the Dhanora Water Reservoir is influenced by seasonal factors and localized contamination sources. The monsoon season presents a significant challenge in terms of microbial water quality, with elevated MPN values due to runoff from surrounding areas. This is consistent with previous studies indicating higher microbial contamination during wet seasons due to the influx of organic material and nutrients.

Public Health Implications:

The presence of coliform bacteria in the reservoir poses a potential health risk to communities that rely on the water for domestic purposes. High MPN values, especially during the monsoon, suggest the need for water treatment and proper management to prevent waterborne diseases.

Recommendations

- **Improved waste management:** Control of sewage discharge and agricultural runoff is essential to reduce microbial pollution.
- **Regular monitoring:** Monthly microbial water quality assessments should be conducted to track contamination trends.
- **Public awareness:** Local communities should be educated about the risks of contaminated water and the importance of using treated water for drinking purposes.

Conclusion:

This study highlights the seasonal and spatial variations in microbial pollution in the Dhanora Water Reservoir, emphasizing the critical periods and sites that require focused intervention. With the highest MPN values recorded during the monsoon season, appropriate water quality management measures should be implemented to

ensure the safety of the water for local communities. Future studies should explore the specific sources of contamination and implement strategies to mitigate their impact.

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Mechanisms of Antifungal Resistance in *Candida albicans*: Challenges and Clinical Implications

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Abstract:

Candida albicans is a major opportunistic fungal pathogen responsible for a range of infections, from superficial mucosal infections to life-threatening systemic diseases. The rise of antifungal resistance in *C. albicans* has become a significant concern, complicating treatment outcomes and increasing mortality rates. This review discusses the primary mechanisms of antifungal resistance, including mutations in drug targets, efflux pump overexpression, biofilm formation, and alterations in ergosterol biosynthesis. Resistance to azoles, echinocandins, and polyenes, the major classes of antifungals, is explored, with a focus on the genetic and molecular underpinnings of resistance. The clinical impact of multidrug-resistant strains and the growing global prevalence of antifungal resistance are highlighted. Strategies to overcome resistance include the development of novel antifungals, antifungal stewardship programs, and advancements in rapid diagnostic tools. Future challenges and directions for research are discussed, emphasizing the need for continued investigation into resistance mechanisms and new therapeutic approaches to manage infections effectively.

Keywords: *C. albicans*, Drug Resistance, Antifungal efficacy, multidrug-resistant strains, diagnostic tools

Introduction:

Candida albicans is a major opportunistic fungal pathogen that exists as a commensal organism on human mucosal surfaces, such as the gastrointestinal and genitourinary tracts. In healthy individuals, it typically coexists with host defenses without causing harm. However, under certain conditions, particularly in immunocompromised individuals, *C. albicans* can shift from a benign colonizer to a pathogenic state, causing a broad spectrum of infections. These infections range from relatively mild, such as oral thrush, esophagitis, and vulvovaginal candidiasis, to more severe and invasive forms like candidemia and disseminated candidiasis. Invasive candidiasis, which can affect the bloodstream and internal organs, is associated with high morbidity and mortality, especially in hospitalized patients with weakened immune systems, such as those undergoing chemotherapy, organ transplants, or prolonged ICU stays.

The treatment of *C. albicans* infections has historically relied on a few classes of antifungal agents: azoles, polyenes, and echinocandins. Azoles, like fluconazole, inhibit ergosterol synthesis, a key component of the fungal cell membrane, and are widely used due to their oral bioavailability and broad spectrum of activity. Polyenes, such as amphotericin B, disrupt the fungal cell membrane by binding to ergosterol, causing cell death.

Echinocandins, like caspofungin, inhibit β -1,3-glucan synthase, an enzyme critical for cell wall biosynthesis. These drugs have formed the cornerstone of antifungal therapy for decades, providing effective treatment for both superficial and invasive fungal infections.

However, the widespread and often prolonged use of these antifungal agents has led to an alarming rise in antifungal resistance in *C. albicans*. Resistance is now being observed across all three major classes of antifungals, complicating the management of *Candida* infections and diminishing the effectiveness of first-line therapies. Azole resistance, in particular, has become a significant clinical problem, driven by mechanisms such as mutations in target enzymes (e.g., *ERG11*), overexpression of efflux pumps that actively expel the drug, and alterations in sterol biosynthesis pathways. Echinocandin resistance, though less common, is also increasing, particularly in patients undergoing prolonged treatment, with mutations in *FKS* genes conferring resistance. Additionally, *C. albicans* can form biofilms on medical devices and mucosal surfaces, further complicating treatment, as biofilm-associated cells exhibit inherent resistance to antifungal agents.

The emergence of antifungal-resistant *C. albicans* strains has serious clinical implications, particularly in healthcare settings where vulnerable

populations, such as critically ill and immunocompromised patients, are at higher risk. Resistant infections are associated with increased mortality, longer hospital stays, and higher healthcare costs due to the limited availability of effective therapeutic options. The development of multidrug-resistant (MDR) *C. albicans* strains poses an even greater threat, as these strains are often resistant to multiple antifungal classes, leaving clinicians with few treatment alternatives.

This growing resistance highlights the urgent need to better understand the molecular mechanisms driving antifungal resistance in *C. albicans* and to develop new therapeutic strategies. In addition to exploring the genetic and biochemical pathways underlying resistance, it is also critical to consider how antifungal stewardship and rapid diagnostic tools can be employed to limit the spread of resistant strains. This review aims to provide a comprehensive overview of the current knowledge on antifungal resistance mechanisms in *C. albicans*, the clinical impact of these resistant strains, and emerging strategies to address this increasingly challenging public health issue.

Mechanisms of Antifungal Resistance in *Candida albicans*:

Antifungal resistance in *Candida albicans* is multifactorial and can be classified into several key mechanisms, each targeting different aspects of the pathogen's cellular biology and antifungal drug interactions. The major mechanisms include mutations in drug target genes, overexpression of drug efflux pumps, biofilm formation, and changes in ergosterol biosynthesis. These resistance mechanisms enable *C. albicans* to evade the action of the major antifungal drug classes: azoles, echinocandins, and polyenes.

These mechanisms are discussed below.

Azole Resistance:

Azoles, such as fluconazole, inhibit the enzyme 14 α -demethylase (encoded by *ERG11*) involved in ergosterol biosynthesis, a critical component of fungal cell membranes. Resistance to azoles in *C. albicans* is mediated by:

- **Mutations in the *ERG11* gene:** Point mutations in *ERG11* reduce the binding affinity of azoles, leading to resistance. Several mutations have been identified, such as Y132F, which are frequently associated with clinical resistance.
- **Overexpression of efflux pumps:** Efflux pumps, including ATP-binding cassette (ABC) transporters (e.g., Cdr1, Cdr2) and major facilitator superfamily (MFS) transporters (e.g., Mdr1), actively export azoles out of the cell, reducing intracellular drug concentration.
- ***ERG3* mutations:** Mutations in *ERG3* lead to altered ergosterol biosynthesis, reducing the reliance on 14 α -demethylase and conferring azole resistance.

Echinocandin Resistance:

Echinocandins, such as caspofungin, target the β -1,3-glucan synthase complex, inhibiting cell wall biosynthesis. Resistance to echinocandins is primarily associated with mutations in the *FKS1* and *FKS2* genes encoding subunits of this complex. These mutations reduce the drug's binding affinity, leading to a failure of echinocandin therapy, especially in persistent infections like biofilm-associated candidiasis.

Polyene Resistance:

Polyenes, such as amphotericin B, bind to ergosterol, creating pores in the fungal cell membrane that result in cell death. Resistance to polyenes is relatively rare in *C. albicans*, but when present, it is often due to alterations in ergosterol content through mutations in the *ERG2*, *ERG3*, or *ERG6* genes, which either reduce the amount of ergosterol or alter its structure, decreasing the efficacy of polyenes.

Biofilm Formation:

Candida albicans can form biofilms on medical devices, tissues, and other surfaces, which are inherently resistant to antifungal treatment. Cells within biofilms exhibit distinct metabolic and phenotypic states compared to planktonic cells. Biofilms provide a protective barrier against antifungal penetration, promote resistance to azoles and echinocandins, and facilitate the persistence of infections.

Clinical Implications of Antifungal Resistance:

Antifungal resistance in *C. albicans* has significant clinical consequences, leading to prolonged infections, increased mortality, and limited treatment options. The rise of multidrug-resistant strains poses a substantial threat in healthcare settings, particularly in patients undergoing immunosuppressive therapies, organ transplants, or those in intensive care units. For instance, candidemia caused by fluconazole-resistant *C. albicans* strains is associated with higher mortality rates and longer hospital stays. The emergence of echinocandin resistance has also reduced the efficacy of first-line therapies for invasive infections, leading to therapeutic failure in some cases.

Epidemiology of Antifungal Resistance

The epidemiology of antifungal resistance in *C. albicans* varies globally. Azole resistance is more prevalent in some regions due to widespread use in both clinical and agricultural settings. In particular, the overuse of fluconazole has driven the selection of resistant strains. Echinocandin resistance remains less common but is increasing, particularly in patients with recurrent or persistent candidemia who undergo prolonged echinocandin therapy.

Strategies to Overcome Antifungal Resistance

Efforts to address antifungal resistance in *C. albicans* involve a combination of novel therapeutic approaches, stewardship programs, and advancements in diagnostics.

Novel Therapeutics

Several new classes of antifungals are under investigation. Ibrexafungerp, a glucan synthase inhibitor, has shown promise as an alternative to echinocandins, with efficacy against echinocandin-resistant strains. Other agents, such as manogepix (an inhibitor of fungal Gwt1 enzyme), are in clinical trials and may provide new treatment options.

Antifungal Stewardship

Optimizing antifungal use through stewardship programs is critical to preventing the

development of resistance. Limiting the overuse of fluconazole and other azoles, especially in non-invasive infections, may help reduce selective pressure. Early diagnosis and targeted therapy, guided by antifungal susceptibility testing, are crucial in managing infections effectively and preventing the emergence of resistance.

Diagnostic Advancements

Rapid diagnostic tools, including molecular assays, can detect resistance markers and provide species identification in a timely manner. Techniques such as next-generation sequencing (NGS) allow for detailed analysis of genetic mutations associated with resistance, enabling more personalized antifungal therapy.

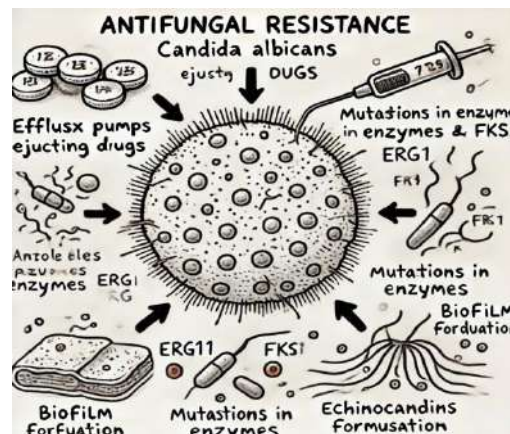


Figure1: Diagrammatic illustration of antifungal resistance mechanisms in *Candida albicans*. It shows key elements like efflux pumps, enzyme mutations, and biofilm formation, all of which contribute to drug resistance.

Future Directions and Challenges:

Despite significant progress in understanding antifungal resistance mechanisms, challenges remain. The dynamic nature of *C. albicans* biofilm formation and the rapid evolution of resistance mutations complicate treatment efforts. Research into fungal genomics and transcriptomics is needed to fully elucidate resistance pathways and identify novel drug targets. Additionally, the development of vaccines against *Candida* species is a promising area of research that could reduce the incidence of infections in high-risk populations.

Conclusion:

Antifungal resistance in *Candida albicans* is an evolving challenge that threatens effective treatment options. A multifaceted approach involving novel drug development, antifungal stewardship, and improved diagnostics is essential to combat this issue. Continued research into resistance mechanisms and epidemiology is crucial to staying ahead of this rapidly adapting pathogen and ensuring better outcomes for patients with fungal infections.

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Roll of Chemicals in Cosmetics in Daily Life and Their Effects

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Abstract:

Cosmetics are safe for use by almost all the people, which serves many functions. Positive effects and adverse effects of cosmetics only depends on chemical contain in it. From the study of chemical contents and different agents and its effect on skin. We have identified good cosmetics or cosmetics which are safe for use.

Keywords: Cosmetics, Chemical Contents, Different agent, effect, etc.

Introduction:

Now a day's numbers of cosmetics are in market. According to cosmetic act and rules 1945 Cosmetic is defined as an interoriented to be rubbed, poured sprinkled or sprayed or introduced in to or otherwise applied to the human body or any part therefore cleansing, protecting, beautifying, promoting attractiveness or altering the appearance. Generally, cosmetics are safe occur for in use certain by almost people all while the people using but many adverse cosmetics reactions such may as Deodorants, Hair Shampoos, Hair Sprays, Hair removers. Hair dyes, Facial creams, Skin cleansers Lipsticks and Nail polishes.

Cosmetic serves many of the functions,

1. Maintain body health and hygiene
2. Avoid premature ageing of skin
3. Give a sense of well being
4. Improve overall looks and personality

The raw materials used in the manufacturing of cosmetic should be of standard quality. They should be tested before its use. The products should be tested under all weather conditions i.e. under extremes of temperature and humidity conditions to which they are likely to encounter in the market, if they are standard or not, the testing of good cosmetics, we have studied some characteristics of good cosmetics. The cosmetics which are studied they are easily available in all market. They increase the appearance of our body. Lipsticks, oils, beeswax, perfumes, nail polish mascaras are commonly used and they contain chemicals that can harm us too. They contain polymers, solvents, grease, petroleum oils, colorants, pigments, etc.

List of Cosmetics:

1. Face powder
2. Compact powder
3. Nail paints
4. Rouges
5. Cleansing creams
6. Vanishing creams
7. Foundation
8. Moisturizing creams
9. Lipsticks
10. Bleaches

In this work, we carried out chemical contaminates in the cosmetics which are available in the all market, as list of cosmetics maintained above, From the contents of chemicals, we studied effects & adverse effects of cosmetics on skin also maintains qualities of good cosmetics, many people use various types of cosmetics in everyday life.

Result:

The effect of cosmetics are many peoples using various types of cosmetics in everyday life. Cosmetics are safe for use. Effects of cosmetics are depending on chemicals contain in it.

Conclusion:

Cosmetics are the important product in market which used in daily life. Various types of cosmetics are available in all market, used for different function. But effects of cosmetics depend only on chemical contents in it.

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Efficient and Green Pathway for one pot Synthesis of Bioactive Spirooxindoles Using Zinc Oxide Nanoparticles (ZnO- NP)

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Abstract:

Zinc oxide nanoparticles are used for an efficient one-pot, three-component synthesis of spirooxindole derivatives, incorporating isatin, malononitrile, and enolizable ketones such as 3-methyl-1-phenyl-2-pyrazolin-5-one, 3-methyl-1-(2-chlorophenyl)-2-pyrazoline-5-one, 4-hydroxy-6-methyl-2-pyrone, and 1-methyl-4-hydroxyquinoline-2-one. This method features inexpensive starting materials, easy separation, high catalytic efficiency, good product yields, and straightforward workup in a 1:1 (v/v) aqueous-alcoholic medium.

Keywords: Spirooxindoles; Enolisable ketones; ZnO- NP.

Introduction:

Spirooxindoles are prevalent heterocyclic ring systems that serve as crucial structural motifs in numerous natural products and pharmaceuticals [1,2]. One effective strategy to address this challenge is the development of multicomponent reactions (MCRs), where three or more reactants are combined in a single reaction flask to produce a product that incorporates most of the atoms from the starting materials[3,4]. This structural framework is found in various pharmaceuticals and natural products, including cytostatic alkaloids like spirotryprostatins A and B, as well as strychnophylline. [5]

Indole is a widely occurring heterocyclic component found in numerous bioactive natural products. [6] Its participation, specifically the sharing of the indole-3 carbon atom, is crucial in the formation of spiroindolines. When combined with a carbonyl group at C-2, these spiroindolines yield spiro-2-oxindoles (spirooxindoles), which hold significant importance in organic and medicinal chemistry. Many compounds featuring spirooxindoles, whether of natural or synthetic origin, exhibit a range of biological activities, including antimicrobial, antioxidant, antitubercular, anticancer, anti-HIV, and anti-inflammatory effects. [7]

Furthermore, the sharing of the C-3 position in spirooxindoles with a pyran ring leads to the formation of pyran-annulated spirooxindoles (spiropyranes and spirochromenes), which are also known for their beneficial properties, such as anticoagulant, diuretic, anticancer, and antianaphylactic activities. The biological potential of spirochromenes has motivated chemists to develop efficient synthesis protocols. Common

methods involve a one-pot, three-component condensation of isatin, malononitrile, and enolizable C–H acids like dimedone, barbituric acid, and naphthols. The literature includes numerous protocols for their synthesis. A focused review of eco-friendly synthesis methods for spirochromenes indicates that few catalyst-free protocols have been reported.[8] Notably, these catalyst-free approaches typically require thermal or electrochemical activation, suggesting that catalysts, alternative energy sources, or specific reaction media are essential for synthesizing spirochromenes at ambient temperature. [9] In our search for methods operable at room temperature, we found various catalysts and reaction media have been explored. Each reported method has its advantages, but some suffer from drawbacks such as the use of expensive or hard-to-prepare catalysts and reaction media. To the best of our knowledge, only a limited number of protocols successfully address both economic and environmental concerns. [10]

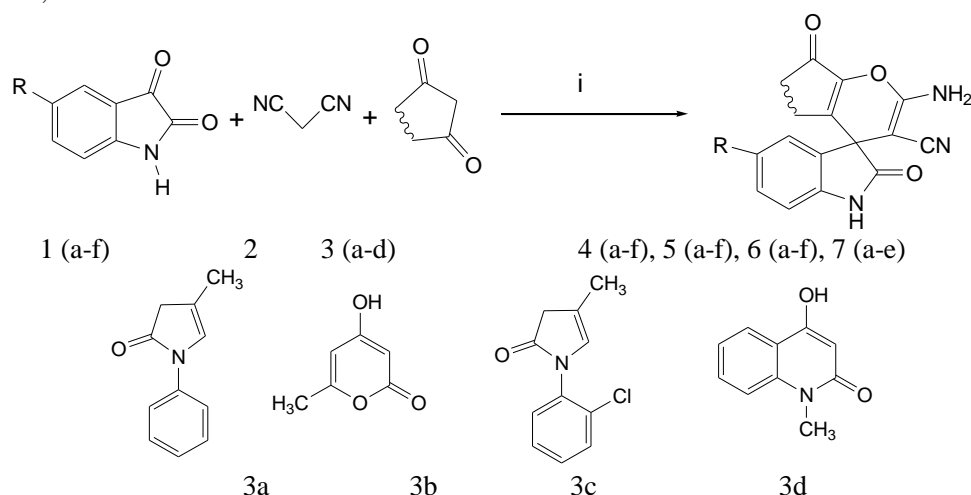
Experimental:

General details: Chemicals from Sigma Aldrich, Alpha Aiser, TCS, and Spectrochem were used as received, without further purification. ¹H and ¹³C NMR spectra were recorded on a Bruker spectrophotometer (400 MHz) using DMSO-d⁶ as the deuterated solvent and tetramethylsilane (TMS) as the internal standard. Reactions were monitored by TLC on Merck silica gel plates. Product characterization was performed using ¹H NMR, ¹³C NMR, and mass spectrometry.

General procedure for the synthesis of spirooxindole derivatives: A mixture of malononitrile (1 mmol), isatin (1 mmol), and an enolisable ketone (1 mmol) was refluxed with constant stirring in a 1:1 water-ethanol solvent

system, using 10 mg of ZnO nanoparticles as a catalyst in an oil bath. The progress of the reaction was monitored by TLC. Upon completion, the mixture was filtered, and the residue was washed

with water to remove the water-soluble zinc triflate catalyst. The precipitate was then filtered, and the products were purified by recrystallization from absolute ethanol.



Scheme 1: Reagent and conditions: (i) (ZnO NP), aqueous: ethanol (1:1) 5 mL, reflux for 60-75 min.

Spectral data:

6'-Amino 5-methoxy 3'-methyl 1'-phenyl 2'-Chloro 2-oxo 1'-H spiro[indoline 3,4'-pyrano[2,3-c] pyrazole] 5'-carbonitrile (8a) (entry 13, Table 2), MP-251-254°C, IR (cm⁻¹)- 686, 771, 778, 851, 872, 954, 1080, 1178, 1179, 1212, 1266, 1308, 1390, 1492, 1578, 1620, 1634, 1708, 2202, 2348, 2844, 3146, 3308.

¹H NMR (400MHz, DMSO d₆): δ (ppm) 1.550 (s, 3H, CH₃), 3.622 (s, 3H, OCH₃), 6.819 (m, 1H, Ar), 7.298-7.613 (d, 1H, Ar), 7.453-7.663 (m, 2H, Ar), 7.464-7.682 (m, 2H, Ar), 7.720 (s, 2H, NH₂), 7.735 (d, 2H, Ar), 10.541 (s, 1H, NH).

¹³C NMR (400MHz, DMSO d₆): 12.645, 49.441, 54.732, 58.541, 98.841, 112.245, 117.993, 119.962, 128.853, 133.357, 144.517, 146.238, 149.218, 157.6, 163.963, 169.259.

ESI-MS: molecular weight for C₂₂H₁₆ClN₅O₃ is 433, found (M+1) m/z = 434.

6'-Amino 3'-methyl 1'-phenyl 2'-Chloro 2-oxo 1'-H spiro[indoline 3,4'-pyrano[2,3-c] pyrazole] 5'-carbonitrile (8d) (entry 16, Table 2), MP-251-252°C,

IR (cm⁻¹)-676, 736, 775, 857, 928, 954, 1054, 1084, 1145, 1168, 1251, 1265, 1298, 1385, 1489, 1545, 1581, 1637, 1675, 1725, 2175, 3175, 3325.

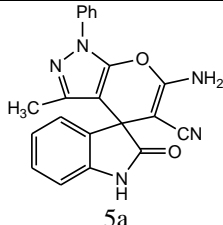
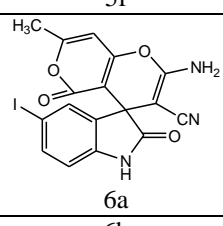
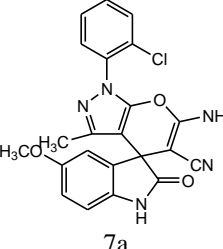
Table 1: Optimization of reaction between malononitrile, isatin, and 3-methyl 1-phenyl 2-pyrazoline 5-one is under the reflux.

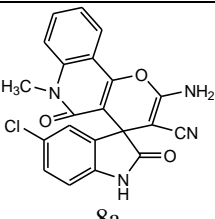
Entry	Solvent	Time	Catalyst (mg)	Isolated yield (%)
1	MeOH	1.5 hrs	5	50
2	THF	3.5 hrs	5	40
3	DMF	4 hrs	5	60
4	EtOH	90 min	5	75
5	EtOH:H ₂ O (1:1)	70min	10	90
6	EtOH:H ₂ O (1:1)	75min	15	85

Optimization of the reaction was explored using various solvents and different amounts of catalyst under reflux conditions (see Table 1). Initially, reactions were carried out in six different solvents (entries 1-6, Table 1). The best results were obtained using an ethanol-water (1:1) mixture (entry 5, Table 1) with 10 mg of the zinc oxide nanoparticle catalyst. Reactions in other solvents yielded moderate to low product yields (entries 1-4, Table 1). Further catalytic experiments in the ethanol-water (1:1) mixture confirmed that a 10 mg catalyst loading resulted in high yields (entry 5, Table 1). These optimized conditions were then applied for the synthesis of various spirooxindole derivatives. The products were purified by simple filtration and washing with ethanol and water. The catalyst was separated from the product by filtration and subsequent washing with water and ethanol.

After optimizing the reaction conditions, several series of compounds were synthesized: 6'-amino-3'-methyl-1'-phenyl-2-oxo-1'-H-spiro[indoline-3,4'-pyrano[2,3-c]pyrazole] 5'-carbonitrile (entries 1-6, Table 2), 2'-amino-7-methyl-2,5'-dioxo-5'H-spiro[indoline-3,4'-pyrano[4,3-b]pyran] 3'-carbonitrile (entries 7-12, Table 2), 6'-amino-3'-methyl-1'-phenyl-2-chloro-2-oxo-1'-H-spiro[indoline-3,4'-pyrano[2,3-c]pyrazole] 5'-carbonitrile (entries 13-18, Table 2), and 2-amino-6-methyl-2,5-dioxo-5,6-dihydro-spiro[pyrano[3,2-c]quinoline-4,3'-indoline] 3-carbonitrile (entries 19-23, Table 2). The reactions were conducted under reflux for 70-80 minutes in a 1:1 water-ethanol mixture, using 10 mg of the ZnO-NP catalyst, yielding good results. The molecular structures of the products were characterized by ¹H NMR, ESI-MS, and ¹³C NMR spectroscopy.

Table 2: One pot synthesis of spiro - oxindole derivatives in 1:1 aqueous ethanol by ZnO-NP.

Entry	Isatin R=[3(a-f)]	4 (a-d)	Product	Time (min.)	Yield ^b (%)	MP °C
1	H	4a		70	90	236-237
2	Br	4a	5b	74	85	242-246
3	Cl	4a	5c	76	82	234-235
4	CH ₃	4a	5d	77	87	288-290
5	I	4a	5e	80	84	>290
6	OCH ₃	4a	5f	74	85	213-215
7	I	4b		78	84	>290
8	OCH ₃	4b	6b	77	86	262-264
9	Cl	4b	6c	80	85	>290
10	H	4b	6d	78	86	285-286
11	Br	4b	6e	79	88	>290
12	CH ₃	4b	6f	78	88	>280
13	OCH ₃	4c		72	90	221-223
14	CH ₃	4c	7b	76	86	252-255
15	Cl	4c	7c	77	85	246-247
16	H	4c	7d	75	88	251-252
17	Br	4c	7e	74	89	260-263
18	I	4c	7f	73	88	267-270

19	Cl	4d		70	90	>290
20	CH ₃	4d	8b	75	87	>290
21	Br	4d	8c	77	88	>290
22	I	4d	8d	78	86	>290
23	OCH ₃	4d	8d	48	85	>290

malononitrile (1 mmol), ^aSubstituted Isatin (1 mmol), enolisable ketone (1 mmol), H₂O:EtOH (1:1) (5 mL), reflux.

^bisolated yield

Conclusion:

- Use of (ZnO -NP) as a homogeneous catalyst.
- Green and eco-friendly reaction conditions.
- The method requires less time period and gives good yield.

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Environment and Sustainable Development

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Abstract:

Environmental Sustainability is a broader concept that seeks to ensure the Preservation of natural resources for future generations. Its general Purpose is to meet the needs of the Present generation without killing or compromising the ability of our future generations to sustain them. Environmental sustainability is a global issue that requires Participation and co-operation between different groups that may include companies' individuals and governments. A variety of activities are included in water Purification, waste disposal, Pollution control, resources storage using renewable methods etc. savings, wastage etc. without compromising future growth.

Keywords: Green design, Bio-diversity, Environmentalism, Air, water, Bio-fuel, water-Conservation etc.



Fig: Environment and Sustainable development image

Introduction:

This research was done to include the cause, effects and results of environmental destruction. We aim to address key issues including global warming, deforestation ozone depletion and more. The environment is an important Part of human life and well-being. We get the resources we need to survive from nature. These resources include food, water and Shelter. However, human Pressure on our natural resources has increased. This has led to various environmental Problems such as climate change, Pollution, Loss of bio-diversity, deforestation. This paper focuses on concepts of environmental sustainability, their importance and the challenges associated with them. It also discuss different approaches that can be adopted to promote the idea of sustainable agricultural Practices an introducing sustainable and safe transportation system.

Importance of Environmental Sustainability:

This is important for the health and well-being of future and current generations. Ensuring that People don't lose the resources they need to

survive, such as food, water and Shelter. It also aims to protect other life forms to maintain ecological balance. In addition, it is necessary to address the serious problem of address the serious Problem of climate change, which has significant consequences for human life and the environment.

Challenges associated with environment Sustainability:

As evident as it is, achieving environmental sustainability is a challenging task because it requires a well synchronized approach to tackle the various dimensions of sustainability such as economic, Social, Environmental. Some of these challenges include:

- **Lack of Political:**

Achieving environmental sustainability requires efforts by governments and leaders to Promote good Policies and Practices. However, this reality is often lacking, especially in developing countries. This may be due to a lack of interest of awareness of the consequences of Sustainability.

- **Resources are sources:**

Sustainability requires significant resources such as Finance, Technology and Human resources to begin the Process most countries either don't have the resources or are unwilling to use them to implement Sustainable development Practices.

- **Public awareness:**

The general Public is not aware of the importance of sustainability and how bad our environment is every day. This lack of information makes implementing policies and Procedures more difficult.

Effects of Sustainability:

There are many advantages and benefits of living nature. Improving Public health, economic growth and Social inclusion are some of them. The main benefits of sustainability are the reduction of the impact of climate change, bio-diversity and security and the availability of natural resources in the long term. When waste materials are Property managed and renewable resources are used the environment begins to sustain itself their natural life.

Literature review:

1. Goni et al 2015:

The importance of sustainability has led to increased research on sustainable development. The authors of this article conducted a study to study life and environmental conditions. The Purpose of this research paper is to present the research trends, literature classification and research focus of environmental sustainability engineering research from a historical Perspective, using five high – Impact journals into the Institute of scientific information journal citation Report. The method to classify research articles is time.

2. K. oziti.2022:

This article reviews current research on Sustainable development and sustainability issues around the world. First, a brief explanation of these two concepts. It shows the dimensions of concepts based on previous articles. It also looks at the relationship between the two using literature review methods. This Paper finds that each sector has made significant Progress towards achieving this goal. This article also examines the effectiveness of sustainable development in Policy circles and highlights the benefits of incorporating it into business management or environmental management. Finally, the article outlines areas for future research.

3. Swain & Wallen in 2015:

This article discusses the nature of criticisms of the UN's sustainable development Goals (SDGs) for being in consistent difficult to implement and measure too broad and global and difficult to monitor. The affect Sustainable development structural equation modeling (SEM) is

used to examine which SDG pillars (Social, Economic, and Environmental) are most effective in moving towards achieving sustainable development. The results show that the most stable countries benefit more from focusing on environmental and social aspects while developing countries still benefit from focusing on economic and social issues.

4. Scones (2016):

This Paper explores the relationship between livelihoods, Politics and development. This article provides an overview of sustainability thinking in traditional culture, the Impact of Sustainability narratives on research, Policy and Practice. This article emphasizes the Policies of change and the ways in which it occurs under a set of different conditions, he emphasized "the Policy of building relationships and co-operation for Prosperity and development cannot be controlled. Instead they have to rely on contingency Policies that involve multiple actors with different knowledge. This article explores the discourse of Politics through the Processes of truth and accumulation and how the understanding of these Political Processes influences government responses. The article concludes with a reflection on future research topics and the situation that is needed to respond appropriately to Policy changes on livelihoods and development.

Objectives of the study:

The Purpose of studying environment sustainability is to analyze and understand the Impact of human activities on the environment and to identify strategies and solutions to reduce negative impacts and improve the environment work.

It is to find ways Protect nature's resources and to figure out alternate sources of energy while reducing harm caused to environment and reducing Pollution.

Research Methodology:

Source of Data collection:

For our research we used the secondary source of data collection

We collected the information from government Publications, websites, books, journal, articles, and internal records and other research papers which were published before.

We used the Primary data of information which was collected by the other researchers and used it as the secondary source of data for analyzing and interpretation.

Fig no: 1 first, human beings must come to the absolute realization that themselves and all life depend on and are made of the same air, water, soil and light that surround us and everything else and not the other way around. A rigorous, disciplined

and profound respect for the world around us is virtually necessary and indispensable.

Secondly, only the Production and exchange of sustainable goods and services are effectuated among its participants in Partnership with the environment and the world that surrounds us all, thus giving rise to a new sustainable living and sustainable economies are assured, expanded and maintained from one business to another from one sustainable enterprise, individual and /or country to another.

Third, legislation must be enacted wherever feasible providing incentives to sustainable living enterprises goods and services.

Findings of study:

- The well- being of the environment is important for the well- being of Present and future generations. In recent decades, the effects of climate change have become more apparent, from rising global temperatures and other extreme disasters to increased heat waves, wildfires damage and severe floods. Climate change poses many environment, Social and economic challenges for different countries around the world.
- As the world suffers from the negative effects of climate change, many communities, societies and associations around the world are embracing environmental sustainability and making it a priority. Through these actions our Planet can protect the natural resources that support the health and well-being of unborn generations.
- Balancing natural resources and consumption that respects the environment but fuels. Our modern life style is one of the most important aspects of climate change. Due to the large restrictions on the use of natural resources we slow down the speed of technological development and productivity. Due to finite resources we are facing a global food crisis, energy crisis increased greenhouse gas emissions leading to global warning.

It is essential for the future of our world that the competing demands of environmental protection and sustainable development are balanced, so that the environment and society can survive. Achieving this balance is challenging, but not impossible and scientists, Philosophers, Politicians and academics have turned their attention to these questions in every sector.

Suggestions of study:

1. Increases Productivity and reduces cost:

Developing a Sustainable company improves operations, because it saves resources and makes business more efficient. This improves employee Productivity and reduces Production costs. It can be started by using Proximity sensors to

turn on or off lights in the office or cooling walls to reduce heating and cooling of the structure.

2. Draw in Knowledgeable Investors and top-notch staff:

Indirect workers are interested in working for an organization that is committed to environmental preservation. For younger generations, who are more conscious of the atmosphere, this is particularly true. This specific demographic would rather avoid doing business with or organizations that cause environmental catastrophes or engage in polluting activities. Investors also consider a number of issues, including a company's waste management procedures, greenhouse gas, emission and carbon footprint, when making investment selections. It is widely believed that business that demonstrate their dedication to "Green" operations are more likely to be successful.

3. Better Brand image:

When making selections about what to buy many customers take the company's environmental impact into account. Businesses that exhibit a dedication to environmental preservation are more likely to be preferred by them. Customers still adore, support, and purchase from businesses that give back to their communities. As a result, a lot well-known companies now emphasize their community involvement in their advertising Campaigns.

4. Development of Sustainable waste management :

Sustainable waste management is one of the simplest methods to make a business viable. Waste management is now a standard Practice in all sustainable businesses, dating back almost thirty years to the early efforts made by corporations to understand the specifics of recycling and continuing into today's Zero-waste operations.

Conclusion:

Environmental sustainability is the duty to protect nature and secure global resources to aid health and welfare of the present and future. It has consideration of the economic, Social and environmental impacts of human activities and the implementation of ideas. It involves sustainable Practices such as energy Production, waste management, water conservation, biodiversity preservation, climate changes and adaption.

In addition it entails tackling issues of social justice and equity, raising awareness and educating people, and encouraging co-operation amongst many stakeholders, such as communities, businesses, Governments and Private Citizens, but there are obstacles in the way of attaining environmental sustainability. Short- term economic interests, a lack of political will and societal and cultural norms that place growth and consumption above sustainability are some of the Obstacles that must be overcome

global differences in resource usage and environmental effects must also be addressed. To sum up, rapid population growth has resulted in widespread agriculture, which raises greenhouse gas emissions and causes deforestation. Since businesses and technology are expanding quickly, we require more power than ever before. Despite these demands, a tipping Point is approaching in our world. For this reason, companies must begin to be sustainable and prioritize social responsibility in order to environmental impacts.

In conclusion, aggressive population increase has led to extensive agriculture, which leads to increased greenhouse gas discharges and deforestation. Technology and industries are growing fast meaning we need manpower than before. Even with these needs, our world is reaching a snapping Point. That's why businesses need to start being sustainable while also focusing on responsibilities. This will contribute to direct sustainability as well as positively affect their customers.

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Effects of Seed Borne Fungi on Physico-Chemical Properties of Seeds of Pigeon pea

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Abstract:

Biochemical changes in the composition of pulses seeds, brought about by the seed moulds are found to be necessary to decide the degree of biodeterioration. The associate fungi are responsible for seed deterioration. Similarly they are known to inhibit seed germination. These fungi have been found to cause quantitative and qualitative changes in chemical composition of the seeds. This is called biodeterioration of seeds. These fungi degrade the chemicals present in the seed, which are rich in protein, carbohydrate and fats by producing enzymes and toxins. Therefore, seeds Pigeon pea Cv. BSMR-853, Green gram Cv. BPMR-145 and Black gram Cv. TAU-1, were surface sterilized with 0.1 % mercuric chloride solution and were washed twice with sterile distilled water and soaked in sterile water for four hours.

Water soaked seeds were distributed in presterilised conical flasks (25 gm / flask). The flasks were incubated separately with 2 mL spore suspension of the seed borne fungus and incubated at room temperature for ten days. The seeds were then washed under running tap water to remove mycelial growth from their surfaces.

Subsequently the seeds were dried at 60 °C for 48 hours and used for further biochemical studies. For control, seeds were incubated in a similar manner but without inoculating the spore suspension of fungi.

Keywords: Physico-Chemical, Seeds Pigeon pea, Green gram, Black gram.

Introduction:

Pigeon pea (Cv BSMR 853) *Vigna radiata* (L.) Wilczek is one of the most important pulse crop of India (Chen et al. 1987). Some fungi are associated with testa and cotyledonary of seeds infected inform of mycelium and conidia. Some fungal seed borne pathogens having ability to kill the seedling or plants and substantially reduce the productive capacity. Several factors are responsible for low production of Pigeon pea. Seed mycoflora known to affect the quality and quantity of seeds and also decrease seed germination and vigour of the seedling. *A. flavus*, *A. niger* and *A. terreus*, *A. tenuis* and *F. oxysporium*, are one of the seed and soil borne disease causing seed rot and seedling blight Pigeon pea and significant yield loss of up to 25% which decrease the quality and quantity of Pigeon pea seeds rendering the seeds unfit for consumption.

Material and methods:

1. Changes in dry weight of pulses seeds

The surface sterilized seeds were distributed in presterilized conical flask (25 gm / flask). The flask were inoculated separately with 2 mL spore suspension of the seed borne fungus and

incubated at room temperature for 10 days. The seeds were then washed under running tap water to remove mycelial growth from their surfaces. Subsequently the seeds were oven dried, re-weighed and changes in dry weight of the seeds were calculated.

2. Changes in ash content of pulses seeds

One gm of seed powder was placed in a previously weighed crucible and it was subjected to heating on a hot plate for about 30 min till the sample was sufficiently turned black, then it was placed in muffle furnace preheated at 600 °C for 2 hrs with automatic control. Crucible were transferred directly to dessicator, cooled and weighed immediately. Weight of ash was obtained and reported as percent ash.

3. Changes in protein content of pulses seeds (Lowry method, 1951.)

One gram of seed powder was taken, to which 25 mL of ethylene ether is added to dissolve other chemicals present in the seeds like carbohydrates and lipids etc. Dry the residue remained and add 10 ml of 10% Trichloro acetic acid (TCA). Keep it in refrigerator at 4 °C for 4 hours. Centrifuge this mixture for 5 minutes and

discard the supernatant. Dissolve the residue in 10 mL of 0.1 N sodium hydroxide (NaOH) and to this add 5 mL of alkaline solution. Stand the test tube for 10 min. After this add 0.5 ml of Folin- ciocaltaeu reagent.

a. Read the optical density of the blue coloured solution that is observed at 750 nm in spectrophotometer.

4. Changes in reducing sugar legume seeds by 3, 5 dinitro salicylate method.

Prepare standard glucose solution (10 mg / 10 mL) and pipette out into a series of test tubes, different volumes of glucose solutions (containing 100 µg – 1000 µg of glucose) and bring the volume of each to 1 mL with distilled water. Add 2 mL of 3, 5 dinitro salicylic acid reagent into each tube and mix well. Keep the tubes in boiling water for 5 min. Cool to room temperature. Add 7 mL of distilled water to each tube and measure the optical density at 540 nm using a blank without glucose. Draw the standard graph.

Proceed as above using 0.5 or 1.0 mL of the seed sample. Measure the O.D. and read out the amount of glucose contained in the sample from the standard graph.

The susceptible cultivars of pulses seeds like from gram Cv. Annigeri, pigeon pea Cv. BSMR – 853, green gram & Cv. BPMR – 145, were artificially infested with dominant fungi.

Experimental result:

A) Pigeon pea Cv. BSMR – 853:

It is clear from the results mentioned in Table 1 that, all the fungi caused decrease in dry weight of seed. Maximum loss in ash content was

done by *A. flavus* followed by *A. tenuis*, *F. oxysporum* and *A. niger*.

In case of protein content, maximum loss was done by *A. flavus* followed by *A. niger*, *F. oxysporum* and *A. tenuis*. There was decrease in reducing sugar content due to *F. oxysporum* followed by *A. flavus*, *A. tenuis* and *R. nigricans*.

B) Green gram Cv. BPMR – 145:

It is clear from the results summarized in Table 2 that, all the five fungi caused significant loss in dry weight and ash content of seeds. Maximum loss in dry weight was done by *A. flavus* followed by *A. tenuis*, *F. oxysporum* and *A. niger*.

Reduction in ash content was done by *A. tenuis* followed by *A. niger*, *A. flavus* and *C. lunata*. In case of protein followed by *A. tenuis*, *F. oxysporum* and *A. niger*. There was decrease in reducing sugar content of seeds by *A. flavus*, *F. oxysporum*, *A. tenuis* and *A. niger*.

C) Black gram Cv. TAU-1:

It is clear from the results summarised in Table 3 that, all the five fungi caused significant loss in dry weight and ash content of seeds. Maximum loss in dry weight was done by *A. flavus* followed by *F. oxysporum*, *A. niger* and *C. lunata*.

Reduction in ash content was done by *A. tenuis* followed by *A. niger*, *F. oxysporum*, *C. lunata* and *A. flavus*. In case of protein content, maximum loss was done by *F. oxysporum* followed by *A. niger*, *A. tenuis* and *A. flavus*. Reducing sugar content of the seeds was highly reduced by *A. flavus* followed by *F. oxysporum*, *A. niger*, *C. lunata* and *A. tenuis*.

Table 1: Effect of seed infestation with moulds on Physico-chemical characters in Pigeon pea Cv. BSMR – 853

Characteristics	Control	<i>A. flavus</i>	<i>A. niger</i>	<i>A. tenuis</i>	<i>F.oxysporum</i>	<i>R.nigricans</i>
Dry weight	24.0	14.4	17.1	16.3	14.3	19.6
Ash content	2.9	-2.0	-1.0	-1.9	-1.3	-0.9
Protein	20.6	-17.2	-16.8	-13.5.	-16.0	-12.2
Reducing sugar	6.0	-4.1	-2.5	-3.6	-4.9	-3.0

Table 2: Effect of seed infestation with moulds on Physico-chemical characters in Green gram Cv. BPMR – 145

Characteristics	Control	<i>A. flavus</i>	<i>A. niger</i>	<i>A. tenuis</i>	<i>F.oxysporum</i>	<i>C. lunata</i>
Dry weight	24.2	-19.4	-17.1	-19.0	-18.2	-15.4
Ash content	2.9	-1.8	-2.1	-2.4	-0.8	-1.0
Protein	21.2	-14.0	-14.9	-16.0	-15.5	-12.4
Reducing sugar	5.5	-4.6	-3.1	-3.6	-4.0	-2.2

Table 3: Effect of seed infestation with moulds on Physico-chemical characters in Black gram Cv. TAU-1

Characteristics	Control	<i>A. flavus</i>	<i>A. niger</i>	<i>A. tenuis</i>	<i>F.oxysporum</i>	<i>C. lunata</i>
Dry weight	24.2	-18.4	-17.0	-15.3	-17.8	-16.2
Ash content	2.2	-0.6	-1.2	-1.9	-1.0	-0.8
Protein	22.2	-10.3	-16.2	-15.4	-16.6	-09.6
Reducing sugar	5.6	-4.8	-3.4	-2.0	-4.1	-2.9

Results and discussion:

The results are very promising and encouraging the experiments. In case of pigeon pea, *R.nigricans* causes more loss in dry weight. *A. flavus* responsible to loss in ash content. *A. niger* causes more loss in protein content. Similarly *A. flavus* causes more loss in reducing sugar.

More or less similar results are observed in case of Green gram and Black Gram as shown in above tables.

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Studies on Hydro-Chemical Parameters of Groundwater from Talni Village, Hadgaon Taluka in Nanded District

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Abstract:

Groundwater is a significant source of drinking and irrigation water in a rural area where agriculture is the main livelihood, and groundwater is the primary source of drinking and irrigation water. In this sense, not only the availability of groundwater is important, but also its appropriate quality. The present study aims to investigate the hydro-chemical characteristics of groundwater in Talni village, Hadgaon Taluka, Nanded District, Maharashtra. Groundwater samples were analyzed for various physical and chemical parameters such as pH, electrical conductivity, total dissolved solids (TDS), hardness, chloride, alkalinity, and turbidity. The results were compared with WHO and BIS standards to determine the suitability of water for drinking and other purposes. The study found that groundwater in Talni has high levels of TDS and hardness, which may pose health risks over prolonged consumption. Efforts to manage and improve water quality through community awareness and regulatory measures at the Gram Panchayat level are recommended.

Keywords: Groundwater, Hydro-chemical Parameters, Talni Village, TDS, Hardness, Water Quality, Nanded District

Introduction:

Water is an essential natural resource that sustains life on Earth. Groundwater, in particular, is a critical source for drinking, agricultural, and industrial use in many rural areas like Talni village. However, with the increasing use of fertilizers, pesticides, and industrial activities, groundwater quality has been deteriorating. Water pollution not only affects human health but also impacts ecosystems. This study aims to assess the hydro-chemical parameters of groundwater in Talni village, Hadgaon Taluka, Nanded District, and evaluate its quality based on standard parameters.

Groundwater quality, in turn, depends on various factors, such as general geology, the degree of mineral weathering, ion exchanges, evaporation, groundwater flow and various human activities (Al-Shaibani, 2008; Appelo and Postma, 2010; Chidambaram et al., 2011; Domenico, 1972; Hussein, 2004; Kumar et al., 2006; Prasanna et al., 2011; Schuh et al., 1997). Consequently, the groundwater from different horizons may have different qualities and different irrigation properties.

The monitoring of groundwater quality is a significant tool that promotes the sustainable development of rural regions and provides important data for water management. Many researchers offer the hydro-chemical indices, such as pH, Electrical Conductivity (EC), TDS, Chlorides, Alkalinity, Hardness, Turbidity, and Water Quality.

Study Area:

Talni village is located in Hadgaon Taluka of Nanded District in Maharashtra. It is a rural area where agriculture is the main livelihood, and groundwater is the primary source of drinking and irrigation water. The geographical location of Talni is marked by varying topographical features, and the village depends largely on bore wells, open wells, and hand pumps for water supply.

Geographical Coordinates:

- **Latitude:** 18.25°N to 19.63°N
- **Longitude:** 78.8°E to 88.16°E

The average rainfall in the region is around 899.7 mm, with the temperature ranging from 13°C to 46°C during different seasons. The village lacks significant surface water bodies, making groundwater the sole source of water for both domestic and agricultural use.

Materials and Methods:

Groundwater samples were collected from various sources such as bore wells, open wells, and hand pumps during the summer and winter seasons of 2023. The physical and chemical parameters were analyzed using standard procedures outlined by the APHA (American Public Health Association) and BIS (Bureau of Indian Standards).

Parameters Analyzed:

- **pH:** Measured using a pH meter, to assess the acidity or alkalinity of water.
- **Electrical Conductivity (EC):** Measured using a conductivity meter, representing the water's

ability to conduct electricity, which correlates with the concentration of dissolved salts.

- **Total Dissolved Solids (TDS):** The concentration of dissolved substances in the water was measured to determine its overall quality.
- **Total Hardness:** Measured using EDTA titration, representing the concentration of calcium and magnesium ions.
- **Chlorides:** Measured by silver nitrate titration, indicating the presence of chloride ions.
- **Alkalinity:** Measured by acid titration, representing the water's ability to neutralize acids.
- **Turbidity:** Measured using a turbidity meter, assessing water clarity.

Results and Discussion:

pH:

The pH of groundwater in Talni village ranged from 6.55 to 8.95, with most samples falling within the acceptable range of 6.5 to 8.5 set by BIS. However, some samples showed a higher pH, which could be due to the presence of alkaline earth metals like calcium and magnesium.

Electrical Conductivity (EC):

The electrical conductivity ranged from 392 $\mu\text{S}/\text{cm}$ to 3206 $\mu\text{S}/\text{cm}$. Higher EC values indicate elevated levels of dissolved salts, which can affect the suitability of water for drinking and irrigation. According to WHO standards, water with an EC above 1500 $\mu\text{S}/\text{cm}$ is not recommended for regular consumption due to its potential to cause health problems like kidney stones.

Total Dissolved Solids (TDS):

The study area ranged from 250 mg/l to 2023 mg/l. The permissible limit for TDS in drinking water is 500 mg/l, as per BIS standards. Samples from the study area exceeded this limit, especially during the in summer season, indicating that the groundwater may not be safe for drinking without proper treatment. The TDS levels

Total Hardness:

Hardness levels in the water varied from 78 mg/l to 770 mg/l, with several samples exceeding the BIS standard of 300 mg/l. High hardness in water can lead to scaling in pipes and boilers and cause health issues such as kidney stones. Talni village showed significant levels of hardness, likely due to the leaching of calcium and magnesium from the surrounding rock formations.

Chlorides:

The chloride concentration ranged from 20 mg/l to 422 mg/l. According to WHO guidelines, chloride levels in drinking water should not exceed 250 mg/l. The study found that certain areas in Talni village had chloride levels exceeding this limit, which could contribute to the salty taste of water and corrosion of plumbing systems.

Alkalinity:

The total alkalinity of groundwater samples ranged from 60 mg/l to 298 mg/l. Alkalinity in water is a measure of its ability to neutralize acids and is mainly due to the presence of carbonates and bicarbonates. Water with high alkalinity may not pose immediate health risks but can affect the taste and overall quality of the water.

Turbidity:

Turbidity levels were found to be well within the permissible limit of 5 NTU. The maximum turbidity recorded was 3.68 NTU, indicating that the water was relatively clear and free of suspended particles. High turbidity can indicate contamination from surface runoff, but this was not a major concern in Talni village.

Conclusion:

The study of groundwater in Talni village revealed that while the water is generally free from turbidity and falls within acceptable pH limits, the high levels of TDS and hardness are concerning. These elevated levels suggest the need for water treatment before consumption, particularly during the summer season when TDS and hardness tend to peak. Awareness programs should be conducted at the village level to educate residents about the health risks associated with consuming untreated groundwater. The Gram Panchayat should also implement stricter regulations on waste disposal and promote rainwater harvesting to replenish groundwater levels and reduce contamination.

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Recent Advances in Biopolymers for Sustainability Approach

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Abstract:

Urbanization and rapid population growth often have negative effects on the environment. Uncontrolled use of synthetic polymers has led to serious environmental problems. The production of sustainable and environmentally friendly products will be essential to preserving the environment for future generations. These materials, derived from renewable sources, offer promising alternatives to conventional petroleum-based plastics. In recent years, significant advances have been made in the producing, modifying, and utilizing biopolymers to enhance their functionality and sustainability. This review highlights the latest innovations in biopolymer science, focusing on improved material properties, biodegradability, green production methods, and emerging applications across various industries. The role of biopolymers in supporting a circular economy and reducing environmental impact is also discussed, along with future challenges and research directions.

Keywords: Synthetic Polymers, Biopolymers, Sustainability.

Introduction:

Existing plastics mostly sourced from fossil fuels, cause substantial environmental problems, such as plastic pollution and greenhouse gas emissions.¹ The bulk of synthetic polymers are manufactured from petrochemicals, which are not recyclable. At the end of their lives, these polymers will linger in the ecosystem for centuries, producing pollution and relying on non-renewable feedstock.² These concerns have prompted researchers and industries to explore sustainable alternatives, with biopolymers emerging as a key solution. Biopolymers, derived from natural resources like plants, algae, bacteria, and other microorganisms, offer the potential for reduced environmental impact, especially in terms of biodegradability and lower carbon footprints.³ This review examines the recent advances in biopolymer technology and their implications for sustainability, addressing the challenges of developing biopolymers that meet the demands of modern industries.

Progress in material qualities of biopolymers:

Researchers have focused on developing new polymers that possess excellent mechanical and skeletal properties. Enormous amounts of biopolymers derived from natural organisms have been manufactured. Current innovations have focused on improving these characteristics through a variety of strategies.

Biopolymer Blends and Composites:

Blending different biopolymers or combining them with synthetic polymers has emerged as an effective strategy to improve material properties. For instance, blending polylactic acid

(PLA) with other biopolymers like polyhydroxyalkanoates (PHA) enhances flexibility, toughness, and thermal stability.⁴ Additionally, hybrid materials such as PLA-starch blends provide improved biodegradability and mechanical strength, making them more suitable for packaging applications.⁵

Nanocomposites:

Incorporating nanomaterials, such as cellulose nanofibers, carbon nanotubes, and nano clays, into biopolymer matrices significantly enhances their mechanical, thermal, and barrier properties.⁶ These nanocomposites also exhibit improved gas permeability, which is critical for applications like food packaging. Nanocomposite-based biopolymers are also finding applications in the automotive, electronics, and medical industries due to their superior performance.⁷

Crosslinking and Functionalization:

Crosslinking is another approach that has been widely adopted to improve the durability and water resistance of biopolymers.⁸ For example, the crosslinking of polysaccharides like chitosan and alginate enhances their structural integrity, making them suitable for medical applications such as wound dressings, drug delivery systems, and tissue engineering scaffolds.⁹

Biodegradability:

Biopolymers are marketed primarily for their biodegradability, but this attribute varies depending on the material and the environment in which it is discarded. Recent research has focused on enhancing biodegradation rates and ensuring that biopolymers decay efficiently in a variety of

conditions. Efforts to increase the biodegradability of biopolymers include the incorporation of functional groups or additives that promote microbial degradation. For example, polybutylene succinate (PBS) and polyhydroxyalkanoates (PHA) are biopolymers designed to degrade in both terrestrial and marine environments, addressing concerns related to ocean plastic pollution.¹⁰ Due to the oxygen and nitrogen atoms in the skeleton of the biopolymers, their biodegradability is effortless. During biodegradation, biopolymer is transformed into CO₂, water, biomass, humid water, and other natural substances. Numerous bioengineering applications are possible with biodegradable polymers, such as wound dressing, drug delivery systems, and tissue engineering.¹¹

Sustainable methods in Production of biopolymers:

Biopolymer production has traditionally been resource-intensive, but recent innovations are focused on reducing energy consumption and environmental impact.

Microbial and Enzyme-Assisted Production:

Microbial production of biopolymers, particularly polyhydroxyalkanoates (PHA), has seen substantial improvements through the use of genetically engineered bacteria and optimized fermentation processes. By utilizing waste biomass or agricultural by-products as feedstocks, these methods contribute to the circular economy and reduce the environmental footprint of biopolymer production.¹²

Solvent-Free and Chemical-Free Processing:

Developments in chemical-free and solvent-free production techniques are further advancing the sustainability of biopolymers. These methods utilize enzyme-catalyzed reactions and other low-energy approaches to minimize the need for harmful chemicals and reduce overall energy consumption during the polymerization process.^{13,14}

Emerging Applications:

Biopolymers are finding applications across a wide range of industries due to their versatility, functionality, and eco-friendliness. Key sectors benefiting from biopolymers include water treatment, packaging, agriculture, and biomedical fields.

Applications of biopolymers in water treatment:

The use of natural polymers in membrane synthesis, manufacture, and production to develop fully biodegradable membrane materials becomes ideal and appealing due to the exceptional properties of biopolymers. Orange peel-activated carbon has recently been used to remove herbicides containing chloro-phenoxyacetic acid from water using the adsorption-desorption process. Consequently, this bio-sourced activated carbon significantly absorbed chloro-phenoxyacetic acid herbicides from water. These biopolymers may be used to modify

membranes. Since cellulose polymers are rich in polysaccharides, they are frequently utilised in water treatments.¹⁵

Biopolymers for Sustainable Packaging:

The packaging industry is the largest market for biopolymers, driven by the demand for sustainable alternatives to single-use plastics. PLA, PHA, and starch-based materials are leading the charge in developing biopolymer-based packaging solutions, with innovations aimed at improving barrier properties, transparency, and shelf life.¹⁶ Recent research into edible biopolymer films for food packaging is also gaining attention, as these materials reduce waste and simplify disposal.¹⁷

Biodegradable Mulch Films in Agriculture:

In agriculture, biopolymer-based mulch films are being developed to replace non-biodegradable plastic films, which are notorious for polluting soil. These films provide similar benefits—such as moisture retention and weed suppression but degrade naturally after use, reducing the environmental impact of farming practices.¹⁸

Biomedical Applications of biopolymers:

Biopolymers are making significant inroads in the biomedical field due to their biocompatibility and biodegradability. Applications include drug delivery systems, tissue engineering scaffolds, and wound dressings. Recent innovations in hydrogels, films, and nanofibers derived from biopolymers like chitosan, alginate, and gelatin are particularly promising for controlled drug release and tissue regeneration. Polyurethanes exhibit qualities like pliability, hardness, and resilience to wear and tear in order to be used to manufacture artificial blood vessels.¹⁹

Challenges and Future outlook:

Practice of biopolymers offer many advantages but few challenges remain. Key issues include the high cost of production compared to traditional plastics, limited scalability, and inconsistent biodegradability under different environmental conditions. Future researcher should focus on reducing production costs through the development of more efficient biotechnological processes. Scientist have to expand the range of feedstocks to include more sustainable and widely available resources, such as non-food biomass addressing the environmental variability in biodegradability to ensure that biopolymers which effectively managed across diverse waste management systems.

Conclusion:

A significant step for a lesser impact on the environment and more sustainable materials is the use of biopolymers. Biopolymers are becoming a growing trend due to recent developments in material design, biodegradability, and environmentally friendly production techniques. These polymers have applications in packaging,

agriculture, and healthcare. Even if there are still issues with cost, scalability, and environmental management, continued research should be able to get over these barriers and solidify biopolymers' position as essential components for a sustainable future.

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Effect of Temperature on Gas Sensing Properties of NiO-GO Nanocomposite

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Abstract:

The gas sensing properties of the Nickel oxide-graphene oxide (NiO-GO) nanocomposite, synthesized using a cost-effective microwave combustion technique, were studied against various volatile compounds (VCs) viz. Methanol, Acetone, Ammonia, Ethanol, and Toulene measured at various temperature ranging from room temperature (25 °C) to 200 °C. The formation of NiO-GO nanocomposite was confirmed using X-ray diffraction (XRD) and scanning electron microscopy (SEM). The NiO-GO nanocomposite shows elevated response of 69% against ammonia @150 °C at 100 ppm. The NiO-GO nanocomposites show appreciable response and recovery time of 44 and 35 sec respectively which indicates the inferiority of the prepared nanocomposite.

Keywords: Nickel oxide-graphene oxide (NiO-GO), Ammonia sensor, Nanocomposite, Volatile compounds.

Introduction:

Nowadays, nanotechnology has acquired momentous attention for its ability to enable the development of novel materials at the nanoscale, specifically within 1-100 nm [1]. This is largely attributed to the unique properties conferred by the exaggerated surface-to-volume ratio and quantum confinement effects at such small dimensions. These characteristics have paved the way for advancements across various scientific and industrial applications [2]. To mitigate the impact of toxic gases viz. NO_x, CO₂, SO₂, CO, and NH₃, H₂S, and to raise public awareness of their harmful effects, it became essential to develop the advanced and cost-effective gas sensors which must be able to detect and quantify the presence of these gases in the environment with enhanced sensitivity and reliability, facilitating timely intervention and environmental monitoring [3]. Among these toxic gases, ammonia (NH₃) is an extremely volatile and reducing gas which is emitted from a wide range of sources, like industrial facilities, the automotive sector, commercial establishments such as hotels, and agricultural waste. Its pervasive release into the environment poses significant concerns due to its potential impact on air quality and human health [4]. Thus, to ascertain environmental safety and defend human health, the development of highly sensitive and selective NH₃ gas sensors is crucial [5]. Various

Formulation:

The response of the prepared nanocomposite was calculated using following formula [10],

$$\text{Response (\%)} = \frac{R_a - R_g}{R_a} \quad (1)$$

Where,

R_a - resistance in air, and R_g - resistance in presence of ammonia.

metal oxides, such as SnO₂, ZnO, NiO, and MnO₂, have demonstrated effectiveness as sensing materials for ammonia detection [6-9]. However, their limited selectivity presents a significant challenge, prompting researchers worldwide to explore novel composite materials with enhanced selectivity and sensitivity for NH₃ sensors. The development of these advanced materials aims to improve performance in detecting ammonia amidst a complex mixture of gases.

In the present work, the NiO-GO nanocomposite has been prepared using microwave combustion technique and further utilized to study the ammonia sensing properties at various temperature ranging from room temperature (25°C) to 200 °C. The prepared material shows highest response of 69% at 150°C with excellent response and recovery time of 44 and 35 sec respectively.

Experimental details:

The NiO-GO nanocomposite was synthesized using a microwave-assisted combustion method. Powdered table sugar was mixed with nickel nitrate and heated in a microwave oven at 350 W for 20 minutes. The resulting product was then annealed at 450°C for 2 hours. This final black powder was subsequently used for sensor measurements, along with structural and morphological characterization.

The target gas concentration was calculated using the formula [11],

$$C = \frac{22.4 \rho T V'}{273 M V} \times 100 \quad (2)$$

Where,

C- target gas concentration (ppm), *P*- ammonia density (gm/ml), *V'*- ammonia volume (μl),
T- temperature (K), *M*- molecular weight (gm/mol), *V*- volume of the chamber (L).

Results and discussion:

Structural and morphological study

The formation of the NiO-GO nanocomposite was confirmed through XRD and SEM analysis. The XRD pattern of NiO-GO, shown in Fig. 1a, reveals distinct peaks at (111), (200),

(220), and (222), corresponding to the JCPDS card 04-0835, which confirm the successful formation of the NiO-GO nanocomposite. Fig. 1b displays the SEM image, highlighting randomly distributed, agglomerated NiO particles embedded within the GO matrix.

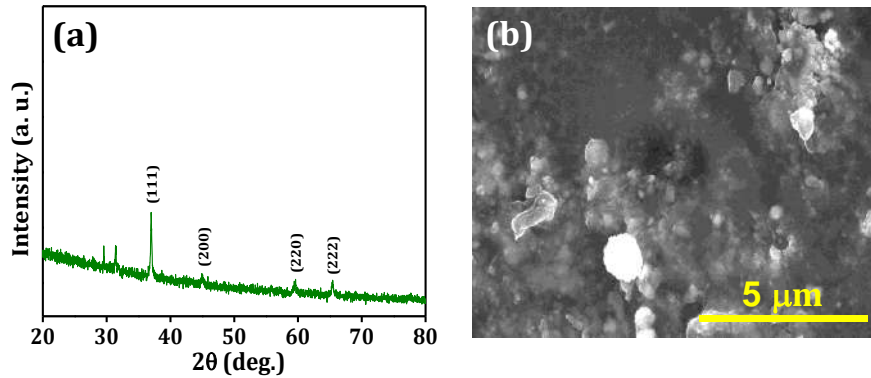


Fig. 1: a) XRD pattern, and

b) SEM image of NiO-GO nanocomposite.

Gas sensing measurements:

The ammonia sensing properties of the NiO-GO nanocomposite were evaluated using a Keithley source meter. Selectivity tests were conducted against various volatile gases, including methanol, acetone, ammonia, ethanol, and toluene, each at a concentration of 100 ppm shown in Fig. 2. The NiO-GO nanocomposite exhibited the highest response of 39%, calculated using eq. 1, to ammonia

at room temperature (RT). Further measurements were performed at elevated temperatures—50°C, 100°C, 150°C, and 200°C—specifically for ammonia. The highest sensor response was observed at 150°C, as shown in Fig. 3a. The variation of the sensor response with temperature is illustrated in Fig. 3b, which clearly demonstrates that the NiO-GO nanocomposite achieves its maximum response at 150°C.

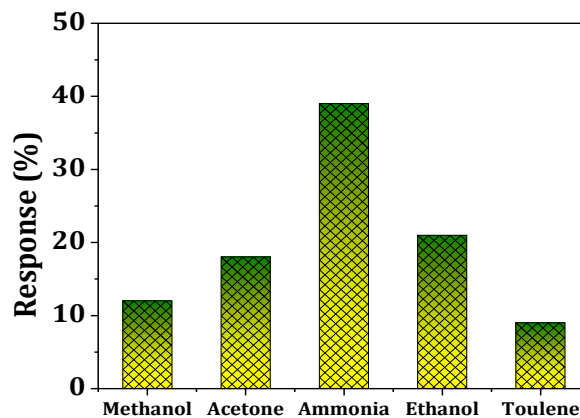


Fig. 2: The selectivity of the NiO-GO nanocomposite against various VOCs.

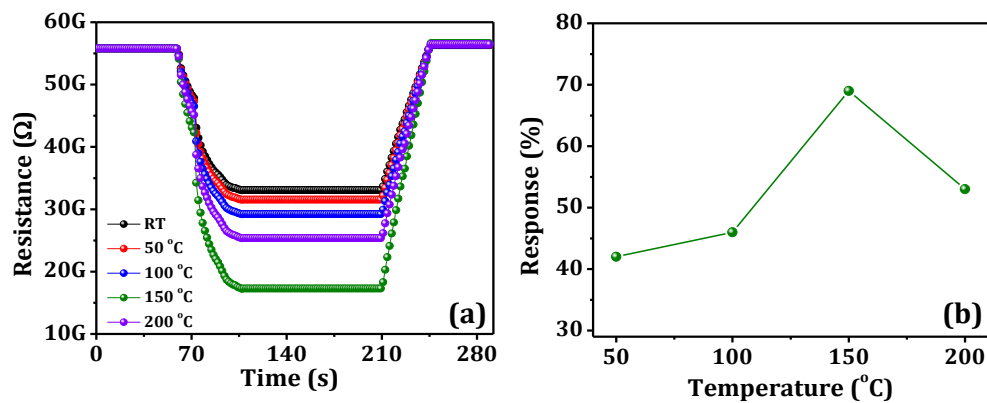


Fig. 3: The effect of temperature on the gas sensing performance of the NiO-GO nanocomposite.

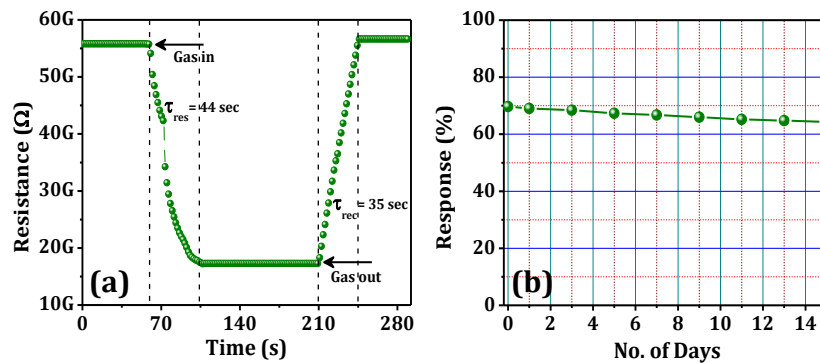


Fig. 4: a) The response and recovery curve, and b) The long-term stability of NiO-GO nanocomposite against ammonia.

The response and recovery curve of the NiO-GO nanocomposite for ammonia detection is presented in Fig. 4a. At 150 °C, the NiO-GO nanocomposite exhibited a superior response of 69%, with rapid response and recovery times of 44 and 35 seconds, respectively. The long-term stability of the prepared NiO-GO nanocomposite was evaluated over a 15-day period and revealed in Fig. 4b. After 15 days, the sensor demonstrated an excellent response of 92.25%, indicating the remarkable stability of the NiO-GO nanocomposite.

Conclusions:

In conclusion, the NiO-GO nanocomposite was successfully synthesized *via* a microwave-assisted combustion method, with XRD and SEM confirming its structural integrity. The sensor demonstrated auspicious ammonia sensing potentiality, achieving a peak response of 39% at room temperature and the highest response of 69% at 150 °C, highlighting the importance of operational temperature. It showed good selectivity against various volatile gases, such as methanol and acetone, and exhibited rapid response and recovery times of 44 and 35 seconds, respectively. Moreover, the sensor maintained excellent long-term stability, with a response of 92.25% after 15 days, indicating its reliability for continuous ammonia monitoring. Overall, the NiO-GO nanocomposite is a promising candidate for effective and stable ammonia sensing applications.

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A New Species of the Genus *Anarete* (Lestremiinae: Ceciodomyiidae: Diptera) From Maharashtra, India

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Abstract:

This contribution reports the description of a new species, *Anarete Ramanandensis* collected from SRTMU Nanded, Maharashtra, India, together with the key to Indian species of the genus. This new species can be distinguished from the known species in the characters of its genitalia, claw, empodium.

Keywords: New species, *Anarete Ramanandensis* Diptera, Maharashtra.

Introduction:

While studying the gall-midge from Maharashtra (India) four individual females of Lestremiinae flies were collected at light. On the closer observation, one new species belonging to the genus *Anarete* Haliday (1833), *Anarete* described already four species of the genus *Anarete*. This genus is diagnosed with following characters: Ocelli absent. Eye bridge two facets wide. Palpi tri or quadriarticulate; antenna with 8-10 or 11 segments; second antennal segment greatly enlarged, subglobose, flagellar segments having only spines; R_1 and R, united as though by very short R, fork of vein M1+2 even, medial fork gradually divergent from base, front legs with tarsus without a sole of dense bristles, claw simple. Tegmen with roots extending anteriorly, these are non gall farming midge flies.

Genotype: *Anarete* candidate Haliday. This genus is presently represented by following Indian Species, (i) *A. manii* Rao (♀), (ii) *A. allahabadensis* Grover, (♂♀), (iii) *A. sitapurensis* Grover (♂).

Anarete Ramanandensis, sp.nov. Figures 1-8

Diagnostic features: Male Body 0.85 mm long, brown in preserved condition. Head: Eyes bridge four facets wide ocelli absent. Trophi normal. Palpus (Figure 1) quadriarticulate, sparsely setose; first segment (12:6) cylindrical, broad apically, 2 x as long as thick; second segment (9:5) shorter than the first, cylindrical, 1.8 x as long as thick; third segment (13:4) cylindrical, nearly as long as the second, 3.25 x as long as thick; fourth segment (29:3) longest of all, cylindrical, broad apically, narrow basally, nearly 10 x as long as thick. Antenna: 0.25 mm long, shorter than the body, with 2+8 segments, sparsely hairy, segments becoming thinner distally; scape (Figure 7a) (14:15) cup shaped, wider than long; pedicel (Figure 7b)(17:16) subglobose, greatly enlarged; third segment (Figure

4a)(8:9) subglobose, not confluent with the fourth, thicker than long; fourth segment (Figure 4b) (8:7) ovoid, 1.14 x as long as thick; fifth segment (Figure 6) (8:8) similar to the fourth, as long as thick, with short apical marked stem; sixth and seventh segments (9) slightly longer than the fifth, enlargement (7:6) 1.16 x as long as thick, stem (2:2) 0.28 the length of the enlargement, as long as thick; eighth segment (8) nearly as long as the sixth, enlargement (6:5) 1.2 x as long as thick, stem (2:3) thicker than long; penultimate segment (Figure 2a) (8) similar to the eighth, enlargement (6:5) 1.2x as long as thick, stem (2:2) as long as thick; terminal segment (Figure 2b) (10:6) conical, longest of all, ending into a round tip apically, 1.66 x as long as thick. Thorax: mesonotum dark brown, Wing (Figure 8) (110:48) hyaline, nearly rectangular, 2.29 x as long as broad, vein R, meeting costa in the distal fourth of the wing, M, and M₂ divergent, longer than vein M1+2, both obsolete, M₃+M obsolete, vein Cu simple. Legs: dark brown, sparsely hairy, metatarsus (120) longer than the rest of the tarsal segments combined (117), fifth tarsal segment (20) longer than the fourth (16). Claw (Figure 5) (11) pectinate on legs, with one long and one small dent, empodium (6) 0.54 the length of the claw. Genitalia (Figure 3) pale brown, sparsely setose, basal clasp segment (38:18) expanded medially, 2.11 x as long as broad, terminal clasp segment (25:9) cylindrical, broad basally, ending with few spines, tooth absent, 2.77 x as long as broad; dorsal plate (13:20) broad, deeply bilobed, lobes oval; subdorsal plate (30:10) entire, linear, longer than the dorsal, broad basally, apically round, 3 x as long as broad; genital rod (29) shorter than the subdorsal plate, long, slender, tegmen (25) shorter than the genital rod.

Female: Unknown.

Material Examined

Holotype: Male, Dissected and mounted on slide no. A. raman-01, labelled as, "at light" Coll. K. A. Ahad Najam. 10-08-2023, SRTMU Campus, Nanded, Maharashtra, India.

Paratype: One male, dissected and mounted on slide, data as of Holotype.

Distribution: SRTM University, Campus, Nanded Maharashtra, India.

Etymology: The specific epithet *ramanandensis* refers to Bramibhoot Swami Ramanand Teerth, in whose memory this university is named.

Remarks:

A. ramanandensis sp.nov. shows closer resemblance to *A. allahabadensis* Grover (1970), but can be readily distinguished from it with characters as discussed in appended key.

1. empodium 0.5 the length of claw (not, empodium as long as claw)
2. fifth antennal segment as long as its thickness, (not, 1.3x as long as thick)
3. genital rod shorter than the subdorsal plate, (not, genital rod extending beyond subdorsal plate).

Acknowledgement:

We record our thanks to principal and Head Dep. of Zoology, Sharadchandra College, Naigaon Dist. Nanded for facilities and encouragement.

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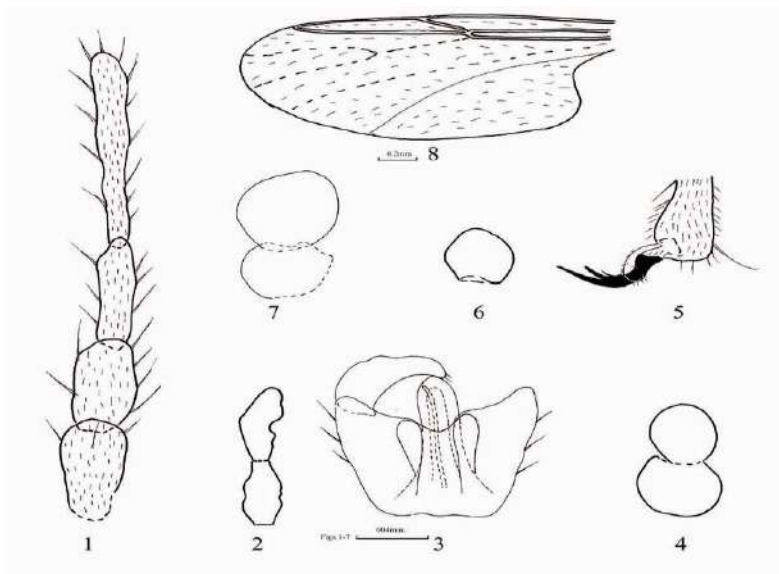
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Figs 1-8

1. Palpus,
2. Penultimate & terminal antennal segments,
3. Genitalia,
4. Third & fourth antennal segments,
5. Claw,
6. Fifth antennal segment,
7. Scape & Pedicel, 8. Wing.





A study on chemical quality of khoa marketed in Nanded city

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Abstract:

The study was conducted to investigate the chemical quality of khoa marketed in Nanded city. Samples of khoa collected from hotellers, street vendors and halwais shops in Nanded. The chemical quality of khoa showed that moisture ,fat, SNF and total solids of market khoa samples have shown lower mean values than those prescribed by ISI standards. It might be due to utilization of partially skimmed milk for the preparation of khoa and keeping more moisture in khoa during preparation for obtaining more profit by getting more yield.

Keywords: Khoa, Hotel, Vendor, Halwais, Chemical quality

Introduction:

The importance of milk in human diet has recognized long ago. It is considered to be the complete food. The importance of milk and milk products in human nutrition is a well known fact. Except milk there is practically no other source of animal protein for vegetarians. In a tropical country like India the total milk production, 90% milk is produced in villages, due to unfavorable climatic conditions , scientific method used in production, handling of milk, no immediate market facilities for collection, transportation and refrigeration, rapid deterioration of milk and milk product at room temperature is a common feature. Due to these reasons the aim has always been to preserve all possible constituents of milk for considerable long period by converting milk into product like khoa.

It supplies most essential elements like calcium and phosphorus along with numerous other essential major and minor substances (Karthikeyan, 2013). Among the Indian indigenous dairy products, Khoa is a concentrated milk product. It is very rich in total solids and hence highly nutritious food in the diet of human beings. According to Indian Standard Institute, khoa shall not contain

moisture less than 28 per cent and fat not less than 26 per cent on dry matter basis. Khoa is a major intermediate base product for a variety of sweets. (kurand, 2011).

Materials and methods:

Present investigation was undertaken to study the quality of khoa marketed in Nanded city was carried out in the laboratory of department of Dairy science, Naigaon. All the khoa samples were collected from various sources like hotellers, sweet marts and street vendors. The samples of khoa were collected randomly and about 250 gram of each sample was brought for analysis. The khoa samples collected were brought in ice box and to the laboratory stored in the refrigerator till analysed. The methods adopted for the estimation of fat and moisture determined by the method cited in ISI (1964) total solids were calculated by Gravimetric method. SNF content is calculated by using the following formula

SNF= Total solids- Fat

Results and Discussion:

The results obtained for moisture content of the market khoa are presented in table 1.

Table No. 1. Moisture content in khoa

Sr. No.	Source	Min. %	Max. %	Average %
1.	Hotellers	26.00	30.00	28.00
2.	Street vendors	30.50	32.00	31.25
3.	Halwais	27.00	30.50	28.75

It indicates that the moisture content for various sources like hotellers, street vendors and halwai that in the range of 26.00 to 30.00, 30.50 to 32.00 and 27.00 to 30.50%, respectively, and the average % of moisture content khoa 28.00,31.25 and 28.75%. The moisture content in street vendors

samples is more than samples collected from other two sources .Several workers have reported variable results in regards moisture content of khoa 28.13% Zariwala et.al. (1974) and 34.50% Naidu and Ranganathan (1965), which is similar to the present study. Trend of high moisture content than the

average is due to the tendency of producer to get more yield of khoa. The result obtained for moisture content in khoa is in accordance with the specifications i.e. (Maximum 28%)

Fat content:

The results obtained regarding fat in market khoa samples collected from different sources are presented in table II.

Table No. 2. Fat content in khoa

Sr. No.	Source	Min. %	Max. %	Average %
1.	Hotellers	16.00	24.00	20.00
2.	Street vendors	19.00	21.50	20.25
3.	Halwais	20.00	23.00	21.50

The average fat % for hotellers khoa was 20.00% ranging from 16.00 to 24.00% , wherever in the sample from street vendor the fat content varied from 19.00 to 21.50% with the average value of 20.25% and ranging values halwai shop 20.00 to 23.00% and average 21.5%. The results obtained for fat content in hotellers, street vendors and halwai shops are considering by ISI (i.e. not less than 20.00%). Several workers have reported variable results with regards to fat content of khoa. On an average fat content of east, west, north and south region khoa was 24.70, 26.06, 23.84 and 30.53 per

cent, respectively, Wanjari et. al (2016). According to BIS specifications, khoa should contain more than 25 per cent fat. So, south region khoa fulfilling its limitations. The present results are in agreement with Kakade et al. (2013) recorded average fat per cent of khoa 30.39, 25.19, 24.26, and 22.65 from east, west, north, and south region in Nagpur city with collection of 60 samples.

Total solid contents:

The results obtained on total solid content in market khoa samples collected from different sources are presented in table III.

Table No. 3. Total solids content in khoa

Sr. No.	Source	Min. %	Max. %	Average %
1.	Hotellers	70.00	74.00	72.00
2.	Street vendors	69.05	68.00	68.75
3.	Halwais	69.05	73.00	71.25

The range value for khoa hotellers, street vendor and halwai i e. 70.00 to 74.00, 69.50 to 68.00 and 69.50 to 73.00% and mean value of various sources i.e. 72.00%, 69.25% and 68.75%. The khoa samples content for hotellers is with higher total solids than other two sources. Present findings are in line with Kumar and Srinivasan (1982) they find out on an average 71.62 and 69.07

per cent in market and cow's milk khoa samples respectively, Shintre (2005) recorded that on an average 72.80, 69.89 and 69.92 per cent total solids in Akola, Nandura and Melghat, respectively.

SNF content:

The result obtained on SNF content in market khoa sample collected from different sources are presented in Table. IV

Table No. 4. Solids not fat (SNF) content in khoa

Sr. No.	Source	Min. %	Max. %	Average %
1.	Hotellers	54.00	50.00	52.00
2.	Street vendors	50.05	46.05	48.05
3.	Halwais	49.05	50.00	49.75

The mean SNF % for hotellers khoa is 52.00% ranging from 54.00 to 50.00%, where as in samples from street vendors the SNF content varied from 50.5 to 46.5% with a average value 48.5% and halwai shops ranging value 49.50 to 50.00% and with average % 49.75 .The khoa samples obtained from hotellers showed higher SNF content than street vendor and halwai shops. The result obtained in present finding are higher than the 36.20% Abhay Kumar et.al. (1975).

Summary and Conclusion:

The study was concluded to investigate the chemical quality of khoa marketed in Nanded City. In all 10 samples of khoa from hotellers, 10 samples of khoa from street vendors and 10 samples of khoa from halwai shops were collected for the purpose. The average moisture percentage is least in hotellers and highest in street vendors sample. The variation in moisture in all three sources are not uniform. The average fat percent for sweet meet shops is maximum and it is minimum hotellers sample. It is indicated that the khoa supplied by samples by

hotellers contains more total solids as compared to other two sources. The average SNF percentage is found lowest in sweet meet shops is compared to other two sources of khoa. The variation in SNF percent in all the three sources are not uniform. Moisture, Fat, SNF and Total solids of Market khoa samples have shown lower mean values than those prescribed by ISI standards. It can be concluded that, the lower fat content and more moisture content of market khoa samples might be due to utilization of partially skimmed milk for the preparation of khoa and keeping more moisture in the khoa during preparation for obtaining more profits by getting more yield. It was found that the khoa supplied in Nanded city has poor chemical quality than the desired quantity.

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A Deeper Dive into Refugee Culture: Resilience, Loss, and the Pursuit of a Better Life

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Abstract:

This essay explores the multifaceted nature of refugee culture, focusing on resilience, loss, and the pursuit of a better life. It examines the challenges faced by refugees in navigating new societies, the importance of cultural preservation, and the role of international organizations in supporting refugee communities. The essay highlights the extraordinary resilience demonstrated by refugees in the face of adversity, the pain of loss experienced by displaced individuals, and the relentless pursuit of a better life that drives many refugees. It also discusses the role of international organizations in providing essential support and protection to refugees. The case of Ukrainian and Russian refugees is used to illustrate the modern tragedy of displacement and the ongoing challenges faced by refugees worldwide.

Keywords: Refugee, Refugee Culture, Cultural Preservation

Introduction:

Like scattered leaves, driven by tempestuous winds, refugees are uprooted from their familiar soil, their lives adrift in a sea of uncertainty. Their journey is one of resilience, loss, and the relentless pursuit of a better life. This essay will delve into the multifaceted nature of refugee culture, exploring its resilience, loss, and the pursuit of a better life. It will examine the challenges faced by refugees in navigating new societies, the importance of cultural preservation, and the role of international organizations in supporting refugee communities.

Resilience, a Tapestry Woven of Hope:

Like a phoenix rising from the ashes, refugees often demonstrate extraordinary resilience in the face of adversity. Forced to leave behind their homes, families, and familiar surroundings, they must adapt to new environments and overcome numerous challenges. This resilience is often rooted in their cultural heritage, a tapestry woven of hope and identity. Cultural traditions can serve as a beacon of light, guiding refugees through the darkness of displacement. By preserving their language, customs, and beliefs, they can maintain a sense of continuity and belonging. For example, many refugees continue to celebrate traditional holidays and festivals, even in unfamiliar settings. These cultural practices can help to foster a sense of community and resilience among refugees, a testament to the enduring human spirit.

Moreover, refugees often develop strong support networks within their communities, a lifeline in the stormy seas of displacement. These networks can provide emotional support, practical

assistance, and a sense of belonging. By relying on each other, refugees can overcome the challenges of displacement and build a more hopeful future, a testament to the power of human connection.

The Pain of Loss, a Silent Storm:

The experience of displacement can be a silent storm, wreaking havoc on the mental health and well-being of refugees. The loss of loved ones, homes, and familiar surroundings can lead to feelings of grief, anxiety, and depression. Additionally, the trauma of forced migration can have lasting effects on refugees' psychological health. Many refugees struggle to adjust to new cultures and societies, like fish out of water, adrift in unfamiliar currents. They may face discrimination, prejudice, and language barriers, which can make it difficult to integrate and build a new life. These challenges can contribute to feelings of isolation, loneliness, and despair.

Furthermore, refugees may experience a sense of loss of identity and belonging. When forced to leave their homeland, they may question their place in the world and their sense of self. This can be particularly difficult for young people who are trying to establish their own identities, their dreams shattered by the harsh realities of displacement.

The Pursuit of a Better Life, a Guiding Star:

Despite the challenges they face, refugees often have a strong desire for a better life, a guiding star that illuminates their path through the darkness. They may seek new opportunities for education, employment, and personal growth. This pursuit of a better life can be a powerful motivator for refugees, driving them to overcome obstacles and build a

more hopeful future. Education is a key factor in the successful integration of refugees. By accessing education, refugees can acquire new skills and knowledge, improve their language proficiency, and increase their employment prospects. Education can also help refugees to build a sense of hope and purpose, a beacon of light in the stormy seas of displacement. Employment is another important aspect of the refugee experience. Finding work can be difficult for refugees due to language barriers, discrimination, and lack of qualifications. However, when refugees are able to find employment, they can gain financial independence and contribute to their new communities. This can be a source of pride and satisfaction, a testament to their resilience and determination.

The Role of International Organizations, a Harbor in the Storm:

International organizations play a crucial role in supporting refugees and promoting their well-being. These organizations provide essential services such as food, shelter, healthcare, and education. They also work to protect the rights of refugees and advocate for their inclusion in host societies. The United Nations High Commissioner for Refugees (UNHCR) is the leading agency responsible for protecting and assisting refugees. UNHCR provides a range of services, including resettlement, repatriation, and local integration. The organization also works to raise awareness of the plight of refugees and promote international cooperation.

Other international organizations, such as the International Committee of the Red Cross (ICRC) and Médecins Sans Frontières (MSF), also provide vital assistance to refugees. These organizations offer medical care, humanitarian aid, and protection to refugees in conflict zones and other vulnerable situations.

The Case of Ukrainian and Russian Refugees, A Modern Tragedy:

The recent conflict between Ukraine and Russia has led to a massive displacement of people, a modern tragedy unfolding before our eyes. Millions of Ukrainians have fled their homes to seek refuge in neighboring countries and beyond, while many Russians have also been forced to leave their homes due to the conflict. Ukrainian and Russian refugees face similar challenges to other refugees, including language barriers, cultural differences, and economic hardship. However, their situation is unique in that they are often fleeing a conflict between two neighboring countries with similar cultures and languages. This can make it easier for them to integrate into new societies, but it can also lead to complex political and social issues. International organizations have been working tirelessly to provide assistance to Ukrainian and Russian refugees. They have provided food, shelter,

healthcare, and education, as well as psychological support. However, the needs of these refugees are immense, and more resources are needed to ensure that they have access to the support they require.

Conclusion:

Refugee culture is a complex and multifaceted phenomenon, reflecting the diverse experiences and challenges faced by those who are forced to flee their homes. It is a culture of resilience, loss, and the pursuit of a better life. By understanding the complexities of refugee culture, we can foster greater empathy, compassion, and support for refugees. As we strive to build a more just and equitable world, it is essential that we recognize the contributions and challenges faced by refugees. By working together to address the root causes of displacement and providing refugees with the support they need, we can help to create a more welcoming and inclusive environment for all.

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The Development of Intelligence Should Be the Ultimate Focus of Human Existence

- Dr. B. R. Ambedkar

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Abstract:

Bharat Dr. B.R. Ambedkar became the architect of that constitution by writing the world famous constitution of independent India and the constitution has given him all kinds of power. Based on this constitution, the vision of how the country of India is run is formed and therefore the constitution that guides the entire country, governs it through laws, brings about the development of the entire country, shows humanity, honour and morality to the people of the country and becomes a role model for the whole world, all the castes, religions of the country. , the Constitution protecting against creed, gender discrimination etc. has been written by Dr. B.R. Ambedkar. The life of all the citizens of India has been brightened up by the Constitution of India. All the constitutional rights are given to everyone today due to the constitution. In education, health, defence, business, company, university, courts, parliament, organization etc., our constitution creates planning, organization, control, communication, administration according to the guiding principles of the constitution and its provisions. Of course, through the Constitution of India, Dr. B.R. Ambedkar. Has spent his entire life in building a modern New Nation based on freedom, equality, fraternity and justice.

Keywords: Constitution, New India, Constitutional Provisions, Constitution assembly, law-Making, Rights etc.

Introduction:

Dr. B. R Ambedkar remains a world-renowned personality shedding light on many subjects in the fields of law and humanities. Since he was born in a community which was basically considered untouchable in the then situation, he had to face the mainly caste exploitation prevailing in the then social system right from his birth. As a solution to this, he introduced through education the inhuman customs and practices of the prevailing social system which have been continuing uninterruptedly for hundreds of years to exploit certain castes and which alienate people from their psyches. A new vibrant India based on equality, liberty, fraternity and justice will be created by eliminating all these dishonest practices through constitutional means. To create such new India Dr. B. R. Ambedkar, with the help of the Constituent Assembly, framed a comprehensive constitution, which if faithfully implemented, no one can stop India from becoming a comprehensively developed nation. In reference to the success of the constitution, Dr. B. R. Ambedkar says...

“However good a Constitution may be, it is sure To turn out bad because those who are called To work it, happens to be bad. However bad

A Constitution may be, it may turn out good if those Who are called to work it, happen to be a good lot.”

Objectives of Research:

1. To understand the concept of new nation from Dr. B. R. Ambedkar's ideological Perspective.
2. To Study Dr. B. R. Ambedkar's contribution in making of modern India
3. To study the provisions of the Indian constitution which helped in building the Egalitarian society and nation of Dr. B. R. Ambedkar's dreamed?

Hypothesis of Research:

1. Through the Constitution of India Dr. B. R. Ambedkar's concept of new nation has been properly understood.
2. The constitution written by him as an alternative to Dr. B. R. Ambedkar has contributed a lot in the construction of new India.

The Scope of Study:

The scope of the research presented is global in nature. Because the contribution of the Indian Constitution in building a new India as dreamed by Dr. B.R. Ambedkar has been comparatively studied from an international perspective.

Research Methodology:

I am doing the said research work under the title "The Man of the Age Who Brought the Concept of New India into Reality through the Constitution". Since the present research is historical in nature, I have adopted historical and analytical research method for this research. All types of literature corresponding to this method have been taken as references in the said research.

Review of Literature:

In the present research, I have perused all kinds of printed, visual and audio materials written by Dr. B. R. Ambedkar himself and produced by others on his life work and have used them wherever necessary.

Dr. B. R. Ambedkar's Contribution to the Creation of New India:**1. Dr. Ambedkar, the Father of Indian Constitution**

On 29th August, 1947 to draft the Constitution of independent India. Dr. B. R. Ambedkar along with seven other members was appointed. Dr. B.R. Ambedkar was appointed as the Chairman of the Drafting Committee. By studying the constitutions of many countries of the world, a comprehensive constitution has been prepared for a multi-racial, multi-religious and multi-cultural, highly diverse and troubled country like India. Despite the fact that there are not one or two problems like caste and bigotry, the nation has almost six hundred institutions but all of them are under the indirect control of the British. From the position of the chairman of the draft committee, Dr. On the shoulders of Ambedkar, B. R. Doing full justice to this responsibility, he drafted the largest constitution in the world in 2 years, 11 months and 17 days and presented it to the nation on 26 November 1949, which was implemented nationwide from 26 January 1950. Ambedkar's constitution guaranteed and protected various civil liberties for individual citizens including freedom of religion, abolition of untouchables and prohibition of all forms of discrimination. Ambedkar can certainly be known as the "Chief Architect of the Constitution of India" due to his many incomparable contributions. His efforts to eradicate social evils are remarkable; hence he is called the "Messiah" of the Indian Dalits and oppressed. [1]

2. Ambedkar's contribution to women's rights:

Hindu Code Bill: Ambedkar's most important contribution to women's rights was the Hindu Code Bill, which revolutionized property and marriage systems and established maintenance laws for women.

- **Four laws were passed as a result of the bill:**

1. The Hindu Marriage Act, 1955, which gave women the right to divorce and maintenance;
2. The Hindu Succession Act, 1956, which gave them the legal right to inherit property,

3. The Hindu Adoption and Maintenance Act, 1956, which allowed women to legally adopt children; And
4. The Hindu Minority and Parentage Act, 1956, which allowed women to become the natural parents of their children.

- **Pro-women laws:**

The impact of these reforms led to other pro-women laws like the Equal Remuneration Act of 1976 and the Dowry Prohibition Act of 1961, which illuminated the dark paths of women's struggles. [2]

3. Ambedkar the Economist:

"Nobel Prize winner Prof. Amartya Sen considered Dr. B. R. Ambedkar as his father in economics."

Below are some of Ambedkar's important economic ideas:**1. Monetary policy**

Ambedkar's thesis at the London School of Economics was 'the problem of the rupee: Its origin and its solution'. Ambedkar joined issue with the famous economist of the times John Maynard Keynes who had argued for a gold-exchange standard for India. However, Ambedkar argued for a gold standard instead of the gold exchange standard, saying the government under the gold exchange standard had unregulated scope to manipulate the currency. He argued for minting gold coins which could stabilize currency rates and prices.

2. Public finance

In his Columbia University dissertation 'The Evolution of Provincial Finance in British India', Ambedkar analyzed the colonial financial system and the Centre-state financial relations. He explained the problems with the centralization of government finance and unproductive expenditure by the government. Ambedkar talked about a diarchy where the Centre collected the revenue while the provinces were responsible only for expenditure. He argued that each level of government should raise its own revenue for its expenditure. [3]

4. What were Dr Ambedkar's thoughts on agriculture and land rights?**1. Land revenue system**

The British government had a ryotwari system in which the landlord was responsible for paying rent to the government. If he did not pay the rent, the owner would have been evicted from the land. Babasaheb Ambedkar himself opposed it when the government introduced an amendment bill to give ryotwari lands to big zamindars. He had said that one day the country will be ruined if the ownership of land continues to increase like this. But, the government did not agree to that. Maharashtra also had the Khoti system. In Rayatwari farmers paid taxes directly to the government, but as per the Khoti system, there were

middlemen, also known as Khots. They were free to do anything to collect taxes from the peasants. They used to torture the peasants a lot and sometimes evicted them from the land. For this, Babasaheb Ambedkar himself introduced a bill to abolish the Khoti system in the Bombay Legislative Assembly in 1937. And, through Ambedkar's efforts, the khoti system ended and the farmers got their rights.

2. Cooperative Farming

Dr. Babasaheb Ambedkar suggested the way of cooperative farming for the development of agriculture in India. Dr Ambedkar wrote an article titled 'Small Holdings in India and Their Remedies' in 1918. The article presented the problems of landholding farmers in scattered areas of India. He said that scattered smallholder farmers are unable to get the expected returns from agriculture due to a lack of adequate capital and resources. Hence, the need for reforms for the development of the agriculture sector in India, the government should provide resources and capital for agricultural activities, his article stated. He explained the nature of collective farming. Here, he demanded the nationalization of lands. [4]

5. Dr. B.R. Ambedkar Contribution of in freedom struggle:

After listening to Babasaheb's speech at the First Round Table Conference, Mahatma Gandhi called him "a patriot of the highest order".

Round Table Conferences were held in England in A.D. 1930, 1931 and 1932. Dr. Babasaheb Ambedkar appeared in all these three round table conferences as the representative of the oppressed and untouchables. At the Round Table Conferences, he demanded political rights for the untouchables and India's independence from the British. He told the rulers of the British government that, 'Just as no sect has the right to enslave another sect by forcing it. Also, no country has the right to impose its rule on another country and keep them as slaves', so the British power in India can no longer use the excuse that India is 'not yet capable of self-government'. How can a child walk on its feet by carrying it on its side? So he should be dismounted and given the right to walk independently. "My struggle is not only for the salvation of the Mahar caste but for the salvation of the entire untouchable community of India i.e. for the salvation of our country." Ambedkar was invited by the British government to participate in the Third Round Table Conference. Victoria left for England by boat. On reaching London, Ambedkar exclaimed,

"The British Government should try to give independence to India as soon as possible." At the time, the Bombay Chronicle, a Congress party newspaper in Bombay, noted Ambedkar's statement in its November 22nd, 1932 issue and said "Dr. Ambedkar's patriotism was never less than that of a patriot". In the conference, Ambedkar also

demanded that both the central power and the provincial power of India should come into the hands of Indians at the same time. [5]

6. Universal Adult Franchise:

The principle of universal adult suffrage was denied to Indian citizens during the British rule. Under the Government of India Acts of 1919 and 1935, only those who met certain criteria such as income, education and property could vote. For decades, most citizens of India did not have the right to exercise universal adult suffrage. In the pre-independence period only 13% of Indian citizens were given the right to vote. The demand for universal adult suffrage was gaining momentum a few decades before independence but Indians were not successful in it. The demand for universal adult suffrage began to gain importance. Motilal Nehru's report became a pioneer in supporting unlimited adult suffrage and equal rights for women. To include universal adult suffrage in the Indian constitution, Dr. B.R Ambedkar appeared before the Simon Commission in 1928 and pressed for the principle of universal adult suffrage to all Indians. It is a matter of pride for all Indians that Article 326 of the Indian Constitution after independence gave the right to vote to all Indians who completed the age of 18 years and Dr. Babasaheb Ambedkar's role has been unique.

Conclusion:

It can be said that there is a huge misconception about Dr. Babasaheb Ambedkar in the Indian society or even though he was born in a caste living outside a village, he gained fame as a famous personality not only in India but also in the world on the strength of his knowledge. Whatever the reason, one thing is true to a large extent that there are two schools of thought about Dr. Babasaheb. One school of thought is that they are the Kaiwaris of India's Dalits; Dr. Babasaheb saved only Dalits through the Constitution and ignored the development of other communities. But the reality is that till date on the life work of Dr. Babasaheb Ambedkar not only in India but also in the whole world hundreds of researches have been done and hundreds of Ph.D., M. Phil. Research Articles, thousands of books theses have been presented. In which it is proved that Dr. Babasaheb Ambedkar was not only the savior of Dalits but he devoted his whole life for the comprehensive development of the whole of India. This is a fact that has been proven after a complete research on the global platform. Then it would not be wrong to say that Dr. Babasaheb Ambedkar is not only the architect of the Indian constitution but also the real architect of the creation of New India.

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Study on Applications of Transform Methods in Science and Technology

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Abstract:

Transform techniques, such as Z-transform, Laplace transform, and Fourier transform are essential to many scientific and engineering fields because they simplify complex functions and, thus, make differential and integral equations easier to understand. These techniques are frequently used in quantum physics, image processing, communication networks, control theory, and signal processing. The Fourier transform in signal processing allows signals to be broken down into their frequency components, which helps with system analysis, noise reduction, and filtering. In control theory, Laplace transforms are very helpful for solving linear time-invariant systems because they provide information on the transient response and stability of the system. On the other hand, discrete-time systems, which are frequently employed in digital signal processing, require the Z-transform to be analyzed.

Transform techniques make circuit analysis in electrical engineering easier, especially for transient and steady-state analyses. Additionally, they make it easier to develop and optimize filters for use in analog and digital communication systems. The Fourier transform aids in image augmentation and compression during image processing, enabling effective transmission and storage.

Keywords: Discrete cosine transformations, Laplace Transform, Fourier Transform, Mellin Transform, Z-Transform, Complex sinusoidal function.

Introduction:

Transform techniques, especially mathematical ones like the Laplace, and Fourier transforms, have transformed a number of scientific and technological domains by offering strong instruments for deciphering intricate systems. By converting data from one domain (like time or space) to another (like frequency), these techniques facilitate the interpretation, manipulation, and resolution of issues that could otherwise be challenging or unsolvable. Signal processing is one of the fields in which transform methods are most frequently used. One essential tool for filtering, signal compression, and noise reduction is the Fourier transform, which breaks down a signal into its individual frequencies. This is essential for signal encoding, transmission, and reconstruction in image processing, audio engineering, and telecommunications.

Fourier and discrete cosine transformations are widely used in modern audio formats (like MP3) and image formats (like JPEG) to compress data without appreciably sacrificing quality. Transform techniques are crucial in physics to solve differential equations describing physical systems. For instance,

Definition of Laplace Transform:

Let f(t) be function defined for all positive values of t,

L{ f(t) }= F (s) = ∫₀^∞ e^{-st} f(t) dt

the Laplace transform is frequently used to convert linear ordinary differential equations into algebraic equations, which are simpler to solve. In electrical engineering, this method is frequently used to analyze signal flow, control systems, and circuits in systems that are subject to linear differential equations.

Transforms are also crucial in the real world of medical imaging. The Radon and Fourier transforms, respectively, are used in computed tomography (CT) scans and magnetic resonance imaging (MRI) to recreate images of the human body from sensor-derived raw data. With the use of these techniques, medical professionals can non-invasively view the body's internal structures and obtain vital information for diagnosis and therapy. Another effective approach is the wavelet transform, which is particularly helpful when evaluating data with changing frequencies over time. Wavelets can focus on fleeting or ephemeral aspects, unlike Fourier transformations, which offer a global perspective of a signal. This makes wavelets valuable in geophysics, finance (for identifying trends in the stock market), and defect detection in engineering systems.

Where:

- $f(t)$ be any function.
- $t \geq 0$ represents time.
- s is a complex variable.
- $F(s)$ is a Laplace transform of $f(t)$.

Definition of Fourier Transform:

For a Continuous function $f(t)$, the Fourier transform $F(w)$ is defined as :

$$F(w) = \int_{-\infty}^{+\infty} f(t)e^{-iwt} dt$$

Where:

- $f(t)$ is a continuous function
- w is the angular frequency
- e^{-iwt} represents the complex sinusoidal function.
- $F(w)$ is the Fourier transform of the Continuous function.

Definition of Mellin Transform:

For a function $f(x)$, the Mellin transform $M(s)$ is defined as :

$$M(s) = \int_0^{\infty} x^{s-1} f(x) dx$$

Where:

- $f(x)$ is the function.
- $x > 0$ is a real variable.
- s is a complex variable.
- $M(s)$ is Mellin transform of the function $f(x)$.

Definition of Z- Transform:

For a discrete signal $x[n]$, the Z- transform defined as:

$$X(z) = \sum_{n=-\infty}^{\infty} x[n] z^{-n}$$

Where:

- $x[n]$ is discrete sequence.
- z is a complex variable, often represented as $z = re^{jw}$, where r is the magnitude and w is the angular frequency.
- $X(z)$ is the Z-transform of the sequence $x[n]$.

Applications of Laplace Transform:

Applied mathematics, engineering, physics, and other branches of science and technology all make extensive use of the Laplace transform, a potent mathematical tool. Its main use is to simplify complicated differential equations into algebraic equations that are easier to understand and solve.

1. Engineering Control Systems: Control systems represent one of the Laplace transform's most important fields of application. It aids in the analysis of stability, controller design, and modeling of dynamic systems by engineers. The Laplace transform helps in the analysis of system responses and streamlines the design of feedback systems by translating time-domain differential equations into the s-domain.

2. Electrical Engineering: The Laplace transform is essential for circuit analysis in electrical engineering, especially when studying transient response. Engineers can use it to construct filters, amplifiers, and other electronic devices more easily by using it to ascertain how electrical circuits behave under different circumstances.

3. Mechanical Systems: The Laplace transform is used in mechanical engineering to analyze the dynamics and vibrations of mechanical systems. Engineers use the transform to model systems, including mass-spring-damper setups, and to develop transfer functions that characterize the

behavior of the system in response to outside forces.

Applications of Fourier Transform:

A mathematical method called the Fourier transform converts a function of time (or space) into a function of frequency. Its uses in a wide range of scientific and technological domains show how important it is in both theoretical and real-world settings. Analyzing audio signals using the Fourier transform is one well-known application in signal processing. Fast Fourier Transform (FFT) is a tool used by engineers in digital audio processing to break down complex sound waves into their component frequencies. This makes it possible to do operations like audio compression, noise reduction, and sound quality improvement, all of which are essential in fields like telecommunication and music production. The Fourier transform is essential to medical imaging, especially Magnetic Resonance Imaging (MRI), as it allows for the reconstruction of pictures from raw data.

The Fourier transform is useful in the science of optics for both building optical systems and comprehending diffraction patterns. This transformation is used in methods such as Fourier optics to study the way light travels and interacts with various materials, resulting in improvements in imaging technology and the creation of tools like cameras and microscopes.

Applications of Mellin Transform:

Signal Processing: It is used to analyze the frequency components of signals, particularly in the context of scaling properties and multi-resolution analysis.

1. Image processing: The Mellin transform is useful for tasks like texture analysis and image recognition in image analysis, particularly for objects that may have varied scales.

2. Probability and statistics: When analyzing distributions and random variables, the Mellin transform is helpful, especially when constructing functions and assessing moments. Analytic number theory use it, especially when examining the distribution of prime numbers and associated functions.

3. Economics: The transform can be applied to several parts of economic growth theories as well as econometric models used to analyze income distributions.

4. Control Theory: The Mellin transform in system analysis can be used to comprehend how a system behaves when scaling changes occur, which is helpful when building controllers.

Applications of Z- Transform:

Z-transforms are extensively employed in many scientific and technological domains, especially in control systems and signal processing. The following are some important applications:

1. Digital Signal Processing (DSP): Z-transforms aid in the analysis and construction of digital filters, allowing for effective signal processing in communications, video, and audio.

2. Control Systems: Through the use of system transfer functions, they are employed in the analysis and design of discrete-time control systems, enabling evaluations of stability and performance.

3. Image Processing: Z-transforms simplify pixel data manipulation in digital images by enabling image filtering and enhancement procedures.

4. Communications: Z-transforms help with error detection and repair algorithms, as well as modulation and demodulation procedures in telecommunication systems.

5. System Identification: By examining the input-output linkages in discrete-time systems, they assist in the identification of dynamic systems.

6. Robotics: Z-transforms are used in robotics control algorithms, especially when processing sensor input in real time.

7. Bioinformatics: Z-transforms can help find patterns and trends in discrete datasets when examining biological signals and sequences.

Effectiveness of Transform Techniques:

Strong mathematical techniques like the Laplace, Fourier, Mellin, and Z-transforms are employed in applied mathematics, engineering, and

physics to study and resolve challenging issues. Every one has advantages and particular uses.

1. Laplace Transform: The Laplace transform handles discontinuities and decays naturally, making it effective for systems with beginning conditions and for stability analysis. Its effectiveness comes from breaking down intricate, time-based systems into more manageable algebraic formulae.

2. Fourier Transform: This method breaks down a function into its individual frequency components. It is frequently used in signal processing, picture processing, and communications. It is perfect for studying periodic signals, such as sound and electromagnetic waves. Fourier transformations are highly effective at revealing the spectrum components of signals by converting them from the time domain to the frequency domain. Its effectiveness stems from its capacity to depict intricate signals as the sums of elementary sinusoids, rendering it indispensable for examining signals' frequency composition.

3. Mellin Transform: This scale-invariant integral transform is helpful for scaling and shape recognition in image analysis, probability, and number theory. It converts multiplicative convolutions into additive ones, making scale-related issues easier to understand.

4. Z-Transform: Applied to the analysis of discrete-time signals and systems, the Z-transform is the discrete analogue of the Laplace transform. It is very effective in control systems, digital signal processing, and discrete-time system stability analysis. Digital system analysis and design are facilitated by the Z-transform, which reduces differential equations to algebraic forms, particularly in the frequency domain.

Conclusion:

The Z transform, Laplace Transform, Fourier Transform and Mellin transforms are important mathematical and engineering tools with a variety of uses. The Laplace Transform, which transforms linear systems from the time domain to the complex frequency domain, is a commonly used tool in circuit analysis, differential equations, and control systems. In order to decompose signals into their frequency components for filtering, modulation, and spectral analysis, the Fourier Transform is essential in signal processing, telecommunications, and picture analysis.

Because it can handle multiplicative scaling, the Mellin Transform finds applications in scaling problems and algorithm analysis, particularly in fields like number theory, probability distributions, and image processing. Finally, by transforming sequences into the complex domain for stability and filter construction, the Z-Transform is used in digital signal processing and discrete-time control systems for analysis and design of systems with discrete inputs. When combined, these

transformations make it easier to analyze and resolve challenging engineering and mathematics issues.

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Social History: Exploring Society through Time

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Abstract:

Examining how societal structures, economic shifts, and cultural practices affected communities across time, social history is a subfield of historical study that focuses on the experiences and daily lives of regular people. By adopting a "history from below" perspective and moving away from conventional political and elite-focused narratives, social history emerged as a separate field in the middle of the 20th century. This article explores the evolution of social history, emphasizing important topics like race, class, gender, family, and global viewpoints. A more comprehensive picture of the past is offered by social historians, who question existing hierarchies in historical academia by looking at the lived experiences of workers, women, immigrants, and oppressed groups. The article demonstrates how social historians reconstruct the lives of common people using a variety of techniques, including census data, private correspondence, and oral histories, providing insightful analysis of both past and current societal issues. In the end, social history continues to be an essential discipline that broadens our comprehension of the intricacies of human society and its development.

Keywords: Societal Structures, Economic Shifts, Cultural Practices, Social Historians, Census Data, Private Correspondence, and Oral Histories

Introduction:

Instead than concentrating on the elites or historical occurrences like wars and politics, social history examines the daily experiences of individuals, especially the common people. In order to comprehend how societal institutions, cultural practices, and economic shifts affected the past, social historians examine trends in the daily lives of different groups, including laborers, women, immigrants, minorities, and the disenfranchised. It signifies a departure from conventional history, which placed a strong emphasis on political developments and the lives of significant personalities, and instead embraces the varied and nuanced stories of various groups.

The Origins of Social History

Though its origins are older, social history emerged as a separate academic field in the 20th century. Interest in worker conditions and the expanding working class was spurred by the industrial revolution in the 19th century. The groundwork for further research was laid by historians such as Karl Marx, who studied the effects of economic systems on social structures.

However, in the middle of the 20th century, especially in post-World War II Europe, social history started to formally establish itself as a distinct methodology. It aimed to document the experiences of people who were usually excluded from the historical record as a response to the elitism of conventional historical narratives. Historians like E.P. Thompson, whose seminal work *The Making of the English Working Class* (1963)

concentrated on the working-class experience throughout the Industrial Revolution, significantly advanced this method in Britain. Thompson's writings marked a shift away from histories that mostly concentrated on the deeds of kings, statesmen, and business magnates and toward the lives of common people.

In a similar vein, historians like Marc Bloch and Fernand Braudel led France's *Annales* School, which placed more emphasis on examining general social and economic trends over time than just high politics or diplomatic history. The long-term structures that molded societies, such as geography, material conditions, and mentalities, were of special interest to the historians of the *Annales*; they referred to this as the "histoire totale" or "total history."

Themes and Methods in Social History:

From the economic roles of various classes to social relations, family structures, cultural practices, and gender roles, social history studies many facets of everyday life. In order to gain a deeper understanding of the social context of historical changes, it frequently intersects other disciplines such as economics, sociology, and anthropology.

Understanding the effects of more significant historical processes, like industrialization, colonialism, or migration, on people and communities has been one of the main concerns of social historians. For instance, the Industrial Revolution's transition from rural to industrial economies had a significant effect on

family structures, social hierarchies, and urbanization in addition to changing the nature of employment. By using resources like census data, private letters, diaries, court documents, and oral histories, social historians have attempted to piece together these shifts and provide insights into the sometimes-overlooked facets of history. Social stratification and class The study of class and social stratification is one of social history's main topics. A more comprehensive examination of the various socioeconomic classes throughout history replaced the early emphasis on the working class, especially in relation to the Industrial Revolution. Social historians study the origins, maintenance, and evolution of class structures, especially as they relate to economic systems such as capitalism, socialism, and feudalism. For instance, feudal hierarchies constituted the main structure of medieval European civilization, with lords, vassals, and serfs all holding distinct positions within the social structure. There was little social mobility for the serfs, who were enslaved and worked for the local lord in return for safety. On the other hand, these inflexible institutions started to crumble with the advent of capitalism and the bourgeoisie in the early modern era, making room for new kinds of social mobility and class awareness.

Since social historians explore how various worker groups, such as domestic servants, industrial workers, or agricultural laborers, organized themselves and participated with larger social and political movements, the study of class is frequently entwined with the history of labor. For example, E.P. Thompson's research on the English working class examined how workers participated in early labor movements against capitalist exploitation and developed a collective identity. Family and Gender By examining the evolution of gender norms and relationships over time, social historians have also been instrumental in the field's development. By concentrating nearly entirely on male actors in politics and the economy, traditional history sometimes overlooked the contributions made by women. However, social history has emphasized how women, whether as employees, activists, or family members, influenced and took part in historical events. Another important topic for social historians has been the study of the family. Social historians have studied how economic, social, and cultural factors influenced family structures, which have changed greatly between cultures and historical times. For instance, the idea of the "nuclear family," which emphasized a distinct division of labor between men (who worked outside the home) and women (who were expected to run the household and care for children), emerged alongside the middle class in 19th-century Europe and North America.). Social historians have also studied the many family arrangements of working-

class and non-Western countries, where women's labor was frequently crucial to the home economy, demonstrating that this ideal was by no means universal.

Ethnicity and Race In social history, race and ethnicity are also major topics, especially when considering colonialism, slavery, and migration. The construction and maintenance of racial hierarchies, as well as their intersections with class, gender, and other types of social inequality, have been studied by social historians. For example, one of the main topics of social history research has been the history of slavery. Historians have studied the social and cultural facets of enslaved communities in addition to the economic effects of slavery. Through daily acts of defiance, revolt, and escape, they have studied how enslaved individuals resisted their captors and preserved cultural and familial bonds in spite of the harsh conditions of bondage. Social historians have also placed a great deal of emphasis on the history of immigration. Mass migrations have had a significant impact on both the migrants and the cultures they inhabited, regardless of whether they were caused by colonialism, political persecution, or economic hardship. Immigrant groups' experiences have been examined by social historians, who have looked at how they connected with larger social and political movements, retained their cultural identities, and adjusted to new surroundings.

The Global Perspective:

A global perspective has become more and more prevalent in social history as the discipline has developed. Comparative and transnational approaches, which aim to comprehend how social processes and institutions have functioned across many locations and cultures, have become more popular as a result. For instance, the experiences of workers in colonial and postcolonial cultures are now included in the history of industrialization, which was formerly mostly studied in the context of Western Europe. This has made it possible for historians to investigate the global aspects of social and economic transformation as well as the manner in which various regions were linked by means of migration, trade, and empire.

More attention is now being paid to the histories of oppressed groups and non-Western nations as a result of the global turn in social history. Historians have studied, for instance, how colonialism altered indigenous societies' social systems, frequently resulting in their marginalization and displacement. Similar to this, social historians who are interested in how global dynamics have influenced race, class, and identity have focused heavily on the history of the African diaspora, which includes the forced migration of millions of Africans during the transatlantic slave trade.

Conclusion:

The Relevance of Social History:

Social history continues to be one of the most vibrant and pertinent fields of historical study in many respects. It provides a more comprehensive and nuanced knowledge of the past by concentrating on the daily lives of common people. It also questions historical scholarship's established hierarchies, which have frequently given elite voices precedence over those of women, minorities, and the working class. Furthermore, social history has a significant impact on our comprehension of modern society. The contemporary world is still shaped by many of the topics that social historians research, including racial hierarchy, gender roles, migration, and inequality. Social history provides important insights into the causes of contemporary social issues and the potential for change by analyzing how these structures have changed over time.

Social historians will probably keep pushing the limits of historical research as the discipline develops, bringing in fresh viewpoints and methodologies to gain a deeper understanding of the intricate social dynamics that have influenced human history. Social history is still crucial for anybody who wants to comprehend the world in all its diversity and depth, regardless of how they view it—through the prisms of class, gender, race, or global interconnection.

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The Role of Nanotechnology in Sustainable Agriculture: Applications, Benefits and Challenges

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Abstract:

The global food production system is under increasing strain from growing populations, environmental challenges, and decreasing arable land. Traditional agricultural methods, heavily reliant on chemical inputs, have led to detrimental impacts on biodiversity, soil health, and water systems. To address these concerns, nanotechnology offers innovative solutions through the application of nanoparticles (NPs). This paper explores the extensive role of nanotechnology in sustainable agriculture, focusing on its applications in the development of nanofertilizers, nanopesticides, nanosensors, and nano-enabled water treatment. While nanotechnology holds promise for enhancing agricultural efficiency and minimizing environmental harm, concerns about the potential risks of NPs on ecosystems and human health warrant further research. This study provides a detailed examination of the current state of nanotechnology in agriculture, its benefits, risks, and the way forward for realizing sustainable farming practices globally.

Keywords: Nanotechnology, Nanoparticles, Sustainable Agriculture, Nanofertilizers, Nanopesticides, Environmental Impact, Crop Yield, Nanosensors

Introduction:

Global food security is one of the most pressing challenges of the 21st century. With a rapidly growing population, agricultural systems must intensify production without exacerbating environmental degradation. Conventional agricultural practices rely heavily on chemical fertilizers and pesticides, which have led to significant soil degradation, water pollution, and loss of biodiversity [1]. In this context, nanotechnology presents a promising avenue for achieving sustainable agricultural practices by increasing productivity while reducing the negative impacts associated with traditional farming.

Nanotechnology involves the manipulation of materials at the nanoscale (1-100 nanometers), which gives rise to unique physical and chemical properties, such as increased surface area, enhanced reactivity, and improved delivery mechanisms [2]. These characteristics have led to the exploration of nanotechnology in agriculture, particularly in the form of nanoparticles (NPs). NPs can be used to improve nutrient delivery through nanofertilizers, target pests with nanopesticides, and monitor crop health using nanosensors. Additionally, NPs have potential applications in water treatment and soil remediation, making them key tools in advancing sustainable agriculture.

This paper aims to provide an in-depth review of the role of nanotechnology in agriculture, focusing on the application of NPs in crop production, plant protection, water management, and environmental sustainability. It also addresses the challenges and potential risks associated with the widespread adoption of NPs in agriculture and proposes future research directions.

Nanotechnology in Agriculture: Key Applications:

The application of nanotechnology in agriculture has grown exponentially in recent years, driven by the need to enhance crop productivity and minimize environmental impact. Nanoparticles are being increasingly employed in various aspects of agriculture, from fertilizers and pesticides to real-time monitoring tools and water treatment solutions.

Nanofertilizers:

Nanofertilizers are designed to improve nutrient uptake efficiency by delivering nutrients directly to plant roots and leaves in a controlled manner. Unlike conventional fertilizers, which often result in significant nutrient loss through leaching and volatilization, nanofertilizers offer slow or controlled release mechanisms, ensuring that nutrients are available to plants for longer periods [1,2].

Copper nanoparticles (CuNPs) are among the most widely used nanofertilizers due to their cost-effectiveness and wide availability. CuNPs enhance nutrient availability in the soil, promote root development, and improve overall plant health. Copper is a trace metal crucial for plant growth and involved in key biological processes. It exists in two forms, Cu^+ and Cu^{2+} , and functions as a structural component in proteins. Copper plays a role in photosynthetic electron transport, oxidative stress response, cell wall metabolism, chlorophyll production, RNA synthesis, and the development of photosystems. It acts as a cofactor in enzymes such as superoxide dismutase (SOD), polyphenol oxidase, and plastocyanin. Additionally, copper is essential for seed germination and biomass production. High-entropy-alloy nanoparticles have potential as nanofertilizers for copper [1,3].

Nanopesticides and nanoinsecticides:

Nanopesticides are innovative agrochemicals developed to overcome the drawbacks of conventional pesticides, which often harm soil health. These pesticides are formulated using materials such as surfactants, organic polymers, and mineral nanoparticles, allowing for more precise targeting of pests while minimizing risks to beneficial insects. A key benefit of nanopesticides is their controlled release of active ingredients, which reduces pesticide runoff and enhances pest and disease management in plant [1,4].

Common materials used in nanopesticides include silver (Ag), copper (Cu), silicon dioxide (SiO_2), and zinc (Zn), which improve solubility and decrease environmental impact. Their target-specific action helps protect crops while reducing damage to non-target plants and limiting the overall amount of pesticides released into the ecosystem [1,5].

Copper-based nanopesticides are particularly effective due to their fungicidal and insecticidal properties. They combat pests like the red flour beetle, which damages stored agricultural products, while copper ions (Cu^{2+}) effectively disrupt harmful microorganisms such as bacteria, fungi, and algae. As a result, copper-based nanopesticides are valuable in both organic and conventional farming, offering broad-spectrum protection with reduced toxicity.

Traditional insecticides, on the other hand, are over 90% ineffective in pest control, leading to environmental damage and increased food production costs. Nanotechnology has transformed crop protection through nanoformulation and nanoencapsulation, which enhance the delivery of active ingredients [5]. These innovative methods improve solubility, permeability, and stability, enabling controlled release without compromising potency. Unlike conventional pesticides, nanoinsecticides help prevent resistance in target

organisms, lower environmental impact, and enhance effectiveness. Moreover, copper nanoparticles (CuONPs) and nanotech-based herbicides and fertilizers present promising solutions for sustainable agriculture [6,7].

Nanosensors:

Nanosensors, especially those based on silver nanoparticles (AgNPs), are transforming agriculture by addressing challenges like antibacterial protection, pathogen detection, and wastewater treatment. AgNPs are widely used in food packaging to combat foodborne pathogens and in agriculture to manage crop diseases such as powdery mildew. These nanoparticles also aid in detecting harmful pesticides and pollutants in plants and soil. AgNP-based biosensors enhance sensitivity in detecting substances like methyl parathion and other environmental toxins [8,9].

• Nutrient Deficiency Detection with Nanosensors:

Nutrient deficiencies in crops can significantly reduce yields. Nanosensors enable early detection of these deficiencies, often before visible signs appear, allowing farmers to take timely corrective action. Smart delivery systems paired with nanosensors precisely target nutrient-deficient areas, overcoming biological barriers for more effective crop management.[10]

• Heavy Metal Detection:

Heavy metal contamination, including cadmium, mercury, and lead, is a serious agricultural and environmental concern. Nanosensors made from materials like gold, silicon dioxide, and iron oxide can detect these toxic metals with high sensitivity. Techniques such as immunochromatographic strips and calorimetric nanosensors provide precise and reliable detection, helping to mitigate health risks [11,12].

• Pathogen Detection:

Nanosensors also play a crucial role in identifying plant pathogens, such as viruses and bacteria. Using materials like gold nanorods and iron oxide nanoparticles, these sensors are designed to detect specific plant viruses and harmful microorganisms, making them essential tools for disease management in crops.[13]

Nano-enabled Water Treatment: Nanoparticles can also be used in water treatment, ensuring clean water for irrigation. For instance, clay nanotubes have been developed to purify water from contaminants, ensuring that irrigation water does not harm crops or soil.

Challenges and Limitations

Environmental Impact and Fate of Nanomaterials: A major concern in the application of nanotechnology in agriculture is the long-term environmental fate of nanomaterials. While they provide numerous benefits, their potential accumulation in ecosystems and the risks they pose

to soil health, aquatic life, and biodiversity are not fully understood. For example, nanoparticles might enter water systems through runoff, potentially affecting aquatic organisms or being absorbed by plants and entering the food chain. Research is ongoing to better understand the interactions between nanomaterials and the environment, but regulatory frameworks are needed to ensure the safe use of these technologies. [5]

Cost and Accessibility: The high development costs associated with nanotechnology are another barrier to its widespread adoption, particularly in low-income regions where farmers may lack the financial resources to invest in these advanced technologies [5]. Developing cost-effective and scalable solutions that can benefit smallholder farmers is essential for achieving the broad adoption of nanotechnology in agriculture.

Regulatory and Ethical Considerations: The regulatory landscape for nanotechnology in agriculture remains underdeveloped. There is a need for clear guidelines on the production, use, and disposal of nanomaterials to ensure that they do not pose risks to human health or the environment. Moreover, public perception of nanotechnology is often shaped by concerns about safety, particularly regarding the potential toxicity of nanoparticles in food products [5].

Addressing these concerns through transparent research, risk assessments, and regulatory oversight will be critical to fostering public trust and ensuring the responsible use of nanotechnology.

Conclusion:

Nanotechnology offers a transformative approach to addressing key challenges in sustainable agriculture. Through various applications, nanoparticles can boost crop yields, reduce environmental degradation, and enhance resource efficiency. However, to fully unlock this potential, challenges like environmental safety, costs, and regulatory oversight must be carefully addressed. The future of agriculture will likely be shaped by the responsible and equitable integration of nanotechnology, offering solutions not only to current agricultural issues but also creating pathways toward a more resilient global food system. As research advances, it is crucial to balance the benefits of nanotechnology with potential risks to ensure its alignment with sustainability and food security goals.

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Domestic Violence: A Sociological Perspective

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Abstract:

Sociology and sociological theory have been good at studying conflicts and violence in society and institutions, but not as much when it comes to looking at individual violence. This article explores the importance of sociology in understanding domestic violence. The connection between sociology and domestic violence is influenced by various tensions and contradictions, which also have larger implications for sociology and sociological theory. We look at these issues by considering the conflicting ideas of violence and closeness in domestic violence, the significance of how we talk about and understand this violence, the reasons behind it, and who is responsible. We also explore how gender norms, power dynamics, and the way we talk about things all play a role in men hurting women they know.

Keywords: Sociological Theory, Conflicts, Violence, Individual Violence, Domestic Violence, Tensions, Contradictions, Violence and Closeness, Gender Norms, Power Dynamics

Introduction:

This article looks at how domestic violence is important in sociology. It shows how studying domestic violence can help us understand bigger issues in sociology, and how sociology can learn from studying domestic violence. The connection between domestic violence and sociology is complicated and has big implications for sociology as a whole. The problem of domestic violence is widespread across the globe, with women being the main victims and men being the main perpetrators. Despite this, mainstream sociology often overlooks these issues. The neglect of these important issues is explored through various aspects such as the relationship between violence and intimacy in domestic violence, the significance of identifying and defining such violence, ethical and political considerations regarding explanation, responsibility, and agency, as well as the role of gender, dominance, and communication in men's violence against women. This study looks at how different things in a household can affect domestic violence. It looks at factors like mood, feeling sad, being aware of health, using social media, doing chores at home, how many people live in the house, and being part of a religion. Sociologists who study domestic violence focus on how men often have more power and control in relationships. They also highlight the influence of traditional beliefs and laws that support male dominance. Some theories suggest that certain behaviours are influenced by cultural practices. Other theories focus on personal problems or social factors like frustration-aggression. Future studies will focus on explaining domestic violence and the challenges faced by women who go through it,

along with related issues. dealing with how social and legal actions affect the safety of victims and addressing the type and amount of violence committed by men, as well as the success of different approaches. Ways to respond to people who are treating you badly.

Domestic Violence: Definition:

The terms wife beating, battered wives, wife abuse, woman abuse, spouse abuse, family violence, domestic violence, and intimate partner violence have all been used to describe this phenomenon. The terms and the conceptions they reflect have all been topics of debate and have evolved. The initial terminology reflected the notion of husbands and wives in a legally sanctioned marital relationship but quickly evolved to include non-state sanctioned cohabiting relationships between men and women as well as same-sex intimate relationships. The various terms also reflect different conceptions of the gender of the usual perpetrators and victims of the violence: men's violence against women, mutual violence between men and women, or women's violence against men. These and other issues were the subject of considerable debate when the problem was 'rediscovered' in the 1970s and continue to be debated to the present. While the initial terms of 'wife beating' and 'wife abuse' contained clear imagery of men's violence against a woman's partner, they also contained notions of formal marriage as a necessary condition of concern and attention. By contrast, the term 'domestic violence' included the notion that the problem occurred in both state and non-state-sanctioned relationships but lost the conception of gender asymmetry regarding

who was most likely to be the victim and who perpetrated the violence. For reasons of popular convention rather than resolution of these debates, the term 'domestic violence' became the term in common usage throughout most of the world (Dobash and Dobash).

History:

In the early days of the Roman Empire, there were old traditions, beliefs, and rules regarding marriage that permitted a husband to harm his wife if she was unfaithful or committed a serious offense. Challenges to his power as a man were made over time as Canon law evolved, which gradually reduced his authority. Over time, legal systems in Europe and Britain changed to punishments that did not cause death or serious injury. In 1765, Sir William Blackstone wrote about these changes in his book Commentaries on the Laws of England. England observed that traditional cultural beliefs and typical legal practices supported a man's ability to use 'moderate' punishment on his wife. Blackstone's Commentaries formalized this idea. This traditional belief reinforced a husband's control over his wife for a long time. These values and norms upheld the husband's power in the relationship. Legal perspectives were brought across the Atlantic Ocean by early settlers who also introduced familiar social beliefs and legal structures to the developing countries in North America. Although there were some exceptions, this viewpoint was still considered the standard in numerous European and North American regions. Different cultures have existed for a long time. Recent evidence from many societies shows that there are strong cultural influences present. Ideas that support the concept of 'wife beating' are sometimes seen in beliefs and reflected in legal systems that either directly or indirectly show approval for it, or at least do not strongly support its victims. Those who commit crimes.

Throughout European and North American societies, there have been three key historical periods where challenges and changes in social and institutional responses to the issue have been notable. When domestic violence was newly discovered and gained widespread attention as a social issue. Over time, the laws about marriage and families changed because of different factors like the government, laws, and police, as well as the economy, politics, and society. organizations. The third era of challenges started in the 1970s in Britain and the United States. Instead of fading away quickly, it has grown over time. They are becoming more prevalent worldwide. People are becoming increasingly aware of the problem and governments are taking action to address it. The issue of violence against women is recognized worldwide as a human rights and social justice problem by the United Nations. Currently, some societies are facing

challenges to the calmness and acceptance that used to be common. Many countries have introduced new laws and practices to address these challenges.

Types of Domestic Violence:

1. Physical Abuse

Physical abuse is one of the most obvious types of domestic violence, causing physical harm like bruises and wounds. It involves hitting, punching, kicking, or using weapons to hurt someone. People who experience physical abuse may face lasting health issues, both in their body and mind. Physical abuse can include grabbing, burning, stabbing, slapping, and hitting, and this also includes withholding physical needs such as sleep or food, locking a victim out of the house, etc.

2. Sexual Violence

Sexual violence in domestic abuse can show up in many ways like rape, assault, pressure, and harassment. Marital rape is a big problem because it's often not reported because of society's rules and unclear laws. People who experience sexual violence might feel trauma, shame, and like their boundaries were crossed.

3. Verbal and Emotional Abuse

Verbal and emotional abuse can harm a person as much as physical violence, sometimes even more. This type of abuse hurts someone's self-esteem and mental health by using mean words, threats, and tricks, and making them doubt their thoughts. In the long run, it can make a person feel less sure of themselves and alone, with no control over their life.

4. Economic Abuse

Economic abuse is a sneaky but powerful way of controlling someone, which is often forgotten when talking about domestic violence. It includes controlling how money is used, job opportunities, or possessions, which can keep the victim stuck relying on the abuser. This type of abuse can make it hard for victims to escape bad relationships or start over on their own.

5. Isolation

Isolation is a specific kind of domestic violence where both the abuser and the victim play a role. Abusers try to control their victims, while those who are abused might avoid seeing people to hide their abuse. Abusers keep their partners away from family, friends, or coworkers who could help or protect them from the abuser. Abusers typically decide who their victims can hang out with, making them feel alone. This means their abusive partner becomes their main person to talk to and rely on for help.

6. Causes of Domestic Violence

Domestic violence in India is a complicated problem with many different reasons that come from society, history, religion, and culture. Things like gender inequality, poverty, and not enough education all play a part in making some people feel

more powerful than others in relationships and able to control them. Throughout history, beliefs in male dominance have made violence against women seem acceptable. Religious beliefs and cultural practices can sometimes be used to excuse or continue abusive behaviour, like violence linked to dowry.

Sociological/ Behavioural Factors:

Factors such as being angry or aggressive, experiencing poverty, having different statuses, being controlling or dominating, struggling with drug addiction, having a troubled upbringing, and dealing with mental health issues like bipolar disorder or depression can all contribute to domestic violence. Neglecting responsibilities in a marriage due to affairs or lack of trust can also play a role in causing domestic violence.

Historical Factors:

Historical reasons can be linked to the long-held belief in patriarchy and a sense of superiority among men that has existed for many years.

Religious Factors:

Religious beliefs can sometimes subtly reinforce the control of women, which can lead to domestic violence.

Cultural Factors:

Cultural reasons like wanting a son can cause domestic violence. When people believe men are better and don't know better, they may hurt women at home. There are many reasons for domestic violence and they can be different for each situation.

Dowry:

Dowry is a social and cultural issue that is important to talk about because it often leads to domestic violence when someone asks for a dowry illegally. The Parliament recognized this and made dowry-related domestic violence its category in the Domestic Violence Act.

Solution Plan:

Communities' response to violence:

Some community programs started by women to address domestic violence are commendable. The Nari Adalat and Sahara Sangh programs were set up by the Department of Education's Mahila Samakya Program in Uttar Pradesh and Gujarat. In West Bengal, the Shramajibee Mahila Samiti organization is using the traditional Salishe method to tackle domestic violence. The ICRW organized a TV show called "Bol" on four channels. This show helped women become more informed.

Legislative response:

There are a number of international Instruments to curb violence against women. The United Nations General Assembly resolution endorsed the urgent need for the universal application of women's rights of equality, security, liberty integrity, and dignity. Article 55 and 56 of

United Nations Charter cast a legal obligation on United Nations organization to promote respect for equality and human rights. The Universal Declaration of Human Rights, article 5, states that no one shall be subjected to torture or to cruel, inhuman or degrading treatment or punishment. There have been three United Nations world conferences on women. One in Mexico in 1975, the second in Copenhagen in 1980, and the third one in Nairobi, wherein strategies were framed to promote gender equality and opportunities for women. These were based on three objectives: Equality, development, and peace. The Vienna Declaration, 1993 calls for action to integrate the equal status human rights of women. It stresses toward elimination of violence against women in public and private life. The Beijing conference, 1995 provided a platform for concentration on some of the key issues identified as fundamental obstacles to the advancement of majority of women in the world. It focused on issues such as discrimination against women, violence against women, etc (Sharma).

Domestic Legal Remedies in India:

The Constitution of India: Article 14 is on equality. Difference in treatment between men and women by the state is totally prohibited on grounds of religion race, caste, sex, or place of birth. Article 21 is on right to live; right to live with human dignity. The National Commission for Women: It was set up as a statutory body in January 1992 under the National Commission for Women Act, 1990 to review the constitutional and legal safeguards for women; recommend remedial legislative measures, facilitate redress of grievances, and advise the Government on all policy matters affecting women (Sharma).

Conclusion:

In summary, domestic violence in India is a common and complicated problem that needs a variety of solutions. Even though laws like the Domestic Violence Act give some help to survivors, there is still a lot more that needs to be done to stop it, make people aware, and change how society views gender-based violence. If we focus on the main reasons for domestic violence, like gender inequality, financial dependence, and cultural beliefs, we can make a society where everyone is treated well and equally, without having to worry about violence at home. Domestic violence is a widespread problem that affects many people worldwide. It can involve physical violence, emotional abuse, or financial control. Some may also experience stalking or being isolated by their partner in a relationship. Experiencing domestic violence can hurt a person's body and mind. Choosing to get out of a harmful situation is hard, but it shows a lot of courage. There are many services available to support someone in making this choice. If you or someone you care about need

assistance leaving an abusive partner, local community centres, helplines, and emergency services are available to help you safely escape the danger and start a new life free from the abuser.

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Relevance of Dr. Babasaheb Ambedkar's Economic Policy: An Overview

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Abstract:

India, a developing agrarian country, has seen significant economic progress in the past 75 years. Among the many leaders who contributed to this growth, Dr. Babasaheb Ambedkar's economic vision holds great relevance for contemporary India. Ambedkar's economic ideas were not only theoretical but also practical, addressing key issues in agriculture, industry, and social welfare. His advocacy for industrialization as a solution to agricultural problems, emphasis on cooperative farming, and insights into public finance, monetary policy, and water resource management continue to influence India's economic policies today. He championed a development approach that promoted equality, eradicated poverty, and eliminated exploitation. Ambedkar's ideas of balanced growth, economic justice, and nationalized resources remain essential for India's progress. This study aims to highlight the importance of Dr. Ambedkar's economic policies and their relevance in shaping the future of modern India, ensuring comprehensive development across agriculture, industry, and services.

Keywords: Economic Policy, Industrialization, Agriculture, Monetary Policy, Public Finance, Cooperative Farming, Water Resources, Social Justice, Balanced Development, Poverty Eradication.

Introduction:

India is a developing and agrarian country. Most Indians depend on the agricultural sector. Alternatively the development of all other sectors also depends. Today, the Indian economy is known as one of the major economies in the world. In the last 75 years, the country has seen great progress in various fields. Various leaders of the country have played an important role for this. Among them, the contribution of Bharatratna Dr. Babasaheb Ambedkar is significant. His economical writing is done in front of the whole country and has a comprehensive view of economic development.

Dr. Babasaheb Ambedkar during his career has studied very closely the important problems of the agricultural sector as well as the regional level in India. His views on agriculture sector and agricultural land reform are considered important in bringing about economic and social transformation of the society. He asserted that the development of industrialization is an important solution to solve the problem of agriculture. Babasaheb's various guises as the 'Architect of the Indian Constitution' and the 'Redeemer of Dalit's are well known. It was evident from his economic thinking that it was not only conceptual, but also practical. Therefore, from the point of view of today's modern or new India, Economic thinking of Dr. Ambedkar is needed.

Choice of Subject:

Dr. Babasaheb Ambedkar's leadership is mentioned in social, political, economic, religious,

cultural, global, etc. Ambedkar's thoughts were not limited to any one class, he was not only the leader of Dalit's, but his thoughts guided the entire Indian society. From this point of view this topic has been chosen to know how Dr. Babasaheb Ambedkar's economic policy thoughts are useful for today's new India.

Research Objectives:

1. To study the life introduction of Dr. Babasaheb Ambedkar.
2. For today's modern India, to study the need of economic policies of Dr. Babasaheb Ambedkar.

Research Hypothesis:

1. Dr. Babasaheb Ambedkar's then economic policy is still applicable today.
2. Dr. Babasaheb Ambedkar's economic policy shows the balanced development approach of the country.

Research Methodology:

Descriptive and analytical method has been adopted in this study. Secondary means have been used for that. The necessary information has been collected through various books published on Dr. Babasaheb Ambedkar and other reference materials. Through that, the importance of economic policies of Dr. Babasaheb Ambedkar in the development of India at present has been studied.

Scope of the Subject:

Scope of this research subject, It is clear how applicable Dr. Babasaheb Ambedkar's economic thoughts are in the current economic

development of India. Because Dr. Ambedkar's thoughts have broad aspects. But, today the development of our country depends on the overall development of agriculture, industry and service sector. Therefore, the scope of the study has been determined from this point of view.

Dr. Babasaheb Ambedkar's Life-Introduction:

Dr. Babasaheb Ambedkar or Bhimrao Ramji Ambedkar was born on 14 April 1891 at Mahu in Madhya Pradesh. Dr. Babasaheb Ambedkar's father's name was Ramji and mother's name was Bhimabai. So Dr. Babasaheb Ambedkar's native village is 'Ambadve' in Ratnagiri district of Maharashtra. Also his original surname was 'Sakpal'. But his father enrolled his name in school as Ambadvekar and later he became Ambedkar.

While living in Bombay, he got his primary education and then at the age of 14 to 15, Babasaheb got married to Ramabai, daughter of Bhiku Valagkar of Dapoli. His taste for education reflects his impressive lifestyle. Dr. Babasaheb Ambedkar received his Ph.D. degree in Economics from Columbia University. He gave the message to educate the society and fight for justice to the common man through his learn, organize and struggle. He did extensive research on economics, political science and law. Initially, he accepted the profession of economics professor and lawyer. He worked in the social, economic and political fields based on the experience gained from his economic situation. Such a great world famous thinker died on 6th December 1956.

Economic Policy of Dr. Babasaheb Ambedkar:

Dr. Babasaheb Ambedkar was an eminent economist. Ambedkar's writings and speeches seem to reflect on economics. From this it is clear what kind of economic policy they have for the balanced development of the country. During the study of economics, his economic policy can be explained from the book Indian Rupee Problem, Its Origin and Solution, Administration and Finance of the East India Company and Evolution of Provincial Finance in British India and other research writings. He expressed his views on trade, banking, rupee, agriculture, caste economic policy, industrialization, wages, workers' welfare, education, state socialism, land reform, irrigation, public finance, etc.

1. Development Complementary Economic Policy:

Explanation of what should be the development economic policy of post-independence India. Dr. Babasaheb Ambedkar has done in his book 'Status and Minorities'. In this context, he emphasized on the elimination of poverty, elimination of inequality and freedom from exploitation. He advocated limited nationalization. His position was that there should be community ownership of agricultural land and heavy industry, and distribution of production in a democratic

manner without discrimination. He proposed that the state should plan economic affairs in a proper manner, so that the productivity of the people would be maximized without hampering private entrepreneurship and the wealth would be distributed equally. These thoughts are still useful in solving various problems existing in the country.

2. Monetary Policy:

Dr. Babasaheb Ambedkar's monetary policy has a great influence on today's Indian monetary system. At that time, the value of our rupee was falling continuously. Then he opined in his book that the gold exchange standard is not stable. A developing country like India cannot afford a gold exchange standard and besides this increases the risk of inflation and price rise. He proved with statistical data and reason how the value of the Indian rupee has depreciated and thus the purchasing power of the rupee is falling. He also suggested paying more attention to price stability than exchange rate stability. The Reserve Bank of India was established based on the ideas presented by him to the Hilton Young Commission. Dr. Babasaheb Ambedkar's monetary policy becomes a guide.

3. Public Finance Considerations:

Dr. Babasaheb Ambedkar's two thesis writings provide information on public finance thinking. He explained his views on the financial affairs of the time and how they had changed between 1792 and 1858 and how they had been unfair to the Indians. After that injustice has been done by putting the burden of debt on poor India. Apart from this, thoughts are expressed about the economic relationship between the then British government and the constituent states. From this, his ideas can complement the reformation of today's deteriorating Indian public finances.

4. Agricultural policy:

Dr. Babasaheb Ambedkar has studied the Indian agriculture sector in depth and has explained the various problems in it and their solutions. According to him inheritance is not the root cause of land division but the additional burden of population on agriculture is the root cause. As farmers have no means other than agriculture to raise their standard, they fragment the land. The solution to all these problems is industrialization. It is important to absorb the unemployed manpower in agriculture in other sectors. It results in an increase in national income thereby reducing the burden on agriculture. Thus it is clear that industrialization is the only effective and sure solution to solve the problems of Indian agriculture even today. Apart from this, it is unfair to levy land revenue on income. Dr. Babasaheb Ambedkar was of the opinion. It is also explained that the emphasis should be on cooperative and community farming as a solution to the problem of holding the agricultural sector.

5. Industrialization Policy:

In an article in the festival 1918, Dr. Babasaheb Ambedkar said that the solution to rural development is rapid industrialization. Industrialization is a natural powerful solution to reduce the pressure of additional labor in agriculture and to stop the subdivision and fragmentation of land. Ambedkar's views seem relevant in the present case. Their idea of cooperative farming is also relevant in the present case, where there is a problem of fragmentation and small land acquisition everywhere in India today. Therefore, fast industrialization is important as a solution.

6. Water Resources and Power Policy -

Dr. Babasaheb Ambedkar has mentioned water resource and electricity policy as an important infrastructural tool that contributes to the economic development of the country. In 1945, Dr. Babasaheb Ambedkar established the Central Water Commission. According to him, 'If the natural wealth of our country is planned and utilized properly, the country can develop'. Dr. Babasaheb Ambedkar had the additional burden of two committees namely Water Resources and Electric Power.

Also in the work of electricity development. Dr. Babasaheb Ambedkar's work is important. In this context, he has taken important decisions that electricity should be nationally owned and a central organization should be formed for the development of electricity. In short, apart from the above economic policy, the prevalence of economic thought is evident from education, division of labor, economic exploitation of untouchables, women's development, Khoti system, Indian constitution, etc. In the balanced development of the country, Dr. Babasaheb Ambedkar's comprehensive thoughts can be useful if implemented in today's modern India.

Conclusion:

Dr. Babasaheb Ambedkar's vision was very subtle. His studies were in-depth and dealt with local to global economic conditions. He emphasized on achieving equality, fraternity and justice by destroying various types of inequalities in the Indian society. His policy of economic development was fair to every section of the country. In particular, there were those who achieved economic and social balance in the country. Humanistic formula is found in the entire thoughts of Dr. Babasaheb Ambedkar and it is highlighted that his thoughts are needed to make India a world superpower in the real sense.

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Stress Management Skills for College Students

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Abstract:

College students frequently encounter significant stressors, including academic demands, financial pressures, social adjustments, and the transition to adulthood. These challenges can lead to elevated levels of stress, potentially impacting their mental and physical well-being. Effective stress management skills are crucial for helping students navigate these difficulties, enhance their resilience, and improve their overall college experience. This paper explores various stress management techniques tailored to college students, such as time management, physical exercise, mindfulness, healthy lifestyle choices, social support, and realistic goal setting. By adopting these strategies, students can not only alleviate stress but also build essential coping skills that will benefit them beyond their college years. Developing these skills can lead to better academic performance, improved mental health, and a more fulfilling college journey.

Keywords: Social Support, Mindfulness, Meditation, Hyper Awareness, Psychological well-being.

Introduction:

Educational challenges generate stress for students, risking their health and affecting their learning capabilities^[1]. Consequently, it is crucial to consider the aspects that may enhance agreeableness and boost good psychological states, thereby improving the physical and psychological well-being of students. College life is often perceived as a time of newfound independence, exploration, and personal growth. However, it is also a period marked by numerous stressors, including academic pressures, financial concerns, social adjustments, and the transition to adulthood. For many students, these stressors can lead to overwhelming feelings of anxiety, burnout, and even depression^[2-4].

Stress is very natural response in certain challenging conditions, but sometimes when it becomes chronic, it can have adverse effects on mental as well physical health. Academic Pressure Rigorous coursework, exams, and the pressure to maintain good grades can be significant sources of stress. Academic vitality is a significant factor influencing individuals' capacity to cope with the challenges of the academic period. Academic vitality refers to an adaptive response to the diverse challenges and obstacles encountered in the educational process^[5]. Individuals who act on electrical impulses not only avoid feeling frustrated and exhausted, but also constantly experience strength and improved energy, and have a general sense of inner vitality^[6]. Consequently, academic life is interconnected with an individual's adaptation to diverse situations during their academic tenure, feelings of self-efficacy and empowerment in

confronting challenges, reduced anxiety and depression, a sense of responsibility in managing academic tasks, and enhanced academic success^[5]. Despite the significant importance of academic vitality in effectively navigating hard academic periods, the literature analysis of studies conducted in Iran revealed that little investigations have been undertaken regarding the aspects that enhance this critical variable. Consequently, the endeavour to rectify this research limitation heightened the necessity for the present investigation.

An further significant positive psychological state in students is psychological well-being. The term "psychological well-being" refers to the development of an individual's true talents and is comprised of six elements: environmental mastery, healthy interpersonal relationships, personal growth, self-acceptance, autonomy, and life purpose^[2]. Positive relationships with others include warm, fulfilling interactions characterized by trust and empathy. Personal growth entails a constant development and the ability to encourage it, accompanied by an enhanced sense of efficacy and wisdom^[7-9]. Self-acceptance entails maintaining a favourable disposition towards oneself and embracing the diverse facets of one's identity. Autonomy refers to the sensation of self-determination, independence, and self-evaluation based on individual standards. Furthermore, environmental mastery signifies a sense of understanding and the capacity to understand the intricate surroundings^[10]. Therefore, understanding and applying effective stress management skills is crucial for college students to

navigate these challenges successfully. This paper explores various stress management strategies that can empower college students to enhance their well-being, improve academic performance, and build resilience^[11-14]. This paper discusses several stress management approaches based on prior literature studies. This helps students maintain a healthy balance between their social and academic lives.

Methods:

Stress Management Techniques for College Student:



1. Time Management Skills:

Talents in Time Management One of the most significant talents in stress management is the ability to effectively manage one's time under stressful situations. Students are able to lessen their procrastination and avoid cramming at the last minute if they schedule their time effectively and prioritize their assignments. It is possible for students to keep track of their assignments, exams, and other responsibilities with the assistance of tools including school planners, to-do lists, and digital apps. In addition to making enormous projects less scary, jobs can be broken down into more manageable segments, and targets can be set that are within reach.

2. Physical Activity and Exercise:

It is well known that engaging in regular physical activity induces the release of endorphins, which are the body's natural stress-relieving chemicals, which in turn improves mood. It is possible for students to clear their minds and obtain new views on the issues they are facing by engaging in activities such as jogging, yoga, swimming, or even just going for a short stroll. College campuses typically provide students with opportunity to maintain an active lifestyle by giving access to a variety of facilities, including gyms, group classes, and intramural sports.

3. Hyperawareness and Meditation:

Stress levels can be considerably reduced by the use of hyperawareness methods that pertain to mental health as well. Some examples of these practices include deep breathing exercises, meditation, and progressive muscle relaxation. Putting these techniques into practice helps students

maintain presence, improves their self-awareness, and decreases the number of negative thought patterns they have. Headspace and Calm are two examples of apps that provide guided meditation sessions that are specifically designed for novices. These sessions make it simple for students to adopt mindfulness into their regular routines.

4. Healthy Lifestyle Choices:

Managing stress requires a number of critical components, including avoiding excessive amounts of caffeine and alcohol, maintaining a nutritious diet, and getting enough sleep throughout the day. Improvements in cognitive function, memory, and the ability to regulate mood are closely correlated with healthy eating habits and adequate sleep. It is possible for students to significantly reduce their levels of stress and preserve their energy levels by adopting regular sleep habits and eating meals that are high in nutrients.

5. Social Support Networks:

Students can benefit from the emotional comfort and practical aid that can be provided by getting social support from friends, family, and peers in order to better handle stress. It is possible for students to develop relationships with others and avoid feelings of isolation by taking part in activities such as joining clubs, participating in study groups, or engaging in social activities. By seeking support from counsellors or mental health services on campus, individuals who are experiencing feelings of being overwhelmed can gain access to extra resources and ways for coping with their situation.

6. Setting Realistic Goals and Expectations:

College students frequently have the tendency to have high expectations for one self,

which can result in feelings of failure when they are unable to meet those standards. Students have the ability to build a sense of accomplishment and minimize the amount of pressure they put on themselves by creating objectives that are both reasonable and attainable. It is possible to make larger goals feel more attainable and less intimidating by breaking them down into smaller, more doable activities.

7. Relaxation Techniques and Hobbies:

Taking a break from the pressures of schoolwork can be accomplished by participating in hobbies and other leisure activities that provide ways for relaxation. Reading, painting, listening to music, or spending time outside are all possible activities that might assist kids in recharging their batteries and reducing their levels of stress. Students are better able to maintain a good balance between their work and their need for relaxation when they schedule time for these activities.

Conclusion:

Stress management skills are essential for college students as they navigate the various challenges of their academic and personal lives. By adopting time management techniques, engaging in physical activity, practicing mindfulness, and building a strong social support network, students can develop resilience and improve their overall well-being. Moreover, by making healthy lifestyle choices and setting realistic expectations, students can prevent stress from escalating into more serious health issues. Learning and practicing these skills not only enhances the college experience but also equips students with lifelong tools for managing stress effectively.

Ultimately, mastering stress management enables college students to face challenges with confidence, maintain their mental and physical health, and achieve their goals. With the right strategies in place, students can turn their college years into a time of growth, achievement, and fulfillment.

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Growth response of Maize to spent mushroom substrate application

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Abstract:

The experiment was conducted to study the effect of SMS on growth in height of Maize plant in growing media amended with varying levels of SMS to a control group grown in unamended soil.

The results demonstrated a significant positive effect of SMS on plant height for Maize plant. Plants grown with 20 grams of SMS exhibited the greatest increase in height, followed by those with 25 grams and 15 grams, respectively. These findings suggest that SMS can be a valuable tool for enhancing plant growth.

Keywords: SMS, Soybean Root nodules, Treatment, NPK.

Introduction:

Spent Mushroom Substrate (SMS) is the composted organic matter and it remained after the harvest of a mushroom crop. The SMS contains simpler form of protein component formed by degradation of agro waste by the fungus after few cultivation cycles, can be used as very good soil conditioners for the growth of fruits, vegetables flower and other foliage crops (Robbins, S. H.,1986). The SMS is rich in N, P, and K, which acts as a good growing medium for crop plants. According to Debosz (2002) spent mushroom substrate is considered to be a good source of organic matter and rich in macro and micro elements for plants, which help to increase the soil biological activity.

Application of SMS in agriculture decreases the amount of biodegradable waste disposed of in landfill sites and also transforms it into economically effective agricultural products (Szmidt, 1994). Roy *et. al.* (2015) studied the potential of spent mushroom substrate (SMS) of oyster mushrooms on the improvement of the growth of *Capsicum annum* L. The analysis of growth parameters in terms of height, yield, number of branches, and number of leaf drops showed that the use of oyster mushrooms (SMS) had a positive effect on the overall growth of the tested plants. Patil S. S. (2024) studied the potential of spent mushroom substrate (SMS) of oyster mushrooms on the improvement of the growth of jowar and mung bean plant and found the positive effect on the overall growth of the tested plants. Hackett (2015) have shown the benefits of SMS as an organic fertilizer and soil conditioner. Siddhant and Ayodhya (2009) used SMS from three strains of oyster mushrooms as fertilizer for the growth of the plant *Spinacea oleracea*. The present investigation was performed to study the effects of spent

mushroom substrate (SMS) as an organic fertilizer on the growth height of maize plant.

Material and Methods:

Collection of Spent Mushroom Substrate SMS: Spent mushroom substrate of soybean straw was collected after the growth of *P. sajor-caju* (Patil and Baig, 2023).

Preparation of the growth media: 5 g of NPK fertilizer and spent mushroom substrates were weighed in different quantities (5 g, 10 g, 15 g, 20 g, and 25 g). Each of these quantities was properly mixed with 4 kg of depleted garden soil, which was collected from the local farm in Naigaon District, Nanded (India). Each mixture was packed into plastic pots of five-liter volume and adequately watered.

Maize variety: seeds of maize variety Phule Maharshi was used in this experiment, collected from the local market in Naigaon, District- Nanded (MS), India.

Treatments and experimental design: There were seven treatments in the experiment, and each treatment was replicated three times. Treatments were defined according to the different levels of SMS concentrations and inorganic fertilizer as basal applications.

The treatments were as follows:

C (control): No fertilizer and SMS application in soil

(control)

T1 = 5 g of NPK fertilizer in the soil.

T2 = 5 g of SMS compost in the soil.

T3 = 10 g of SMS compost in the soil.

T4 = 15 g of SMS compost in the soil.

T5 = 20 gm of SMS compost in the soil.

T6 = 25 g of SMS compost in the soil.

A randomized complete block design (RCBD) with three replications of each treatment was laid out. Each pot has 4 kg of soil and was placed in open field conditions. The plants were

watered at regular intervals, and the growth parameters were studied. Growth promotion was recorded at 2, 4, 6, 8, 10, and 12-week intervals in

terms of plant height in centimeters (cm) using a scale.

Result and Discussion:

Table1. Effect of SMS on growth of Maize plant as presented height in cms

Treatment	Weeks					
	2	4	6	8	10	12
5 gm SMS	21	31	78	105	113.4	122
10 gm SMS	22	33	79.7	109	117	125
15 gm SMS	24	35.5	82	113	121	131
20 gm SMS	28	42	90	122	130	142.2
25 gm SMS	26.3	38	86	117	126.6	136.7
NPK 5 gm	23.5	32.7	79	108	116.3	128
Untreated	20	30.8	76.7	103.2	111.4	120

Table 1 reveals the data for growth in height of Maize plant when treated with different proportion of SMS and 5 gm of NPK fertilizer. Not much difference were found when the soil treated with 5 and 10 gm SMS. Maximum growth in height of maize plant were recorded 28.0 to 142.2 cm from 2 to 12 week old plant when soil treated with 20 gm of SMS. When the proportion of SMS increased from 20 to 25 gm in soil, the height of plant declined from 26.3 to 136.7 cm over the same period. With addition of 5 gm NPK fertilizer in soil, the height of plant was observed 128 cm. These results are in accordance with Patil, S.S. (2024). Wang, Lohr and Coffey (1984) observed that increase in plant growth was found with addition of 20 and 30 % of SMS and those grown with 50 % SMS, exhibit stunted growth.

Our investigation revealed that the crops studied showed a significant increase in growth when supplemented with SMS. This approach helps farmers produce high-quality crops while reducing the costs associated with inorganic fertilizers, contributing to sustainable agricultural practices.

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Silver Nanoparticles Synthesized Using Bamboo Leaf Extract: A Green Nanotechnology Perspective

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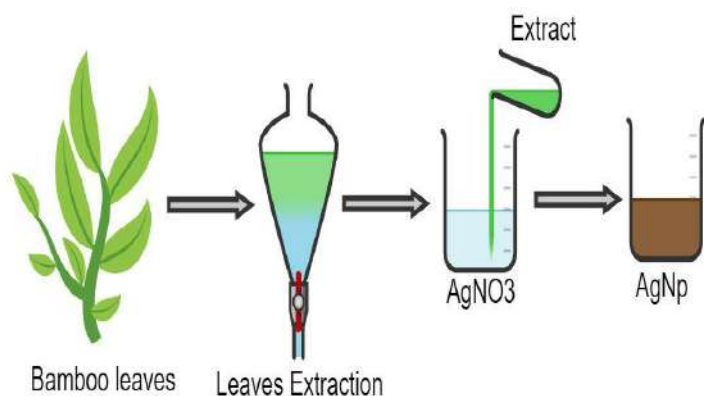
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Abstract:

The synthesis of nanoparticles from biological processes brings about a new era of nanotechnology research. Silver nanoparticles are typically created using chemicals that are both toxic and flammable. The study looks at an environmentally friendly biosynthesis process for antibacterial silver nanoparticles made from bamboo leaves. UV-Vis spectroscopy and scanning electron microscopy (SEM) were used to confirm the formation and characterization of AgNPs. Antimicrobial activities were performed using the disc diffusion method.

Keywords: Silver Nanoparticles; bamboo Leaves; Green Synthesis; Antibacterial

Graphical Abstract, If any in High Quality Resolution



Introduction:

Nanotechnology has made significant progress in synthesizing nanoscale matter and understanding its unique features, including physicochemical and optoelectronic. Nanotechnology will play a crucial role in critical technologies in the new millennium due to advances in self-assembly processes and the ability to organize nanoparticles into preset types.[1] The application of nanoparticles in commercial settings necessitates their organization and encapsulation in thin film formats. In this context, the "bottom-up" approach has garnered significant interest.[2] Due to their exceptional antibacterial activity, unique optical and chemical characteristics, and dependence on nanoparticle size and form, silver nanoparticles have been the subject of much research. [3, 4] Due to their quick and simple translocation to the circulation, nano-sized silver and other substances may likewise pose a risk to

human health [5]. There have been reports of several techniques for creating silver nanoparticles with regulated sizes, size distributions, and forms. [6-11] The Sol Gel Method, Chemical Oxidation Polymerization, Radical Polymerization, and Reverse-Micelle Method are the most widely utilized techniques for synthesizing these nanoparticles. Sono Chemical Synthesis and Electrodeposition Method: Mechanochemical Synthesis. All these preparation-related chemical pathways are extremely reactive, and their byproducts may pose biological and environmental hazards. [12]. As a result, there is an increasing need to create ecologically friendly methods for synthesizing nanoparticles without the use of hazardous chemicals. Consequently, scientists working on the synthesis and assembly of nanoparticles have looked to biological systems for ideas. Green synthesis is one of the methods developed in recent years. It creates biocompatible

metal and semiconductor nanostructures using biological systems, including bacteria, fungi, yeast, and plants.

Here, we show that the bamboo leaf extract reduces the generation of metal ions in the 20–50 nm diameter SNPs formed when exposed to an aqueous AgNO₃ solution. The amines and alkaloid groups were found in bamboo leaf extract because of this decrease. These silver nanoparticles are advantageous in the fields of optoelectronics and biomedical engineering.

Experimental Materials:

Production of Extracts from Bamboo Leaves (*Bambusa vulgaris*) 10 grams of genuine Neem (*Bambusa vulgaris*) leaves were used to prepare the extract. Bamboo leaves should first be cleaned twice with distilled water, dried, and then chopped into little pieces. To get the fresh extract, these leaves are now boiled for 10 minutes in 50 ml of distilled water, cooled to room temperature, and then filtered using Whatman filter paper no. 1.

Silver Nanoparticle Synthesis:

The initial step in making SNPs was dissolving 10 mM AgNO₃ in 100 ml of distilled water while stirring constantly. In the meantime, sodium hydroxide (NaOH) was added to a different flask to keep the pH of the bamboo leaf extract at 12. Now, in ambient settings, 1 ml of an extract from bamboo leaves (*Bambusa vulgaris*) was added. After centrifuging the synthesized product for ten minutes at 3000 rpm, it was cleaned with ethanol and distilled water. For a whole day, the residue was

dried at 80°C. Characterizations are ready to start on the final product.

UV-Vis. Absorption Spectra of Silver Nanoparticles

One efficient technique for characterizing the structure of metal nanoparticles is UV-VIS spectroscopy. It is commonly known that surface plasmon resonance, which changes to shorter wavelengths with decreasing particle size, dominates the optical absorption spectra of metal nanoparticles. It is also commonly known that the size and form of silver nanoscale particles mostly determine its absorption. The valence and conduction bands of metal nanoparticles, like silver, are extremely near to one another and allow for free electron mobility. Because of the collective oscillation of NP electrons in resonance with the light wave, these free electrons produce a surface plasmon resonance (SPR) absorption band. The NPs were measured using UV-VIS Absorption spectroscopy on a MOTRAS UV-VIS (INDAI) spectrophotometer. The spectrophotometer has a resolution of 0.5 nm. The sample's pattern was captured in the 300-600 nm region. Figure 1 shows the UV-VIS spectral pattern of the powdered material. The UV-VIS absorption spectrum gives

A distinctive surface plasmon resonance absorption band at 450 nm. The plasmon bands were almost symmetrical, indicating well-distributed and homogeneous nanoparticle sizes. If particles are not uniform, they can cause a large absorption peak at higher wavelengths and break a plasmon band into two bands [14-15]

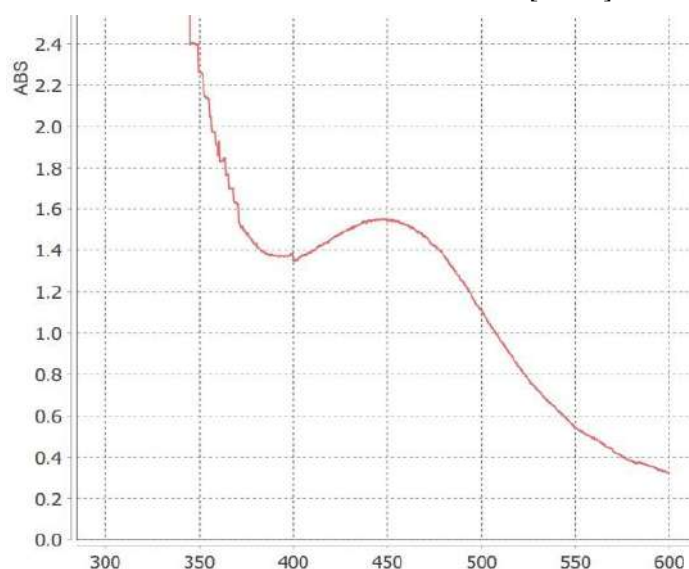


Figure 1: UV-Vis. Absorption Spectra of Silver Nanoparticles

FTIR spectral analysis of synthesized AgNP by *Bambusa vulgaris*

The FTIR study revealed the presence of many functional groups in AgNP samples, which might be ascribed to the diverse phytochemicals contained in bamboo leaf. The strong distinctive bands at 3418 cm⁻¹ to 3429 cm⁻¹ and 2361 cm⁻¹ in

all samples of AgNP are ascribed to the O-H stretching/N-H stretching of amides, and 2361 cm⁻¹ to the C≡C stretching. All sample AgNPs had faint bands at 1017-1022 cm⁻¹ and 828 cm⁻¹, indicating carbohydrates and -C=O bending. C-O stretching is evident, as seen by the prominent band at 1353 cm⁻¹. CH₃ has weak bands at 2922 cm⁻¹ and 2857

cm^{-1} , which span of Stretches of alkane/carboxylic acids were detected in AgNPs but not in AgNPs. The bands discovered at 3418 cm^{-1} to 3429 cm^{-1} and 1618.35 cm^{-1} suggest the presence of phenolic

compounds and flavonoids, while the band at 1021.35 cm^{-1} reveals carboxylic acid, ester, and other groups of proteins and metabolites that may be implicated in the creation of nanoparticles.

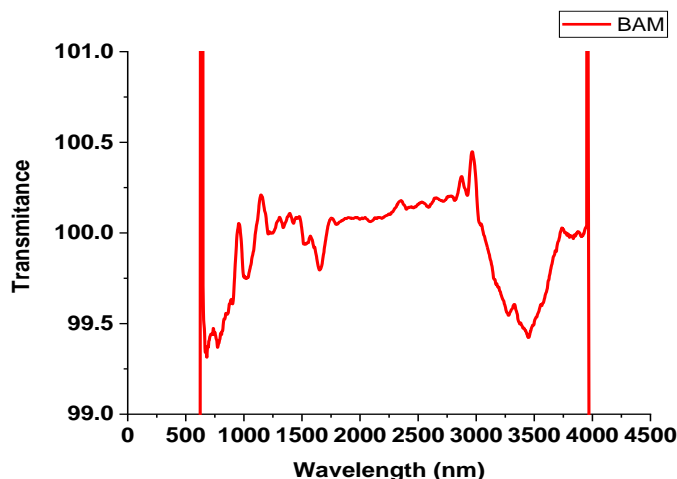


Figure 2: FTIR of synthesized NPs.

SEM (Scanning Electron Microscopy):

SEM was used to analyze the structure and shape of plant-based AgNPs. The SEM investigation demonstrates that the particles are consistently spherical, with the rough surface covered with an

organic coating. The particle size was determined using TEM and FE-SEM analysis, and it ranged between 10 and 50 nm. The size distribution histogram shows that the majority of particles were 16-20 nm in size.

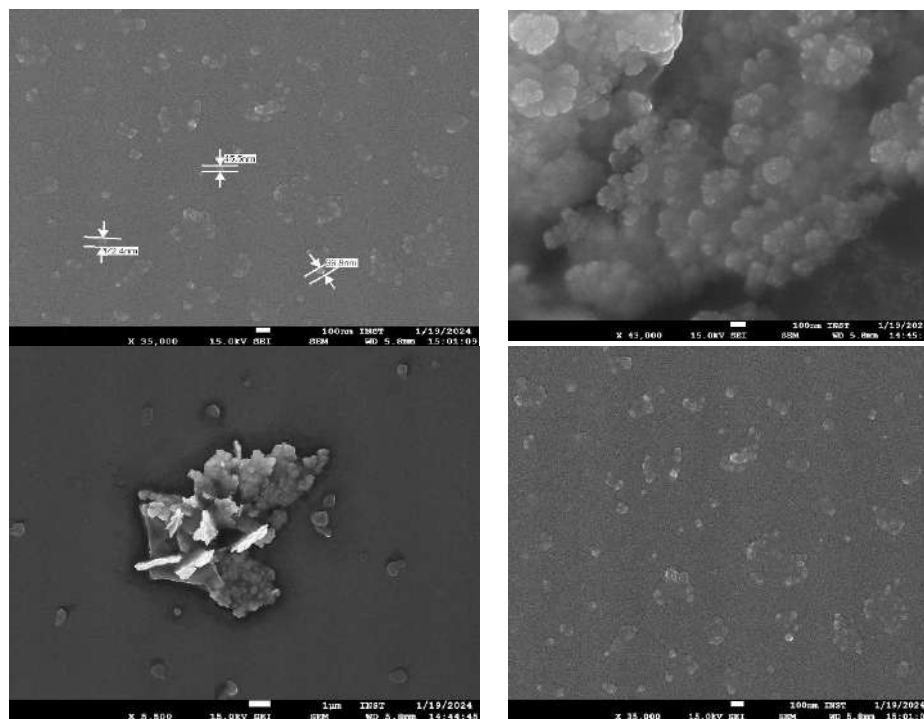


Figure 3: SEM micrograph of synthesized NPs

Conclusion:

The sustainable Bamboo leaf (*Bambusa vulgaris*) extract may effectively reduce the production of silver nanoparticles, as demonstrated in the current green synthesis. Silver nanoparticles made using this process are stable and show no obvious alterations even after a month. Using natural resources, such as neem leaf extract, to

synthesize metallic nanoparticles is a unique and greener alternative to chemical synthesis. SEM micrographs reveal symmetrical and stable silver nanoparticles with typical sizes ranging from 10-50 nm. The UV-Vis absorption spectra reveal a surface plasmon band at 450 nm.

N. R. Mishra, R. R. Tayade, A. A. Sukhadeve, A. N. Bondre

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Raptors – Birds of Prey

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Abstract:

Raptors are a diverse avian guild distributed worldwide and adapted to different environments. They have attracted a strong interest from scientists because of their conservation status and ecology. Raptors provide critical ecosystem services based on their role in natural food chains. They have evolved ecologically to specialize and adapt to different habitats and food resources. They are subject to a wide range of biological, ecological, and evolutionary studies. At present, this guild of birds faces a high risk of extinction due to numerous threats. They stand at the top of the trophic pyramids and are normally distributed at low densities over vast areas. Birds of prey play a crucial role in the conservation of ecosystems and are assumed as flagship species in relation to other taxa. Understanding and studying their demography, abundance, diet, resource selection, movements, ecological requirements, adaptive capacity, and the threats they face, will provide valuable information about the current ecosystem functioning and status.

Keyword: Raptors, Conservation, Ecology, Environment

Introduction:

The group of birds called raptors or birds of prey consists of the orders Acciptriformes, Falconiformes, Cariamiformes, Cathartiformes, and Strigiformes (Jarvis et al., 2014, McClure et al., 2019). Raptors provide ecosystem services and are considered indicators of environmental health (Sergio et al., 2008). Globally, 18% of raptors are threatened with extinction and 52% have declining populations (McClure et al., 2021).

Even though less common and diverse than other birds, raptors occupy a wide array of habitats such as forests, grasslands, deserts, coastal areas, wetlands, and urbanized areas (Almpanidou et al., 2020). Birds, including raptors, are highly influenced by human-induced landscape alterations as they are sensitive to environmental changes (Cooper et al., 2021). Prey diversity and habitat heterogeneity among other factors play an important role in the distribution, status, and diversity of raptors in an ecosystem (Grande et al., 2018). Urban and suburban landscapes act as suitable habitats for raptors by providing their key requirements such as food resources, nesting habitats, and breeding grounds (Natsukawa, 2021).

Importance of Raptors in Ecology:

The importance of raptors is even more pronounced, since by protecting them and their habitats, we are actually preserving a variety of other invertebrate and vertebrate species. At a global scale, many raptors are considered umbrella species of particular importance in conservation. By studying their intra and inter-specific interactions, we can learn more about their diet, competition, and movement ecology, as

well as the diversity of environments they inhabit. These environments, on other hand, harbor diverse communities of prey species, which are utilized by raptors. However, raptors' behavior may differ between different age classes and is very often determined by sex depending on the species. Since raptor population trends are mostly driven by the given species' demography, turnover, breeding rates, and human-induced mortality, studying these aspects of their ecology is fundamental to the conservation interventions to be conducted. (Dobrev et al., 2023).

Besides conservation, there are other good reasons to monitor raptors (Movalli et al., 2008). As top predators, raptors are often the first species to be affected by a range of Environmental pressures, such as changes in habitat availability or quality, prey populations, pollutants and human disturbance. Raptors can provide a cost-effective and sensitive means of detecting environmental change, as was so successfully demonstrated through pioneering research on the response of birds of prey to organochlorines in the environment (Jon Hardey et al., 2014). Compounding the population declines faced by raptors, the vast majority of these species are poorly understood and monitored (McClure et al., 2021).

Ways to conserve Raptors:

Researchers and conservationists also need access to the scientific literature to implement and build upon past results while avoiding unintended duplication (Sunderland et al., 2009). Platforms that aggregate, disseminate, and summarize scientific literature aid the science

of conservation (Walsh *et al.*, 2015), especially in developing countries where access to scientific literature is limited (Gossa *et al.*, 2015).

Diverse and inclusive scientific communities are known to be more productive, innovative, and impactful (Jimenez *et al.*, 2019). Many of the understudied and threatened species are located in the Global South, where limited funding and other challenges may hinder raptor research and conservation (Santangeli *et al.*, 2019).

Globally, human-caused environmental impacts, such as habitat loss, have seriously impacted raptor species, with some 50% of species having decreasing populations (McClure *et al.*, 2021).

Causes for Declining Raptors:

Human activities are responsible for the catastrophic decline and extinction of thousands of animal and plant species throughout the world, and this loss is occurring at unprecedented rates (Ceballos *et al.*, 2020). Raptors are some of the most threatened vertebrate taxa, and in the last three decades many species have experienced severe population declines or faced extinction (C. J. W. McClure *et al.*, 2018). This threat is primarily the result of habitat loss and fragmentation, pollution, human wildlife conflicts, and global climate alterations (Ceballos *et al.*, 2020). The relationship between raptors and humans is seemingly contradictory. Historically, raptors were important icons in different cultures and have been used for falconry in many places globally. In contrast, they have been persecuted due to conflicts with human interests, namely predation of game species and livestock. As top predators, raptors are flagship, umbrella, or keystone species and are used as surrogate species in biodiversity conservation efforts (J. A. Donázar *et al.*, 2016). From an ecological perspective, raptors are top predators and scavengers, critical for maintaining ecosystem structure and function and ecosystem services (Williams *et al.*, 2020).

As scavengers, vultures contribute to regulating ecosystem services by recycling dead matter and preventing the spread of diseases (Ogada *et al.*, 2012). Despite such beneficial roles for humans, some vulture populations have declined by over 95% in many Asian countries, such as India, because of the widespread use of diclofenac, a nonsteroidal anti-inflammatory drug. In Africa, particularly West Africa, vulture populations have decreased by an average of 95% in rural areas over the last 30 years as the result of shooting, harassment, and poisoning through feeding on carcasses of livestock treated with diclofenac (Green R. E. *et al.*, 2004).

Present Scenario:

The tropics have the greatest diversity of raptor species, including hotspots in the Andes and Himalayan and Indo-Malayan regions. These regions

have been defined as conservation priority hotspots for all vertebrates (McDonald and Boucher 2011). Raptor populations are generally affected by human activities such as habitat loss and fragmentation in ecosystems and currently about 19% of both diurnal and nocturnal raptors are threatened in the short or long term (Myers *et al.*, 2000). Among large predators, raptors are some of the most sensitive taxa to habitat disturbance, stability, and the health of their prey populations because of their complex ecological requirements. Globally, 35 to 40% of the world's forest area has been converted to other uses, primarily croplands (Newton I., 1979).

Conclusion:

As raptors can act as an umbrella species in an ecosystem, proper management strategies could conserve raptors and in turn other birds. (Wickramasinghe *et al.*, 2021).

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Yogic Management in Stress

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Abstract:

Yoga is a form of exercise that focuses on both mental and physical health. It can be practiced by anyone and is particularly effective for stress management, helping individuals achieve peace of mind and relaxation. Research has shown that yoga offers numerous benefits, including improved sleep quality, reduced blood pressure, and decreased anxiety levels.

Mentally, yoga incorporates meditation and breathing exercises, which help improve mental health. Regular yoga practice reduces stress and lowers stress and other related factors, making it an effective tool for managing stress and anxiety.

Keywords: Mental health, physical health, stress management, meditation, breathing, exercises, reduces anxiety, enhances mental clarity and calmness, S

Introduction:

In today's fast-paced and competitive world, individuals are constantly subjected to stress, which can manifest in various aspects of life. The term "stress" comes from the Latin word "stringer," meaning to draw tight, and refers to the complex interactions between a person and their environment. Stress arises when individuals face challenging or dangerous situations, and its effects are not limited to external pressures but also include internal demands. Stress is defined as a state manifested by specific biological changes in response to stimuli. According to the National Institute for Occupational Safety and Health, about 80% of worker's experience job stress.

Effective stress management involves understanding how our bodies react to stress and learning how to handle it. Stress management is not about avoiding pressure but about adapting to it. Yoga, an ancient Indian science, has proven to be an effective tool for managing and overcoming stress.

Symptoms of Stress:

- **Cognitive Symptoms:** Difficulty in concentration, memory problems, poor judgment, negative thoughts, constant worrying.
- **Emotional Symptoms:** Mood swings, irritability, short temper, agitation, feelings of overwhelm, loneliness, and depression.
- **Physical Symptoms:** Aches and pains, nausea, dizziness, chest pain, rapid heartbeat, frequent colds.
- **Behavioral Symptoms:** Changes in eating or sleeping habits, social withdrawal, and reliance on substances like alcohol or drugs.

Causes of Occupational Stress:

1. **Organizational Factors:** Job insecurity, workplace restructuring, excessive work demands, and risk-taking contribute to stress.
2. **Job Design Factors:** Poor working conditions, such as high noise levels, extreme temperatures, inadequate facilities, and unhygienic environments, lead to stress.
3. **Lack of Social Support:** Insufficient support from colleagues or supervisors.
4. **Career and Promotional Factors:** Overload of work and lack of career advancement opportunities.

Stress Management Techniques:

- **Identify Warning Signs:** Recognizing physical signs of stress, such as jaw tension or headaches, can help manage it early.
- **Identify Triggers:** Knowing the factors that elevate stress levels helps individuals cope more effectively.
- **Establish a Routine:** Maintaining a balanced daily routine, including exercise, regular meals, and sleep schedules, can reduce stress.
- **Spend Time with Supportive People:** Social interactions with family and friends foster relaxation and mental well-being.
- **Focus on Health:** Healthy eating habits, regular exercise, and hobbies can enhance physical and mental resilience to stress.

The Role of Yoga in Stress Management:

Yoga, a 3000-year-old practice originating in India, is one of the most effective tools for managing stress. It promotes internal peace and helps individuals respond to stress gracefully. Yoga offers numerous physiological benefits, including

improved health, weight control, increased flexibility, and enhanced circulation. Additionally, yoga practices, such as breathing exercises, help calm the nervous system, leading to a relaxed state of mind and body.

Benefits of Yoga for Stress Relief:

1. **Physiological Benefits:** Better health, increased energy levels, and reduced physical tension.
2. **Psychological Benefits:** Improved mood, decreased anxiety, and enhanced mental focus.
3. **Immune System Support:** Yoga boosts immunity by increasing immunoglobulin levels and reducing inflammatory markers.
4. **Controlled Breathing:** Pranayama, a form of yogic breathing, activates the parasympathetic nervous system, creating a sense of calm and balance.

Yoga Poses for Stress Management:

- **Child's Pose (Balasana):** Stretches the hips and spine, calming the mind and relieving tension.
- **Seated Forward Fold (Paschimottanasana):** Stimulates the abdominal organs, improves circulation, and reduces stress.
- **Legs Up the Wall Pose (ViparitaKarani):** Relieves tired legs, improves circulation, and calms the mind.
- **Cat-Cow Pose (Marjaryasana-Bitilasana):** Improves spine flexibility and reduces tension.
- **Corpse Pose (Savasana):** Relaxes the entire body and calms the nervous system.

Breathing Techniques (Pranayama):

Pranayama involves controlled breathing exercises that have significant benefits for the cardiovascular and nervous systems. It is divided into three phases: inhalation (puraka), retention (kumbhaka), and exhalation (rechaka). Regular practice of pranayama helps reduce stress and improve overall well-being.

Conclusion:

Stress is a major contributor to various physical and mental health problems. Prolonged exposure to stress can lead to conditions such as insomnia, digestive disorders, high blood pressure, and heart disease. Yoga offers a holistic approach to stress management by combining physical postures, breathing techniques, and meditation. By integrating yoga into daily life, individuals can reduce stress, improve mental clarity, and promote overall health and well-being.

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कक्षा नौवी के छात्रों की चिंता और शैक्षिक सफलता का तुलनात्मक अध्ययन

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Abstract:

इस शोध के लिए केवल सांगली शहर के छात्रों का विचार किया गया है। वर्तमान शोध में केवल नौवी कक्षा के छात्रों का विचार किया गया है। शोध में छात्रों की चिंता और शैक्षिक सफलता का तुलनात्मक अध्ययन किया है। प्रस्तुत शोध में हेतु सर्वेक्षण का प्रयोग किया गया है। सांगली शहर के 39 विद्यालय में से 4 विद्यालय का चयन संभाव्यता नमूने में लॉटरी पद्धति का उपयोग करके किया गया है। 4 विद्यालय के नौवी कक्षा के छात्रों का चयन सुविधा नमूनाकरण विधि का उपयोग करके गैर-संभाव्यता नमूनाकरण विधि द्वारा किया गया है। शोध में मानकीकृत कपूर की प्रश्नावली इस उपकरण का उपयोग किया गया है। इस शोध से यह अनुमान निकला है कि, कक्षा नौवी के छात्रों में चिंता और शैक्षिक सफलता के बीच एक महत्वपूर्ण धन सहसंबंध है।

कीवर्ड्स: कक्षा नौवी, चिंता, शैक्षिक सफलता

प्रस्तावना:

शिक्षा एक आजीवन प्रक्रिया है, प्रत्येक मनुष्य जन्म से मृत्यु तक कुछ न कुछ सीखता रहता है। शिक्षा या ने की केवल लिखना, पढ़ना और गणना नहीं बल्कि ये व्यक्ति के शारीरिक, मानसिक, सांस्कृतिक, वैज्ञानिक, नैतिक सभी विभिन्न अंगों का विकास है। इसलिए शिक्षा जीवन की अन्य आवश्यकताओं से भी अधिक महत्वपूर्ण है।

शिक्षा से छात्रों में सामाजिक जागरूकता का विकास होता है। साथ ही, प्रतिबद्धता को साकार और हासिल किया जा सकता है। शिक्षा के कारण उत्तरदायित्व, सामाजिक कर्तव्य, पालन-पोषण आसान होता है। शिक्षा तीन प्रकार की होती है।

1. औपचारिक शिक्षा
2. अनौपचारिक शिक्षा
3. सहज शिक्षा

शिक्षा लगातार बदल रही है। जॉन ड्यूई के अनुसार शिक्षा भी एक त्रिस्तरीय प्रक्रिया है।

1. सामाजिक प्रेरणा
2. छात्र
3. अध्यापक

किसी भी राष्ट्र की प्रगति उसकी शिक्षा प्रणाली पर अत्यधिक निर्भर होती है। कोठारी आयोग के अनुसार, किसी राष्ट्र के भाग्य का कक्षा में आकार दिया जा रहा है। हमारे छात्रों से ही देश की भावी पिढी का निर्माण हो रहा है और यही देश की भावी पिढी याने की हमारे छात्र, उनमें चिंता और तनाव का अध्ययन करना जरूरी है। 13 से 18 वर्ष की आयु का काल कुमारावस्था है। शालेय जीवन में कुमारावस्था बहुत महत्वपूर्ण अवस्था होती है। इस अवस्था में बच्चों में शारीरिक और मानसिक परिवर्तन होते हैं। ऐसे में छात्रों के साथ उनकी चिंता भी बढ़ जाती है। और इसी चिंता के वजन से छात्र के सामने बहुत सी समस्या खड़ी रहती है। उनकी चिंता बढ़ने लगती है और इसी चिंता के वजह से छात्रों के शैक्षिक सफलता में परिणाम दिखने लगते हैं।

समस्या विधान /समस्या का विवरण:

कक्षा नौवी के छात्रों में चिंता और शैक्षिक सफलता का तुलनात्मक अध्ययन।

शोध के उद्देश्य:

1. कक्षा नौवी के छात्रों में होनेवाली चिंता का मानकीकृत परीक्षण के माध्यम से पता लगाना।

2. कक्षा नौवी के छात्रों की शैक्षिक सफलता का अभ्यास करना।
3. कक्षा नौवी के छात्रों की चिंता और शैक्षिक सफलता का तुलनात्मक अध्ययन करना।

अनुसंधान/ शोध परिकल्पना:

- नौवी कक्षा के छात्रों में चिंता और शैक्षिक सफलता के बीच सहसंबंध है।

शून्य परिकल्पना:

- कक्षा नौवी के छात्रों में चिंता और शैक्षिक सफलता के बीच कोई महत्वपूर्ण संबंध नहीं पाया गया है।

गृहितक -

1. चिंता का शैक्षिक सफलता से गहरा संबंध है।
2. मानकीकृत कसोटी के द्वारा चिंता और शैक्षिक सफलता की सहसंबंध की जांच की जा सकती है।

शोध का महत्व एवं आवश्यकता:

मानव जीवन में बदलते आयु वर्ग के अनुसार अलग-अलग प्रश्न उठते हैं। कभी-कभी एक के बाद एक सवालों की शृंखला खड़ी हो जाती है। हर प्रश्नचिह्न के साथ मन और अधिक चिंतित हो जाता है। तनाव या चिंता मानव जीवन के लिए कितना हानिकारक है, यह समझने के लिए इस शोध की आवश्यकता है।

छात्रों में चिंता और उनके सीखने या शैक्षिक सफलता पर इसके प्रभाव पर शोध की आवश्यकता है। यह जानने के लिए इस शोध की आवश्यकता है कि चिंता का कारण क्या है और इसे कैसे पहचाना जा सकता है।

शोध छात्रों का दायरा और सीमाएं:

1. इस शोध के लिए केवल सांगली शहर के छात्रों का विचार किया गया है।

2. वर्तमान शोध में केवल नौवी कक्षा के छात्रों का विचार किया गया है।
3. वर्तमान शोध में छात्रों की चिंता और शैक्षिक सफलता का तुलनात्मक अध्ययन किया है।

परिसीमन:

- 1) वर्तमान शोध सांगली शहर के कक्षा नौवी के छात्रों तक सीमित होगा।

शोध प्रविधि:

प्रस्तुत शोध में हेतु सर्वेक्षण का प्रयोग किया गया है।

नमूना चयन:

वर्तमान शोध में, सांगली शहर के 39 विद्यालय में से 4 विद्यालय का चयन संभाव्यता नमूने में लॉटरी पद्धति का उपयोग करके किया गया है। 4 विद्यालय के नौवी कक्षा के छात्रों का चयन सुविधा नमूनाकरण विधि का उपयोग करके गैर-संभाव्यता नमूनाकरण विधि द्वारा किया गया है।

अनुसंधान उपकरण:

वर्तमान शोध में प्रश्नावली इस उपकरण का उपयोग किया गया है। कपूर की प्रश्नावली अनुसंधान में एक मानकीकृत परीक्षण है।

एकत्रित जानकारी का विश्लेषण और अर्थनिर्वचन --

शोध के सही निष्कर्ष / अनुमान निकालने के लिए एकत्रित जानकारी का विश्लेषण करना आवश्यक है। विश्लेषण करने से शोधकर्ता को निष्कर्ष निकालने और विश्लेषण के साथ-साथ विश्लेषण के बाद सिफारिशें करने में मदद मिलती है। प्रस्तुत शोध हेतु एकत्रित किये गये आँकड़ों का विश्लेषण इस प्रकार है-

Comparison of Anxiety between male and female

Group Statistics			
	Gender	N	Mean
Anxiety	Male	123	31.29
	Female	77	31.50

अर्थनिर्वचन:

उपरोक्त तालिका से पता चलता है कि लड़कों और लड़कियों के बीच चिंता के औसत स्कोर में कोई अंतर नहीं है।

Comparison of Academic Achievement between male and female

Group Statistics			
Academic Achievement	Gender	N	Mean
	Male	123	61.61
	Female	77	55.91

अर्थनिर्वचन:

उपरोक्त तालिका से पता चलता है कि लड़कियों की शैक्षिक सफलता के प्राप्तांक औसत लड़कों की शैक्षिक सफलता के औसत से अधिक है।

Comparison between Anxiety and Academic Achievement

Group Statistics				
Mean	N	Range Of Raw Score	Anxiety	Academic Achievement
	13	0-19	15.46	80.84
	172	20-43	31.75	56.77
	15	44-80	49.33	40.33

अर्थनिर्वचन:

उपरोक्त तालिका से पता चलता है कि 10% से भी कम छात्र चिंतित हैं। उनकी औसत शैक्षिक सफलता चिंता प्राप्तकर्ताओं के औसत से अधिक है।

86% छात्रों में भौतिक चिंता का स्तर दिखता है। इसलिए, 86% छात्रों की औसत शैक्षिक सफलता 10% छात्रों की शैक्षिक सफलता से कम है।

10% से अधिक छात्रों में चिंता का स्तर अधिक है, इसलिए उनकी शैक्षिक सफलता का औसत चिंता के औसत से कम है।

अनुमान:

कक्षा नौवी के छात्रों में चिंता और शैक्षिक सफलता के बीच एक महत्वपूर्ण धन सहसंबंध है।

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वर्धा जिल्ह्यातील महिला पोलीस कर्मचाऱ्यांच्या कार्यात विज्ञान आणि तंत्रज्ञानाची भूमिका

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सारांश:

हा शोधनिबंध महाराष्ट्रातील वर्धा जिल्ह्यातील महिला पोलीस कर्मचाऱ्यांची कार्यक्षमता वाढवण्यात विज्ञान आणि तंत्रज्ञानाची महत्त्वपूर्ण भूमिका तपासतो. कायद्याच्या अंमलबजावणीमध्ये लैंगिक विविधतेवर वाढत्या जोरासह, आधुनिक तांत्रिक साधनांचे एकत्रीकरण हे महिला अधिकाऱ्यांच्या सक्षमीकरणासाठी एक महत्त्वपूर्ण घटक म्हणून उदयास आले आहे. हा अध्ययन पोलीस कर्मचाऱ्यांद्वारे नियोजित केलेल्या विविध तांत्रिक प्रगतीचा तपास करतो, ज्यामध्ये संप्रेषण प्रणाली, फॉरेन्सिक तंत्रज्ञान आणि डेटा व्यवस्थापन सॉफ्टवेअर यांचा समावेश आहे. वर्धा जिल्ह्यातील महिला पोलीस अधिकाऱ्यांच्या गुणात्मक मुलाखतींद्वारे, संशोधन तंत्रज्ञानाच्या फायद्यांवर प्रकाश टाकते, जसे की तपासात वाढलेली कार्यक्षमता, सुधारित सुरक्षा उपाय आणि वर्धित समुदाय सहभाग. याव्यतिरिक्त, ते तांत्रिक अडथळे, सांस्कृतिक पूर्वाग्रह आणि संसाधन मर्यादांसोबत या अधिकाऱ्यांसमोरील आव्हानांना संबोधित करते. हे निष्कर्ष तंत्रज्ञान आणि प्रशिक्षणामध्ये सतत गुंतवणुकीची गरज अधोरेखित करतात, पोलीस कर्मचाऱ्यांच्या कार्यात लिंग-संवेदनशील दृष्टिकोनाचे समर्थन करतात. शेवटी, या अध्ययनाचे उद्दिष्ट आहे की विज्ञान आणि तंत्रज्ञान महिला पोलीस कर्मचाऱ्यांच्या कार्यात कसा बदल घडवून आणू शकतो, वर्धा जिल्ह्यात सर्वसमावेशक आणि प्रभावी कायद्याची अंमलबजावणी करणारे वातावरण निर्माण करू शकते याचा शोध घेणे.

मुख्य शब्द: महिला पोलीस कर्मचारी, विज्ञान आणि तंत्रज्ञान, वर्धा जिल्हा, कायद्याची अंमलबजावणी, लैंगिक विविधता, न्यायवैद्यक विज्ञान

परिचय:

कायद्याच्या अंमलबजावणीमध्ये महिलांची भूमिका गेल्या काही दशकांमध्ये लक्षणीयरीत्या विकसित झाली आहे, सार्वजनिक सुरक्षा आणि समुदायाच्या कल्याणासाठी त्यांच्या योगदानाची वाढती ओळख. भारतात, हे बदल विशेषतः वर्धा, महाराष्ट्र सारख्या जिल्ह्यांमध्ये दिसून येतात, जेथे महिला पोलीस कर्मचारी केवळ पारंपारिक कायद्याची अंमलबजावणी करणाऱ्या भूमिकांमध्ये सहभागी होत नाहीत तर त्यांची प्रभावीता वाढवण्यासाठी विज्ञान आणि तंत्रज्ञानातील प्रगतीचा लाभ घेत आहेत. जसजसे पोलीसांचे कार्य अधिकाधिक गुंतागुंतीचे होत आहे तसतसे आधुनिक कायद्याची अंमलबजावणी करण्याच्या पद्धतींमध्ये तांत्रिक साधनांचे एकत्रीकरण हा एक महत्त्वाचा घटक म्हणून उदयास आला आहे, ज्यामुळे दीर्घकालीन आव्हानांवर नाविन्यपूर्ण उपाय मिळतात.

ऐतिहासिकदृष्ट्या, भारतातील पोलीस दल हे प्रामुख्याने पुरुषांचे आहे, जे सामाजिक नियमांद्वारे आकारले गेले आहे जे सहसा कायद्याच्या अंमलबजावणीमध्ये करिअर

करण्यापासून स्त्रियांना परावृत्त करतात. तथापि, समाजाच्या विविध गरजा पूर्ण करू शकणारे अधिक प्रातिनिधिक आणि प्रतिसाद देणारे पोलीस दल तयार करण्यासाठी पोलीस दलामध्ये महिलांचा समावेश आवश्यक आहे. महिला पोलीस अधिकारी त्यांच्या भूमिकेत अद्वितीय दृष्टीकोन आणि कौशल्ये आणतात, समुदाय पोलीस कार्यामध्ये योगदान देतात आणि नागरिकांमध्ये विश्वास निर्माण करतात. त्यांची उपस्थिती महत्त्वपूर्ण आहे, विशेषतः घरगुती हिंसाचार, लैंगिक छळ आणि महिलांची सुरक्षितता यासारख्या समस्यांना संबोधित करण्यासाठी, ज्यांना लिंग गतीशीलतेची बारकाईने समज आवश्यक असते.

विज्ञान आणि तंत्रज्ञान कायद्याच्या अंमलबजावणीच्या परीदृश्याचा आकार बदलण्यात, संवाद प्रणाली, डेटा व्यवस्थापन सुधारण्यासाठी आणि तपास प्रक्रिया सुव्यवस्थित करण्यासाठी साधने प्रदान करण्यात महत्त्वपूर्ण भूमिका बजावतात. वर्धा जिल्ह्यात, फॉरेन्सिक सायन्स, डिजिटल कम्युनिकेशन टूल्स आणि डेटा

□नालिटिक्स यांसारख्या आधुनिक तंत्रज्ञानाच्या अंमलबजावणीमुळे महिला पोलीस कर्मचाऱ्यांना त्यांची कर्तव्ये अधिक कार्यक्षमतेने आणि प्रभावीपणे पार पाडण्यासाठी सक्षम केले आहे. या प्रगती केवळ त्यांच्या कार्यात मदत करत नाहीत तर कर्तव्यावर असलेल्या महिला अधिकाऱ्यांच्या सुरक्षिततेला आणि कल्याणालाही प्रोत्साहन देतात.

आशादायक फायदे असूनही, आव्हाने कायम आहेत. अनेक महिला पोलीस कर्मचाऱ्यांना तंत्रज्ञानाचा अपुरा प्रवेश, प्रशिक्षणाच्या मर्यादित संधी आणि त्यांच्या व्यावसायिक वाढीस अडथळा निर्माण करणारे सामाजिक पक्षपात यासारख्या अडथळांचा सामना करावा लागतो. या संशोधनाचा उद्देश वर्धा जिल्ह्यातील विज्ञान, तंत्रज्ञान आणि महिला पोलीस कर्मचाऱ्यांचे कार्य यांच्यातील बहुआयामी संबंध शोधणे आहे. तांत्रिक एकात्मतेशी संबंधित फायदे आणि आव्हानांचे परीक्षण करून, हा अध्ययन कायद्याच्या अंमलबजावणीमध्ये महिलांना सक्षम करण्यासाठी या प्रगतीचा उपयोग कसा करता येईल याविषयी अंतर्दृष्टी प्रदान करण्याचा प्रयत्न करतो, शेवटी अधिक प्रभावी आणि न्याय्य वातावरणाकडे नेतो.

गुणात्मक मुलाखती आणि विश्लेषणाद्वारे, हा अध्ययन वर्धा जिल्ह्यातील महिला पोलीस अधिकाऱ्यांच्या तंत्रज्ञानाच्या वापराच्या वर्तमान स्थितीवर प्रकाश टाकेल, त्यांचे अनुभव, आव्हाने आणि त्यांच्या दैनंदिन कामकाजात या साधनांच्या परिवर्तनीय क्षमतेचा शोध घेईल. धोरण निर्मात्यांना आणि कायद्याची अंमलबजावणी करणाऱ्या संस्थांना तंत्रज्ञान आणि प्रशिक्षणामध्ये गुंतवणुकीच्या महत्त्वपूर्ण महत्त्वाची माहिती देणे हे या निष्कर्षांचे उद्दिष्ट आहे जे पोलीस कार्यामध्ये लिंग-संवेदनशील दृष्टिकोनांना समर्थन देतात.

संशोधनाची उद्दिष्टे:

- 1) तपासाची गती आणि अचूकता यासोबत वर्धा जिल्ह्यातील महिला पोलीस कर्मचाऱ्यांच्या कार्यक्षमतेत विविध तांत्रिक साधने आणि वैज्ञानिक प्रगतीमुळे कशी सुधारणा झाली आहे याचा तपास करणे.
- 2) वर्धा जिल्ह्यातील महिला पोलीस अधिकाऱ्यांनी वापरलेल्या विशिष्ट तंत्रज्ञान आणि वैज्ञानिक पद्धती ओळखणे आणि त्यांचे वर्णन करणे.
- 3) महिला पोलीस अधिकाऱ्यांसाठी तंत्रज्ञानाच्या एकात्मतेचे फायदे तपासणे.
- 4) प्रशिक्षण, प्रवेश आणि सांस्कृतिक पूर्वाग्रहांशी संबंधित समस्यांसह तंत्रज्ञानाचा अवलंब आणि वापर करताना महिला पोलीस कर्मचाऱ्यांना येणारी आव्हाने आणि अडथळे ओळखणे आणि त्यांचे विश्लेषण करणे.
- 5) महिला पोलीस कर्मचाऱ्यांमध्ये तंत्रज्ञानाच्या वापरावर आणि परिणामकारकतेवर लैंगिक गतिमानता कसा प्रभाव पाडते हे शोधणे.

आरती रामदासराव राऊत, प्रो. डॉ. संपदा नासेरी

साहित्य समीक्षा:

साहित्य समीक्षा महिला पोलीस कर्मचाऱ्यांच्या कार्यात विज्ञान आणि तंत्रज्ञानाची सांगड घालण्याचे महत्त्व अधोरेखित करते. तंत्रज्ञानातील प्रगती कार्यातील कार्यक्षमता आणि सुरक्षितता सुधारू शकते, तरीही प्रवेश, प्रशिक्षण आणि सामाजिक पूर्वाग्रह यासारखी आव्हाने उरतात. या संशोधनाचा उद्देश महिला पोलीस कर्मचाऱ्यांच्या कामातील विज्ञान आणि तंत्रज्ञानाच्या भूमिकेचे, विशेषतः वर्धा जिल्ह्यातील, लिंग आणि प्लीसांचे कार्य या विषयावर चालू असलेल्या चर्चासत्रात योगदान देणे आहे.

मास्ट्रोरिलो आणि सहयोगी (२०१६) विविध देशांमधील कायद्याच्या अंमलबजावणीमध्ये महिलांच्या सहभागाचे विहंगावलोकन प्रदान करते, त्यांना भेडसावणारे अडथळे आणि त्यांच्या एकात्मतेला समर्थन देण्यासाठी लिंग-संवेदनशील धोरणांची आवश्यकता प्रदर्शित करते. ते यावर भर देतात की पोलीस दलात महिलांचे प्रतिनिधित्व वाढल्याने समुदाय संबंध सुधारले जाऊ शकतात आणि अधिक प्रभावी पोलीस धोरण आखले जाऊ शकते.

गोन्झालेझ, एम., आणि ग्रॅहम (२०१९) यांनी पोलिसिंगमधील तांत्रिक प्रगती महिला अधिकाऱ्यांना कसा फायदा होऊ शकतो हे शोधून काढले, बॉडी कॅमेरे आणि मोबाईल कम्युनिकेशन ऍप्लिकेशन्स यासारखी साधने महिला पोलीस कर्मचाऱ्यांची सुरक्षा आणि परिणामकारकता वाढवतात, विशेषतः उच्च जोखमीच्या परिस्थितीत. ते या तंत्रज्ञानामध्ये समान प्रवेश सुनिश्चित करण्यासाठी योग्य प्रशिक्षण देण्याचे महत्त्व देखील अधोरेखित करतात.

चॅडविक, आर. (२०२०), महिला अधिकाऱ्यांवर होणाऱ्या प्रभावावर लक्ष केंद्रित करून पोलीस दलांनी अवलंबलेल्या विविध तंत्रज्ञानाची चर्चा केली. रोझेनबॉम, डी. पी. (२०१९) समुदाय तपास उपक्रम आणि तंत्रज्ञान वापर यांच्यातील संबंधांचे परीक्षण करते, विशेषतः महिला पोलीस अधिकारी समुदाय संबंध वाढवण्यासाठी तंत्रज्ञानाचा कसा फायदा घेऊ शकतात यावर लक्ष केंद्रित करते.

संशोधन पद्धती:

वर्धा जिल्ह्यातील महिला पोलीस कर्मचाऱ्यांच्या कार्यात विज्ञान आणि तंत्रज्ञानाची भूमिका तपासण्यासाठी हा अध्ययन गुणात्मक संशोधन आराखड्याचा वापर करतो. लक्षित लोकसंख्येमध्ये पोलीस दलातील विविध पदांवर आणि पदावरील अधिकारी समाविष्ट आहेत. अर्ध-संरचित मुलाखती आणि दस्तऐवज विश्लेषणाद्वारे माहिती संकलित केली गेली आहे. महिला पोलीस कर्मचाऱ्यांमध्ये तंत्रज्ञानाच्या वापराशी संबंधित मुख्य विषय आणि नमुने ओळखण्यासाठी विषयगत विश्लेषणाचा वापर केला गेला आहे.

वर्धा जिल्ह्यातील महिला पोलिस कर्मचाऱ्यांच्या कार्यात विज्ञान आणि तंत्रज्ञानाची भूमिका:

तपासामध्ये विज्ञान आणि तंत्रज्ञानाच्या एकात्मतेने जगभरातील, विशेषतः भारतात, विशेषतः वर्धा जिल्ह्यासारख्या प्रदेशात कायद्याच्या अंमलबजावणीवर लक्षणीय परिणाम केला आहे. महिला पोलिस कर्मचाऱ्यांनी वापरलेल्या तंत्रज्ञान साधनांमध्ये मोबाईल कम्युनिकेशन, सोशल मीडिया प्लॅटफॉर्म, फॉरेन्सिक सायन्स, गुन्हेगारी दृश्य व्यवस्थापन साधने, डेटा व्यवस्थापन प्रणाली आणि डेटा विश्लेषण यांचा समावेश होतो.

मोबाईल कम्युनिकेशन महिला अधिकाऱ्यांना त्यांच्या टीमशी जुळून राहण्यास आणि घटनांना त्वरीत प्रतिसाद देण्यास अनुमती देते, आणीबाणीच्या वेळी समन्वय वाढवते. सोशल मीडिया प्लॅटफॉर्म थेट संवाद साधण्याची परवानगी देतात, पोलिस कर्मचारी आणि समुदाय सदस्य यांच्यात विश्वास वाढवतात. फॉरेन्सिक सायन्स महिला अधिकाऱ्यांना फिंगरप्रिंट विश्लेषण, डीएनए संकलन आणि डिजिटल फॉरेन्सिक यांसारख्या गुन्हाच्या घटना तपासण्यासाठी विशेष कौशल्ये सुसज्ज करते. क्राईम सीन मॅनेजमेंट टूल्स क्राईम पॅटर्न आणि हॉटस्पॉट्सची कल्पना करण्यात मदत करतात, ज्यामुळे संसाधने आणि प्रतिबंधात्मक उपायांची अधिक धोरणात्मक तैनाती करता येते.

डेटा मॅनेजमेंट सिस्टीम चालू तपासांचा मागोवा घेण्यास, पुरावे व्यवस्थापित करण्यात आणि रेकॉर्ड कार्यक्षमतेने राखण्यात, कागदपत्रे कमी करण्यात आणि प्रक्रिया सुव्यवस्थित करण्यात मदत करतात. प्रगत डेटा विश्लेषण साधने गुन्हेगारी कलाचे विश्लेषण करण्यात आणि गुन्हेगारी प्रतिबंधासाठी धोरणे विकसित करण्यात मदत करतात.

तपासामध्ये तंत्रज्ञानाचा अवलंब केल्याने महिला पोलिस कर्मचाऱ्यांच्या कार्यक्षमतेत लक्षणीय सुधारणा होते, ज्यामुळे ते घटनांना अधिक जलद प्रतिसाद देऊ शकतात आणि प्रकरणे सोडवण्यासाठी लागणारा वेळ कमी करतात. या वाढीव कार्यक्षमतेमुळे महिला अधिकाऱ्यांमध्ये उच्च उत्पादकता वाढते.

सुरक्षा □प्स आणि जीपीएस ट्रॅकिंगने महिला पोलिस कर्मचाऱ्यांची सुरक्षा वाढवली आहे, विशेषतः गस्त घालताना किंवा आपत्कालीन परिस्थितीला प्रतिसाद देताना. ही तंत्रज्ञाने जलद लोकेशन ट्रॅकिंगसाठी परवानगी देतात आणि आवश्यकतेनुसार सहाय्य उपलब्ध असल्याचे सुनिश्चित करतात. वर्धित सुरक्षा उपाय महिला अधिकाऱ्यांना त्यांची कर्तव्ये आत्मविश्वासाने आणि प्रभावीपणे पार पाडण्यासाठी सक्षम करतात.

तंत्रज्ञानामुळे पोलीस कर्मचारी आणि समुदाय यांच्यात चांगला संवाद साधला जातो, ज्यामुळे महिला अधिकाऱ्यांना नागरिकांशी अधिक प्रभावीपणे संपर्क साधता आरती रामदासराव राऊत, प्रो. डॉ. संपदा नासेरी

येतो. ऑनलाइन तक्रार नोंदणी आणि कम्युनिटी पोलिसिंग □प्स यांसारख्या उपक्रमांमुळे सुरक्षा प्रयत्नांमध्ये लोकसहभाग वाढतो, कायद्याच्या अंमलबजावणीसाठी सहयोगी दृष्टिकोन वाढतो.

तथापि, वर्धा जिल्ह्यातील महिला पोलिस कर्मचाऱ्यांना त्यांच्या कार्यात तंत्रज्ञानाच्या एकात्मिकतेबाबत अनेक आव्हानांना तोंड द्यावे लागते. नवीन तंत्रज्ञानामध्ये पुरेशा प्रशिक्षणाचा अभाव हा एक महत्त्वाचा अडथळा आहे, ज्यामुळे या संसाधनांचा प्रभावीपणे फायदा घेण्याची त्यांची क्षमता मर्यादित होते. तंत्रज्ञानात प्रवेश करणे देखील एक आव्हान असू शकते, कारण काही अधिकाऱ्यांना बजेटची कमतरता किंवा पोलिस विभागातील रसद समस्यांमुळे अत्याधुनिक साधने किंवा संसाधने मिळू शकत नाहीत.

पोलिस दल आणि समाजातील लैंगिक पूर्वाग्रह तंत्रज्ञानाचा वापर करून महिला अधिकाऱ्यांच्या स्वीकृती आणि परिणामकारकतेवर परिणाम करू शकतात. तंत्रज्ञानाच्या प्रभावी वापरास समर्थन देणारे सर्वसमावेशक वातावरण निर्माण करून, कायद्याची अंमलबजावणी करणाऱ्या एजन्सी महिला पोलिस कर्मचाऱ्यांना अधिक सक्षम बनवू शकतात, ज्यामुळे अधिक प्रभावी आणि न्याय्य तपास परिदृश्य बनते.

संशोधनाचे परिणाम (Findings):

वर्धा जिल्ह्यातील महिला पोलिस कर्मचाऱ्यांच्या कार्यात विज्ञान आणि तंत्रज्ञानाच्या एकात्मतेमुळे त्यांची परिणामकारकता आणि कार्यक्षमता वाढवणाऱ्या अनेक प्रगती झाल्या आहेत. महिला पोलिस कर्मचाऱ्यांकडून कार्यरत असलेल्या सध्याच्या तंत्रज्ञानामध्ये मोबाईल □प्स, रेडिओ कम्युनिकेशन, फॉरेन्सिक सायन्स, डेटा मॅनेजमेंट सॉफ्टवेअर आणि डेटा □नालिसिस टूल्स यांसारखी संवाद साधने समाविष्ट आहेत. ही साधने अधिकाऱ्यांना घटनांची तक्रार करण्यास, रीअल-टाइम माहितीमध्ये प्रवेश करण्यास आणि त्यांच्या कार्यसंघांशी संवाद साधण्यात मदत करतात.

फिंगरप्रिंट्स, डीएनए नमुने आणि डिजिटल फॉरेन्सिक यांसारख्या तपासाचा दर्जा सुधारण्यासाठी महिला पोलिस अधिकाऱ्यांनी फॉरेन्सिक तंत्राचा वापर वाढत्या प्रमाणात केला आहे. हे केवळ प्रकरणे सोडविण्यास मदत करत नाही तर महिला अधिकाऱ्यांद्वारे केलेल्या तपासाची विश्वासाहता देखील वाढवते. डेटा मॅनेजमेंट सॉफ्टवेअर अधिकाऱ्यांना चालू तपासांचे व्यवस्थापन करण्यास, पुराव्यांचा मागोवा घेण्यास आणि संघटित नोंदी ठेवण्यास, कागदपत्रे कमी करण्यास आणि प्रकरणांची अधिक कार्यक्षम हाताळणी करण्यास परवानगी देण्यास मदत करते.

तंत्रज्ञानाच्या एकात्मिकतेमुळे वर्धा जिल्ह्यातील महिला पोलिस कर्मचाऱ्यांना अनेक महत्त्वपूर्ण फायदे झाले आहेत. याचा परिणाम तपास आणि गुन्हाचा अहवाल

देण्यासाठी लागणाऱ्या वेळेत लक्षणीय घट झाली आहे, ज्यामुळे ते घटनांना अधिक जलद प्रतिसाद देऊ शकतात आणि तपास प्रक्रिया सुव्यवस्थित करू शकतात. याव्यतिरिक्त, कर्तव्यावर असताना महिला पोलिस कर्मचाऱ्यांची सुरक्षा वाढवण्यासाठी वैयक्तिक सुरक्षा □प्स आणि जीपीएस ट्रॅकिंग तंत्रज्ञान महत्त्वपूर्ण आहेत.

वर्धा जिल्ह्यातील महिला पोलिस कर्मचाऱ्यांसाठी तंत्रज्ञानाचा आणखी एक फायदा म्हणजे समुदाय सहभाग. ते लोकांपर्यंत पोहोचण्यासाठी आणि जनजागृतीसाठी सोशल मीडिया प्लॅटफॉर्मचा फायदा घेतात आणि सुरक्षितता उपाय, गुन्हेगारी कल आणि समुदाय उपक्रमांबद्दल माहिती प्रसारित करण्यासाठी Facebook, Twitter आणि WhatsApp सारख्या व्यासपिठाद्वारे समुदायाशी संलग्न असतात.

तथापि, उपलब्ध साधनांच्या पूर्ण वापरात अडथळा आणणारी आव्हाने कायम आहेत. तांत्रिक अडथळे, जसे की तंत्रज्ञानाचा प्रवेश आणि पुरेसे प्रशिक्षण, एक महत्त्वपूर्ण अडथळा आहे. प्रवेश समस्या, प्रशिक्षणातील कमतरता, सांस्कृतिक पूर्वाग्रह आणि परिचालन मर्यादा उपलब्ध तंत्रज्ञानाच्या पूर्ण वापरात महत्त्वपूर्ण अडथळे निर्माण करतात.

शेवटी, वर्धा जिल्ह्यातील महिला पोलिस कर्मचाऱ्यांचे कार्य विज्ञान आणि तंत्रज्ञानाने लक्षणीयरीत्या वाढवलेले असताना, त्यांची क्षमता वाढवण्यासाठी अनेक आव्हानांना सामोरे जावे लागेल. प्रवेश, प्रशिक्षण आणि सामाजिक पूर्वाग्रहांशी संबंधित अडथळ्यांवर मात करणे हे महिला अधिकाऱ्यांचे सक्षमीकरण करण्यासाठी आणि कायद्याच्या अंमलबजावणीमध्ये तंत्रज्ञान एक मौल्यवान संपत्ती आहे याची खात्री करण्यासाठी महत्त्वपूर्ण आहे.

चर्चा:

वर्धा जिल्ह्यातील महिला पोलिस अधिकाऱ्यांच्या भूमिकेवर तंत्रज्ञानाचा लक्षणीय परिणाम झाला असून, त्यांची कर्तव्ये पार पाडण्यात त्यांची कार्यक्षमता आणि आत्मविश्वास वाढला आहे. मोबाईल □प्स आणि डेटा मॅनेजमेंट सिस्टीमच्या उपलब्धतेमुळे महिला अधिकाऱ्यांना गंभीर माहितीवर तात्काळ प्रवेश उपलब्ध करून दिला आहे, त्यांना माहितीपूर्ण निर्णय घेण्यास, घटनांना अधिक प्रभावीपणे प्रतिसाद देण्यास आणि त्यांच्या तपास प्रक्रिया सुव्यवस्थित करण्यास सक्षम बनवले आहे. हे तंत्रज्ञान त्यांच्या भूमिकांमध्ये क्षमता आणि नियंत्रणाची भावना वाढवते.

फॉरेंसिक सायन्स आणि गुन्हे विश्लेषण सॉफ्टवेअरच्या एकीकरणामुळे कार्यक्षमतेत वाढ झाली आहे, ज्यामुळे जलद निराकरण आणि गुन्हेगारी प्रतिबंधासाठी अधिक सक्रिय दृष्टीकोन निर्माण झाला आहे. ही वाढलेली ऑपरेशनल कार्यक्षमता त्यांच्या व्यावसायिक

विकासात थेट योगदान देते आणि पोलिस दलात त्यांचे स्थान वाढवते. वैयक्तिक सुरक्षा □प्स आणि जीपीएस ट्रॅकिंग सिस्टीममुळे ज्युटीवर असताना महिला अधिकाऱ्यांच्या सुरक्षिततेत लक्षणीय वाढ झाली आहे. हे तंत्रज्ञान त्यांना स्वतंत्रपणे आणि आत्मविश्वासाने गस्त घालण्यास, त्यांच्या समुदायांमध्ये अधिक सक्रियपणे गुंतून राहण्यास आणि घटनांना संकोच न करता प्रतिसाद देण्यास सक्षम करते.

तंत्रज्ञानावर लक्ष केंद्रित केलेले प्रशिक्षण आणि कौशल्य विकास कार्यक्रम महिला पोलिस कर्मचाऱ्यांना नवीन कौशल्ये आत्मसात करण्यास आणि नवीनतम प्रगतीसह अपडेट राहण्यास सक्षम करतात. हे प्रशिक्षण उपक्रम केवळ त्यांची तांत्रिक क्षमताच वाढवत नाही तर त्यांच्या व्यावसायिक वाढीसही हातभार लावतात, पोलिस विभागामध्ये करिअरच्या प्रगतीसाठी मार्ग तयार करतात. तंत्रज्ञानाचा प्रभावीपणे वापर करण्यात महिलांना नैपुण्य मिळत असल्याने, कामाच्या ठिकाणी त्यांचा आत्मविश्वास आणि ठामपणा वाढतो आणि त्यांना त्यांच्या भूमिकांमध्ये अधिक सक्षम बनवते.

कायद्याच्या अंमलबजावणीमध्ये महिलांबद्दलच्या सामाजिक धारणा बदलण्यात तांत्रिक प्रगतीने महत्त्वपूर्ण योगदान दिले आहे. ते कायद्याच्या अंमलबजावणीतील महिलांच्या क्षमतांबाबत पारंपारिक रूढींना आव्हान देतात, ते दाखवून देतात की ते त्यांच्या पुरुष समकक्षांप्रमाणेच कामगिरी करू शकतात. तपासामध्ये लैंगिक भूमिकांबद्दलच्या सामाजिक विश्वासांना आकार देण्यासाठी ही दृश्यमानता महत्त्वपूर्ण आहे.

महिला अधिकाऱ्यांकडून तंत्रज्ञानाचा यशस्वी वापर हा त्यांच्या कौशल्यांचा आणि क्षमतेचा एक शक्तिशाली पुरावा आहे, ज्यामुळे अधिकाधिक महिलांना कायद्याच्या अंमलबजावणीत करिअर करण्यासाठी प्रोत्साहन मिळते. हे बदल लैंगिक समानतेला प्रोत्साहन देते आणि विविध दृष्टीकोन आणि दृष्टिकोनांसह पोलिस दलाला समृद्ध करते.

शिवाय, तंत्रज्ञानाचा वापर करून सशक्त महिला पोलिस कर्मचाऱ्यांची दृश्यता भविष्यातील पिढ्यांसाठी एक सकारात्मक उदाहरण प्रस्थापित करते, तरुण मुलींना अशाच प्रकारच्या करिअरची आकांक्षा बाळगण्यास प्रोत्साहित करते. या धारणा विकसित होत राहिल्याने, कायद्याच्या अंमलबजावणीमध्ये महिलांची भूमिका कदाचित विस्तारेल, समाजात कायद्याच्या अंमलबजावणीसाठी अधिक समावेशक आणि प्रभावी दृष्टिकोनाला चालना मिळेल.

निष्कर्ष:

वर्धा जिल्ह्यातील महिला पोलिस कर्मचाऱ्यांच्या कार्यात विज्ञान आणि तंत्रज्ञानाच्या एकात्मतेमुळे त्यांची परिणामकारकता आणि सक्षमीकरणात लक्षणीय सुधारणा झाली आहे. संवाद साधने, फॉरेंसिक सायन्स आणि डेटा मॅनेजमेंट सिस्टीममधील प्रगतीने महिला अधिकाऱ्यांसाठी

परिचालन परिदृश्य बदलले आहे, त्यांची तपास क्षमता, कार्यक्षमता आणि वैयक्तिक सुरक्षा सुधारली आहे. तंत्रज्ञान केवळ महिला अधिकाऱ्यांना सक्षम बनवत नाही तर कायद्याच्या अंमलबजावणीत महिलांबद्दलच्या सामाजिक धारणांना आकार देते, पारंपारिक लैंगिक रूढींना आव्हान देते आणि पुरुष अधिकाऱ्यांचे वर्चस्व असलेल्या क्षेत्रात त्यांची क्षमता प्रदर्शित करते. ही दृश्यमानता भविष्यातील पिढ्यांना तपासामध्ये करिअर करण्यासाठी प्रेरित करते, अधिक संतुलित आणि समावेशक कार्यबलामध्ये योगदान देते. तथापि, महिला पोलिस कर्मचाऱ्यांच्या सक्षमीकरणासाठी तंत्रज्ञानाची क्षमता पूर्णपणे ओळखण्यासाठी संसाधनांपर्यंत अपुरा प्रवेश, प्रशिक्षणाच्या संधींचा अभाव आणि प्रचलित लिंगभेद यासारख्या आव्हानांना सामोरे जाणे आवश्यक आहे. कायद्याची अंमलबजावणी करणाऱ्या संस्थांमध्ये सतत प्रशिक्षण देणे, पायाभूत सुविधा सुधारणे आणि समर्थनाची संस्कृती वाढवणे यासाठी प्रयत्न केले पाहिजेत. शेवटी, वर्धा जिल्ह्यातील महिला पोलिस कर्मचाऱ्यांच्या कार्यात विज्ञान आणि तंत्रज्ञानाची भूमिका परिवर्तनकारी आहे, ज्यामुळे समाजाची अधिक चांगली सेवा करणारे तपास प्रतिमान अधिक प्रभावी, न्याय्य आणि प्रतिसादात्मक आहे.

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रायपुर जिले के तिल्दा विकासखण्ड के ग्रामीण क्षेत्रों में पोषण दशाएं एक विश्लेषण

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शोध सारांश:

मानव को अपना जीवन संचालित करने के लिए भोजन की आवश्यकता होती है। वह किसी भी जाति, धर्म, स्तर का क्यों न हो, भोजन उसके स्वास्थ्य का मूल आधार है। पौष्टिक भोजन मानव जीवन की नींव है। अतः प्रस्तुत अध्ययन का उद्देश्य तिल्दा विकासखण्ड के ग्रामीण क्षेत्रों में निवासरत् परिवारों की पोषण दशाओं का अध्ययन करना तथा उनके निराकरण हेतु सुझाव प्रस्तुत करना है। प्रस्तुत अध्ययन प्राथमिक आंकड़ों पर आधारित है। अध्ययन संबंधी जानकारी हेतु तिल्दा विकासखण्ड के चार गांव (कोनारी, परसदा, कोहका एवं जांजगीर) का चुनाव दैवनिदर्शन विधि द्वारा किया गया है। चयनित गांवों से 280 परिवारों के पोषण संबंधी दशाओं की जानकारी अनुसूची एवं साक्षात्कार के माध्यम से प्राप्त की गई है। पोषण स्तर का मूल्यांकन भारतीय आयुर्विज्ञान अनुसंधान परिषद द्वारा अनुशंसित विधि का प्रयोग करके किया गया है। सर्वेक्षित परिवारों में पोषण स्तर को मापने के लिए भूमि की उपलब्धता के आधार पर चार कृषक परिवारों में वर्गीकृत किया गया है – 1. भूमिहीन मजदूर (0 एकड़), 2. लघु कृषक (0–5 एकड़), 3. मध्यम कृषक (5–10 एकड़) 4. वृहत कृषक (10 से अधिक एकड़)।

अध्ययन क्षेत्र के कुल बोया गया क्षेत्र का 81.61% खरीफ और 18.39% रबी के अंतर्गत आता है। कुल फसली क्षेत्र का 98.36% कुल अनाज का है। इस क्षेत्र में सबसे महत्वपूर्ण अनाज धान है जिसके अंतर्गत 83.34% शामिल है। धान के बाद गेहूँ का स्थान आता है। 2.66% क्षेत्र में इसकी खेती की जाती है। अन्य अनाजों में कोदो कुटकी, ज्वार, मक्का व रागी हैं। जिनके अंतर्गत कुल फसली क्षेत्र का 0.04% भाग आता है। 11.81% अर्थात् 6198% हेक्टेयर क्षेत्र में दालें बोई जाती है। सभी दालों में अरहर व तुअर प्रमुख है जो क्रमशः 57.74% व 26.72% है। शेष 15.54% क्षेत्र में मूंग, मटर, चना, उड़द व अन्य दालों का उत्पादन किया जाता है। तिलहनों के अंतर्गत कुल बोया क्षेत्र का 1.42% क्षेत्र आता है। प्रमुख तिलहन क्रमशः अलसी, राई/सरसों, तिल, मूंगफली, सोयाबीन एवं अन्य है।

मानव को अपना जीवन संचालित करने के लिए भोजन की आवश्यकता होती है। मानव किसी भी जाति, धर्म, स्तर का क्यों न हो भोजन उसके स्वास्थ्य का मूल आधार है। पौष्टिक भोजन मानव जीवन की नींव है। अतः शारीरिक एवं मानसिक विकास के लिए संतुलित मात्रा में भोजन के सभी पोषण तत्वों का मिलना आवश्यक है। इनमें कमी होने से रोग निरोधक क्षमता में कमी, कुपोषण एवं अन्य कई प्रकार की शारीरिक व मानसिक बीमारियों का जन्म होता है। किसी भी क्षेत्र का पोषण स्तर खाद्यान्न उपभोग द्वारा प्रभावित एवं नियंत्रित होता है। विभिन्न कृषक समुदायों में खाद्यान्न उपभोग की मात्रा में भिन्नता होती है जिससे पोषण स्तर भी भिन्न होता है। अध्ययन क्षेत्र में पोषण स्तर की स्थिति तथा उसको प्रभावित करने वाले कारकों के स्थानिक स्वरूप का विश्लेषण इस अध्ययन में करने का प्रयास किया है।

Keywords: पोषण उपभोग प्रतिरूप

प्रस्तावना:

मानव को अपना जीवन संचालित करने के लिए भोजन की आवश्यकता होती है। मानव किसी भी जाति, धर्म, स्तर का क्यों न हो भोजन उसके स्वास्थ्य का मूल आधार है। पौष्टिक भोजन मानव जीवन की नींव है। अतः शारीरिक एवं मानसिक विकास के लिए संतुलित मात्रा में भोजन के सभी पोषण तत्वों का मिलना आवश्यक है। इनमें कमी होने से रोग निरोधक क्षमता में कमी, कुपोषण एवं अन्य कई प्रकार की शारीरिक व मानसिक बीमारियों का जन्म होता है। किसी भी क्षेत्र का पोषण स्तर खाद्यान्न उपभोग द्वारा प्रभावित एवं नियंत्रित होता है। विभिन्न कृषक समुदायों में खाद्यान्न उपभोग की मात्रा में भिन्नता होती है जिससे पोषण स्तर भी भिन्न होता है। अध्ययन क्षेत्र में पोषण स्तर की स्थिति तथा उसको प्रभावित करने वाले कारकों के स्थानिक स्वरूप का विश्लेषण इस अध्ययन में करने का प्रयास किया है।

अध्ययन का उद्देश्य:

प्रस्तुत शोध-पत्र का उद्देश्य तिल्दा विकासखण्ड के ग्रामीण क्षेत्रों में पोषण स्तर का अध्ययन करना है, साथ ही पोषण दशा संबंधी समस्याओं की जानकारी के साथ उनके निराकरण हेतु सुझाव एवं नियोजन प्रस्तुत करना है।

शोध परिकल्पना:

प्रस्तुत अध्ययन के लिए निम्नलिखित शोध-परिकल्पना की रचना की गई है:-

1. भूमिहीन मजदूर परिवारों में खाद्य पदार्थों की उपलब्धता एवं पोषण स्तर निम्न होती है।
2. जोत के आकार एवं पोषण स्तर में गहरा धनात्मक संबंध होता है।

अध्ययन क्षेत्र:

तिल्दा विकासखण्ड (20°59' से 22°28' उत्तरी अक्षांश तथा 81°31'30" से 82°1'30" पूर्वी देशान्तर) छत्तीसगढ़ राज्य के रायपुर जिले के मध्य स्थित है।

अध्ययन क्षेत्र महानदी बेसिन में स्थित है। संपूर्ण क्षेत्र समतल है। यहाँ का कुल क्षेत्रफल 718.88 वर्ग कि.मी. है। अध्ययन क्षेत्र की कुल जनसंख्या 2001 के अनुसार 1,76,114 है जिसमें पुरुषों की संख्या 88,287 एवं 87,827 जनसंख्या स्त्रियों की है। तिल्दा जनपद में 1,49,203 जनसंख्या ग्रामीण है जो कुल जनसंख्या का 84.72% है।

आंकड़ों के स्रोत एवं विधितंत्र:

प्रस्तुत अध्ययन प्राथमिक आंकड़ों पर आधारित है। अध्ययन संबंधी जानकारी हेतु तिल्दा जनपद के चार गांव

सारणी क्रमांक -1 तिल्दा जनपद के चयनित गांव

क्रम	चयनित गांव	क्षेत्रफल (हेक्टर)	कुल परिवारों की संख्या	कुल जनसंख्या
1	कोनारी	322.108	120	667
2	परसदा	309.655	230	1103
3	कोहका	394	123	928
4	जांजगीर	449.019	128	989
कुल		1474.782	601	3687

स्रोत : पटवारी से प्राप्त

फसल प्रतिरूप

अध्ययन क्षेत्र के कुल बोया गया क्षेत्र का 81.61% खरीफ और 18.39% रबी के अंतर्गत आता है। कुल फसली क्षेत्र का 98.36% कुल अनाज का है। इस क्षेत्र में सबसे महत्वपूर्ण अनाज धान है जिसके अंतर्गत 83.34% शामिल है। धान के बाद गेहूँ का स्थान आता है। 2.66% क्षेत्र में इसकी खेती की जाती है। अन्य अनाजों में कोदो, कुटकी, ज्वार, मक्का व रागी हैं। जिनके अंतर्गत कुल फसली क्षेत्र का 0.04% भाग आता है। 11.81% अर्थात् 6198 हेक्टर क्षेत्र में दालें बोयी जाती है। जिसमें अरहर व तुअर प्रमुख है जो क्रमशः 57.74% व 26.72% है। शेष 15.54% क्षेत्र में मूंग, मटर, चना, उड़द व अन्य दालों का उत्पादन किया जाता है। तिलहनों के अंतर्गत कुल बोया क्षेत्र का 1.42% क्षेत्र आता है। प्रमुख तिलहन क्रमशः अलसी, राई/सरसों, तिल, मूंगफली, सोयाबीन एवं अन्य है।

भोजन व्यवस्था:

अध्ययन क्षेत्र के विभिन्न कृषक समुदायों में उनके द्वारा उत्पादित उपज एवं आर्थिक स्थिति में भिन्नता होने के कारण इनके खाद्यान्न उपभोग प्रतिरूप में भिन्नता स्पष्ट दिखाई पड़ती है। प्रदेश में धान, कोदो-कुटकी, गेहूँ, मक्का, ज्वार, तिवरा, अरहर, लाखड़ी इत्यादि प्रमुख फसलें पैदा की जाती है जबकि तेल गुड, शक्कर, नमक, मिर्च, मसालें इत्यादि सामग्री दुकानों से खरीदी जाती है। सामान्यतः अध्ययन क्षेत्र में दिन में तीन बार भोजन किया जाता है।

(1) प्रातः कालीन भोजन

अध्ययन क्षेत्र में प्रातः कालीन भोजन में बासी का प्रमुख स्थान होता है। इसका उपयोग प्रायः सभी कृषक वर्ग के लोगों के द्वारा किया जाता है। भूमिहीन एवं लघु कृषक परिवारों में इसका सबसे अधिक प्रयोग होता है। जबकि वृहत कृषक वर्ग के परिवारों में रोटी का प्रचलन बढ़ रहा है।

(2) मध्याह्न कालीन भोजन

अध्ययन क्षेत्र के परिवारों का मध्याह्न भोजन में चावल और दाल या हरी सब्जी का प्रयोग होता है। चावल

(कोनारी, परसदा, कोहका एवं जांजगीर) का चुनाव दैनिकदर्शन विधि द्वारा किया गया है। चयनित गांवों से 280 परिवारों के खाद्य उपलब्धता की जानकारी अनुसूची एवं साक्षात्कार के माध्यम से प्राप्त की गई है। पोषण स्तर का मूल्यांकन भारतीय आयुर्विज्ञान अनुसंधान परिषद द्वारा अनुशंसित विधि का प्रयोग करके किया गया है। सर्वेक्षित परिवारों में पोषण स्तर को मापने के लिए भूमि की उपलब्धता के आधार पर चार कृषक परिवारों में वर्गीकृत किया गया है।

के साथ दाल एवं सब्जी का एक साथ प्रयोग कम परिवारों में होता है। वृहत एवं मध्यम कृषक वर्ग के परिवारों में दाल का प्रयोग प्रायः प्रतिदिन होता है जबकि भूमिहीन एवं लघु कृषक परिवारों में सप्ताह में 2 या 3 दिन ही दाल का प्रयोग होता है।

(3) रात्रि कालीन भोजन

रात्रि कालीन भोजन में चावल एवं रोटी का प्रयोग होता है। दाल के स्थान पर सब्जी का प्रयोग होता है। वृहत कृषक परिवारों में चावल के स्थान पर रोटी का प्रयोग होता है जबकि भूमिहीन परिवारों में रात्रि कालीन भोजन में रोटी का प्रयोग नहीं होता है।

खाद्य पदार्थों का उपभोग प्रतिरूप:

फसल प्रतिरूप का वहाँ के लोगों के भोजन पर बहुत प्रभाव पड़ता है। सामान्यतः जिस फसल का उत्पादन अधिक होता है। भोजन प्रतिरूप में भी उसी फसल का प्रतिषत सर्वाधिक होता है। सर्वेक्षित क्षेत्र चावल प्रधान क्षेत्र है एवं इसी खाद्यान्न फसल का सर्वाधिक उपयोग किया जाता है।

खाद्य पदार्थों के उपभोग के आधार पर आहार प्रतिरूप एवं पोषण स्तर को मापने के लिए सर्वेक्षित परिवारों में भूमि की उपलब्धता के आधार पर चार कृषक परिवारों में वर्गीकृत किया गया है जो निम्नानुसार हैं - 1.भूमिहीन मजदूर (0 एकड़), 2. लघु कृषक (0-5 एकड़), 3. मध्यम कृषक (5-10 एकड़) 4. वृहत कृषक (10 से अधिक एकड़)।(सारणी क्रमांक -2)

चावल का उपभोग प्रतिरूप -

सर्वेक्षित क्षेत्र में चावल प्रमुख खाद्यान्न फसल है। चावल उर्जा का मुख्य स्रोत है। उर्जा का 80 प्रतिषत भाग चावल से प्राप्त होता है। सर्वेक्षित परिवारों में चावल का औसत उपभोग प्रति व्यक्ति प्रतिदिन 535 ग्राम है जो कि ICMR के अनुशंसित मात्रा (500) से अधिक है। चावल का औसत उपभोग भूमिहीन मजदूर परिवारों में 536 ग्राम, लघु कृषक परिवारों में 538 ग्राम, मध्यम कृषक परिवारों में 548 ग्राम तथा वृहत परिवारों में 517 ग्राम प्रतिव्यक्ति प्रतिदिन है।

सारणी क्रमांक -2
प्रतिदिन प्रतिव्यस्क के लिये संतुलित आहार (कठिन कार्य)

क्रम	खाद्य पदार्थ	अनुशंसित मात्रा(ग्राम)	प्रतिदिन प्रतिव्यस्क औसत उपभोग प्रतिरूप, आय वर्गानुसार (ग्राम)				औसत
			भूमिहीन मजदूर	लघु कृषक	मध्यम कृषक	वृहत कृषक	
1	चावल	500	536	538	548	517	535
2	दाल	70	17.9	20.88	29.44	37.08	26.32
3	गेहूं	70	18.15	36.9	61.72	84.7	50.36
4	सब्जी	300	211	223	233	247	229
5	दूध	80	17.28	50	62.4	54.98	46.16
6	मांस-मछली	25	5.88	6.2	5.58	12.39	7.51
7	वसा/तेल	30	11.38	11.78	13.82	18.86	13.96
8	षक्कर/गुड़	30	23.35	25.05	29.4	39.48	29.32

स्रोत : व्यक्तिगत सर्वेक्षण

दाल का उपभोग प्रतिरूप -

दाल प्रोटीन का मुख्य स्रोत है। दाल में तिवरा, अरहर, चना एवं उड़द दालों का प्रयोग अधिक होता है। अध्ययन क्षेत्र में दाल का उत्पादन उपभोग कम मात्रा में होता है। सर्वक्षित परिवारों में दाल का औसत उपभोग प्रतिदिन प्रतिव्यक्ति 26.32 ग्राम है। दाल का उपभोग क्रमशः भूमिहीन मजदूर परिवारों में 17.9 ग्राम, लघु कृषक परिवारों में 20.88 ग्राम, मध्यम कृषक परिवारों में 29.44 ग्राम तथा वृहत कृषक परिवारों में 37.08 ग्राम प्रतिव्यक्ति प्रतिदिन होता है।

गेहूं का उपभोग प्रतिरूप -

चावल के बाद खाद्यान फसल में गेहूं प्रमुख फसल है। इसमें प्रोटीन, विटामिन व कार्बोहाइड्रेट भरपूर मात्रा में होती है। सर्वक्षित ग्रामीण परिवारों में गेहूं का उपयोग बहुत कम मात्रा में किया जाता है। सर्वक्षित परिवारों में गेहूं का औसत उपभोग प्रतिव्यक्ति प्रतिदिन 50.36 ग्राम है। गेहूं का उपभोग क्रमशः भूमिहीन मजदूर परिवारों में 18.15 ग्राम, लघु कृषक परिवारों में 36.90 ग्राम, मध्यम कृषक परिवारों में 61.72 ग्राम एवं वृहत कृषक परिवारों में 84.70 ग्राम प्रतिव्यक्ति प्रतिदिन होता है जो कि अनुशंसित मात्रा (70ग्राम) से काफी कम है।

सब्जी का उपभोग प्रतिरूप -

मानव के भोजन में खाद्यान अनाज के साथ अनेक प्रकार की साग-सब्जियों का प्रयोग होता है। सब्जियाँ खनिज, लवण तथा विटामिन के स्रोत हैं। सब्जी मानव शरीर के विभिन्न पोषक तत्वों के द्वारा ताप एवं शक्ति प्रदान करती है। सब्जियों में आलू, भाटा, मूली, भिण्डी, लोकी, कुम्हड़ा, तुरई, सेम, बरबटी, करेला, गोभी, पत्तागोभी एवं हरे पत्तियों वाली भाजियाँ सम्मिलित हैं। सर्वक्षित परिवारों में प्रतिदिन प्रतिव्यक्ति 229 ग्राम सब्जी उपलब्ध है जो अनुशंसित मात्रा (300) से काफी कम है। सब्जी का उपभोग क्रमशः भूमिहीन मजदूर परिवारों में 211 ग्राम, लघु कृषक परिवारों में 223 ग्राम, मध्यम कृषक परिवारों में 233 ग्राम तथा वृहत कृषक परिवारों में 247 ग्राम प्रतिव्यक्ति प्रतिदिन होता है।

दूध का उपभोग प्रतिरूप -

दूध सभी पोषक तत्वों प्रोटीन, विटामिन, वसा, खनिज, कार्बोहाइड्रेट्स का प्रधान स्रोत है। यह शरीर के वृद्धि व विकास में सहायक होते हैं। सर्वक्षित परिवारों में इसका औसत उपभोग 46.16 ग्राम प्रतिव्यक्ति प्रतिदिन है। दूध भूमिहीन मजदूर परिवारों में 17.28 ग्राम, लघु कृषक परिवारों में 50 ग्राम, मध्यम कृषक परिवारों में 62.40 ग्राम

तथा वृहत कृषक परिवारों में दूध का उपभोग 64.98 ग्राम प्रतिदिन प्रतिव्यक्ति होता है जो कि संतुलित मात्रा (80) से कम है।

खाद्य तेल का उपभोग प्रतिरूप -

खाद्य तेल कैलोरी व वसा का मुख्य स्रोत होता है। तेल शरीर के तापमान को स्थिर रखने तथा त्वचा की अनुरक्षण करने का कार्य करते हैं। चयनित परिवारों में खाद्य तेल का औसत उपभोग प्रतिव्यक्ति प्रतिदिन 13.96 ग्राम है। भूमिहीन मजदूर परिवारों में 11.38 ग्राम, लघु कृषक परिवारों में 11.78 ग्राम तथा मध्यमकृषक परिवारों में 13.82 ग्राम तथा वृहत कृषक परिवारों में खाद्य तेल का उपभोग 18.86 ग्राम प्रतिव्यक्ति प्रतिदिन होता है। जो अनुशंसित मात्रा (30) से काफी कम है।

गुड़-शक्कर का उपभोग प्रतिरूप -

शक्कर कार्बोहाइड्रेट्स का प्रमुख स्रोत है। ग्रामीण क्षेत्र में इसका प्रयोग मिष्ठान, व्यंजन, पकवान व पेय पदार्थों में करते हैं। सर्वक्षित परिवारों में शक्कर का उपभोग प्रतिव्यक्ति प्रतिदिन 29.32 ग्राम है। भूमिहीन मजदूर परिवारों में 23.35 ग्राम, लघु कृषक परिवारों में 25.05 ग्राम, मध्यम कृषक परिवारों में 29.4 ग्राम तथा वृहत कृषक परिवारों में शक्कर का उपभोग 39.48 ग्राम प्रतिव्यक्ति प्रतिदिन होता है। वृहत कृषक परिवारों में शक्कर का अधिक प्रयोग उनके आर्थिक संपन्नता एवं खरीद क्षमता प्रमुख कारण रहा है।

पोषक तत्वों की उपलब्धता -

शरीर की वृद्धि एवं विकास के लिए पोषक तत्वों यथा- कैलोरी, प्रोटीन, कैल्शियम, लोहा, विटामिन आदि का आवश्यकता होती है। इनकी पूर्ति अनाज, दाल, साग-सब्जी, तेल, मांस, मछली, अंडे आदि से निश्चित मात्रा में ही हो पाती है।

(1) कैलोरी उपभोग प्रतिरूप -

भोजन से मानव को कैलोरी की प्राप्ति होती है कैलोरी ऊर्जा का मुख्य स्रोत है जो मनुष्य को कार्य करने के लिए क्षमता प्रदान करती है। शारीरिक कोशों में इनके आक्सीकरण की निरंतर क्रिया होती रहती है। व्यक्ति के कार्य, शारीरिक बनावट, आयु, संरचना एवं लिंग के अनुसार कैलोरी की मात्रा भिन्न होती है। औसत रूप से एक व्यस्क व्यक्ति को प्रतिदिन 2400 कैलोरी की आवश्यकता होती है।

सर्वक्षित परिवारों में कैलोरी का प्रतिव्यक्ति प्रतिदिन औसत उपभोग 2308 ग्राम है। जो ICMR के अनुशंसित मात्रा (2400) से बहुत कम (-92 ग्राम) है। भूमिहीन मजदूर परिवारों में कैलोरी का उपभोग 2114 ग्राम एवं लघु कृषक परिवार में 2240 ग्राम प्रतिव्यक्ति प्रतिदिन

रही है। जो अनुसंशित मात्रा से कमशः 386 एवं 160 ग्राम कम है। वहीं मध्यम कृषक परिवार में 2414 ग्राम तथा वृहत कृषक परिवारों में कैलोरी का उपभोग 2464 ग्राम प्रतिव्यक्ति प्रतिदिन हो रही है। जो अनुसंशित मात्रा से कमशः 14 तथा 64 ग्राम अधिक है। इस प्रकार कैलोरी उपभोग का जोत के आकारों से धनात्मक संबंध को दर्शाता है।

(2) प्रोटीन का उपभोग प्रतिरूप -

कैलोरी के पश्चात पोषक तत्वों में प्रोटीन प्रमुख है। यह शरीर को ऊर्जा प्रदान करती है और शरीर के निर्माण में उपयोगी है। सर्वशक्ति परिवारों में प्रोटीन का प्रतिव्यक्ति प्रतिदिन औसत उपभोग 51.52 ग्राम है जो कि अनुसंशित मात्रा (55) से कम है। प्रोटीन का उपभोग भूमिहीन मजदूर परिवारों में 44.26 ग्राम, लघु कृषक परिवारों में 48.88 ग्राम एवं मध्यम कृषक परिवारों में 54.80 ग्राम प्रतिव्यक्ति प्रतिदिन है। जो कि अनुसंशित मात्रा से कमशः 10.74, 6.12 तथा 0.20 ग्राम कम है। जबकि वृहत कृषक परिवारों में प्रोटीन का उपभोग 58.12 ग्राम प्रतिव्यक्ति प्रतिदिन होता है। जो कि अनुसंशित मात्रा से 3.12 ग्राम अधिक है।

समस्याएं एवं सुझाव -

अध्ययन क्षेत्र के ग्रामीण परिवारों में पोषक तत्वों की आवश्यक मात्रा का अभाव है। जिसके फलस्वरूप ग्रामीण क्षेत्र में कुपोषण व अल्पोषण की समस्या व्याप्त है। अशिक्षा, अज्ञानता व गरीबी के कारण ग्रामीण क्षेत्र में लोग पौष्टिक आहार नहीं ले पाते हैं। अतः शिक्षा का प्रसार कर, जागरूकता एवं पौष्टिक आहार प्रदान कर पोषण संबंधी समस्याओं को दूर किया जा सकता है।

पोषणतत्वों की कमी को दूर करने हेतु निम्न सुझाव प्रस्तुत है -

1. ग्रामीण क्षेत्र में पोषण समस्याओं का समाधान करने के लिए शिक्षा का प्रसार किया जाना चाहिए। खास कर स्त्री शिक्षा का प्रचार प्रसार एवं महत्व प्रदान करना।
2. ग्रामीण क्षेत्र में अध्ययन क्षेत्र के लोगों को अपने भोजन प्रतिरूप में परिवर्तन करना चाहिए।
3. ग्रामीण क्षेत्र में दुग्ध उत्पादन की ओर ध्यान देना चाहिए, ताकि इसका उपभोग करके पोषण स्तर को बढ़ाया जा सकें।
4. ग्रामीण क्षेत्र में शासन के साथ-साथ विभिन्न स्वयंसेवी संस्थाओं का योगदान उपयोगी हो सकता है।
5. भूमिहीन मजदूर एवं निम्न वर्ग के कृषक परिवारों को पौष्टिक आहार का मुफ्त वितरण किया जाना चाहिए। साथ ही इन्हें स्वास्थ्य संबंधी शिक्षा भी देनी चाहिए।
6. ग्रामीण क्षेत्र में सामाजिक चेतना का विकास किया जाना चाहिए।
7. ग्रामीण क्षेत्र में रोजगार का विकास कर इन्हें आर्थिक रूप से सुदृढ़ बनाया जाना चाहिए। लघु उद्योग एवं कुटीर उद्योग का ग्रामीण क्षेत्र में विकास हो। इस प्रकार ग्रामीण कृषक लघु उद्योग को अपनाकर कुशल श्रमिक के रूप में अपनी स्थिति सुधार सकेंगे एवं पोषण स्तर तथा स्वास्थ्य में सुधार ला सकेंगे।

निष्कर्ष :

इसप्रकार उपर्युक्त अध्ययन से स्पष्ट है कि रायपुर जिले के तिल्दा विकासखण्ड के ग्रामीण क्षेत्रों में निवासरत् परिवारों के व्यक्तियों में औसत उपभोग की दृष्टिकोण से पोषक तत्वों की प्राप्ति अनुसंशित मात्रा से कम है जो आय

वर्ग पर निर्भर करता है। आय वर्ग से स्पष्ट है कि इनके खानपान की आदतें एवं भोज्य पदार्थ की उपलब्धता में पर्याप्त अंतर है, जिसके कारण उनका पोषण स्तर भी प्रभावित है। अतः स्पष्ट है कि कैलोरी की कमी से कार्यक्षमता प्रभावित होती है।

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ग्रामीण भागातील कोविड-19 आणि लसीकरण कार्यक्रमाचे अध्ययन

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Abstract:

केंद्रीय अर्थ आणि कॉर्पोरेट व्यवहार मंत्री निर्मला सीतारामन यांनी मांडलेला आर्थिक सर्वेक्षण 2022-23 च्या अहवालात भारताच्या राष्ट्रीय कोविड-19 लसीकरण कार्यक्रमाला मिळालेल्या यशाचे तपशीलवार वर्णन केले आहे. त्यानुसार भारताने 6 जानेवारी 2023 पर्यंत देशात 220 कोटी पेक्षा जास्त कोविड लस मात्रा (डोस) दिल्या आहेत. 97% पात्र लाभार्थ्यांना यापूर्वीच कोविड 19 लसीचा किमान एक मात्रा मिळाली आहे आणि सुमारे 90% पात्र लाभार्थ्यांना दोन्ही मात्रा मिळाल्या आहेत. 12-14 वर्षे वयोगटासाठी 16 मार्च 2022 रोजी लसीकरण सुरू करण्यात आले, त्यानंतर 10 एप्रिल 2022 पासून 18 ते 59 वर्षे वयोगटासाठी बूस्टर डोस देण्यात आला. तसेच, 22.4 कोटी बूस्टर डोस देण्यात आल्याचे सर्वेक्षणात पुढे म्हटले आहे.

भारताचा राष्ट्रीय कोविड-19 लसीकरण कार्यक्रम जो जगातील सर्वात मोठा लसीकरण कार्यक्रम आहे. 16 जानेवारी 2021 रोजी सुरू झाला, सुरुवातीला देशातील प्रौढ लोकसंख्येचे कमीत कमी कालावधीत लसीकरण करणे हे त्याचे उद्दिष्ट होते. त्यानंतर लसीकरण कार्यक्रमात बारा वर्षे आणि त्याहून अधिक वयाच्या सर्व व्यक्तींचा समावेश करण्यासाठी तसेच 18 वर्षे आणि त्याहून अधिक वयाच्या सर्व व्यक्तींना बूस्टरडोस देण्यासाठी लसीकरण कार्यक्रमाचा विस्तार करण्यात आला.

Keywords: कोरोना महामारी, लसीकरण, अर्थव्यवस्था प्रभाव, शहरातील ग्रामीण भागात पलायन, लॉकडाऊन प्रतिकूल परिणाम

प्रस्तावना:

आधुनिक समाजाच्या आणि राष्ट्राच्या जडणघडणीत अर्थव्यवस्थेची स्थान अतिशय महत्वाचे आहे. आपल्या भारताच्या अर्थव्यवस्थेचे वर्णन केले असता भारत हा कृषिप्रधान देश म्हणून दिसून येतो. भारतीय अर्थव्यवस्थेचा पाया हा ग्रामीण भागातून रुजलेला दिसून येतो. अर्थव्यवस्थेचे अध्ययन करित असताना जगातील परंपरेचा अभ्यास केला तर नैसर्गिक आपत्ती आलेली दिसून येते. 1720 मध्ये प्लेग हा रोग महामारीच्या रूपाने आला होता त्यानंतर 1820 मध्ये एशियाई देशात हैजा, 1920 मध्ये स्पॅनिश फ्लू आणि आता 2019-20 मध्ये कोरोना महामारीने परत ही परंपरा दर शंभर वर्षांनी येणारी महामारी दृढ केल्याचे दिसून येते. कोरोनाव्हायरस पहिल्यांदा 1930 च्या दशकात सापडले जेव्हा संसर्गजन्य ब्रॅड फायटीस विषाणूमुळे IBUपाळीव कोंबड्यांचा तीव्र श्वसन संसर्ग झाल्याचे दिसून आले. 1940 मध्ये MHV आणि ट्रान्समिसिसिवल ग्रॅन्ट्रोएन्टेरिटिस व्हायरस (TGEV) व आणखी दोन प्राणी कॉर्नॉव्हायरसपासून अलग ठेवण्यात आले. 1960 मध्ये ह्युमन कोरोना व्हायरस तर 2003 मध्ये सार्स-सीओव्ही, एचसीओव्ही एनएल 2004 मध्ये एच के 2019 मध्ये मेर्स-सीओव्ही आणि 2019 मध्ये एसएआरएस-कोव्ही-2 (पुर्वी 2019-एनसीओव्ही म्हणून ओळखले जाणारे) या कुटुंबातील अन्य सदस्यांची ओळख पटली आहे. कोरोना म्हणजे

“किरीट” किंवा “तेजोवलय” तोरण किंवा “परिवलय मुकुट” असा मराठी विश्वकोशात अर्थ सांगितला आहे. लॅटिन भाषेत कोरोना म्हणजे “मुकुट” असा अर्थ होतो.

सर्वेक्षित उत्तरदात्यांच्या कोरोना मृत्युच्या स्थितीचा अभ्यास केला असता त्याचे प्रमाण 92.67 टक्के आढळून आले.

1. सर्वेक्षित उत्तरदात्यांच्या कोरोना प्रतिबंधाच्या स्थितीचा अभ्यास केला असता सर्व नियम पाळल्याचे प्रमाण 90.22 टक्के असल्याचे आढळून आले.
2. ग्रामीण भागात कोरोना संक्रमण होवु नये म्हणून परंपरागत उपचार पध्दतीचा वापर करण्याचे प्रमाण 99.56 टक्के आढळून आले.3
3. सर्वेक्षित उत्तरदात्यांच्या लस घेण्याच्या स्थितीचा अभ्यास केला असता दोन डोस घेतल्याचे प्रमाण 80.44 टक्के आढळून आले.
4. सर्वेक्षित उत्तरदात्यांच्या लसीच्या साईड इफेक्टची स्थितीचा अभ्यास केला असता, त्याचे साईड इफेक्ट जास्त होते याचे प्रमाण 60.89 टक्के आढळून आले.

लक्षण:

1. ताप येणे, थंडी वाजणे
2. थरथरणे
3. स्नायूंमध्ये दुखणे
4. डोकेदुखी

5. खोकला किंवा घसा खवखवणे
6. चव न कळणे किंवा वास न येणे

उद्दिष्टे:

1. कोरोना महामारीच्या लसीकरण कार्यक्रमाचे अध्ययन करणे
2. कोरोना महामारीच्या प्रभावाचे अध्ययन करणे
3. कोरोना महामारीच्या लसीकरणाचे फायदे काय झाले याचे अध्ययन करणे
4. कोरोना महामारीच्या लसीकरणा मुळे झालेल्या नुकसानाचे अध्ययन करणे

गृहीतके:

1. कोरोना महामारीचा सामाजिक जीवनावर प्रभाव पडला
2. कोरोना महामारीच्या लसीकरणा मुळे कोरोना प्रतिबंध करण्यात आला
3. कोरोना लसीकरणा चे अनुकूल आणि प्रतिकूल परिणाम दिसून आले

विषयाचे महत्व:

कोरोना महामारी ही जगातील सगळ्यात मोठी महामारी म्हणून गणल्या गेली होती, डब्ल्यू. एच. ओ. ने जागतिक महामारी म्हणून घोषित केले होते. कोरोना लसीकरणा मुळे बऱ्याच प्रमाणात कोरोनाला प्रतिबंध किंवा आळा घालण्यात आला होता. याचा अभ्यास करणे गरजेचे वाटल्यामुळे या विषयाची निवड करण्यात आली.

तथ्य संकलन:

प्राथमिक स्रोत - मुलाखत अनुसूची

द्वितीय स्रोत - शासकीय अहवाल, वृत्तपत्रे, मासिके, जर्नल, संशोधन विषयाशी निगडित पुस्तके, वेब पोर्टल इत्यादी.

संशोधन पद्धती:

प्रस्तुत संशोधनात ग्रामीण भागातील कोविड-19 आणि लसीकरण कार्यक्रमाचे अध्ययन या विषयाची निवड केली असून या संशोधन पद्धतीमध्ये गैरसंभव्यता नमुना निवड पद्धती अंतर्गत सर्वेक्षणात्मक संशोधन पद्धतीचा अवलंब करण्यात आलेला आहे. प्रस्तुत संशोधनामध्ये वर्णनात्मक संशोधन पद्धती सोबतच संशोधन अहवाल, प्रबंध, मासिके वृत्तपत्र, शासकीय संस्थांच्या अहवाल, इंटरनेट यामधून संशोधनाचे अध्ययन करण्यात आलेले आहे.

समारोप:

केंद्रीय अर्थ आणि कॉर्पोरेट व्यवहार मंत्री निर्मला सीतारामन यांनी मांडलेला आर्थिक सर्वेक्षण 2022-23 च्या अहवालात भारताच्या राष्ट्रीय कोविड-19 लसीकरण कार्यक्रमाला मिळालेल्या यशाचे तपशीलवार वर्णन केले आहे. त्यानुसार भारताने 6 जानेवारी 2023 पर्यंत देशात 220 कोटी पेक्षा जास्त कोविड लस मात्रा (डोस) दिल्या आहेत. 97% पात्र लाभार्थ्यांना यापूर्वीच कोविड 19 लसीचा किमान एक मात्रा मिळाली आहे आणि सुमारे 90% पात्र लाभार्थ्यांना दोन्ही मात्रा मिळाल्या आहेत. 12-14 वर्षे वयोगटासाठी 16 मार्च 2022 रोजी लसीकरण सुरू करण्यात

आले, त्यानंतर 10 एप्रिल 2022 पासून 18 ते 59 वर्षे वयोगटासाठी बूस्टर डोस देण्यात आला. तसेच, 22.4 कोटी बूस्टर डोस देण्यात आल्याचे सर्वेक्षणात पुढे म्हटले आहे.

भारताचा राष्ट्रीय कोविड-19 लसीकरण कार्यक्रम जो जगातील सर्वात मोठा लसीकरण कार्यक्रम आहे. 16 जानेवारी 2021 रोजी सुरू झाला, सुरुवातीला देशातील प्रौढ लोकसंख्येचे कमीत कमी कालावधीत लसीकरण करणे हे त्याचे उद्दिष्ट होते. त्यानंतर लसीकरण कार्यक्रमात बारा वर्षे आणि त्याहून अधिक वयाच्या सर्व व्यक्तींचा समावेश करण्यासाठी तसेच 18 वर्षे आणि त्याहून अधिक वयाच्या सर्व व्यक्तींना बूस्टरडोस देण्यासाठी लसीकरण कार्यक्रमाचा विस्तार करण्यात आला.

वरील संशोधनामध्ये कोरोना महामारीचा सामाजिक अर्थव्यवस्थेवर व आरोग्यावर खूप मोठ्या प्रमाणात प्रभाव झालेला दिसून येतो. कोरोना महामारीचा परिणाम ग्रामीण भागातील आरोग्यावर मोठ्या प्रमाणात दिसून येतो. शहरी भागातून लोकांचे पलायन झाल्यामुळे ग्रामीण भागातील लोकांमध्ये भीती निर्माण झाली होती आणि मोठा प्रभाव कोरोना महामारीचा पडलेला दिसून येतो. अनेक लोक मृत्युमुखी पडलेले दिसून येते. जीवित हानी मोठ्या प्रमाणावर झालेली दिसून येते. सोबतच आर्थिक नुकसान भारताचे सोबतच जगातील देशांचे झालेले दिसून येते. कोविड-19 लसीकरण मुळे बऱ्याच लोकांनी लसीकरण घेण्यात आली होती. बऱ्याच लोकांनी लसीकरण घेतलेली नव्हती कारण त्यांच्या मनामध्ये भीती होती की या वॅक्सिनमुळे आरोग्यावर परिणाम होतो. कोरोना महामारी ला आळा घालण्यासाठी भारत सरकारने कोविड-19 वर उपाय म्हणून को वॅक्सिन आणि कोविड शिल्ड या पद्धतीचा लसीकरण ग्रामीण भागातून शहरी भागापर्यंत केल्याचे दिसून येते. त्यामध्ये सार्स-कोविड यावर नियंत्रण करण्यासाठी हा उपाय केलेला होता.

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महाराष्ट्र के जल संचयन की योजनाएं और कार्यक्रम

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सारांश:

इस शोध पत्र में महाराष्ट्र राज्य की जल संचयन योजनाओं और कार्यक्रमों का विस्तृत अध्ययन किया गया है। महाराष्ट्र, जो अर्ध-शुष्क उष्णकटिबंधीय मानसूनी जलवायु का अनुभव करता है, अक्सर जल संकट और सूखे की समस्याओं से जूझता है। राज्य की आधी से अधिक जनसंख्या कृषि पर निर्भर है, इसलिए पानी का उचित प्रबंधन अत्यावश्यक हो जाता है।

इस शोध में, महाराष्ट्र सरकार द्वारा जल संचयन और जल संरक्षण के लिए लागू की गई प्रमुख योजनाओं पर चर्चा की गई है। इनमें जलसंधारण योजना, सौम्य जल योजना, पानी बचाओ अभियान, कृषि जल प्रबंधन योजना, जल पुनर्चक्रण योजना और शिक्षा एवं जागरूकता कार्यक्रम शामिल हैं। इन योजनाओं का उद्देश्य राज्य की पानी की समस्याओं का समाधान करना, भूजल स्तर को बढ़ाना, और पानी के पुनः उपयोग एवं संचयन को प्रोत्साहित करना है।

जलसंधारण योजना वर्षा जल को संग्रहित कर भूजल स्तर को बढ़ाने का कार्य करती है, जबकि सौम्य जल योजना विशेष रूप से सूखा प्रभावित क्षेत्रों में बोरवेल और चेक डैम के माध्यम से जल संचयन सुनिश्चित करती है। पानी बचाओ अभियान जनता में जल संरक्षण के प्रति जागरूकता फैलाने का कार्य करता है। कृषि जल प्रबंधन योजना और जल पुनर्चक्रण योजना में कृषि क्षेत्र में जल का निरंतर उपयोग, ड्रिप सिंचाई और पुनः उपयोग किए गए जल का प्रयोग कर टिकाऊ तरीके से जल प्रबंधन पर ध्यान केंद्रित किया गया है।

मुख्य शब्द: महाराष्ट्र जल संचयन, जल संरक्षण योजना, भूजल स्तर, सूखा प्रबंधन, जल पुनर्चक्रण, पानी बचाओ अभियान, कृषि जल प्रबंधन

परिचय:

महाराष्ट्र राज्य भारतवर्ष के पश्चिम और मध्य दोनों क्षेत्रों को शामिल करता है, जिसमें अरब सागर के किनारे लगभग 720 किलोमीटर तक फैला एक विस्तृत किनारा है। वर्तमान अनुमानित जनसंख्या लगभग 13.16 करोड़ की आबादी वाला यह राज्य 0.308 मिलियन वर्ग किलोमीटर के भौगोलिक क्षेत्र को कवर करता है, यह राज्य जनसंख्या के मामले में दूसरे स्थान पर और भूमि क्षेत्र में तीसरे स्थान पर है। महाराष्ट्र शहरीकरण की दर उल्लेखनीय है, इसकी 45.2% आबादी शहरी इलाकों में रहती है। राज्य में अर्ध-शुष्क विशेषताओं वाली उष्णकटिबंधीय मानसून जलवायु का अनुभव होता है। स्थान और समय दोनों में परिवर्तनशीलता इसके वर्षा ऋतु की विशेषता है, जिसका वार्षिक औसत 400 से 600 के बीच है। महाराष्ट्र अक्सर सूखे की स्थिति का सामना करता है, जिसका असर इसके लगभग 42.5% भूमि क्षेत्र पर पड़ता है। उल्लेखनीय रूप से, राज्य

का सकल फसल क्षेत्र 22.9 मिलियन हेक्टेयर (2015) है, जिसमें 17.19 मिलियन हेक्टेयर का शुद्ध बोया गया क्षेत्र और 5.929 मिलियन हेक्टेयर में कई बार बोया गया क्षेत्र शामिल है। राज्य की आधी आबादी की आजीविका में कृषि एक महत्वपूर्ण भूमिका निभाती है। कृषि पानी की सबसे ज्यादा प्यासी उपभोक्ता है। इसके चुनौतियों का समाधान करने के लिए महाराष्ट्र के जल संचयन की योजनाएं और कार्यक्रम एक व्यापक रोडमैप प्रस्तुत करता है। जो जल के मामले में आत्मनिर्भर हो सकता है: यह सुनिश्चित करना कि कृषि से लेकर घरेलू उपयोग, शुद्ध पेय जल तथा नगरपालिका और औद्योगिक तक कई जरूरतों को पूरा करने के लिए पर्याप्त पानी हो। इसका यह भी अर्थ है कि जलवायु परिवर्तन के प्रभावों, जैसे कि वर्षा की कमी और सूखा, या बहुत अधिक वर्षा और बाढ़ के प्रति प्रतिरोधी होने के बावजूद जल आपूर्ति निरंतर बनी रहेगी।

वर्तमान में जल संकट एक गंभीर समस्या बनती जा रही है, खासकर सूखे और जलवायु परिवर्तन के प्रभावों के

कारण। इस समस्या के समाधान के लिए महाराष्ट्र सरकार ने विभिन्न योजनाएँ और कार्यक्रम विकसित किए हैं, जो जल संचयन और संरक्षण को बढ़ावा देते हैं। ये योजनाएँ न केवल सतत जल संसाधनों का संरक्षण करती हैं, बल्कि कृषि और ग्रामीण विकास में भी महत्वपूर्ण भूमिका निभाती हैं। महाराष्ट्र ने जल संचयन के लिए कई योजनाएँ और कार्यक्रम शुरू किए हैं। यहाँ कुछ प्रमुख योजनाओं का संक्षेप में विवरण दिया गया है:

1. **जलसंधारण योजना:** यह योजना वर्षा के पानी को संचित करने के लिए बनाई गई है, जिससे भूजल स्तर में सुधार हो सके। इसमें जलाशयों और तालाबों का निर्माण शामिल है।
2. **सौम्य जल योजना:** इस योजना के तहत जल संचयन के लिए बोरवेल, चेक डेम और अन्य जल संरचनाओं का निर्माण किया जाता है। यह योजना विशेष रूप से सूखे क्षेत्रों में जल आपूर्ति सुनिश्चित करने के लिए है।
3. **पानी बचाओ अभियान:** यह अभियान नागरिकों को जल संरक्षण के महत्व के प्रति जागरूक करने के लिए चलाया जाता है। इसमें विभिन्न सामुदायिक गतिविधियाँ और कार्यशालाएँ शामिल हैं।
4. **कृषि जल प्रबंधन योजना:** यह योजना कृषि में जल के उपयोग को सुधारने और संचय करने के लिए विशेष तकनीकों को अपनाने पर केंद्रित है। इसमें ड्रिप सिंचाई और वर्षा जल संचयन तकनीकें शामिल हैं।
5. **जल पुनर्चक्रण योजनाएँ:** सरकार ने जल पुनर्चक्रण को बढ़ावा देने के लिए भी कदम उठाए हैं, ताकि अपशिष्ट जल को उपचारित करके पुनः उपयोग किया जा सके।
6. **शिक्षा और जागरूकता कार्यक्रम:** स्कूलों और समुदायों में जल संरक्षण के बारे में जागरूकता फैलाने के लिए कार्यक्रम आयोजित किए जाते हैं।

इन योजनाओं का उद्देश्य जल संकट को कम करना, भूजल स्तर को बढ़ाना और जल संसाधनों का समुचित उपयोग करना है। इन पहलों के जरिए सरकार जल संकट के प्रभाव को कम करने की दिशा में कार्य कर रही है।

जलसंधारण योजना:

जलसंधारण योजना महाराष्ट्र सरकार की एक महत्वपूर्ण पहल है, जिसका उद्देश्य वर्षा के पानी को संचित करना और जल संसाधनों का संरक्षण करना है। यहाँ इसके कुछ प्रमुख पहलू दिए गए हैं:

1. **उद्देश्य:**
 - वर्षा के पानी का संचय करना।
 - भूजल स्तर को बढ़ाना।
 - सूखे क्षेत्रों में जल आपूर्ति सुनिश्चित करना।
2. **मुख्य गतिविधियाँ:**
 - **तालाबों और जलाशयों का निर्माण:** पुराने तालाबों का पुनरुद्धार और नए जलाशयों का निर्माण किया जाता है।

- **चेक डेम:** छोटे-छोटे चेक डेम बनाए जाते हैं ताकि वर्षा के पानी को रोककर उसे भूमि में अवशोषित किया जा सके।
- **वृक्षारोपण:** जलसंधारण के साथ-साथ वृक्षारोपण भी किया जाता है, जिससे मिट्टी का कटाव रोका जा सके और जल का संरक्षण हो सके।

3. सामुदायिक भागीदारी:

- स्थानीय समुदायों को योजना में शामिल किया जाता है, जिससे वे अपने जल संसाधनों का बेहतर प्रबंधन कर सकें।
- ग्राम पंचायतों और स्वयंसेवी संगठनों को सक्रिय रूप से शामिल किया जाता है।

4. तकनीकी सहायता:

- योजना के तहत तकनीकी ज्ञान और सहायता प्रदान की जाती है, ताकि जलसंधारण के उपायों को प्रभावी ढंग से लागू किया जा सके।

5. सफलताएँ:

- कई क्षेत्रों में जलसंधारण के उपायों के परिणामस्वरूप जल स्तर में सुधार और कृषि उत्पादन में वृद्धि देखी गई है।

6. जागरूकता अभियान:

- जलसंधारण के महत्व को लेकर जागरूकता फैलाने के लिए कार्यशालाएँ और अभियान चलाए जाते हैं।

यह योजना न केवल जल संकट को कम करने में मदद करती है, बल्कि कृषि, पशुपालन और अन्य क्षेत्रों में भी विकास को प्रोत्साहित करती है।

सौम्य जल योजना:

सौम्य जल योजना महाराष्ट्र सरकार की एक पहल है, जिसका उद्देश्य जल संचयन और प्रबंधन को सुधारना है। यहाँ इसके प्रमुख पहलुओं का विवरण दिया गया है:

1. उद्देश्य:

- वर्षा के पानी का संचयन करना।
- भूजल स्तर को बनाए रखना और सुधारना।
- सूखा प्रभावित क्षेत्रों में जल की उपलब्धता सुनिश्चित करना।

2. मुख्य गतिविधियाँ:

- **बोरवेल और चेक डेम का निर्माण:** जल संचयन के लिए बोरवेल और छोटे चेक डेम बनाए जाते हैं, जिससे वर्षा के पानी को रोककर उसे भूमि में अवशोषित किया जा सके।
- **जल पुनर्चक्रण:** अपशिष्ट जल के उपचार के लिए योजनाएँ और तकनीकें अपनाई जाती हैं, ताकि इसे पुनः उपयोग किया जा सके।

3. सामुदायिक सहभागिता:

- स्थानीय समुदायों और ग्राम पंचायतों को योजना में शामिल किया जाता है, ताकि वे जल संरक्षण के उपायों को अपनाएँ।

- जागरूकता कार्यक्रम आयोजित किए जाते हैं, जिससे लोग जल के महत्व को समझें।
- 4. **तकनीकी सहायता:**
 - तकनीकी ज्ञान और संसाधनों की उपलब्धता सुनिश्चित की जाती है, ताकि लोग जल संचयन के तरीकों को सही ढंग से अपनाएँ।
- 5. **सफलताएँ:**
 - इस योजना के अंतर्गत कई क्षेत्रों में जल स्तर में सुधार और कृषि उत्पादन में वृद्धि देखी गई है।
- 6. **सतत विकास:**
 - योजना का उद्देश्य जल संसाधनों का सतत प्रबंधन और संरक्षण करना है, ताकि भविष्य की पीढ़ियों के लिए जल की उपलब्धता बनी रहे।

सौम्य जल योजना, जल संकट के समाधान में एक महत्वपूर्ण कदम है, जो न केवल जल संरक्षण को बढ़ावा देती है, बल्कि ग्रामीण क्षेत्रों के विकास में भी योगदान करती है।

पानी बचाओ अभियान:

पानी बचाओ अभियान महाराष्ट्र सरकार द्वारा चलाया गया एक महत्वपूर्ण जागरूकता कार्यक्रम है, जिसका उद्देश्य जल संरक्षण और जल संचयन के प्रति लोगों को जागरूक करना है। यहाँ इस अभियान के प्रमुख पहलुओं का विवरण दिया गया है:

1. उद्देश्य:

- जल के महत्व को समझाना और उसके सही उपयोग के लिए लोगों को प्रेरित करना।
- जल संकट के प्रभावों से अवगत कराना और उसे कम करने के उपाय सुझाना।

2. मुख्य गतिविधियाँ:

- **जागरूकता कार्यक्रम:** स्कूलों, कॉलेजों और समुदायों में कार्यशालाएँ और सेमिनार आयोजित किए जाते हैं।
- **सामुदायिक गतिविधियाँ:** स्थानीय स्तर पर सामुदायिक कार्यक्रमों का आयोजन किया जाता है, जैसे जल महोत्सव, निबंध प्रतियोगिता, और चित्रकला प्रतियोगिताएँ।
- **प्रदर्शनियाँ:** जल संरक्षण पर आधारित प्रदर्शनी आयोजित की जाती हैं, जिसमें जल के विभिन्न उपयोगों और संरक्षण तकनीकों को प्रदर्शित किया जाता है।

3. सामुदायिक सहभागिता:

- स्थानीय लोगों को अभियान में शामिल किया जाता है, ताकि वे सक्रिय रूप से जल संरक्षण में योगदान दे सकें।
- ग्राम पंचायतों और स्वयंसेवी संगठनों के साथ मिलकर कार्य किया जाता है।

4. संस्थानिक सहयोग:

- विभिन्न सरकारी और गैर-सरकारी संस्थाओं के सहयोग से कार्यक्रमों का आयोजन किया जाता है।
- विशेषज्ञों और वैज्ञानिकों की मदद से जल संरक्षण के प्रभावी उपाय सुझाए जाते हैं।

प्रा. डॉ. संजय गणपती भालेराव

5. सफलताएँ:

- इस अभियान के माध्यम से लोगों में जल के प्रति जागरूकता बढ़ी है और कई क्षेत्रों में जल संरक्षण की तकनीकों को अपनाया गया है।

6. लंबी अवधि के लक्ष्य:

- इस अभियान का उद्देश्य जल संकट को कम करना और भविष्य में जल संसाधनों का सतत प्रबंधन सुनिश्चित करना है।

पानी बचाओ अभियान, जल के महत्व को समझाने और संरक्षण की दिशा में महत्वपूर्ण कदम उठाने में मदद करता है, जिससे समुदायों में जल संकट के प्रति सजगता बढ़ती है।

कृषि जल प्रबंधन योजना:

कृषि जल प्रबंधन योजना महाराष्ट्र सरकार की एक महत्वपूर्ण पहल है, जिसका उद्देश्य कृषि में जल के उपयोग को अधिक प्रभावी और सतत बनाना है। यहाँ इस योजना के प्रमुख पहलुओं का विवरण दिया गया है:

1. उद्देश्य:

- कृषि में जल संसाधनों का कुशल प्रबंधन करना।
- जल की बर्बादी को कम करना और पानी की उपलब्धता सुनिश्चित करना।
- सूखे और जल संकट वाले क्षेत्रों में कृषि उत्पादन को बढ़ाना।

2. मुख्य गतिविधियाँ:

- **ड्रिप सिंचाई प्रणाली:** फसल के लिए आवश्यकतानुसार जल की आपूर्ति सुनिश्चित करने के लिए ड्रिप सिंचाई तकनीक को प्रोत्साहित किया जाता है। इससे जल की बर्बादी कम होती है।
- **स्प्रिंकलर सिंचाई:** इस प्रणाली के माध्यम से फसलों को समान मात्रा में पानी दिया जाता है, जिससे पानी का उपयोग अधिकतम किया जा सके।
- **वर्षा जल संचयन:** वर्षा के पानी को संचित करने के उपायों को अपनाने के लिए किसान परिवारों को प्रोत्साहित किया जाता है, जैसे तालाबों का निर्माण और चेक डेम।

3. सामुदायिक सहभागिता:

- स्थानीय किसानों और समुदायों को योजना में शामिल किया जाता है, ताकि वे जल प्रबंधन के तरीकों को समझें और अपनाएँ।
- प्रशिक्षण कार्यक्रम आयोजित किए जाते हैं, जहाँ किसानों को आधुनिक तकनीकों के बारे में जानकारी दी जाती है।

4. तकनीकी सहायता:

- सरकार विशेषज्ञों और कृषि वैज्ञानिकों की सहायता से जल प्रबंधन के सर्वोत्तम तरीकों को विकसित करती है।
- वित्तीय सहायता और अनुदान योजनाओं के माध्यम से किसानों को संसाधनों की उपलब्धता कराई जाती है।

5. सफलताएँ:

- योजना के अंतर्गत जल प्रबंधन में सुधार के परिणामस्वरूप कृषि उत्पादन में वृद्धि देखी गई है, खासकर सूखा प्रभावित क्षेत्रों में।

6. लंबी अवधि के लक्ष्य:

- जल संकट को कम करना और कृषि उत्पादन को स्थायी रूप से बढ़ाना।
- किसानों को जल संरक्षण के प्रति जागरूक करना और उन्हें सतत कृषि प्रथाओं को अपनाने के लिए प्रेरित करना।

कृषि जल प्रबंधन योजना, जल संसाधनों का कुशल उपयोग सुनिश्चित करने के लिए एक महत्वपूर्ण कदम है, जो न केवल कृषि क्षेत्र में सुधार लाता है, बल्कि पर्यावरण संरक्षण में भी मदद करता है।

जल पुनर्चक्रण योजनाएँ:

जल पुनर्चक्रण योजनाएँ उन पहलों को संदर्भित करती हैं, जिनका उद्देश्य अपशिष्ट जल का उपचार और पुनः उपयोग करना है। यह योजना जल संकट को कम करने और जल संसाधनों के सतत प्रबंधन के लिए महत्वपूर्ण है। यहाँ इस योजना के प्रमुख पहलुओं का विवरण दिया गया है:

1. उद्देश्य:

- अपशिष्ट जल को उपचारित करके पुनः उपयोग करना।
- जल संसाधनों का संरक्षण करना।
- जल संकट को कम करना और पर्यावरण को सुरक्षित रखना।

2. मुख्य गतिविधियाँ:

- **अपशिष्ट जल उपचार संयंत्र:** शहरी और ग्रामीण क्षेत्रों में अपशिष्ट जल को उपचारित करने के लिए संयंत्र स्थापित किए जाते हैं, जहाँ से पानी को पुनः उपयोग के लिए तैयार किया जाता है।
- **ट्रीटेड वॉटर का पुनः उपयोग:** उपचारित जल का उपयोग कृषि, औद्योगिक प्रक्रियाओं, और बागवानी में किया जाता है।
- **वर्षा जल संचयन:** वर्षा के पानी को संग्रहित करने की तकनीकें अपनाई जाती हैं, जिससे प्राकृतिक जल स्रोतों पर दबाव कम होता है।

3. सामुदायिक सहभागिता:

- स्थानीय समुदायों को जल पुनर्चक्रण के महत्व के बारे में जागरूक किया जाता है।
- स्वच्छता और जल संरक्षण कार्यक्रमों में सामुदायिक भागीदारी को बढ़ावा दिया जाता है।

4. तकनीकी सहायता:

- विशेषज्ञों द्वारा जल पुनर्चक्रण के लिए नई तकनीकों और विधियों का विकास किया जाता है।
- किसानों और उद्योगपतियों को जल पुनर्चक्रण की तकनीकों का प्रशिक्षण दिया जाता है।

5. सफलताएँ:

- कई क्षेत्रों में जल पुनर्चक्रण योजनाओं के सफल कार्यान्वयन से जल की उपलब्धता में सुधार हुआ है और कृषि तथा औद्योगिक उत्पादकता में वृद्धि देखी गई है।

6. लंबी अवधि के लक्ष्य:

- जल संकट को कम करना और जल संसाधनों का सतत प्रबंधन सुनिश्चित करना।
- अपशिष्ट जल के प्रभावी प्रबंधन के माध्यम से पर्यावरण की सुरक्षा करना।

जल पुनर्चक्रण योजनाएँ न केवल जल संकट के समाधान में मदद करती हैं, बल्कि पर्यावरण संरक्षण और सतत विकास में भी महत्वपूर्ण योगदान देती हैं।

शिक्षा और जागरूकता कार्यक्रम:

शिक्षा और जागरूकता कार्यक्रम जल संरक्षण और प्रबंधन के प्रति लोगों को जागरूक करने के लिए चलाए जाने वाले महत्वपूर्ण पहल हैं। इन कार्यक्रमों का उद्देश्य जल के महत्व को समझाना और इसे बचाने के उपायों को अपनाने के लिए प्रेरित करना है। यहाँ इन कार्यक्रमों के प्रमुख पहलुओं का विवरण दिया गया है:

1. उद्देश्य:

- जल के महत्व और इसके संरक्षण के तरीकों के बारे में जानकारी फैलाना।
- समुदायों को जल संकट के प्रभावों से अवगत कराना।
- जल संरक्षण के लिए सक्रिय भागीदारी को बढ़ावा देना।

2. मुख्य गतिविधियाँ:

- **कार्यशालाएँ और सेमिनार:** स्कूलों, कॉलेजों और समुदायों में जल संरक्षण पर कार्यशालाएँ और सेमिनार आयोजित किए जाते हैं।
- **प्रदर्शनी:** जल संरक्षण के उपायों, तकनीकों और महत्व को प्रदर्शित करने के लिए प्रदर्शनी आयोजित की जाती हैं।
- **कंपटीशन और कार्यक्रम:** निबंध लेखन, चित्रकला, और नाटक जैसे प्रतियोगिताओं के माध्यम से जागरूकता बढ़ाई जाती है।

3. सामुदायिक सहभागिता:

- स्थानीय लोगों को कार्यक्रमों में शामिल किया जाता है, ताकि वे जल संरक्षण में सक्रिय रूप से भाग लें।
- स्वयंसेवी संगठनों और स्थानीय प्रशासन के सहयोग से कार्यक्रमों का आयोजन किया जाता है।

4. शिक्षण सामग्री:

- ब्रोशर, पोस्टर, और वीडियो सामग्री तैयार की जाती है, जो जल संरक्षण के महत्व और उपायों को स्पष्ट करती है।
- स्कूलों में पाठ्यक्रम में जल संरक्षण को शामिल किया जाता है।

5. सफलताएँ:

- इन कार्यक्रमों के माध्यम से लोगों में जल के प्रति जागरूकता बढ़ी है, और कई समुदायों ने जल संरक्षण के उपायों को अपनाया है।

6. लंबी अवधि के लक्ष्य:

- जल संकट को कम करना और सतत जल प्रबंधन की दिशा में समुदायों को प्रेरित करना।
- जल संरक्षण के प्रति समाज में एक सकारात्मक दृष्टिकोण विकसित करना।

शिक्षा और जागरूकता कार्यक्रम, जल संरक्षण के प्रति एक स्थायी और सकारात्मक बदलाव लाने में मदद करते हैं, जिससे न केवल वर्तमान बल्कि भविष्य की पीढ़ियों के लिए जल संसाधनों का संरक्षण संभव हो सके।

निष्कर्ष:

महाराष्ट्र में जल संधारण की स्थिति में चुनौतियाँ हैं, लेकिन सरकार और समाज के प्रयासों से सुधार हो रहा है। जल संचयन, जल प्रदूषण नियंत्रण, और जलवायु परिवर्तन के प्रति तैयारी के उपायों को लागू करके जल संधारण की स्थिति में सुधार किया जा सकता है। महाराष्ट्र का लक्ष्य है जल संसाधनों तक समान पहुंच सुनिश्चित करना, पर्यावरण और उसकी सुरक्षा करना लोगों के समग्र कल्याण को बढ़ावा देना, जिसके परिणामस्वरूप आने वाली पीढ़ियाँ समृद्ध होंगी।

संदर्भ:

1. "महाराष्ट्र में जल संचयन: एक विशेष अध्ययन" - डॉ. राजेश कुलकर्णी, महाराष्ट्र ज्ञान विज्ञान अकादमी
2. "महाराष्ट्र में जल संचयन: एक अध्ययन" - डॉ. अरविंद कुलकर्णी
3. "जल संचयन: महाराष्ट्र की ओर" - विजय कुवलेकर
4. "जल संचयन और महाराष्ट्र का भविष्य" - डॉ. अशोक खोसला
5. राज्य जल एवं स्वच्छता मिशन जल आपूर्ति एवं स्वच्छता विभाग, महाराष्ट्र अधिकृत संकेतस्थल
6. जलसंपदा विभाग, महाराष्ट्र शासन, भारत यांचे हे अधिकृत संकेतस्थल
7. The Maharashtra Water Resources Regulatory Authority (MWRRA) अधिकृत संकेतस्थल
8. "जल संचयन के लिए महाराष्ट्र के प्रयास" - विजय कुवलेकर, महाराष्ट्र टाइम्स
9. "महाराष्ट्र में जल संचयन: चुनौतियाँ और अवसर" - डॉ. अरविंद कुलकर्णी, इकोनॉमिक एंड पॉलिटिकल वीकली



भारतीय संविधान आणि त्यावर पडलेला प्रभाव

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¹संशोधक विद्यार्थी, पीपल्स कॉलेज, नांदेड

²मार्गदर्शक, राज्यशास्त्र विभाग प्रमुख, बहिर्जी स्मारक महाविद्यालय वसमत,
ता. वसमत, जि. हिंगोली, मु. पो. मालेगाव, ता, अर्धापूर जि. नांदेड

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सारांश:

भारतीय संविधान, जगातील सर्वात लांब लिखित संविधान म्हणून ओळखले जाते, २६ नोव्हेंबर १९४९ रोजी स्वीकारले गेले आणि २६ जानेवारी १९५० रोजी लागू करण्यात आले. या संविधान निर्मितीची प्रक्रिया भारताच्या स्वातंत्र्यापूर्वीच सुरू झाली होती आणि ती पूर्ण होण्यासाठी २ वर्षे, ११ महिने, १८ दिवस लागले. या संशोधनात ब्रिटिशकालीन कायद्यांचा, विशेषतः १९३५ च्या भारत सरकार कायद्याचा भारतीय संविधानावर कसा प्रभाव पडला, याचा अभ्यास करण्यात आला आहे. यासोबतच, जगातील इतर राष्ट्रांच्या संविधाने भारतीय संविधानावर कसे परिणामकारक ठरली, याचाही आढावा घेतला आहे. संविधान निर्मात्यांनी जवळपास ६० देशांच्या संविधानांचा अभ्यास करून भारतीय परिस्थितीला अनुरूप तरतुदी संविधानात समाविष्ट केल्या. स्वातंत्र्यानंतरच्या काळातील सामाजिक, आर्थिक आणि धार्मिक विविधतेतून एकता साधण्याचे आव्हान आणि स्वातंत्र्य, समता, बंधुता आणि न्याय या मूल्यांवर आधारित समाज निर्माण करण्याचे महत्त्व यावरही संशोधनात भर देण्यात आला आहे. संविधानातील संसदीय लोकशाही, संघराज्य, आणि न्यायालयीन पुनरावलोकन या तत्वांना इतर देशांच्या अनुभवांमुळे आकार मिळाला. शेवटी, बदलत्या परिस्थितीनुसार भारतीय संविधानात आवश्यक त्या सुधारणा करण्याचे महत्त्व देखील या अभ्यासात अधोरेखित करण्यात आले आहे.

कीवर्ड्स: भारतीय संविधान, ब्रिटिशकालीन कायदे, भारत सरकार कायदा १९३५, संवैधानिक प्रभाव, संसदीय लोकशाही, संघराज्य, न्यायालयीन पुनरावलोकन, सामाजिक-राजकीय आव्हाने, संविधानिक सुधारणा.

प्रस्तावना:

15 ऑगस्ट 1947 रोजी भारत स्वातंत्र्य झाला; परंतु भारतीय संविधान निर्मितीची प्रक्रिया स्वातंत्र्याअगोदरपासूनच सुरू झालेली होती. भारतीय नागरिकांच्या वतीने 26 नोव्हेंबर 1949 रोजी भारतीय संविधान स्वीकारले गेले तसेच हे संविधान संपूर्ण देशात 26 जानेवारी 1950 पासून लागू झाले. भारताचे संविधान जगातील सर्वात लांब लिखित संविधान आहे. भारताचे संविधान निर्माण करण्यासाठी 2 वर्षे 11 महिने 18 दिवस इतका कालावधी लागला.

स्वातंत्र्यानंतर भारतासमोर अनेक समस्या होत्या. येणाऱ्या काळामध्ये राष्ट्राचे ऐक्य टिकवण्याची आणि त्याचबरोबर स्वातंत्र्य, समता, बंधुभाव आणि न्याय या तत्वावर आधारित नवा समाज निर्माण करावयाचा होता. देशातील सामाजिक व आर्थिक मागासलेपणा दूर करून लोकशाहीच्या मार्गाने नवसमाज निर्माण करण्याची व

त्याचबरोबर धार्मिक, भाषिक, वांशिक, सांस्कृतिक विविधतेतून एकता साध्य करण्याची लोकांची इच्छा दिसून येते.

भारतीय संविधान निर्माण करण्यासाठी संविधान कर्त्यांनी खूप प्रयत्न केलेले दिसून येतात. जगातील वेगवेगळ्या जवळपास 60 देशांच्या संविधानांचा अभ्यास संविधान कर्त्यांनी केलेला होता आणि भारतीय परिस्थितीला अनुरूप अशा तरतुदी भारतीय संविधानात समाविष्ट करण्यात आल्या. त्याचबरोबर ब्रिटिशकालीन कायदे, ब्रिटिश कालीन व्यवस्थेचा प्रभाव भारतीय संविधानावर पडल्याचे दिसून येते.

उद्दिष्टे:

१) भारतीय संविधानावर प्रभाव पाडणाऱ्या ब्रिटिशकालीन कायद्यांचा आढावा घेणे.

२) स्वातंत्र्यासाठी झालेल्या चळवळीचा / आंदोलनाचा / सत्याग्रहाचा अभ्यास करणे.

३) जगातील वेगवेगळ्या देशांच्या संविधानातील तरतुदींचा आढावा घेणे.

४) भारत सरकार कायदा, 1935 चा विशेष आढावा घेणे.

गृहीतके:

१) भारतीय संविधानावर ब्रिटिशकालीन कायद्यांचा प्रभाव पडलेला आहे.

२) भारत सरकार कायदा, 1935 चा विशेष प्रभाव भारतीय संविधानावर पडलेला आहे.

३) भारतीय संविधानावर जगातील वेगवेगळ्या राष्ट्रांच्या संविधानाचा प्रभाव पडलेला आहे.

संशोधन पद्धती :

प्रस्तुत शोधनिबंध हा दुय्यम साधनसामग्रीवरून तथ्य संकलन करून त्यांचे विश्लेषण संशोधकाने केले आहे. यामध्ये विविध ग्रंथ, दैनिक, साप्ताहिक वृत्तपत्रे तसेच इंटरनेटवरून माहिती प्राप्त केली आहे.

विश्लेषण:

1. ब्रिटिश कालीन कायद्याचा प्रभाव: ब्रिटिशांच्या जगात अनेक वसाहती होत्या, त्याच पद्धतीने भारत ही सुद्धा ब्रिटिशांची वसाहत होती. ब्रिटिशांनी भारताची सत्ता हस्तगत केल्यानंतर येथील सत्ता व्यवस्थित चालवण्यासाठी वेगवेगळ्या संहिता व कायदे केले गेले. भारतीय संविधानावर विशेषतः भारत सरकारचा 1909 चा कायदा, 1919 चा कायदा, 1935 चा कायदा या कायद्यांचा प्रभाव अधिक दिसून येतो.

2. भारतीय राष्ट्रीय चळवळ: ब्रिटिश वसाहतवादी राजवटीपासून भारताच्या स्वातंत्र्यासाठी लढलेल्या भारतीय राष्ट्रीय चळवळीचा ही भारताच्या संविधानावर महत्वपूर्ण प्रभाव होता. महात्मा गांधी, जवाहरलाल नेहरू आणि डॉ. बी. आर. आंबेडकर या नेत्यांनी संविधानाची दृष्टी आणि मूल्ये घडविण्यात महत्त्वाची भूमिका बजावली.

3. भारत सरकार कायदा, 1935:

1935 च्या भारत सरकारच्या कायद्याने भारतात जबाबदार शासनपद्धती निर्माण करण्याचे उद्दिष्ट होते. 1919 च्या कायद्यानंतर घटनात्मक विकासाच्या प्रक्रियेत या कायद्याचे महत्त्व अनन्यसाधारण आहे. भारतीयांना सत्ता हस्तगत करण्याचा महत्त्वाचा टप्पा म्हणून या कायद्याकडे पाहिले जाते. या कायद्यात एकूण 321 कलमे आणि 19 परिशिष्टे होती. 1935 च्या कायद्याच्या काही तरतुदी भारतीय संविधानात स्वीकारण्यात आल्या त्या पुढील प्रमाणे:

1. 1935 च्या कायद्याने भारतासाठी संघराज्य स्थापन करण्याची व्यवस्था केली होती. या संघराज्यात संस्थाने व ब्रिटिश प्रांत मिळून ही संघराज्य बनवायचे होते. या कायद्याने अधिकारांची विभागणी केंद्रसूची, राज्यसूची आणि समवर्ती सूची अशा तीन प्रकारात करण्यात आली होती. केंद्र सरकार व प्रांतीय सरकार यांच्या

अधिकाराबाबतीत संघर्ष उद्भवले तर न्याय देण्यासाठी संघ न्यायालयाची स्थापना करण्यात आली थोडक्यात संघराज्यात आढळणारी सर्व प्रमुख वैशिष्ट्य, लिखित घटना, घटक राज्यांचे अस्तित्व, अधिकार, विभागणी आणि संघन्यायालय. 1935 च्या कायद्याद्वारे निर्माण करण्यात येणाऱ्या भारतीय संघराज्यात आढळतात.

- या कायद्याने प्रांतात सुरु असलेली द्विदल शासनपद्धती रद्द करून प्रांतांना स्वायत्तता प्रधान करण्यात आली. प्रांतीय प्रशासनातून राखीव आणि सोपीव असा फरक नष्ट करून प्रशासनाची जबाबदारी राज्य मंत्रिमंडळावर सोपवण्यात आली. प्रांतातून जबाबदार शासन पद्धतीची सुरुवात करून मंत्रिमंडळ सामूहिकरीत्या कनिष्ठ सभागृहाला जबाबदार राहिल अशी तरतूद 1935 च्या कायद्यात करण्यात आली होती.
- द्विग्रही केंद्रीय विधिमंडळ:** 1935 च्या कायद्याने केंद्रामध्ये द्विदल राज्यपद्धतीचा स्वीकार केला. कनिष्ठ गृहाला संघीय विधानसभा आणि वरिष्ठ गृहाला संघीय राज्यसभा म्हटले गेले. या गृहाचा कालावधी पाच वर्षे निश्चित करण्यात आला. दोन्ही गृहांच्या सदस्यांची निवड अप्रत्यक्षरीत्या करण्यात येत असे. वरिष्ठ सभागृह हे स्थायी सभागृह होते. अशा पद्धतीने भारतीय संविधानातील अनेक तरतुदी यावर आधारित असल्याचे दिसून येते.
- या कायद्याने संघराज्याची निर्मिती केल्यामुळे संघराज्य व प्रांत यांच्यात वाद निर्माण होऊ नये, वाद निर्माण झाल्यास ते सोडवण्याची व्यवस्था व्हावी म्हणून संघ न्यायालयाची निर्मिती करण्यात आली. सध्याचे सर्वोच्च न्यायालय हे याच तरतुदीच्या आधारे अस्तित्वात असल्याचे दिसून येते.
- 1935 च्या कायद्याद्वारे भारतासाठी लोकसेवा आयोगाची स्थापना करण्यात आली होती. या आयोगाच्या माध्यमातून उच्च पदांसाठी व्यक्तींची निवड केली जात होती. याच पद्धतीने स्वातंत्र्यानंतर केंद्रीय लोकसेवा आयोगाच्या माध्यमातून भारतासाठी सर्वोच्च पदांसाठी निवड केली जाते.
- 1935 च्या कायद्याने भारतात केंद्रीय कायदेमंडळाचे दोन सभागृह निर्माण करण्यात आले. वरिष्ठ सभागृहाला राज्यसभा आणि कनिष्ठ सभागृहाला विधानसभा असे नाव देण्यात आले. कनिष्ठ सभागृहावर संपूर्ण संघराज्याचे तर वरिष्ठ सभागृहावर केवळ राज्याचे प्रतिनिधी असतात. सध्याच्या केंद्रीय विधिमंडळामध्ये वरिष्ठ सभागृहाला राज्यसभा आणि कनिष्ठ सभागृहाला लोकसभा या नावाने ओळखले जाते. या तरतुदीनुसार केंद्रीय विधिमंडळाची निर्मिती झाल्याचे दिसून येते.
- 1935 च्या कायद्याने गव्हर्नरकडे घटनात्मक प्रमुख व शासन प्रमुखांची जबाबदारी दिली होती. गव्हर्नरला काही विशेष अधिकार होते. त्यामध्ये स्वविवेकाधीन अधिकार, विशेष अधिकार आणि मंत्र्यांच्या सल्ल्याने

पार पाडावयाचे अधिकार. भारतातील राज्यपाल हे पद या गव्हर्नर पदावर आधारित असल्याचे दिसून येते.

4. भारतीय संविधानावर जगातील वेगवेगळ्या राष्ट्रांच्या घटनेचा पडलेला प्रभाव:

भारतीय संविधान 26 नोव्हेंबर 1949 रोजी संविधान सभेने स्वीकारले आणि 26 जानेवारी 1950 रोजी ते अंमलात आले. हे देशाच्या समृद्ध सांस्कृतिक, सामाजिक आणि राजकीय वारशाचा पुरावा म्हणून उभे आहे. पुढील वेगवेगळ्या देशांच्या संविधानाचा प्रभाव भारतीय संविधानावरती पडलेला आहे.

1) **ब्रिटिश संविधान:** संसदीय लोकशाही, कायद्याचे राज्य, विधिमंडळ कार्यपद्धती, एकल नागरिकत्व, मंत्रिमंडळ प्रणाली, विशेष अधिकार, संसदीय विशेषाधिकार या तरतुदींचा प्रभाव भारतीय संविधानावर आहे.

2) **अमेरिकेचे संविधान:** मूलभूत अधिकार, न्यायपालिकेचे स्वातंत्र्य, न्यायिक पुनरावलोकन, राष्ट्रपतीचा महाभियोग, सर्वोच्च न्यायालय आणि उच्च न्यायालयाच्या न्यायाधीशांना काढून टाकणे आणि उपराष्ट्रपती पद यासारख्या भारतीय संविधानाच्या तरतुदीवर प्रभाव असल्याचे दिसून येते.

3) **आयरिश संविधान:** राज्य धोरणाची मार्गदर्शक तत्वे, राज्यसभेसाठी (वरिष्ठ सभागृहात) सदस्यांचे नामनिर्देशन आणि राष्ट्रपतीची निवड पद्धत या भारतीय राज्यघटनेच्या तरतुदीवर आयरिश संविधानाचा प्रभाव पडल्याचे दिसून येते.

4) **कॅनडाचे संविधान:** मजबूत केंद्र असलेले संघराज्य, केंद्राचा विशेष अधिकार, केंद्राद्वारे राज्याच्या राज्यपालांची नियुक्ती आणि सर्वोच्च न्यायालयाचे सल्लागार अधिकार क्षेत्र अशा भारतीय संविधानातील अनेक तरतुदींना कॅनडियन संविधानातून प्रेरणा मिळाल्याचे दिसून येते.

5) **ऑस्ट्रेलियन संविधान:** भारतीय संविधानाने ऑस्ट्रेलियन संविधानातून समवर्ती यादी, व्यापार व वाणिज्याचे स्वातंत्र्य, संसदेच्या दोन्ही सभागृहांची संयुक्त बैठक ही वैशिष्ट्ये घेतलेली दिसून येतात.

6) **फ्रेंच संविधान:** फ्रेंच संविधान हे एक लिखित संविधान आहे, जे 1958 मध्ये स्वीकारले गेले. भारतीय संविधानाच्या काही वैशिष्ट्यांवर त्याचा प्रभाव पडलेला आहे, जसे की गणराज्य, प्रास्ताविकेतील स्वातंत्र्य, समता व बंधुता हे आदर्श.

7) **दक्षिण आफ्रिकेचे संविधान:** भारतीय संविधानातील दुरुस्तीची प्रक्रिया आणि राज्यसभेच्या सदस्यांची निवड या भारतीय संविधानाच्या वैशिष्ट्यांवर दक्षिण आफ्रिकेच्या संविधानाचा प्रभाव असल्याचे दिसून येते.

8) **जपानचे संविधान:** जपानचे संविधान हे एक लिखित संविधान आहे, जे जपानमध्ये घटनात्मक राजेशाही बनल्यानंतर 1947 मध्ये स्वीकारण्यात आले. भारतीय

संविधानाच्या एका वैशिष्ट्यांवर त्याचा प्रभाव पडला जे "कायद्याने स्थापित केलेली प्रक्रिया" आहे.

निष्कर्ष:

१) भारतीय संविधानावर ब्रिटिशकालीन कायद्याचा प्रभाव पडलेला आहे.

२) भारत सरकार कायदा, 1935 चा विशेष प्रभाव भारतीय संविधानावर पडलेला आहे.

३) भारतीय संविधानावर जगातील वेगवेगळ्या राष्ट्रांच्या संविधानाचा प्रभाव पडलेला आहे.

उपाययोजना :

1) भारतीय संविधान अधिक मजबूत होण्यासाठी बदलत्या परिस्थितीनुसार त्यात आवश्यक सुधारणा करणे आवश्यक आहे.

2) आधुनिक परिस्थितीच्या आव्हानांचा सामना करण्यासाठी संविधानावर प्रभाव पडणाऱ्या घटकांचा अभ्यास करणे आवश्यक आहे.

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अध्ययन अक्षम विद्यार्थ्यांसाठी उपचारात्मक अध्यापनाची आवश्यकता

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सारांश:

उपचारात्मक अध्यापन हा एक अध्यापनाचा विशेष प्रकार असून त्यांचा स्वतंत्रपणे अभ्यास केला जातो. उपचारात्मक अध्यापन हे शाळेच्या वेळेच्या एक तास अगोदर घेतले जाते. उपचारात्मक अध्यापनाच्या माध्यमातून जे विद्यार्थी अध्ययनात मागे आहेत किंवा अध्ययन अक्षम आहेत त्यांना आवश्यक असणाऱ्या सर्व गरजा पूर्ण केल्या जातात. विद्यार्थी अध्ययनात मागे का पडले? त्यांना कोणत्या समस्या आहेत कोणत्या विषयात आहेत, त्या पूर्ण का करू शकत नाही. इत्यादी बाबी जाणून घेणे. व त्यानंतर त्यावर उपचारात्मक अध्यापन करणे.

कळ शब्द: अध्ययन अक्षम, उपचारात्मक अध्यापन, विद्यार्थी, शैक्षणिक गुणवत्ता विकास, सर्व शिक्षा अभियान

प्रस्तावना:

प्राथमिक शिक्षण हे प्रत्येक व्यक्तीच्या जीवनातील शिक्षणाचा पाया असतो. प्राथमिक शिक्षण हे उत्तम दर्जाचे मिळाले तर विद्यार्थी शिक्षणात उत्तम प्रकारे यश संपादन करू शकतो. पण प्राथमिक शिक्षण घेत असतांना कोणत्याही कारणाने विद्यार्थी मागे पडला. तर तो नेहमीच मागे राहातो. तो परिणामकारक अध्ययन प्राप्त करू शकत नाही. अध्ययन अक्षम किंवा अभ्यासात मागे असणाऱ्या विद्यार्थ्यांना अध्ययन कार्यात शिक्षकांनी मदत करणे हे त्यांचे प्रमुख कार्य आहे.

विद्यार्थ्यांच्या अध्ययनाशी संपूर्ण शिक्षण प्रक्रिया जोडलेली असते. शिक्षकांनी प्रथम आपल्या वर्गातील अध्ययन अक्षम किंवा अभ्यासात मागे असणारी मुले शोधायची. त्यानंतर जे विद्यार्थी अध्ययन अक्षम किंवा अभ्यासात मागे आहेत त्यांना दररोज सराव, विशेष लक्ष चांगले मार्गदर्शन देऊन त्यांना इतर विद्यार्थ्यांबरोबर आणावे. हे आपले आद्य कर्तव्य समजले पाहिजे. वर्गात सर्वसाधारणपणे शिक्षक हुशार समजणाऱ्या विद्यार्थ्यांकडे अधिक लक्ष देऊन अध्यापन कार्य करतात. त्यामुळे वर्गातील अध्ययन अक्षम किंवा अभ्यास मागे असणाऱ्या विद्यार्थ्यांकडे

दुर्लक्ष होते. व असे विद्यार्थी अधिकाधिक मागे पडत जातात. म्हणून त्यांना स्पेशली खास दररोज एक तास शाळेच्या वेळेच्या अगोदर सराव वर्ग किंवा उपचारात्मक अध्यापन कार्य करणे अत्यंत गरजेचे असते.

अध्ययन प्रक्रिया:

एखाद्या शाळेतील एखाद्या वर्गाचे वर्ग निरीक्षण केले असता वर्गात चालणाऱ्या अनेक कृती आपणास पहायला मिळतात. उदा. अध्ययन अध्यापन, विद्यार्थी-विद्यार्थी आंतरक्रिया, मित्रांशी चर्चा, लक्षपूर्वक श्रवण, चित्र पाहून गोष्ट सांगणे, छोटे छोटे प्रयोग करणे. अशा अनेक गोष्टी विद्यार्थी शिकत असतात. विद्यार्थी अध्ययन करत असतात. म्हणजेच शिकत असतात. शिक्षणामुळेच व्यक्तीच्या वर्तनात अपेक्षित वर्तन बदल घडून येत असतो.

ब्याख्या:

- 1) अध्ययन म्हणजे शिकणे होय.
- 2) सरावाने वर्तनात परिवर्तन होणे म्हणजे अध्ययन होय.
- 3) अध्यापन म्हणजे व्यक्तीने आपल्या वर्तनामध्ये अनुभवामुळे घडवून आणलेले टिकावू स्वरूपाचे बदल होय.

4) अनुभव व वर्तन यामधिल सुधारणा म्हणजे अध्ययन होय.

अध्ययन अक्षमता:

विद्यार्थ्यांला सहज अध्ययन करता येत नसेल वाचन, लेखन, गणन, गणितिय क्रिया, करता येत नसेल सर्वसामान्य विद्यार्थ्यांपेक्षा अध्ययनाचा वेग कमी असेल तर त्याचा या उणीवेस अध्ययन अक्षमता म्हणतात. अध्ययन अक्षमता म्हणजे अध्ययन प्रक्रियेत येणारे अडथळे होय.

वर्गाच्या अपेक्षित अध्ययन क्षमता प्राप्त करू न शकणारे विद्यार्थी वर्गात सर्व साधारण विद्यार्थ्यांच्या मागे पडणारे विद्यार्थी म्हणजे अध्ययन अक्षम विद्यार्थी होय. असे विद्यार्थी उपेक्षित समजले जातात. अशा विद्यार्थ्यांच्या समस्या जाणून घेता शिक्षक पुढे जातात. शिक्षक अशा विद्यार्थ्यांना बरोबर न घेता वर्गातील हुशार मुलांबरोबर पुढे जातात. जे विद्यार्थी हुशार असतात त्यांच्याकडे अधिक लक्ष देतात. हुशार मुलांच्या अध्ययनाच्या वेगाने अध्यापन करतात. परंतु अध्ययनात मागे असणाऱ्या विद्यार्थ्यांना शिक्षकांची खरी गरज असते. अध्ययन अक्षम विद्यार्थ्यांनाच विशेष मदतीची व मार्गदर्शनाची गरज असते. अशा विद्यार्थ्यांकडे जास्त लक्ष देऊन त्यांच्या गरजा, समस्या समजून घेऊन शिक्षकांने अध्यापन करावे. जेणे करून त्यांना अध्ययनात प्रगती करण्यात मदत होईल. अशा विद्यार्थ्यांना कोणत्या प्रकारच्या मार्गदर्शनाची गरज आहे. हे समजून घेऊन शिक्षकांने त्यांना अध्यापन करावे. अध्ययन अक्षम विद्यार्थ्यांकडे हुशार विद्यार्थ्यांप्रमाणे लक्ष देणे आवश्यक आहे. कारण शिक्षकांच्या मार्गदर्शनामुळे ते विद्यार्थी जिवनावश्यक गरजा पूर्ण करू शकतात.

अध्ययन अक्षमता येण्याची कारणे:

1. आर्थिक परिस्थिती
2. अध्ययनास योग्य वातावरण नसणे.
3. अध्ययनात येणाऱ्या समस्या
4. संबोध स्पष्ट नसणे.
5. विशिष्ट लयीचे अज्ञान
6. घटनाचा क्रम लक्षात न येणे
7. ज्ञानेंद्रिया कडून येणारे ज्ञानाचे संघटन
8. दृष्टी व हालचालीचे संघटन बांधण्याची क्षमता नसणे.
9. निकृष्ट शरीर संवेदनशीलता
10. अनुवंशिकता
11. दृष्टीदोष

कु. सुरेखा रघुनाथ फुलझेले, प्रा. डॉ. वंदना पी. बेंजामीन

12. सामान्यज्ञान व व्यवहार ज्ञानातील त्रुटी
13. परिस्थितीजन्य कारणे
14. योग्य शिक्षकांचा अभाव
15. पालकांचीशिक्षणाबदलची अनास्था

अध्ययन अक्षम विद्यार्थ्यांची शैक्षणिक कारणे:

1. सामान्य विद्यार्थ्यांप्रमाणे अध्ययन अक्षम विद्यार्थी वाचन लेखन करू शकत नाही.
2. आत्मविश्वासाची कमतरता
3. स्व जाणीव नसते
4. अवधान नसते
5. भाषा विकसित नसते
6. नविन वातावरणाशी जुळवून घेत नाही
7. नेतृत्व कौशल्याचा अभाव असतो.
8. अध्ययन अक्षय विद्यार्थ्यांत नुन्यगंड असतो.
9. स्मरणशक्तीचा अभाव
10. परिस्थितीशी जुळवून घेऊ शकत नाही.
11. नियोजनाचा अभाव
12. साधी सोपी गोष्टी समजत नाही
13. उदासिन वृत्ती असते.
14. आकलन क्षमतेचा अभाव
15. अभ्यासात लक्ष नसते.
16. शैक्षणिक विकास मंद गतीने होते.

अध्ययन अक्षम विद्यार्थ्यांची सामाजिक कारणे:

1. अशिक्षित पालक
2. पोटासाठी भटकंती
3. अज्ञान, अंधश्रद्धा दारिद्र्य
4. घर कामाकडे अधिक लक्ष
5. पालकांच्या अवास्तव अपेक्षा
6. उपलब्ध संधीचा अभाव
7. अवधान कमी
8. अयोग्य परिसर
9. शिक्षणावर श्रद्धा नाही
10. अनुवंशिकता
11. भावनिक असुरक्षितता
12. अपोषक वातावरण
13. शिक्षण सुविधा उपलब्ध नाही.

अध्ययन अक्षम विद्यार्थ्यांसाठी उपचारात्मक अध्यापन:

प्राथमिक स्तरावरील विद्यार्थ्यांच्या अध्ययनात शैक्षणिक व सामाजिक समस्या निर्माण झाल्यामुळे त्याची

अध्ययन क्षमता ही किमान क्षमतेपेक्षा कमी असते. अशा अध्ययन अक्षम विद्यार्थ्यांसाठी उपचारात्मक अध्यापन अत्यंत उपयुक्त आहे.

उपचारात्मक अध्यापनाची कौशल्ये:

श्रवण, भाषण, संभाषण, वाचन, लेखन, संख्याज्ञान, संख्यावरील क्रिया इत्यादी.

उपचारात्मक अध्यापनाचे नियोजन:

सर्व प्रथम सत्राच्या सुरुवातीलाच सर्व विद्यार्थ्यांची एक चाचणी घेण्यात येते. त्यात वर्गाच्या क्षमता प्राप्त करून शकणारे विद्यार्थी निवडतात. त्यांच्यासाठी 60 दिवसांचे उपचारात्मक अध्यापन कार्यक्रमांचे नियोजन करण्यात येते. हा कार्यक्रम घेत असताना दररोज शाळेच्या वेळेपूर्वी एक तास अगोदर उपचारात्मक अध्यापन सराव वर्ग घेण्यात येतो. यात अध्ययन अक्षम विद्यार्थ्यांना येणाऱ्या समस्या शोधून त्यावर शिक्षकांनी मार्गदर्शन करणे हे अत्यंत महत्वाचे आहे.

उपचारात्मक अध्यापन:

शैक्षणिक साहित्याचा अध्ययनासाठी वापर करणे, अक्षरकार्ड, शब्दकार्ड, मुळाक्षरे, वाक्यपट्ट्या अंककार्ड, संख्याकार्ड, चिन्हांचे कार्ड, चित्रकार्ड, कलरकार्ड इत्यादी.

वरील अक्षरकार्डच्या साहाय्याने शब्द तयार करते.

1. मुळाक्षरांपासून शब्द तयार करणे.
2. शब्दा पासून वाक्य तयार करणे.
3. जोड्या लावणे
4. शब्दकोडी सोडविणे
5. एका अक्षरा पासून अनेक शब्द तयार करणे.
6. चित्राच्या साहाय्याने गोष्ट तयार करणे.
7. गोष्ट स्वतःच्या भाषेत सांगणे.
8. गट चर्चा घडवून आणणे.
9. अंक कार्ड देऊन त्यांचेकडून वाचन घेणे.
10. अंक कार्ड देऊन त्यांचेकडून लेखन घेणे.
11. बेरीज, वजाबाकी, साहित्याच्या साहाय्याने करणे
12. संख्या वाचन व संख्यावरील क्रिया करवून घेणे.
13. परिसरातील फुलांची नावे सांगणे.
14. परिसरातील अनेक वस्तूची ओळख करून देणे.
15. परिवारातील व्यक्तीची नावे व इतर माहिती सांगणे.
16. नाते संबंध सांगणे.

अशा प्रकारे शिक्षकांनी मुलांना मार्गदर्शन करून त्यांचा शैक्षणिक विकास उपचारात्मक अध्यापनाच्या

कु. सुरेखा रघुनाथ फुलझेले, प्रा. डॉ. वंदना पी. बेंजामीन

माध्यमातून घडवून आणू शकतात. म्हणूनच अध्ययन अक्षम विद्यार्थ्यांना उपचारात्मक अध्यापनाची अत्यंत आवश्यकता आहे.

संशोधनाची उद्दिष्टे:

- विद्यार्थ्यांना अध्यायनात येणाऱ्या अडचणीचा शोध घेणे.
- विद्यार्थ्यांना अध्ययन अक्षमता येणाऱ्या शैक्षणिक कारणांचा शोध घेणे.
- विद्यार्थ्यांना अध्ययन अक्षमता येणाऱ्या सामाजिक कारणांचा शोध घेणे.
- विद्यार्थ्यांना अध्ययन अक्षमता येणाऱ्या आर्थिक कारणांचा शोध घेणे.
- विद्यार्थ्यांसाठी राबविण्यात येणाऱ्या उपचारात्मक अध्यापनाची परिणामकारता अभ्यासणे.

संशोधनाची पध्दती:

जनसंख्या:

प्रस्तुत संशोधनासाठी केंद्र यशवंत नगर, पंचायत समिती, चंद्रपूर येथिल इयत्ता दुसरी ते चौथीतील 140 विद्यार्थ्यांची निवड करण्यात आली.

नमुना निवड:

प्रस्तुत संशोधनासाठी केंद्र यशवंत नगर, पंचायत समिती, चंद्रपूर येथिल इयत्ता दुसरी ते चौथीतील 50 विद्यार्थ्यांची निवड संभाव्य नमुना निवड पध्दतीतील साध्या यादृच्छिक नमुन्यातील लॉटरी पध्दतीने निवड करण्यात आली.

संशोधनाची साधने:

प्रस्तुत संशोधनासाठी पदनिश्चयन श्रेणी पूर्व चाचणी व उत्तर चाचणी घेण्यासाठी प्रश्नावली निरीक्षण, मुलाखत, पडताळा सूची इत्यादी साधनाची निवड केली आहे.

निष्कर्ष:

वरील विश्लेषणावरून असा निष्कर्ष काढण्यात येतो की, अध्ययन अक्षम विद्यार्थ्यांना उपचारात्मक अध्यापनाची गरज आणि महत्व जितके आवश्यक आहे. तितकेच ते आपल्याला पुढील जीवनात मदत करते. उपचारात्मक अध्यापन हे अध्ययन अक्षम विद्यार्थ्यांना येणाऱ्या अडचणी, समस्या समजून घेऊन त्यावर योग्य मार्गदर्शक करून त्यांच्या समस्या सोडविल्या जातात.

प्रत्येक विद्यार्थ्यांची समस्या ही वेगवेगळी असू शकते तेव्हा प्रथम शिक्षकांनी विद्यार्थ्यांच्या समस्या जाणून घेऊन त्यांच्या समस्येनुसार उपचारात्मक अध्यापन करावे. त्यामुळे त्यांची शैक्षणिक समस्या सुटेल व त्यांची शैक्षणिक प्रगती होण्यास मदत होते.

उपचारात्मक अध्यापन विद्यार्थ्यांच्या विकासासाठी अत्यंत उपयुक्त आहे. सतत सराव होत असल्याने व हे मार्गदर्शन वैयक्तिक रित्या शिक्षक करित असल्यामुळे त्यांच्या ज्या समस्या होत्या त्या सुटतील. त्यांना शिक्षकांनी केलेले मार्गदर्शन उत्तम व प्रभावी ठरेल. व त्यांची शैक्षणिक प्रगती होईल. म्हणूनच उपचारात्मक अध्यापन हे अत्यंत उपयुक्त आहे.

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सार:

समस्या विषयाची निवड केल्यानंतर संशोधकास वेगवेगळ्या अवस्थामधून जावे लागते संशोधन विषयाची मांडणी तर्कशुद्ध पध्दतीने करताना संशोधनाचे उद्देश, कार्यक्षेत्र, व्याप्ती संशोधनाची वैशिष्ट्ये, संशोधन पध्दती, संकलीत तथ्ये, विश्लेषण निष्कर्ष महत्वाचे ठरते. संशोधन लिखान करताना प्रथमतः संशोधनातील टप्पे कोणती आहेत. त्या टप्प्याला अनुसरूनच लिखान कार्य करावीत संशोधन अहवाल लेखन करताना पहिल्या मसुद्याचे लिखान करावे नंतर दुसऱ्या व अंतिम संशोधन अहवाल लेखन करावीत लेखन करत असताना सर्व सामान्य नियमांचा आधार घेवूनच अहवाल लेखन करावे ज्यामुळे सदरिल संशोधन इतरभाषी संशोधकास उपयुक्त ठरेल.

शोध संज्ञा: संशोधन अहवाल, अहवाल लेखन, संशोधन, संशोधन लेखनाचे टप्पे.

प्रस्तावना:

संशोधनातील संशोधन अहवाल लेखन ही शेवटची पायरी आहे. संशोधकाने संशोधकाची समस्या निवड केल्यानंतर संशोधनाचा आराखडा तयार केला जातो. आराखडा तयार झाल्यानंतर निरनिराळ्या स्त्रोताद्वारे माहितीचे संकलन केले जाते. संकलीत तथ्याचे वर्गीकरण, सारणीकरण, साख्यंक्रिय तंत्राचा वापर करून निष्कर्ष काढले जाते. या सर्व अवस्था पूर्ण केल्यानंतर संशोधकास शेवटी अहवाल लेखन करावे लागते.

संशोधक संशोधन कार्य करताना अथम परिश्रम घेवून विखुरलेले ज्ञान, माहितीची जुळवाजुळव करून लिखित ज्ञानामध्ये भर टाकते. संशोधन कार्य हाती घेतल्यानंतर संशोधकास विविध समस्यांना सामोरे जावे लागते. म्हणजेच संशोधनात आलेल्या समस्या सोडविताना संशोधकास अनेक अडचणी उद्भवता त्या सर्व सोडवणे हे संशोधकाचे कर्तव्यच असते. संशोधनासाठी समस्यांची निवड हा संशोधनाचा पाया आहे. तर संशोधनाचा अहवाल लेखन हि संशोधनरुपी इमारतीचा कळसच होय. संशोधन लेखन करणे म्हणजे स्वताला एका साचेबंद नियमावलीच लावून

घेणे होय अहवाल लेखन झाले म्हणजे सदरिल संशोधन कार्य पूर्ण होत असते.

अहवालाची आवश्यकता:

आराखड्यानुसार संशोधन कार्य पूर्ण झाल्यानंतर आपण आपले संशोधनकार्य कसे केले, कोणती पध्दती वापरली, आवश्यक माहिती कशा पध्दतीने संकलीत केली, निष्कर्ष काय आले. शिफारशी कोणत्या केल्या आहेत. या बाबीची माहिती इतरांना करून देण्यासाठी संशोधकास संशोधन अहवाल लिहावा लागतो. हे अहवाल इतर वाचक वाचून अशाप्रकारे समस्येशी संबंधित समस्या सोडविण्यास मदत होते. म्हणूनच अहवाल लेखनाची आवश्यकता, गरज आहे.

व्याख्या:

1. "संशोधन अहवाल हा संशोधकाचे लिखित स्वरूप आहे. संशोधनाची संपूर्ण प्रक्रिया योग्य क्रमाने लिहून काढणे म्हणजे अहवाल लेखन होय"
2. "प्रा. हंसराज च्या मते समाजाने केलेले परिणामकारक आणि हेतुपूर्वक निवेदन म्हणजे खरेखुरे संशोधन म्हणजेच खरेखुरे अहवाल लेखन होय"

3. प्रा. गंगाधर कायदे-पाटील च्या मते 'संशोधनासाठी विषयाची निवड करण्यापासून संकलीत केलेल्या तथ्याचे विश्लेषण करणे गृहितकाची तपासणी सांख्यिकीय साह्याने केल्यानंतर संशोधकाचे योग्य आणि संशोधनात्मक भाषेत लिहलेले वस्तूनिष्ठ स्वरूपातील प्रकरणनिहाय अनुभव म्हणजे अहवाल होय".

अहवालाची वैशिष्ट्ये:

- संशोधन अहवाल हा लिखित स्वरूपाचा असतो.
- संशोधनासाठी विषयाची निवड केल्यापासून तथ्याचे विश्लेषण करण्यापर्यंतचा क्रम संशोधन अहवालात लिहलेला असतो.
- संशोधनामध्ये वर्गीकरण आणि सारणीकरण तथ्याचे विश्लेषण निर्वचन करून काढलेले निकर्ष जनहितासाठी प्रसिद्ध करावे लागतात त्यास संशोधन अहवाल असे म्हणतात.
- अहवालामुळे इतर संशोधकाना सरकारला, व समाजाला धोरणात्मक निर्णय घेण्यासाठी उपयुक्त असतो.
- अहवालाच्या आधारे सामाजिक सुधारणेचे धोरण तयार करून त्या धोरणाची प्रभावीपणे अंमलबजावणी करता येते.
- अहवालात उद्देश, अध्ययन क्षेत्र, संशोधन पध्दती, विश्लेषण, निकर्ष इत्यादी घटकांचा समावेश असतो.

संबंधित साहित्याचा आढावा:

स्वतःच्या संशोधनाचे संकल्पना स्पष्ट होण्याच्या दृष्टीने संशोधनात कोणती पध्दत वापरावी माहिती संकलन करण्याची साधने कशी करावीत त्यात कोणत्या मुद्याचा समावेश करावा हे समजून घेण्यासाठी संबंधित साहित्याचा आढावा फार महत्वाचा असतो.

संशोधनाची उद्दिष्ट्ये:

परिकल्पना संबंधित साहित्याच्या पुनर्विलोकनात असते. उद्दिष्ट्यामुळे संशोधनाची दिशा स्पष्ट होते. जी उद्दिष्ट्ये आपण मांडलीत ती सर्व साध्य झाली किंवा नाही व साध्य झालेल्या बाबीचा तालमेळ उद्दिष्ट्याशी आहे किंवा नाही हे पडताळून पाहता येते.

संज्ञाच्या व्याख्या:

संशोधन समस्येतील विशेष अर्थ असलेल्या पदाच्या स्पष्ट कार्यात्मक व्याख्या घ्याव्यात अमुर्त किंवा

डॉ. भरत आर. लोकलवार

संदिग्ध संकल्पनेचे मोजमाप करता येईल अशा स्वरूपात मांडलेल्या व्याख्या म्हणजे कार्याभिमुख व्याख्या होय.

समस्येचे महत्व:

या समस्येमुळे शैक्षणिक प्रक्रियेत कोणत्या अडचणी निर्माण होतात व या समस्येच्या निराकरणाचे शैक्षणिक प्रक्रिया कशी सुलभ होईल याचे विवेचन करून समस्येचे महत्व वाचकास पटवून द्यायचे असते.

संशोधनाची व्याप्ती मर्यादा:

संशोधन कोणत्या ठिकाणी, कोणत्या प्रकरणाच्या विषयवस्तूवर आणि कोणत्या विषयाच्या कोणत्या घटकाशी संबंधित आहे हे स्पष्ट करावयास हवे. उदा. संशोधनात जि. प. प्रा. शाळा बोरगाव काळे येथील इयत्ता पहिलीचे विद्यार्थी समाविष्ट आहेत.

माहिती संकलनाची साधने:

संशोधनात आधार सामग्री संकलीत करण्यासाठी उपयोगात आणलेल्या विविध प्रकारच्या उपकरणांचे विविध चाचण्या, प्रश्नावली, अभिवृत्ती, निरीक्षण मुलाखत इत्यादीचे सविस्तर वर्णन करणे अवश्यक आहे. एखाद्या क्षमतेचे मापन करण्यासाठी प्रमाण मापणानेच मापणी करावी लागते.

संशोधन पध्दती:

संशोधन समस्या सोडविण्यासाठी वापरलेल्या पध्दती विषयी माहिती थोडक्यात घ्यावी. संशोधनासाठी तीच पध्दती वापरली याचाही स्पष्ट खुलासा करावा प्रायोगिक पध्दतीचा वापर केला असल्यास कोणत्या अभिकल्पनाचा उपयोग केला यांचे वर्णन घ्यावे.

निष्कर्ष व शिफारशी:

संशोधनातून प्राप्त झालेली वस्तूस्थिती व त्याचा लावलेला अर्थ म्हणजे निष्कर्ष. निष्कर्ष काढताना हे संशोधन कोणत्या विशिष्ट परिस्थितीत केले आहे आणि म्हणून या संशोधनाचे निष्कर्ष कोणत्या विशिष्ट परिस्थिती किंवा मर्यादेपर्यंत उपयुक्त ठरतील हे नमुद करणे अवश्यक असते.

परिशिष्टे:

यात पुढील बाबीचा समावेश होतो.

- अभ्यासासाठी वापरलेल्या विविध साधनाच्या प्रति
- संदर्भग्रंथाची यादी उदा. पंडीत ब.वी. (१९९७) शिक्षणातील संशोधन पुणे : नुतन प्रकाशन
- चित्रे नकाशाबदल माहिती

संशोधन अहवालाचे महत्व संशोधन अहवालाचे महत्व खालील प्रमाणे सांगता येतील.

- संशोधन अहवालामुळे नवनविन माहिती समाजात विनाविलंब प्राप्त होते. या माहितीद्वारे सामाजिक परिवर्तन होण्यास चालना मिळते.
- वेगवेगळ्या विषयाशी संबंधित ज्ञानाचा प्रकार संशोधन अहवालामुळे होतो
- संशोधनातील ज्ञान सर्वसामान्य व्यक्तीकडे सहज पोहचविले जाते.
- संशोधनातील निष्कर्ष आणि उपाय अनेक सामाजिक समस्या सोडविण्यासाठी उपयुक्त ठरतात.
- संशोधन अहवालद्वारे नविन पध्दती आणि तंत्र विकसित होण्यास मदत होते.

अहवाल लेखन करताना लक्षात ठेवावयाच्या बाबी:

हे एक शास्त्रीय दस्तऐवज आहे. म्हणून ते जास्तीत जास्त वस्तुनिष्ठ आसणे आवश्यक आहे.

संशोधन मांडणी करताना उपयुक्त असणारे कांही मुद्दे बाबी पुढील प्रमाणे आहे.

- संशोधन अहवाल हा विचार आणि कृती यांच्या तर्कसंगतीनुसार मांडणी केलेला असावी.
- संशोधनाचा अहवालात मी आम्ही माझा इत्यादी सर्वनामाचा उपयोग करून नये त्याऐवजी, संशोधक, शोधकर्ता, अभ्यासक्रम, प्रकल्प, आशा सज्ञाचा वापर करावा.
- अहवालीची भाषा व्याकरण दृष्ट्या शुध्द असावी.
- नेहमीच्या प्रचारातले आणि नेमक्या अर्थाचे शब्द वापरावेत.
- भाषा सरळ सोपी असावी लांबलचक व मिश्र आणि संदिग्ध गोलमाल करणारी वाक्य रचना टाळावी.
- अलंकारात्मक दृष्टांतपूर्ण भावनात्मक भाषेचा वापर टाळावे.
- संशोधनाचे निष्कर्ष मांडताना भुतकाळाचा वापर करावा.
- संदर्भ ग्रंथ सुची संशोधकाने वेगवेगळ्या प्रकरणासाठी विचारात घेतलेले संदर्भग्रंथ इत्यादी योग्य पध्दतीने मांडले किंवा नाही याची खात्री करावी. संशोधन अहवालाचा अकारा ए-४ या साईजमध्ये असावा त्यापेक्षा वेगळ्या साईजमध्ये करू नये.

संशोधन लेखनाचे सामान्य नियम:

- विवेचनाची भाषा सोपी असावी.

- विचार पुन्हा पुन्हा वेगवेगळ्या शब्दात उगाच आवृत्त करू नये
- तुमच्या भाषेतूनच शोधविषयाच्या संदर्भातल्या सकल्पना प्रकट व्हायला हव्यात.
- संशोधन विषयाला अनुसरूनच भाषाशैली लेखन असावी.

संशोधन अहवाल लेखनातील टप्पे:

1. शोध विषय सुचविणे व सामग्री गोळा करून लागणे संबंधित ग्रंथ नियतकालिके इत्यादी उपलब्ध करून घेणे, ती कुठून मिळाली त्याची निट नोंद करणे.
2. संबंधित ग्रंथ, इत्यादीचे स्थूल-सुक्ष्म वाचन करणे.
3. जानवलेल्या महत्वपूर्ण भागाच्या नोंदी वाक्य, परिच्छेद वाचनात आलेल्या विवेचनातील मुद्दे यांची टिप्पणे काढणे.
4. टिप्पणे काढताना त्या मुदयाबद्दल तुमच्या मनात आलेल्या विचाराची तपशीलवार नोंद करणे हे करताना आपल्या शोध विषयाचा आवाका ध्यानात येवू लागतो. कच्चा खडी लिहला जावू शकतो.
5. कच्चा खर्डाचे पुनर्वाचन - जाणवलेल्या त्रुटी संदिग्धता दूर होऊ लागते.
6. सुधारणा - संशोधन लेखक करताना निदर्शनास आलेल्या त्रुटीत सुधारणा घडवून आणणे.
7. सुधारणा: पुनलेखन-विवेचन सुत्रबद्ध तर्कशुध्द होऊ लागते, संदिग्धता दूर होऊ लागते.
8. अंतिम पक्का खर्डा वरिल सर्व टप्पे पूर्ण केल्यानंतर संशोधन अहवालाचा पक्का खर्डा अर्थातच लिखानास सुरूवान करावी.

अहवालाच्या पहिल्या मसुदयाचे लेखन:

अहवाल लेखन करताना शंका भिती, इत्यादी बाबीला बाजूला सारून हातात लेखणी घेतली पाहिजे. निसंकोच पणे लिखानास सुरूवात करणे अवश्यक ठरते एक तरि शब्द लिहिला पाहिजे, की दुसरा शब्द आपोआपच उगवतोच तो दुसरा शब्द पहिल्या शब्दामुळे लिहा त्यावर तिसरा शब्द सुचेल आणि असा चमत्कार घडेल की एका मागून एक शब्द सुचत जावून वाक्य तयार होईल एका वाक्यामुळे त्याच्या पुढचे त्या वाक्याशी सुसंगत असे दुसरे वाक्य मग तुम्ही स्वतःहून लिहाल हि वाक्य म्हणजे किमान एका विचाराच्या अविष्काराला प्रारंभच होईल. आणि

कालांतराने पहिल्या आराखड्याचे काम तुमच्या हातून केले जाईल.

अहवालाच्या दुसऱ्या मसुदयाचे लेखन:

प्रकरण तयार झाले की वाचून पहा. जाणवणाऱ्या विसंगती त्रुटीची लागोलाग. नोंद करा-त्याचे स्पष्टीकरण तिथेच तुमच्या विचारानुसार लिहून ठेवा अवतरणाचे संदर्भ राहिले असतील तर तिथल्या तिथे तुमच्या टिप्पणीमधून उदघन करा हे काम नंतर करित असे म्हणणे बाजुला टाळले तर ते करावयाचेच राहते. नंतर परिक्षकापुढे कितीही खुलासे केले तरी त्यांचा उपयोग होत नाही. कोणतेही कार्य वेळेच्या वेळीच केलेच पाहिजे तर संशोधन अहवाल लेखनाचे कार्य पूर्णत्वास जावू शकते. महत्वाचे म्हणजे जेथे जेथे बदल करावयाचा वाटला त्या ठिकाणी अवश्यकतेनुसार लेखनामध्ये बदल करून टाका. म्हणजे खऱ्या अर्थाने पुर्नलेखनाची प्रक्रिया सुरू झाली आहे. पुर्नलेखन म्हणजे एका प्रकारचे भिजपावसाचीच प्रक्रिया भिजपाऊस जमिनीत जसा हळूहळू झिरपत मुरत जातो, तसे तुमचे प्रत्येक पुर्नलेखन तुमच्या शोधविषयाला अंतिम स्वरूपाकडे नेईल.

संशोधन अहवालाचे तिपाकी रूप आणि भाषाशैली:

संशोधन अहवाल लेखनाचे कार्य हाती घेतल्यानंतर प्रारंभ, आणि अंतिम अशा टप्पयातून जावे लागते. प्रारंभीच्या बाजुमध्ये तुमचा जो काही शोध निबध असेल त्यावर कोणी संशोधन लेखन केले असल्यास पुस्तक, हस्त लिखिते, नियतकालिके, लेख अप्रकाशित प्रबंधानुसार, तपशिलवार परामर्श घेऊन पुन्हा त्या साधनाचे परामर्श घ्यावयास हवे. मध्ये पाखामध्ये मुख्य शोध विषय येत असतो. या मध्यभागात तुमच्या शोध विषयाचे गर्भसत्य उलघडून दाखविले पाहिजे हे गर्भसत्य अनेकदा आपण किती अभ्यास केला आहे. या वाचनातून विविधआंगी लेखनातून प्रबंध फुगत जातो. असेच संकलन सतत वाढत राहिले तर संकल्पनात्मक संशोधन प्रकल्प होण्याची शक्यता आहे. संशोधनात भाषाशैलीचा उगीच भडीमार करू नये अलंकारिक भाषा शक्यतो टाळा. साधी सोपी अर्थपूर्ण भाषेचा अहवाल लेखनात वापर करावा. त्याचबरोबर प्रथमपुरुषवाचक नामाचा वापर करता कामा नये. माझे असे मत आहे मला असे वाटते इत्यादी प्रकारचे निर्देश पुर्णपणे टाळलेच पाहिजे. उसाच्या पेरातून पेर उगवते त्याचप्रमाणे एकातून एक याप्रमाणे निर्माण झाली पाहिजे म्हणून आधीच्या प्रकरणाच्या आखेरितच पुढल्या प्रकरणाची चाहूल

डॉ. भरत आर. लोकलवार

लागली पाहिजे. सत्य स्तरामध्ये परिशिष्टे, साधेग्रंथ, नियतकालिके, इत्यादीची सुची टिप्पा तक्ते, आवश्यकतेनुसार अंतर्भाव करावा.

संशोधन अहवालाची रचना किंवा मांडणी:

संशोधन अहवाल तयार करताना एक साचेबद्ध नमुना सागणे कठिनच असते तथापी एक स्थूल मानाने संशोधन अहवालाची रचना व मांडणी पुढील घटकाच्या आधारे करता येईल.

1. प्राथमिक विभाग
2. प्रकल्प अहवालाचा मुख्य विभाग
3. अंतिम विभाग

1. प्राथमिक विभाग:

1. मुखपत्र
2. प्रतिज्ञापत्र
3. प्रमाणपत्र
4. त्रणनिर्देश
5. अणुक्रमाणिका
6. कोष्टके व आकृत्याची सुची

१) **मुखपृष्ठ:** संशोधन अहवालातील पहिल्या पानाला मुखपृष्ठ असे म्हणतात मुखपृष्ठावर खालील बाबींचा समावेश होतो.

1. संशोधन समस्येचे विधान
2. कोणत्या शिक्षणक्रमासाठी अहवाल सादर केला त्याचे नाव
3. विद्यार्थ्यांचे नाव
4. विद्यापीठाचे नाव
5. अहवाल सादर करण्याची तारिख वर्ष
6. मार्गदर्शकाचे नाव

२) **प्रतिज्ञापत्र:** प्रतिज्ञापत्रात म्हणजे संशोधकाने संशोधनाचे कार्य स्वतः केले आहे. याची लेखी हमी असते.

३) **प्रमाणपत्र:** संशोधकाने संशोधनाचे कार्य मार्गदर्शकाच्या मार्गदर्शनानुसार स्वतः पुर्ण केले आहे. याची हमी मार्गदर्शक देतो (उदा. विद्यापीठाचे विशिष्ट नमुना असेल तर तसे प्रमाणित प्रमाणपत्राचा नमुना घ्यावा.)

४) **ऋणनिर्देश:** संशोधन कार्यात ज्या व्यक्तीने संस्थेने मार्गदर्शन केले असेल त्याचा आदर्श पुर्वक उल्लेख करावा. त्रणनिर्देशांची भाषा नेमकी सौम असावी अवास्तव स्तूती व अलंकारित भावना अथवा भावनात्मक भाषा टाळणे आवश्यक आहे. घरातील नाते कुटुंबीय इत्यादीच्या नावे

शक्यतो टाळावी. शेवटी प्रत्यक्ष अप्रत्यक्ष सहकार्य करणाऱ्या सहकार्यांचे उल्लेख अहवालात केला जावा.

५) **अनुक्रमणिका:** सुयोग्य अनुक्रमणिका म्हणजे अहवालाचे आरसाच होय. अनुक्रमणिकेचे प्रामुख्याने दोन भाग पडतात.

अ) प्राथमिक विभागात मुखपृष्ठ प्रमाणपत्र प्रतिज्ञापत्र ऋणनिर्देश अनुक्रमणिके पर्यंत च्या सर्व पानांना रोमन क्रमांक दयावे.

ब) त्यानंतर अहवालाच्या मुख्य विभागापासून आरेबीक क्रमांक दयावेत

2. प्रकल्प अहवालाचा मुख्य विभाग:

प्रकल्प अहवालाच्या मुख्य विभागात पुढील सर्वसाधारण घटकाचा समावेश असतो.

1. प्रस्तावना/पार्श्वभूमी
2. संशोधन समस्येची संबंधित साहित्याचा आढावा
3. समस्येची संप्रेषणाच्या दृष्टीकोनातून मांडणी
4. संशोधनाची कार्यपध्दती
5. सामग्री विश्लेषण अन्वयार्थ आणि निष्कर्ष
6. सारांश आणि शिफारशी

1. **प्रस्तावना:** संशोधनाचे महत्व गरज वाचकाला कळावी तसेच संबंधित विषयां समस्ये पर्यंतची सविस्तर माहिती थोडक्यात प्रस्तावनेत मांडावी लागते. त्या घटकामध्ये कोणत्या बाबीचा समावेश आहे हे प्रस्तावनेतून समजून येते.

2. संशोधन समस्येशी संबंधित साहित्याचा आढावा:

आपल्या संशोधन समस्येशी संबंधित साहित्याचा आढावा घेऊन आपल्या संशोधन अहवालासाठी समस्याची सोडवणूक करण्यासाठी समस्येशी संबंधित साहित्याचा आढावा घ्यावा लागतो.

3. **समस्येची संप्रेषणाच्या दृष्टीकोनातून मांडणी:** तुमची संशोधन समस्या संप्रेषणाच्या क्षेत्राशी निगडित आहे. व ती वाचकाला समजावी म्हणून संशोधन समस्याची संप्रेषणाच्या दृष्टीने मांडणी करावी लागते.

4. **सामग्री विश्लेषण अन्वयार्थ आणि निष्कर्ष:** अहवालातील हे अत्यंत महत्वाचे प्रकरण आहे. माहितीचे पृथक्करण, विश्लेषण, अन्वयार्थ, अर्थनिर्वचन आणि निष्कर्ष हे सर्व एकाच प्रकरणात दिले जाते. मिळालेल्या सामग्रीचा अर्थ कळण्यासाठी कोष्टके, आकृत्याद्वारे माहिती सादर केली जातात. मुख्यता तुमचे निष्कर्ष हे तुमच्या

एकत्रित केलेल्या सामग्रीवर आधारलेले आहेत याची काळजी घ्यावी.

5. सारांश व शिफारशी यात प्रामुख्याने समस्याची पुन्हा एकत्रीत मांडणी केलेली असते. समस्या सोडवण्यासाठी वापरण्यात आलेली पध्दत व तिचे वर्णन निष्कर्ष परिकल्पनाची चाचणी व त्यातून निघालेले अनुमान निष्कर्ष यांचा संबंध जोडला जातो. निष्कर्षाच्या सादरीकणावरून संशोधकाने उदिष्टासंदर्भात काय साध्य केले. याचा आढावा येथे घेतला जातो. थोडक्यात नविन संशोधनासाठी येथे विषय सुचविले जाते व त्याबाबत शिफारसी केलेल्या असतात.

अंतिम विभाग:

अंतिम विभागात प्रामुख्याने संदर्भग्रंथसूची आणि परिशिष्टाचा समावेश असतो.

संदर्भ ग्रंथ सूची:

संशोधनात वापरलेल्या स्रोताच्या माहितीची संदर्भ ग्रंथसूची येथे असते. अहवाल लेखनाच्या शेवटी संदर्भग्रंथसूची दिलेली असते. ग्रंथसूची दोन विभागात विभागली जाते. पुस्तकाच्या दुसऱ्या विभागात नियकालिके आणि वर्तमानपत्रे यांची नोंद असते. संदर्भ सूची ही वर्णअक्षरानुसार तयार केली जावी. उदा. AACR२, शिकागे, APA इ. ग्रंथाची संदर्भसूची पुढील प्रमाणे लिहावी. लेखकाचे आडनाव, नाव, प्रकाशन वर्ष, पुस्तकाचे नाव (इटालिक मध्ये) स्थल प्रकाशक खंड क्र. उदा. मुळे रा. श व उमाटे वि.त. (१९८७) संशोधनाची मुलतत्वे, महाराष्ट्र विद्यापीठ ग्रंथनिर्मिती मंडळ, नागपुर. मासिके वर्तमानपत्राची संदर्भसूची खालील प्रमाणे लिहावी

1. प्रथम लेखकाचे आडनाव, नाव, प्रकाशनाची तारीख खंड क्र. पान क्र.
2. नियतकालिकाचे नाव अधोरेखित करावे.
3. लेखकाचे नाव अवतरण चिन्हात दयावे. उदा. 'कौल एल.' (जानेवारी १९७७) ए स्टडी ऑफ द इम्पेक्ट टिचर ट्रेनिंग इंडियन एज्युकेशन (आवृती-बारावी)

परिशिष्टे: जी माहिती अत्यंत महत्वाची आहे. पण संशोधन अहवालात देणे योग्य नही अशी सर्व माहिती परिशिष्ट या विभागात दयावी. साहित्यात प्रश्नावली चित्राचा संच पत्राच्या प्रती, दस्तावेज, चाचण्या मुलाखती, नमुना आणि इतर माहिती इ. समोवेश होते.टिप्पणी नोंद करण्याची

पध्दत प्रमाणे पध्दती अनुसरावी लागते. टिप्पा टिप्पनी याची नोदी उत्तरवून काढताना पुढील ग्रंथाबाबत:

१) लेखकाचे अडनाव, नाव, प्रकाशन वर्ष २) पुस्तकाचे नाव व आवृत्ती ३) प्रकाशन स्थळ ४) प्रकाशकाचे नाव व पृष्ठ क्रमांक

नियतकालिके:

१) लेखकाचे आडनाव, नाव नियतकालिकाचे प्रकाशन वर्ष २) लेखकाचे नाव ३) नियतकालिकाचे नाव ४) अंक क्रमांक ५) पृष्ठ क्रमांक

संपादित ग्रंथ:

१) संपादकाचे नाव २) प्रकाशन वर्ष ३) पुस्तकाचे नाव ४) आवृत्ती ५) प्रकाशकाचे नाव ६) प्रकाशन स्थळ ७) पृष्ठ क्रमांक

या क्रमाने टिप्पा टिप्पनीची नोंद करून घ्यावी. ज्या ग्रंथालयातून किंवा व्यक्तीकडून तुम्हाला शोधविषयाशी संबंधित साधन उपलब्ध झाले आहे. त्या ग्रंथालयाचे नाव पुस्तकाचा दाखल अंक क्रमांक इत्यादी माहिती कार्डवर नोंदी करून ठेवावी. मिळालेले संदर्भ वेगवेगळ्या वेळी टिप्पन करून ठेवले तर ती माहिती मिळण्यास वेळ लागणार नाही. आणि ग्रंथसुची तयार करताना या टिप्पा टिप्पनीच्या नोंदीची ग्रंथसुची देताना उपयुक्त ठरतात.

आलेख तकत्याद्वारे माहितीचे स्पष्टीकरण:

संशोधन अहवालातील समस्या विषयक माहितीचे परिणामकारक अचूक असी माहिती दर्शविण्यासाठी संशोधनात तक्ते आणि आलेखाचा वापर करावा लागतो ज्यामुळे स्पष्ट नेमकेपणाची माहिती दर्शविता येते. उदा. समाजशास्त्रीय, आर्थशास्त्रीय, विज्ञानात्मक, गणितीय माहिती सर्वसामान्यपणे आलेख तक्ते तयार करूनच माहितीचे सादरीकरण करावे लागते. उदा. झोपडपट्टीतील प्राथमीक शाळेत जाणाऱ्या मुलांची स्थिती शोधावयाची असेल तर झोपडपट्टीत जाऊन सर्वेक्षण करून त्याचे मासिक उत्पन्न, राहणीमान, आरोग्य, वेशनाधिनता, गुन्हेगारी इत्यादी बाबींचा विचार करून तकतांच्या, सारणीच्या आलेखाच्या स्वरूपात माहितीचे विश्लेषण करावे लागते. तरच ती समस्या ठळकपणे समजून येते.

- 1) रेषा आलेख
- 2) स्तंभालेख
- 3) वर्तुळ विभाजन आलेख

तकत्याद्वारे माहितीचे स्पष्टीकरण:

कर्मचाऱ्याची कार्य दाखविण्यासाठी, अधिकार कक्षात किंवा रचना कामाची दिशा आराखडा तक्ता स्वरूपात दर्शविणे व काम करून घेणे सोयीचे ठरते. विशेषतः वर्तुळ, चौकोन इत्यादी तकत्याचा वापर करून माहितीचे परिणामकारक पृथक्करण करता येते.

संदर्भ देण्याच्या विविध पध्दती:

एखादा मजकूर किंवालेखातील भाग आपल्या संशोधन अहवालासाठी उपयोगाचे असेल तर ते घ्यावे लागते. लेखकाचे विचार जसेच्या तसे अवतरणामध्ये घेण्यात यावे. दुसऱ्याचे विचार स्वतःचे म्हणून लिहलात तर ते केव्हातरी उघडे पडल्याशिवाय राहत नाही. त्यासाठी मुळ लेखाचा संदर्भ दिला पाहिजे. संदर्भ देण्याच्या विविध पध्दती पुढील प्रमाणे

१) शोधलेखनाच्या आखेरिला स्वतंत्र परिशिष्टामध्ये ग्रंथसुची जर एखादया ग्रंथातून अनेक वेळा संदर्भ घ्यावयाचा असेल तर पुन्हा पुन्हा लेखकाचे नाव लिहत बसू नये तर स्वतंत्र लिहून पृष्ठक्रमांक लिहावे.

उदा. १) केळकर न.ची (१९२२) विलायतची बातमीपत्रे पृ.क्र.६९

२) तत्रैव- पृ.क्र. ६० (IBID)

३) तत्रैव- पृ.क्र. ७६ (IBID)

तत्रैव ला इंग्रजीत (IBID) अशी संज्ञा आहे. याबरोबरच आनखी एक संज्ञाचा वापर शोधलेखनात केला जातो. ती संज्ञा म्हणजे 'उनि' होय उनि म्हणजे उपरिनिर्दिष्ट वर निर्देशित केलेले. समजा एक विशिष्ट ग्रंथाचा संदर्भ पुन्हा पुन्हा येत असेल किंवा त्याची पुनरावृत्ती करण्याऐवजी लेखकाचे आडनाव लिहून त्यापुढे ' उनि' ही संज्ञा द्यावी त्यानंतर पृष्ठ क्रमांकाचा निर्देश उदा. जोशी वामन मल्हार, विचार सौंदर्य १९४६ पृ ९२-१०३

२) केसरी १९८६ डिसें ०७

३) जोशी वा.म. 'उनि' पृ.१०४-१०८

४) तत्रैव पृ.१०४-१०९

अशा पध्दतीने सुध्दा संदर्भ देता येतो.

नियतकालिक, वार्षिक, मासिके, साप्ताहिक आणि दैनिकातील संदर्भ देत असताना त्यांचा क्रम असा असावा. लेखकाचे नाव वर्ष, लेखाचे नाव, वार्षिकाचे नाव, अंक माहिती पृ. क्र. द्यावे एखादया वेळेस पत्रे यांचा सुध्दा

मजकूर संदर्भात दयावा उदा. विजय तेंडुलकराचे पत्र-
तारिख . . . अशा तऱ्हेने करावा.

सारांश:

संशोधन समस्याची निवड झाल्यानंतर संशोधनकर्ता अवश्यक साहित्याची जुळवाजुळव करत असतो. माहितीची संकलन केल्या नंतर अहवाल लेखनाच्या टप्प्याचा विचार करून साचेबद्ध पध्दतीने परिकल्पनाची मांडणी करून अहवाल लेखनाचे नियमाची अमलबजावणी करून लेखन करावे लागते. यात अहवाल लेखनाचे मसुदया नुसार असावेत. भाषा शैली सहज समजेल टिप्पा टिपनीचा वापर संदर्भ ग्रंथाची सुची वेगवेगळ्या पध्दतीची परिणामकारक मांडणी अहवाल लेखनात करणे आवश्यक ठरते. एकदरित अहवाल लेखन करताना नियमावलीला धरूनच मार्गदर्शकाच्या सुचनेनुसार अहवालाचे लेखन कार्य करावे.

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शाश्वत ग्रामीण विकास

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सारांश:

या संशोधन पत्रात शाश्वत ग्रामीण विकास या संकल्पनेचा सखोल अभ्यास करण्यात आला आहे. शाश्वत विकास म्हणजे भविष्यातील पिढ्यांच्या गरजांवर तडजोड न करता सध्याच्या गरजा पूर्ण करणारा विकास. विशेषतः ग्रामीण भागाच्या विकासात या संकल्पनेचा विचार होणे महत्वाचे आहे, कारण पर्यावरण, नैसर्गिक संसाधने, आणि समाजातील सर्व घटकांचा विकास यावर ग्रामीण विकासाची रणनीती अवलंबून आहे.

या संशोधनात शाश्वत ग्रामीण विकासाची आवश्यकता आणि उद्दिष्टांची चर्चा करण्यात आली आहे. त्यात पर्यावरणीय साधनसंपत्तीचे संरक्षण, ऊर्जा, पाणी, अन्न, आणि सामाजिक-सांस्कृतिक घटकांचा सहभाग महत्वाचा असल्याचे अधोरेखित केले आहे. शाश्वत विकासाची 17 ध्येये आणि त्यांचे ग्रामीण विकासाशी असलेले नाते समजावून सांगण्यात आले आहे. या ध्येयांमध्ये गरिबी निर्मूलन, अन्नसुरक्षा, शाश्वत शेती, स्वच्छ पाणी, सर्वसमावेशक शिक्षण आणि पर्यावरणीय शाश्वतता यांचा समावेश आहे. संशोधनासाठी दुय्यम साधनांचा वापर करण्यात आला असून, शाश्वत विकासाच्या धोरणांसाठी केंद्र व राज्य सरकारच्या विविध योजनांचा अभ्यास केला आहे.

शोध संज्ञा: पर्यावरण संकट, इंधन संकट, उर्जा संकटे, लोकसंख्या, अन्न समस्या, चालू लष्करी संघर्ष, दहशतवादाचा धोका.

प्रास्ताविक:

शाश्वत विकास म्हणजे भविष्यातील पिढ्यांच्या गरजा पूर्ण करण्याच्या क्षमतेची तडजोड न करता वर्तमान गरजा पूर्ण करणारा विकास. गावाचा विकास आराखडा तयार करताना तो शाश्वत ग्रामविकास आराखडा असणं गरजेचे आहे. भावी पिढ्यांच्या गरजा लक्षात ठेवून यासाठी आताच्या आपल्या गरजांचे सारासार विचार करून नियोजन ठेवून विकास करणं, पर्यावरण लक्षात ठेवून विकास करणं याला शाश्वत विकास आराखडा असं म्हणतात. ग्राम विकास साध्य करण्यासाठी निश्चित ध्येय धोरणांनी यंत्रणा उभारून योजना राबवल्या आहेत. परंतु विसाव्या शतकाच्या उत्तरार्धात मानवतेच्या प्रगतीला अडथळा आणणाऱ्या आणि त्याच्या अस्तित्वाला धोका निर्माण करणाऱ्या अनेक घडामोडींमुळे शाश्वत विकासाच्या संकल्पनेचा मुखवटा लोकांसमोर आला. यामध्ये पर्यावरण संकट, इंधनसंकट, उर्जासंकटे, लोकसंख्या, अन्नसमस्या, चालू लष्करी संघर्ष, दहशतवादाचा धोका, विविध सामाजिक

श्रेणी आणि देशांमधील राहणीमानाचा वाढता फरक इत्यादींचा समावेश आहे.

संकल्पनेचा विकास:

शाश्वत ग्रामीण विकासाच्या अभ्यासाची आवश्यकता:

समग्र ग्रामीण विकास हा शाश्वत ग्रामीण विकासाचा महत्वाचा टप्पा आहे. समाजातील मातृशक्ती, सज्जनशक्ती, संतशक्ती, संघशक्ती आणि युवाशक्ती यांच्या माध्यमातून जलसंपदा, जंगल वन संपदा, जमीन भूसंपदा, जनावर जैवविविधता संपदा, उर्जासंपदा आणि जन संपदाचा समाजातील प्रत्येक घटकाचा सहभाग, विचार घेऊन करण्याची पर्यावरण पूरक शाश्वत विकास प्रक्रिया आहे. तसेच ग्रामीण भागात सुविधा राबवून ग्रामीण भागाचा मोठ्या प्रमाणात विकास केला गेला पाहिजे. शाश्वत ग्रामीण विकास करायचा असेल तर ग्रामीण भागातील लोकांची मानसिकता बदलली पाहिजे.

अभ्यासाचीउद्दिष्टे:

1. शाश्वतविकासाचाअर्थसमजूनघेणे.
2. शाश्वतविकासाचीध्येयसमजावूनघेणे.
3. श्वतविकासाच्याध्येयाच्यानऊसंकल्पनांचाअभ्यासकरणे.

संशोधन पद्धती:

शाश्वत ग्रामीण विकास या विषयाच्या अभ्यासासाठी दुय्यम साधन-सामग्रीचा आधार घेण्यात आला आहे. त्यासाठी विषयास अनुसरून असणारी ग्रंथ संपदा, विशेष मासिकातील लेख आणि विशेषांक यांचा आधार घेण्यात आला असून केंद्र व राज्य सरकारच्या शाश्वत विकासाच्या विविध योजनांची माहिती देणारी पुस्तिकायांचा आधार घेण्यात आला आहे.

अचिरंतन विकासाकडून चिरंतन विकासाकडे:

पृथ्वी व पृथ्वीवरील सर्व निवासीमध्ये भवितव्य हे पर्यावरणाच्या प्रतिपाळावर (देखरेखीवर) वजनत करण्यावर अवलंबून आहे. या संदर्भातूनच पर्यावरणाचा दीर्घ कालावधीपर्यंत उपयोग आणि अभिवृद्धीसाठी चिरंतन विकासाची संकल्पा विकसित झाली. 1990 या दशकात असे जाणवू लागले की पर्यावरणीय साधनसंपत्तीचा आतिरेकी प्रमाणात व अविवेकी स्वरूपात उपयोग केल्यामुळे पर्यावरणाचा ऱ्हास होत असून पर्यावरणात असंतुलन निर्माण होत आहे. ही बाब सर्वात जास्त प्रमाणात विकसनशील राष्ट्रात दिसून येत आहे. परंतु चिरंतन विकासाची संकल्पना दोन दशकापूर्वीच विकसित झाली. चिरंतन विकास या शब्दाचा सर्वपथम वापर जागतिक संवर्धन रणनीतीमध्ये 1980 ला केला गेला. परंतु यांचा सविस्तर रितीने प्रचार 'जागतिक पर्यावरण आणि विकास आयोगाद्वारे केला गेला.

"भावीपिढीच्या गरजा पूर्ण करण्याच्या पर्यावरणाच्या क्षमतेचा -हास न करता वर्तमान पिढीच्या गरजा पूर्ण करणे म्हणजेच चिरंतन विकास होय."

सयुक्त राष्ट्र संघाने शाश्वत विकासाच्या उद्देशाने जाहीर केलेल्या 'जागतिक कार्यक्रम 2030' मध्ये 17 शाश्वत विकासाची ध्येये वत्या अंतर्गत 169 साध्ये यांचा समावेश असून हा कार्यक्रम 1 जानेवारी 2016 पासून लागू झाला आहे.

शाश्वत विकासाची 17 ध्येये:

शाश्वत विकासाचे ध्येये, ग्रामपंचायत विकास आराखड्याचा एक भाग असले पाहिजेत. शाश्वत विकासाची

प्रा. डॉ. गोविंद राजाराम परडे

ध्येये खालील प्रमाणे असून ती सन 2030 पर्यंत साध्य करावयाची आहेत.

1. सर्व प्रकारच्या गरिबीचे निर्मूलन करणे.
2. भूक संपवणे, अन्न सुरक्षा व सुधारित पोषण आहार उपलब्ध करून देणे. आणि शाश्वत शेतीला प्राधान्य देणे
3. आरोग्य पूर्ण आयुष्य सुनिश्चित करणे व सर्व वयोगटातील नागरिकांचे कल्याण साधणे.
4. सर्वसमावेशक व गुणवत्ता पूर्ण शिक्षण उपलब्ध करणे.
5. लिंग भाधिष्ठित समानता व महिला आणि मुलीचे सक्षमीकरण साधणे.
6. शुध्द पाण्याची व स्वच्छतेच्या संसाधनांची उपलब्धता सुनिश्चित करणे.
7. सर्वांना अल्पखर्चिक विश्वासाह, शाश्वत आणि आधुनिक ऊर्जा साधने उपलब्ध करून देणे.
8. शाश्वत, सर्व समावेशक आर्थिक वाढ आणि उत्पादक रोजगार उपलब्ध करणे.
9. पायाभूत सोयी सुविधांची निर्मिती करणे. सर्वसमावेशक आणि शाश्वत औद्योगिकीकरण करणे आणि कल्पकतेला वाव देणे
10. देशातील विविध असमानता दूर करणे.
11. शहरे आणि मानवी वस्त्या अधिक समावेशक, सुरक्षित, संवेदनशील आणि शाश्वत करणे.
12. उत्पादन आणि उपभोगाच्या पध्दती शाश्वत रूपात आणणे.
13. हवामान बदल आणि त्याच्या दुष्परिणामांना रोखण्यासाठी उपाय योजना करणे.
14. महासागर व समूहांचे संवर्धन करणे तसेच त्यांच्याशी संबधित संसाधनांचा शाश्वत पणे वापर करणे.
15. परिस्थितीकीय व्यवस्थांना शाश्वत पध्दतीने वापर करणे, वनाचे शाश्वत व्यवस्थापन, वाळवंटीकरणाशी मुकाबला करणे, जमिनीचा कस कमी होण्याची प्रक्रिया आणि जैवविविधतेची हाणी रोखणे.
16. शांतता पूर्ण आणि सर्वसमावेश समाज व्यवस्था प्रोत्साहन देणे, त्यांची शाश्वत विकासाच्या दिशेने वाटचाल निश्चित करणे. सर्वांची न्यायापर्यंत पोहोच स्थापित करण्यासाठी विविध पातळ्यांची परिणामकारक, उत्तरदायी आणि सर्वसमावेशक संस्था उभ्या करणे.

17. चिरस्थायी विकासासाठी वैश्विक भागीदारी निर्माण व्हावी यासाठी अंमलबजावणीची साधने विकसित करणे.

शाश्वत विकास ध्येयांच्या नऊ संकल्पना / विषय:

'सर्वाना सोबत घेऊन चला' हा या जागतिक कार्यक्रमाचा गाभा आहे. जागतिक कार्यक्रम-2030 ची देशात प्रभावी अंमलबजावणी करणेसाठी भारत सरकार कटीबद्ध आहे. भारतीय राष्ट्रीय विकास ध्येये व सर्वांची योजना सर्वांचा विकास' किंवा सर्वासोबत आणि सर्वासाठी विकास' ही धोरणे शाश्वत विकासाची ध्येये साध्य करण्यासाठी अनुरूप अशीच आहेत. विविधसंस्था, संघटना, खाजगी क्षेत्रे, तरुण, समुदाय आणि घटकांशी समन्वयातून ही शाश्वत विकासाची ध्येये साध्य करणे निश्चितच शक्य होणार आहे.

भारत सरकारच्या पंचायतीराज विभागाने तयार केलेल्या तज्ञ गटाने पंचायतराज संस्थामध्ये ही ध्येये साध्य करण्यासाठी संकल्पात्मक दृष्टीकोणाचा अंगीकारकरणे बाबत सूचित केले असून यासाठी 9 संकल्पना / विषय निश्चित करून दिले आहेत. या संकल्पना खालील प्रमाणे

1. गरिबी मुक्त आणि उपजीविका वृद्धीस पोषक गाव:

गरिबी मुक्त गाव म्हणजे असं गाव, ज्या गावात सर्व समाज घटकांची भरभराट आणि वाढ होण्यासाठी आवश्यक उपजीविका विकासाची पुरेशी साधने उपलब्ध असतील. असं गाव ज्या गावात कुणीही मागे राहणार नाही यासाठी सर्व समाज घटकाना सामाजिक सुरक्षा उपलब्ध असेल.

गरिबीला अनेक अंग असतात. त्यात आर्थिक, सामाजिक, शैक्षणिक, लिंग भाव आणि अन्य सामाजिक क्षेत्रातही संधी पासून वंचित राहिल्याने व त्यातून असमानता निर्माण होत असल्याने समाजातील अनेक घटकांना गरिबीचा प्रश्न भेडसावत असतो.

2. आरोग्यदायी गाव:

असे गाव ज्या गावात सर्व वयोगटाच्या महिला पुरंषाचे आरोग्य आणि खुशालीची खात्री असेल. गावातील सर्व समाज घटकांना पुरेशे अन्न मिळेल आणि गावातील कुपोषण नाहीसे होईल यासाठी शाश्वत आणि एकात्मिक शेतीला प्रोत्साहन देणे, बालके, किशोरवयीन मुले-मुली, महिला आणि जेष्ठ नागरिकांच्या आहारातील पोषण मूल्ये वाढविणे आणि त्यांच्यासाठी सुरक्षित आणि गुणवत्तापूर्ण आरोग्य सेवांची उपलब्धता असणे.

प्रा. डॉ. गोविंद राजाराम परडे

3. बालस्नेही गाव:

गावातील सर्व मुलांना निर्धोक आणि सुरक्षित वातावरण तसेच चांगले गुणवत्ता पूर्ण शिक्षण आणि आरोग्य सेवा उपलब्ध करणे. यासाठी 100 टक्के बाल मजुर मुक्त गाव करणे आणि 100 टक्के मुलांची शाळेमध्ये नोंदणी करणे तसेच बालविवाह प्रतिबंध करणे गरजेचे आहे.

4. जल समृद्ध गाव:

गावातील सर्व घरांसाठी वैयक्तिक नळ जोडणीद्वारे माप दंडानुसार गुणवत्ता पूर्ण आणि दर्जेदार पाणी पुरवठा. उत्तम पाणी व्यवस्थापन, शेती आणि पाण्याच्या सर्व गरजा पूर्ण होतील इतकी पाण्याची उपलब्धता, पाण्याचा पुनर्वापर आणि जल पुनर्भरण

5. स्वच्छ आणि हरित गाव:

बालकांच्या भविष्यासाठी बालस्नेही गाव तयार करणे. निसर्ग संपन्न हरित गाव निर्माण करणे, अपारंपारिक उर्जेचा वापर, स्वच्छता, पर्यावरणाची अनुकूल व्यवहार आणि पर्यावरण रक्षण.

6. स्वयंपूर्ण पायाभूत सुविधा युक्त गाव:

पायाभूत सुविधांच्या दृष्टीने गाव स्वयं पूर्ण करणे, गावातील सर्वांना परवडणारी घरे, निर्धोक आणि पुरेशा प्राथमिक सोयी सुविधा उपलब्ध करून देणे.

7. सामाजिकदृष्ट्या सुरक्षित गाव:

गावात प्रत्येक व्यक्तीची काळजी घेतली जाते याची भावना गावकऱ्यांमध्ये निर्माण करणे. गावातील सर्व पात्र नागरिकांना सामाजिक सुरक्षा योजनांचा लाभ मिळवून देणे. गावातील गरिब व असुरक्षित नागरिकांच्या मानवी हक्कांचे संरक्षण करण्याची सामाजिक संरक्षण यंत्रणा निर्माण करणे जेणे करून सर्वांना गावाच्या विकासात सोबत घेऊन जाणे शक्य होईल.

8. सुशासन युक्त गाव:

सुशासनाद्वारे गावातील सर्व लोकांना विविध विकास योजनांचा लाभ व जबाबदार सेवा वितरणाची हमी देणे. विकासाची ध्येये साध्य करण्यासाठी तसेच गावामध्ये सुधारणविषयक कार्यक्रम राबविणेच्या दृष्टीने पारदर्शकता हा महत्वाचा घटक आहे.

9. लिंग समभाव पोषक गाव:

गावात लिंग समभाव स्थापन करण्यासाठी महिलांना समान संधी उपलब्ध करून देणे. महिलांचे सक्षमीकरण करणे आणि मुलींना सुरक्षित वातावरण उपलब्ध

करून देणे. भारतीय संविधानाच्या 14 व्या कलमान्वये देशातील सर्व नागरिकांना कायद्या पुढे समानता प्रदान करणेत आली असून धर्म, वंशजात, लिंग किंवा जन्मस्थानाच्या आधारे भेदभाव करणेस मनाई करण्यात आली आहे. लिंगसमभाव, समानता, महिलांच्या हक्काचे रक्षण व त्यांचा सहभाग याशिवाय सामाजिक व आर्थिक विकासातील विषमता नष्ट करणे आवश्यक आहे.

शाश्वत विकासाच्या संकल्पनांवर काम करण्यासाठी सहाय्यभूत ठरणारी संसाधने म्हणून खालील कार्यक्रमाचा उपयोग ग्रामपंचायतीने करता येईल. दीन दयाळ अंत्योदय याजना- महाराष्ट्र राज्य ग्रामीण जिवन्नोन्नती अभियान- राष्ट्रीय ग्रामीण आरोग्य अभियान, महात्मा गांधी राष्ट्रीय ग्रामीण रोजगार हमी योजना, दीन दयाळ उपाध्याय- ग्रामीण कौशल्य विकास योजना राष्ट्रीय सामाजिक सहायता कार्यक्रम. प्रधानमंत्री आवास योजना, सार्वजनिक वितरण प्रणाली, राष्ट्रीय स्वास्थ्य बीमा योजना, स्वच्छ भारत मिशन, मध्यान्ह भोजन, समग्र शिक्षा अभियान, दीन दयाळ उपाध्याय ग्राम ज्योती योजना, जननी सुरक्षा योजना, एकात्मिक बाल विकास योजना, नारी, शिशु सुरक्षा कार्यक्रम, राष्ट्रीय स्वास्थ्य बीमा योजना, राष्ट्रीय मृद आणि कृषी अभियान राष्ट्रीय कृषी विकास योजना, प्रधानमंत्री कृषी सिंचाई योजना, पोषण अभियान, एकात्मिक पाणलोट व्यवस्थापन कार्यक्रम, ग्रीन इंडिया मिशन, सामाजिक वनीकरण कार्यक्रम, हरित भारत अभियान, सामाजिक वनीकरण योजना, जल जीवन मिशन, आणि केंद्र व राज्य शासनाच्या ग्रामविकास मंत्रालय, स्वच्छता आणि पेय जल मंत्रालय, शिक्षण मंत्रालय, ग्राहक उपभोक्ता मंत्रालय, अन्न आणि पुरवठा मंत्रालय या विभागांकडील अन्य विविध योजनांच्या अभिरणातून गावाला आवश्यक संसाधनांची उपलब्धता करून घेता येईल.

गावाला मदत करू शकणारे घटक:

स्थायी समिती, कार्यगट/ कार्यकारी समिती, स्वयं सहाय्यकता समूह, विविध विभागांचे आघाडीवर काम करणारे फ्रंटलाईन वर्कर्स, समुदाय संसाधन व्यक्ती, सामाजिक संघटना, स्थानिक युवक आणि स्वयंसेवक, डॉक्टर्स, स्थानिक तज्ञ, कृषिशी संबंधित यंत्रणा, कृषी आणि फलोत्पादन यंत्रणा, पानलोट विकास चमू, दुग्धविकास आणि पुशधन व्यावसायिक, पालक शिक्षक संघटना शालेय व्यवस्थापन समिती, ग्रामस्तरीय बाल संरक्षण समिती,

प्रा. डॉ. गोविंद राजाराम परडे

पाणी पुरवठा योजना चालक, गवंडी, महात्मा गांधी राष्ट्रीय ग्रामीण रोजगार योजने अंतर्गत नोंदणीकृत मंजूर, स्वच्छतादूत, पारंपारिक, पोलिस आणि कायदे विषय सहाय्य, सामाजिक न्याय विभाग, पोलिस / गृहविभाग, वित्त विभाग, विज्ञान आणि तंत्रज्ञान विभाग

शाश्वत विकासाचे फायदे काय आहेत?:

शाश्वत विकासाचे अनेक फायदे आहेत, ज्यात सुधारित पर्यावरणीय गुणवत्ता, वाढलेली सामाजिक समानता, सर्व समावेशक आणि शाश्वत आर्थिक वाढ आणि भविष्यातील पिढ्यांसाठी नैसर्गिक संसाधनांचे जतन यांचा समावेश आहे.

शाश्वत विकास साधण्यासाठी काही आव्हाने कोणती आहेत?:

शाश्वत विकास साध्य करण्याच्या आव्हानांमध्ये बदलाला विरोध, राजकीय इच्छा शक्तीचा अभाव, अपुरी संसाधने आणि शाश्वत विकासाच्या तत्वांची जाणीव आणि समजयांचा अभावयांचा समावेश होतो.

शाश्वत विकासाला चालना देण्यासाठी व्यक्ती काय करू शकतात?:

व्यक्ती त्यांच्या दैनंदिन जीवनात शाश्वत पद्धतींचा अवलंब करून शाश्वत विकासाला चालना देऊ शकतात. जसे की ऊर्जा आणि पाणी वाचवणे, कचरा कमी करणे आणि पर्यावरणास अनुकूल उत्पादने निवडणे.

निष्कर्ष:

शाश्वत विकासाची 17 ध्येये आणि 169 उद्दिष्टे 2023 पर्यंत साध्य करावयाची असून प्रत्यक्ष कृती गावपातळी पासून करणे आवश्यक आहे. विकास प्रक्रियेचा केंद्रबिंदू 'जनता' आहे. फक्त आर्थिकदृष्ट्या प्रगती साधण्यापेक्षा विकासाच्या विविध संधी उपलब्ध करून त्याद्वारे लोकांना सक्षम करून त्यांचा शाश्वत विकास साधण्याची गरज आहे.

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शाश्वत विकास : एक संकल्पना

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सारांश:

या संशोधन पत्रात शाश्वत विकास या संकल्पनेचा सखोल अभ्यास केला आहे. शाश्वत विकास म्हणजे भविष्यातील पिढ्यांच्या गरजा पूर्ण करताना सध्याच्या पिढीच्या गरजांवर तडजोड न करणे, आणि नैसर्गिक संसाधनांचा सतत वापर करणे. यामध्ये पर्यावरणीय, सामाजिक, आणि आर्थिक घटक यांचा समतोल राखणे महत्त्वाचे आहे.

शोधसंज्ञा: शाश्वत विकास, हवामान, ऊर्जा, लोकसंख्या.

प्रस्तावना:

शाश्वत विकास हा विकास आणि मानवी विकासाचा एक दृष्टिकोन आहे. ज्याचा उद्देश भविष्यातील पिढ्यांच्या त्यांच्या स्वतःच्या गरजा पूर्ण करण्याच्या क्षमतेशी तडजोड न करता वर्तमान गरजा पूर्ण करणे आहे. ग्रहाच्या अखंडतेला धक्का न लावता पूर्ण करणे आणि ग्रहाच्या अखंडतेला धक्का न लावता राहण्याची परिस्थिती आणि संसाधने मानवी गरजा पूर्ण करतात. असा समाज असणे हे उद्दिष्ट आहे. शाश्वत विकासाचा उद्देश अर्थव्यवस्था पर्यावरण आणि सामाजिक कल्याण यांच्या गरजा संतुलित करणे 1987 मध्ये युनायटेड नेशन्स वर्ल्ड कमिशन ओन एनवॉर्मेन्ट अँड डेव्हलपमेंट ने आमचा सामान्य भविष्य हा अहवाल प्रसिद्ध केला. ज्याला सामान्यतः बुडलँड रिपोर्ट म्हणतात अहवालात शाश्वत विकासाची व्याख्या समाविष्ट आहे. जी आता मोठ्या प्रमाणात वापरली जाते. शाश्वत विकास म्हणजे भविष्यातील पिढ्यांच्या स्वतःच्या गरजा पूर्ण करण्याच्या क्षमते तडजोड न करता वर्तमान गरजा पूर्ण करणारा विकास त्यामध्ये मुख्य दोन प्रकारच्या संकल्पना आहेत गरजा ही संकल्पना विशेषतः जगातील गरिबांच्या अत्यावश्यक गरजा ज्याला प्राधान्य दिले पाहिजे.

संकल्पनेचा विकास:

शाश्वत विकासाचे मूळ शाश्वत वनव्यवस्थापनाशी संबंधित कल्पनांमध्ये आहे जे सतराव्या आणि अठराव्या शतकात युरोपमध्ये विकसित झाले. इंग्लंडमधील लाकूड संसाधनाच्या वाढत्या जागरूकतेला प्रतिसाद म्हणून जॉन एव्हलिनने 1662 च्या सिल्वा या निबंधात असा युक्तीवाद केला की झाडे लावणे आणि लागवड करणे हे राष्ट्रीय कर्तव्य मानले जावे. कर्मवीर भाऊराव पाटील म्हणतात एका वर्षाची बिदागी हवी असेल तर धान्य पेरा, शंभर वर्षाची बिदागी हवी असेल तर माणसे पेरा, आणि हजारो वर्षाची बिदागी हवी असेल तर झाडे लावा हा सुद्धा शाश्वत विचाराचा मंत्र आहे.

शाश्वत विकासाची उद्दिष्टे:

2015 मध्ये संयुक्त राष्ट्रांच्या सदस्यांनी शाश्वत विकासासाठी 2018 मध्ये अजेंडा जाहीर केला एकूण 17 जागतिक शाश्वत विकासाची उद्दिष्टे तयार केली. लोकांसाठी आणि ग्रहासाठी शांतता आणि समृद्धी हवामान बदलाचा सामना करताना आणि महासागर आणि जंगलाचे रक्षण करण्यासाठी ही तयार करण्यात आली असून शाश्वत विकासाच्या पर्यावरणीय सामाजिक आणि आर्थिक पैलू मधील संबंधावर प्रकाश टाकतात शाश्वत विकासाची ध्येय पुढील प्रमाणे सांगितले आहेत गरिबीचे निवारण,

उपासमारीचे उच्चाटन, सर्वांना चांगले आरोग्य, आणि त्यांचे कल्याण दर्जेदार शिक्षण लैंगिक समानता स्वच्छ पिण्याचे पाणी आणि स्वच्छता परवडणारी ऊर्जा सद्य काम आणि आर्थिक वाढ नवीन उद्योग नवकल्पना आणि पायाभूत सुविधा कमी असमानता शाश्वत शहरे आणि समुदाय जबाबदार उपभोग आणि उत्पादन हवामान कृती पाण्याखालील जीवन जमिनीवरील जीवन शांतता न्याय आणि मजबूत संस्था आणि भागीदारी इत्यादी महत्त्वाकांक्षी उद्दिष्टे आहेत ही उद्दिष्टे 2030 पर्यंत पूर्ण झाली पाहिजेत अशी अपेक्षा आहे पण वाढती असमानता हवामान बदल जैविक विविधतेचे नुकसान हे विकासाला धोका निर्माण करणारी विषय आहेत 2020 ते 2023 मधील कोविड-19 च्या महामारी मुळे ही आव्हाने वाढली आहेत साथीच्या रोगाने वरील उद्दिष्टावर परिणाम झाला आहे शाश्वत विकासासाठी शिक्षण शाश्वत विकासासाठी शिक्षण हा संयुक्त राष्ट्रांनी अधिकृतपणे वापरला जाणारा शब्द आहे मानवतेसाठी अधिक शाश्वत आणि न्याय समाज सक्षम करण्यासाठी ज्ञान कौशल्य मूल्य आणि वृत्ती मधील बदलांना प्रोत्साहन देणारी शिक्षण पद्धती अशी त्यांची व्याख्या आहे शाश्वत विकासाच्या आर्थिक सामाजिक आणि पर्यावरणीय परिमाणासाठी संतुलित आणि एकात्मिक दृष्टिकोन वापरून वर्तमान आणि भावी पिढ्यांना त्यांच्या गरजा पूर्ण करण्यासाठी सक्षम आणि सुसज्ज करणे हे ईएसडीचे उद्दिष्ट आहे.

महात्मा ज्योतिराव फुले यांनी शिक्षणाचे महत्त्व पटवून देताना म्हणतात;

विद्ये विना मती गेली

मती विना गती गेली

गतीविना वित्त गेले

वित्त विनाशुद्ध खचले

इतके अनर्थ एका अविद्येने केले

म्हणून त्यांनी भारतीयांचा शाश्वत विकास होण्यासाठी शिक्षणाचा प्रसार आणि प्रचार करण्यासाठी संपूर्ण आयुष्य खर्च केले तर डॉक्टर बाबासाहेब आंबेडकर यांनी संपूर्ण विकासाचे मूळ शिक्षण आहे हे लक्षात घेऊन शिक्षण संस्था निर्माण केल्या काही विशिष्ट वर्गाने शिक्षण घेतले पाहिजे इतरांना शिक्षण घेण्याचा अधिकार नाही ही असमानता दूर केली आणि सर्वांना मोफत आणि सक्तीचे शिक्षण मिळाले पाहिजे असा आग्रह धरला देशाचा विकास

प्रो. डॉ. बलभीम राजाराम वाघमारे

करायचा असेल तर शिक्षणाशिवाय पर्याय नाही अमेरिका इंग्लंड रशिया जपान यांचा जो विकास झाला तो फक्त शिक्षणामुळेच होय पाश्चिमात्य विचारवंत प्राध्यापक लॉस्की म्हणतात काही व्यक्तींना उच्च शिक्षण मिळण्या अगोदर सर्वांना मोफत आणि सक्तीचे शिक्षण मिळाले पाहिजे असमानता दूर झाली पाहिजे गरीब आणि श्रीमंत; कनिष्ठ आणि वरिष्ठ; काळे आणि गोरे; जातिवाद वंशवाद भेदाभेद लिंगभेद जगातून नष्ट झाला पाहिजे स्वातंत्र्य समता बंधुता न्याय यावर आधारित समाजाची निर्मिती झाली पाहिजे. भिकाऱ्याला भीक देणे सेवा आहे तर भिकाऱ्याला भीक मागण्याची पाळी येणार नाही अशी परिस्थिती निर्माण करणे हे परिवर्तन आहे यालाच शाश्वत विकास म्हणतात काही लोकांनी सुग्रास जेवण्या अगोदर सर्वांनी साधी भाकरी खाल्ली पाहिजे काही लोकांनी बंगल्यात राहण्यापेक्षा सर्वांनी साध्या खोलीत राहिले पाहिजे भारतीय राज्यघटनेच्या 1949 च्या समारोप प्रसंगाच्या भाषणात घटनाकार डॉ. बाबासाहेब आंबेडकर म्हणतात. अन्न वस्त्र आणि निवारा या प्राथमिक गरजा जनतेच्या पूर्ण झाल्या पाहिजेत.

आर्थिक विकास:

कोणत्याही सार्वभौम राष्ट्राला आर्थिक विकासाची ओढ लागलेली असते आर्थिक विकास हा कृषी आणि औद्योगिक क्षेत्राच्या विकासावर अवलंबून असतो आणि ह्या क्षेत्राचा विकास पायाभूत क्षेत्राच्या विकासावर अवलंबून असतो एखादी इमारत उभी करताना तिच्या पायाच्या मजबुतीवर अधिक भर दिला जातो. पाया जितका मजबूत तितकी इमारत दीर्घकाळ टिकणारी असते. भारत सरकारने नियोजन काळात पायाभूत सरचनेच्या विकासावर विशेष भर दिलेला आहे त्यासाठी प्रचंड प्रमाणावर गुंतवणूक केली आहे नियोजन काळात पायाभूत विकासाची जबाबदारी सार्वजनिक क्षेत्रावर टाकण्यात आली आहे काही पायाभूत विकासाची जबाबदारी केंद्र सरकारने तर काही जबाबदारी राज्य सरकारने घेतली आहे.

ऊर्जा:

आर्थिक विकासाच्या दृष्टीने ऊर्जा एक अत्यंत महत्त्वपूर्ण पायाभूत साधन आहे आर्थिक विकासाची प्रक्रिया ऊर्जा व स्तोत्रमार्फत प्रत्यक्ष किंवा अप्रत्यक्षरीत्या प्रभावित केली जाते आज जगात अशी परिस्थिती आहे की ज्या देशाकडे ऊर्जेची मोठी साधने स्वस्त दरात उपलब्ध आहेत

त्या देशाचा जलद गतीने विकास होत आहे या उलट ज्या देशाकडे ऊर्जा स्तोत्राचा अभाव आहे त्या देशाचा आर्थिक विकास मंद आहे.

मानवी संसाधनाचा विकास:

देशातील मानवी संसाधनाचा विकास कितपत झाला आहे यावर शाश्वत विकास अवलंबून असतो मानवी संसाधन विकास निर्देशांक तयार करित असताना आरोग्य शिक्षण आणि आर्थिक स्थिती विचारात घेतली जाते. सामाजिक व सांस्कृतिक विकास: दारिद्र्याचे दुष्टचक्र तोडण्यासाठी समाजातील परंपरा प्रिय लोकांच्या सामाजिक व सांस्कृतिक वृत्तीत ही बदल करणे आवश्यक आहे एकत्र कुटुंब पद्धत, धार्मिक रूढी व परंपरा सामाजिक संघटना यांच्यात सुधारणा घडवून आणल्यास विकासाला पोषक वातावरण निर्माण होऊ शकते. शाश्वत विकासात नैसर्गिक साधनांचा आणि मानवी विकासाचा जवळचा संबंध आहे निसर्गाने मानवाला जमीन, पाणी, ऊन, वारा यासारखी अनेक साधने दिली आहेत परंतु मानवाने नैसर्गिक साधनाचा अतिरेकी वापर केल्यामुळे पर्यावरणाचा ऱ्हास होत आहे जागतिक पर्यावरण आयोगाच्या मते भावी पिढीच्या गरजा पूर्ण करण्याच्या पर्यावरणात च्या क्षमतेचा ऱ्हास न करता वर्तमान पिढीच्या गरजा पूर्ण करणे म्हणजे चिरंतन विकास होय चिरंतर विकास म्हणजे भविष्यकालीन पिढीला धोका न पोहोचवता वर्तमान काळात केलेला विकास होय. चिरंतन विकास म्हणजे भविष्यकालीन पिढीला धोका न पोहोचवता वर्तमान काळात केलेला विकास होय शाश्वत विकास म्हणजे ही एक बदलाची प्रक्रिया आहे त्यामध्ये संसाधनाचा विकास व संस्थात्मक बदल आणि गुंतवणुकीची दिशा यामध्ये अनुरूपता असणे आणि मानवी गरजा व महत्त्वाकांक्षा पूर्ण करण्यासाठी वर्तमान व भविष्यकालीन सामर्थ्य वाढविणे म्हणजेच शाश्वत विकास होय.

इ. स. 1955 मध्ये शाश्वत विकास आयोगाने निर्देशकांचा एक कृती आराखडा मंजूर केला शाश्वत विकास निर्देशकांचे वर्गीकरण प्रामुख्याने सामाजिक आर्थिक संस्थात्मक आणि पर्यावरण विषयक अशा भागात करण्यात येते.

लोकसंख्येवर नियंत्रण:

लोकसंख्या भरमसाठ वाढत आहे भविष्यात पृथ्वीवरील जमीन कमी पडेल का अशी भीती वाटत आहे विज्ञानाच्या प्रगतीमुळे चंद्रावर मानव वस्ती करत आहे पण

प्रो. डॉ. बलभीम राजाराम वाघमारे

ही घंटा धोक्याची आहे ही गोष्ट ओळखून महर्षी धोंडो केशव कर्वे यांनी संतती नियमन कायदा करावा ही मागणी केली होती भारतीय घटनाकार डॉ.बाबासाहेब आंबेडकर यांनी कुटुंब नियोजन सक्तीचे करून लोकसंख्येवर नियंत्रण आणावे असे भारतीयांना आवाहन केले श्रीमती इंदिरा गांधी यांनी कुटुंब नियोजन कार्यक्रम राबविण्याचा प्रयत्न केला होता.

पाण्याचा योग्य वापर:

पाणी पिण्यासाठी, शेती उद्योगधंद्यासाठी वापर केला जातो आणि मुबलक प्रमाणात असेल तरच चिरंतन विकास होऊ शकतो जिथे पाणी आहे त्या ठिकाणी पाण्याचा वापर काटकसरीने करावा शेतीसाठी गरजेपेक्षा जास्त वापर करू नये अति पाण्याच्या वापरामुळे जमिनीची सुपीकता नष्ट होते.

समारोप:

जंगल संपत्तीचे रक्षण; देशी उत्पादनाचा दर वाढला पाहिजे दळणवळणाच्या सोयी उपलब्ध झाल्या पाहिजेत शुद्ध हवा तांत्रिक प्रगती झाली पाहिजे जापान अमेरिका इंग्लंड या देशांच्या विकासातला जर कोणता घटक जबाबदार असेल तर त्या देशातील तांत्रिक प्रगती होईल डॉ. ए. पी. जे. अब्दुल कलाम म्हणतात सामान्य जनतेपर्यंत तंत्रज्ञान पोचले पाहिजे वारे माफ विजेचा वापर टाळावा देशाचा विकास साधण्यासाठी खेड्याचा विकास होणे आवश्यक आहे.

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समकालीन भारतीय लोकशाहीतील निवडणूक आयोगाची भूमिका

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सारांश:

समकालीन भारतीय लोकशाहीतील निवडणूक आयोगाची भूमिका अत्यंत महत्त्वाची आहे. निवडणूक आयोगाचे मुख्य कार्य म्हणजे निवडणूकांच्या पारदर्शकतेची, निःपक्षतेची आणि वैधतेची खात्री करणे. यामध्ये खालील गोष्टींचा समावेश होतो. आयोग निवडणूकांच्या तारखा निश्चित करतो, निवडणूक प्रक्रियेचे नियोजन करतो, आणि विविध टप्प्यांवर आवश्यक मार्गदर्शक तत्त्वे जारी करतो. आयोग राजकीय पक्ष आणि उमेदवारांना नियमांची माहिती देतो आणि त्यांच्या पालनावर लक्ष ठेवतो. हे नियम निवडणुकीतील भ्रष्टाचार टाळण्यासाठी महत्त्वाचे आहेत. आयोग मतदारांची यादी अद्ययावत ठेवतो, ज्यामुळे सर्व मतदारांना मतदानाचा हक्क वापरण्यात मदत होते. योग्य ठिकाणी मतदान केंद्रे स्थापन करून सर्व मतदारांपर्यंत सेवा पोहोचविणे याची जबाबदारी आयोगावर असते. आयोग राजकीय पक्षांच्या आर्थिक स्रोतांवर देखरेख ठेवतो आणि धनादेश, देणग्या यांची माहिती मागतो. आयोग निवडणूकांदरम्यान तक्रारींवर त्वरित कार्यवाही करतो, ज्यामुळे निवडणूक प्रक्रिया अधिक पारदर्शक होते. नागरिक जागरूकता निवडणूक आयोग जनतेमध्ये मतदानाच्या महत्त्वाबद्दल जागरूकता वाढवतो आणि त्यासाठी विविध कार्यक्रम राबवतो. भारतीय निवडणूक आयोग लोकशाहीच्या स्तंभांपैकी एक असून, तो लोकशाहीच्या प्रक्रियेत निपक्षपातीपणे कार्य करतो, ज्यामुळे नागरिकांचा विश्वास वृद्धिंगत होतो.

मूळ शब्द: समकालीन, आधुनिक, वर्तमान काळातील, भारताशी संबंधित, लोकशाही जनतेच्या शासनाची प्रणाली, मतदान प्रक्रिया, आयोग, एक प्रकारची संस्था किंवा समिती

प्रस्तावना:

लोकशाही ही अशी प्रणाली आहे ज्यामध्ये लोकांना आपले प्रतिनिधी निवडण्याचे पूर्ण स्वातंत्र्य असते. निवडणूकांद्वारे ही प्रक्रिया पार पडते आणि निवडणूक आयोग या प्रक्रियेला सुस्थितीत ठेवण्यासाठी एक महत्त्वपूर्ण संस्था म्हणून कार्य करते. स्वतंत्र आणि निष्पक्ष निवडणूकांसाठी निवडणूक आयोग आवश्यक असतो, कारण तो निवडणूका नियंत्रित करतो, मतदान प्रक्रियेत पारदर्शकता राखतो, आणि लोकशाहीचे अस्तित्व कायम ठेवतो. या लेखामध्ये आपण निवडणूक आयोगाचा इतिहास, त्याचे महत्त्व, कार्यपद्धती आणि त्याच्यावर होणाऱ्या टीका यांचा सविस्तर आढावा घेणार आहोत.

निवडणूक आयोगाचा इतिहास:

भारतातील निवडणूक आयोगाची स्थापना २५ जानेवारी १९५० रोजी भारतीय संविधानाच्या अनुच्छेद ३२४ नुसार करण्यात आली. स्वतंत्र भारतात लोकशाही

व्यवस्थेच्या आधारभूत घटकांच्या अंमलबजावणीसाठी एक स्वतंत्र आणि स्वायत्त संस्था म्हणून निवडणूक आयोगाची निर्मिती झाली. सुरुवातीला निवडणूक आयोगामध्ये एकच मुख्य निवडणूक आयुक्त होता, परंतु १९९०च्या दशकात भारतीय निवडणूकांच्या वाढत्या प्रमाणामुळे आणि जटिलतेमुळे दोन अतिरिक्त निवडणूक आयुक्तांची नियुक्ती करण्यात आली, ज्यामुळे आयोग त्रिसदस्यीय बनला. निवडणूक आयोगाचा सर्वात मोठा यशस्वी प्रकल्प म्हणजे १९५१-५२ मध्ये झालेल्या पहिल्या सार्वत्रिक निवडणूका होत्या. या निवडणूका जगातील सर्वात मोठी निवडणूक म्हणून ओळखली जाते. या निवडणूकीने भारतातील लोकशाही प्रक्रियेचे स्थिरपणे पाऊल ठेवले.

निवडणूक आयोगाची रचना:

भारतीय निवडणूक आयोगामध्ये सध्या एक मुख्य निवडणूक आयुक्त आणि दोन निवडणूक आयुक्त असतात. हे आयुक्त राष्ट्रपतींकडून नियुक्त केले जातात, मात्र त्यांच्या

स्वायत्ततेसाठी त्यांना हटविण्याची प्रक्रिया संसदेच्या सहमतीनेच होऊ शकते. आयोगाच्या सर्व निर्णयांमध्ये सामूहिक जबाबदारी असते, म्हणजे आयोगाचे निर्णय बहुमताने घेतले जातात.

निवडणूक आयोगाचे कार्य

१. निवडणुकांचे आयोजन:

निवडणूक आयोगाचे प्रमुख कार्य म्हणजे लोकसभा, विधानसभा, आणि स्थानिक स्वराज्य संस्थांच्या निवडणुका घेणे. या निवडणुकांच्या वेळापत्रकाचे नियोजन करणे, मतदान केंद्रांची स्थापना करणे, आणि मतदान प्रक्रिया पारदर्शक ठेवणे हे काम आयोग करतो.

२. आचारसंहिता:

प्रत्येक निवडणुकीच्या आधी आदर्श आचारसंहिता जाहीर केली जाते. ही आचारसंहिता सर्व राजकीय पक्ष, उमेदवार, आणि निवडणुकीशी संबंधित व्यक्तींनी पाळणे आवश्यक असते. या आचारसंहितेचे पालन न केल्यास आयोग कारवाई करण्याचे अधिकार ठेवतो.

३. मतदार नोंदणी:

देशभरात मतदार यादी तयार करणे आणि ती अद्ययावत ठेवणे हे देखील निवडणूक आयोगाचे महत्त्वाचे कार्य आहे. पात्र व्यक्तींना मतदानाचा अधिकार मिळावा यासाठी मतदार नोंदणी मोहीम हाती घेतली जाते.

४. मतदान प्रक्रियेतील पारदर्शकता:

निवडणूक आयोग मतदान प्रक्रिया पारदर्शक करण्यासाठी अनेक उपाययोजना करतो. इलेक्ट्रॉनिक वोटिंग मशीन (EVM) आणि मतदार सत्यापन कागदपत्रे (VVPAT) यांचा वापर करून मतदारांचे मतदान सुरक्षित केले जाते.

५. उमेदवारांच्या निवडीवर देखरेख:

उमेदवारांचे अर्ज तपासून त्यांची पात्रता ठरवणे, आणि निवडणुकीसाठी आवश्यक कागदपत्रांची पूर्तता करणे हे देखील आयोगाचे काम आहे.

निवडणूक आयोगाचा लोकशाहीतील महत्त्व:

लोकशाही व्यवस्थेमध्ये निवडणूक आयोगाच्या कामाचे महत्त्व विशेष आहे. एक मजबूत आणि निष्पक्ष निवडणूक आयोग लोकशाहीला सक्षम बनवतो. जर निवडणूक प्रक्रिया पारदर्शक असेल, तर लोकशाही व्यवस्थेतील लोकांचा आयोगावर विश्वास राहतो. अशा प्रकारे, आयोग लोकशाही व्यवस्थेच्या स्थिरतेसाठी आवश्यक घटक आहे.

१. स्वतंत्र निवडणुका:

निवडणूक आयोग स्वतंत्र निवडणुकांचे आयोजन करतो, ज्यामुळे कोणत्याही पक्षाचे किंवा व्यक्तीचे एकाधिकारशाही होऊ नये. निवडणूक प्रक्रियेतील निष्पक्षता ही लोकशाहीची मूलभूत गरज आहे.

२. लोकप्रतिनिधींची निवड:

लोकांनी निवडलेले प्रतिनिधीच देशाच्या सरकारचे नेतृत्व करतात, आणि निवडणूक आयोग या प्रक्रियेचे संचालन करतो. निवडणुकांच्या माध्यमातून जनतेचे प्रतिनिधी संसदेत पोहचतात, आणि हेच प्रतिनिधी देशाच्या धोरणांचा निर्धार करतात.

३. सत्तांतरणाचे साधन:

लोकशाहीमध्ये निवडणूक आयोगाच्या माध्यमातून सत्ता शांततेने हस्तांतरित होते. लोकांच्या मतांनी नवी सत्ता स्थापन होते, आणि जुनी सत्ता सत्ता सोडते. हे सर्व प्रक्रिया सुसूत्रपणे पार पडण्यासाठी निवडणूक आयोग महत्त्वाची भूमिका बजावतो.

निवडणूक आयोगावर होणारी टीका:

निवडणूक आयोगाचे कार्य प्रशंसनीय असले तरी त्याच्यावर अनेकदा टीका केली जाते. काही टीकाकारांच्या मते, निवडणूक आयोगाला संपूर्ण स्वायत्तता नसल्यामुळे काही निर्णयांवर राजकीय दबाव असू शकतो. या टीकेमध्ये काही महत्त्वाचे मुद्दे पुढे येतात.

१. सरकारी दबाव:

निवडणूक आयोगाचे प्रमुख अधिकारी राष्ट्रपतींनी नियुक्त केले जातात. सरकारकडून या नियुक्त्यांमध्ये हस्तक्षेप असल्याच्या आरोपांमुळे आयोगाच्या स्वायत्ततेवर प्रश्नचिन्ह निर्माण होते.

२. आयोगाची क्षमता:

निवडणूक आयोगाची यंत्रणा कित्येक वेळा मोठ्या देशव्यापी निवडणुकांमध्ये अपुरी पडते, असे तज्ज्ञांचे म्हणणे आहे. मतदार याद्यांमध्ये चुका, मतदान केंद्रांवर व्यवस्था पुरेशी नसणे, अशा तक्रारी अनेकदा येतात.

३. धनशक्तीचा प्रभाव:

निवडणुकीदरम्यान पैशाचा मोठ्या प्रमाणात वापर केला जातो, ज्यावर आयोगाचे नियंत्रण अपुरे असल्याची टीका होते. मोठ्या राजकीय पक्षांकडून प्रचारात मोठा खर्च केला जातो, ज्यामुळे निवडणुका फक्त श्रीमंत उमेदवारांसाठी सोयीस्कर ठरतात.

४. मतदान प्रक्रियेत अनियमितता:

बोगस मतदान, मतदारांची खरेदी-विक्री, आणि मतदान यंत्रांमध्ये छेडछाड अशा प्रकारच्या आरोपांवर आयोगाला योग्य तो बचक ठेवता येतो का, यावर देखील शंका उपस्थित होतात.

भारतीय लोकशाही वास्तव व आभास:

भारत देशाला स्वातंत्र्य मिळवून देण्यासाठी अनेक विराणी आहुतीदिली अनेक वीर शहीद झाले अखेर 1947 ला भारत देशाला स्वातंत्र्य प्राप्त झाले. या स्वातंत्र्याचा अमृत कलश हा सर्वसामान्य लोकांची तहान भागवेल व सर्वसामान्य लोकांच्या इच्छा आकांक्षेला मुत स्वरूप प्राप्त होईल. अशी सर्वांची इच्छा होती पण तसे वास्तवात उतरले नाही. स्वातंत्र्याचा 78 वा वाढदिवस साजरा करत असताना आजही भारतामध्ये भीषण दारिद्र्य व मूलभूत गरजा पूर्ण झालेला समाज दिसून येत नाही. 2% लोकांकडे 60 % धनसंपदा आहे. ही आर्थिक विषमतेची दरी दिवसेंदिवस वाढतच आहे. सामाजिक लोकशाही केव्हा प्रस्थापित होणार का भारती समाजाने अधूरी स्वप्न घेऊनच जगावे काय असा प्रश्न पडतो. जगामध्ये अनेक राजकीय शास्त्रज्ञांनी लोकशाहीच्या वेगवेगळ्या व्याख्या केल्या आहेत. परंतु भारतामध्ये लोकांनी लोकांसाठी चालवलेली राजकीय व्यवस्था म्हणजे लोकशाही ही परिभाषा प्रचलित आहे परंतु वास्तव मात्र चित्र वेगळे आहे. "शाही लोकांचा सत्ता संघर्ष म्हणजे लोकशाही, आमदाराने आमदारासाठी खासदाराने खासदारासाठी सरपंचांनी सरपंचासाठी चालवलेली व्यवस्था म्हणजे लोकशाही अशी स्थिती भारतीय समाज व्यवस्थेमध्ये दिसत आहे.

म्हणूनच हिंदी साहित्यातील कवी धुमील भारतीय लोकशाहीवर फार सुंदर व्यंग करतात ते म्हणतात...

"एक आदमी रोटी बेलता है
दुसरा आदमी रोटी खाता है

एक आदमी रोटी बेलता है तिसरा आदमी रोटी से खेलता है हम पुछते है तिसरा आदमी कौन है संसद हमारी मोन है नरेंद्र जाधव असे म्हणतात भारतीय लोकशाहीचा कळस काळवंडलेला आहे इथे स्वार्थाचा मंत्र जाप सतत चालत असतो भारतीय संसदेला मासळी बाजाराचे स्वरूप आले आहे मासळी बाजारात तरी काही देवाण-घेवाण होते पण भारताच्या संसदेमध्ये अशा प्रकारची वैचारिक मांडणी होत नसताना दिसून येते.

पश्चिमात्य राजकीय विचारवंत ग्रामसी: यांच्या मते कोणतीही राजकीय सत्ता भांडवलदारांचे संरक्षण आणि संवर्धन करते तसेच प्रत्येक राष्ट्राध्यक्ष व पंतप्रधान करमट राष्ट्रवाद निर्माण करतो त्यासाठी तो समाजामध्ये मित्तके यांचा प्रसार व प्रचार करत असतो व समाजामध्ये धार्मिक तेड निर्माण करून विकासाच्या मुख्य ध्येय कडून समाजमन विचलित करत असतो त्यामुळे समाजामध्ये विषमतेची दरी वाढत असते.

डॉ. पाटील श्याम पुंडलिकराव

भारतीय लोकशाही बद्दल भगवान रजनीश यांचे विचार: 19 व्या शतकामध्ये आचार्य रजनीश यांनी भारतीय लोकशाही बद्दल त्यांच्या वैचारिक विचार मंथना मधून एक नवीन नवनीत भारतीय समाजाला प्रदान केलेले आहे ते म्हणजे या लोकशाहीचे शुद्धीकरण करण्यासाठी लोक तंत्राचे चे रूपांतर बुद्धी तंत्रामध्ये होणे आवश्यक आहे. त्यासाठी त्यांनी सांगितले आहे की समाजातल्या मध्यम गरीब कामगार शेतकरी वर्गाने समाजातील बुद्धिजीवी वर्गाच्या घरी जाऊन त्यांचा चरण स्पर्श करावे व त्यांना भारतीय लोकशाहीच्या प्रक्रियेमध्ये आणण्यासाठी आमंत्रण द्यावे. उदाहरणार्थ रघुनाथ माशेलकर, नरेंद्र जाधव, एन आर मूर्ती, परम संगणकाचा निर्माता विजय भाटकर, राणी बंग, प्रकाश आमटे, केजरीवाल, पंजाबचे टीकेत, पोपटराव अण्णा हजारे, जरांगे पाटील अशा निस्वार्थी व सजुनात्मक कार्य करणाऱ्या अशा लोकांना लोकसभेच्या निवडणुकीमध्ये भरघोस मतांनी निवडून देऊन विजय करावे. उपाय भगवान रजनीश सांगितलेला असून अत्यंत उपयुक्त असा उपाय आहे. जेणेकरून लोकशाहीचे, शुद्धीकरण होईल व समाजातील दारिद्र्याचे समूळ उच्चाटन होईल आणि भारतीय लोकशाहीची वाटचाल अंध कारा कडून प्रकाशाकडे तो दिवस भारतीय समाजासाठी सोनियाचा दिनु वर्षे अमृताचा घनु असा राहिल.

भारतीय निर्वाचन आयोग इलेक्शन कमिशन:

किभूमिगत सिलेक्शन कमिशन:

भारतीय निवडणूक आयोग हा भारतीय लोकशाहीचा प्राणवायू आहे निवडणूक आयोग ही एक फार मोठी मशिनरी आहे. लोकशाहीच्या निकोप वाढीसाठी व लोकांचा लोकशाही वरील विश्वास दृढ होण्याचे ते प्रभावी स्वतंत्र व नि पक्षपाती काम करणारी व्यवस्था आहे. परंतु सध्याच्या परिस्थितीमध्ये तिची वाटचाल अधःपतनाकडे चालू आहे. टी एन सेशन भारतीय निवडणूक आयोगाचे मिस्टर क्लीन अध्यक्ष होते. त्यांनी त्यांच्या कारकीर्द मध्ये आणि पक्षपाती कुठल्याही दडपणाला बळी न पडता स्वयं निर्णय घेतले लोकांनी त्यांची व्हावा सुद्धा केली. त्यांच्याच काळामध्ये बोगस वोटिंग रोखण्यासाठी इलेक्शन आयडेंटि कार्ड देण्यात आले. परंतु त्यानंतरच्या निवडणूक आयोगाच्या अध्यक्षानी त्याचे पावित्र्य राखले नाही. 2019 पासून ते 2024 पर्यंतच्या प्रवासाचे सूक्ष्म निरीक्षण केल्यास तीची पावित्रता नष्ट होताना दिसून येते.

1. **विजेच्या गतीने निवडणूक आयोगाची नेमणूक:** भारताचे निवडणूक अध्यक्ष अरुण कुमार गोयल यांनी स्व इच्छा निवृत्ती घेतली त्यानंतर राजकुमार यांची नियुक्ती विजेच्या गतीने करण्यात आली. एकाच दिवशी आवेदन पत्र एके दिवशी नियुक्ती हे सर्व संभ्रम निर्माण करणारे आहे. यासंदर्भात सुप्रीम कोर्टाचे न्यायाधीश

रस्तोगी असे म्हणतात की त्याच दिवशी प्रक्रिया त्याच दिवशी आवेदन पत्र त्याच दिवशी नियुक्ती या सर्व हालचाली संशय निर्माण करणाऱ्या आहेत. तसेच सुप्रीम कोर्टाचे म्हणणे असे आहे की निर्वाचन आयोगाचा अध्यक्ष स्वतंत्र विचाराचा व नी पक्षपाती व्यक्ती असावा वास्तववादी चित्र वेगळ्या स्वरूपाचे आहे. तिच्या पवित्रा ते वर संशय निर्माण होतो.

2. भारतीय निवडणूक आयोगाचे पक्षपाती धोरण:

भारतीय निवडणूक आयोगाने 2024 च्या निवडणुकीमध्ये मोदी धारजीने धोरण स्वीकारले उदाहरणार्थ कर्नाटकाच्या निवडणूक प्रचारार्थ बी जे पी ने तचे काँग्रेस चोर आहे. असे त्यांच्या पाम्प्लेट मध्ये व जाहिरातीमध्ये नमूद केले होते. र्णमूल काँग्रेसने काँग्रेसने कलकत्ता कोर्टाकडे धाव घेतली. काँग्रेसने न्यायाधीश भट्टाचार्य यांनी असा निवाडा दिला होता की अपमान जनक प्रचार करणे चुकीचे आहे तेव्हा कुठे बीजेपीच्या जाहिराती बंद झाल्या वास्तविक हे कार्य निर्वाचन आयोगाच्या अध्यक्षाने आहे. पण कोर्टाला हे कार्य पार पाडावे लागले. तसेच आसामचे मुख्यमंत्री, हेमंतानी मथुरेच्या इदगा बदल स्टेटमेंट केले पण आचारसंहितेचा भंग झाला. त्यांच्यावर निवडणूक आयोगाने आचारसंहितेच्या भंगाची कारवाई केली नाही. पंतप्रधान स्वतः मोदींनी 2019 च्या निवडणूक दौऱ्यामध्ये लातूर येथे शहीद सैनिकाच्या नावावर मते मागितली. परंतु त्यावेळेस पंतप्रधान मोदी वर आचारसंहितेचा भंग केलेल्याचे पाच गुन्हे दाखल करण्यात आले. परंतु निर्वाचन आयोग अरोरा व सुशील कुमार चंद्राने त्यांना क्वीन चिट दिली. एकंदरीत पाहता निर्वाचन आयोगाने सत्ताधारी पक्षाच्या नेत्यांना आचारसंहितेच्या भंगाचे उल्लंघन झाल्याबद्दल कारवाई करण्यात येईल. धोरण राबवले तर विरोधी पक्ष सदस्यांना सक्तीने आचारसंहिता भंगाच्या कारवाया करण्यात आल्या.

2024 निवडणुकीमध्ये निर्वाचन आयोग का अध्यक्ष कैसा हो मोदी बोले जैसा हो:

2019 च्या निवडणुकीमध्ये मोहम्मद मोसिन ने पंतप्रधान मोदीचे हेलिकॉप्टर चेक केले. त्याला पदावरून निलंबित करण्यात आले. त्यांनी शेवटी GAG कडे धाव घेतली व निलंबन मागे घेण्यात आले. सुप्रीम कोर्ट म्हणते की निर्वाचन आयोगाच्या अध्यक्षांनी पंतप्रधानाची चौकशी केली पाहिजे.

3. प्रेस कॉन्फरन्स वानवा 2019 च्या निवडणुकीमध्ये प्रत्येक टप्प्यानंतर प्रेस कॉन्फरन्स घेतली जात होती. पण 2024 या निवडणुकीत प्रेस कॉन्फरन्स झाल्यास नाही असे म्हटले तरी चालेल प्रेस कॉन्फरन्स घेण्यासाठी प्रवक्ता असतो प्रेस कॉन्फरन्स मुळे लोकांचा मतदानावरील लोकशाही वरील विश्वास घट्ट होतो. परंतु प्रचलित निवडणूक अध्यक्षांनी प्रेस कॉन्फरन्स घेतली नाही.

4. **17 सी चे प्रकरण:** सुप्रीम कोर्टाने निर्वाचन आयोगाला नोटीस इशू केली तात्काळ 17सी चे फॉर्म वेबसाईटवर डिस्प्ले करा निर्वाचन आयोगाने त्यांना प्रति उत्तर दिले की त्या प्रक्रियेला फार वेळ लागतो माजी निर्वाचन आयोगाशी चर्चा केली असता त्यांनी असे सांगितले की फक्त एक ते दोन तासाचा वेळ लागतो असे प्रत्युत्तर दिले त्यानंतर निर्वाचन आयोगाने अकरा दिवसाचा विलंब करून सतरा सी चे फॉर्म आपल्या वेबसाईटवर डिस्प्ले केले याचाच अर्थ निर्वाचन आयोगाच्या अध्यक्षांमध्ये व सदस्यांमध्ये पारदर्शकपणा नाही हे सिद्ध होते एवढेच नाही तर 2019 च्या निवडणुकीचे संपूर्ण रेकॉर्ड एक वर्ष नियमाने ठेवावे लागते परंतु निर्वाचन आयोगाने चार महिन्यांमध्ये ते सर्व रेकॉर्ड नष्ट केले.

5. **जनतेच्या सार्वभौम सत्तेवर घाला:** 2013 च्या सुप्रीम कोर्टाच्या आदेशानुसार VVPAT मशीन मतदान प्रक्रियेचे अविभाज्य अंग बनले. केंद्र सरकारने पाच करोड रुपये खर्च करून 24 लाख ईव्हीएम मशीन व व्हीव्हीपॅट मशीन विकत घेतल्या. त्यापैकी 37% मशीन Defective आहेत. अशा मशीनी द्वारे निर्वाचन आयोगाने 2024 चे भारतातील निवडणूक प्रक्रिया पार पाडून घेतली. A D R व अग्रवाल यांनी निर्वाचन आयोगाच्या विरोधात सुप्रीम कोर्टामध्ये याचिका दाखल केली मतदाताची प्रत्येक पोलचीट मोजली पाहिजे अशी मागणी या याचिकेत करण्यात आली होती निर्वाचन आयोग मतमोजणी ही रँडमली पाच मतदान केंद्राची मतमोजणी करून घेऊन रिझल्ट डिक्लेअर करते. हे कुठेतरी A D R (association of democratic right) व अग्रवाल यांना संशयास्पद वाटले होते. परंतु निर्वाचन आयोगाने सुप्रीम कोर्टाच्या या याचिकेला प्रतिउत्तर देताना असे स्टेटमेंट दिले की ही वेळ खाऊ प्रक्रिया आहे. त्यामुळे अति विलंब होईल म्हणजेच जनतेला सार्वभौम सत्ता जी संविधानाने प्रदान केलेली आहे त्यावर निर्वाचन आयोगाने घाला घातलेला दिसून येतो.

6. **निर्वाचन आयोगाच्या सदस्यांची नेमणूक करताना स्वहिताला व स्वार्थाला महत्व:** निर्वाचन आयोगाच्या अध्यक्षाची व सदस्यांची निवड करते वेळेस निवृत्त न्यायाधीशाचा एक सदस्य विपक्ष व सत्ताधारी पक्ष अशा पद्धतीने नेमणुकीची प्रक्रिया होत असे. परंतु मोदी सरकारच्या काळामध्ये सर्वोच्च न्यायालयाचा निवृत्त न्यायाधीश सदस्याची जागा रद्द करण्यात आली आहे. त्यामुळे स्वार्थाला महत्व प्राप्त झालेले दिसून येते तसेच निर्वाचन आयोग पंतप्रधानाच्या हातातील बाहुले बनले आहे.

अनुमान व काही सूचना: भारतामध्ये लोकशाहीच्या नावावर एक पक्षाची हुकूमशाही निर्माण झालेली दिसून येते. मोदी सरकारची जी साम्राज्यसत्ता E V M Machine

and V V P A T Machine च्या जोरावर निर्माण केलेले दिसून येते.

Suggestion:

1. लोकशाहीच्या विकासासाठी पहिली अट साक्षरता असणे आवश्यक आहे. परंतु भारतात हायर एज्युकेशन साक्षरतेचे प्रमाण 12% आहे साक्षर जनतेचा सतत विवेक जागृत असतो असतो व ती कोणत्याही भुलतापाला बळी पडत नसते.

2. **V V P A T मध्ये पडणारी मतपत्रिका:** मतदाराच्या हातामध्ये पडावी व मतदाराने तिच्यावरती आपल्या अंगठ्याचे ठसे उमटून व्हीव्हीपॅट मशीन मध्ये टाकण्याची व्यवस्था असावी जेणेकरून मतदान प्रक्रियेला शुद्ध स्वरूप प्राप्त होईल.

3. **परत एकदा बॅलेट बॉक्सचा स्वीकार:** जगामध्ये अनेक देशांमध्ये लोकशाही पद्धतीने निवडणुका होतात त्या निवडणुकीमध्ये विकसनशील राष्ट्र विकसित राष्ट्र हे बॅलेट बॉक्सचा वापर करूनच निवडणुका घेतात व योग्य राष्ट्राध्यक्षाची निवड केली जाते. परंतु भारतामध्ये ईव्हीएम मशीन चा वापर याबाबतीत विरोधी पक्षांचा व जनते च्या मनात संशयाची पाल चुकचुकताना दिसून येते.

4. **निर्वाचन आयोगाच्या अध्यक्षाची निवड:** निर्वाचन आयोगाच्या अध्यक्षाची निवड करत असते वेळेस निवृत्त सनदी अधिकारी हा अट्टाहास का धरला जातो त्यापेक्षा राष्ट्रभक्ती राष्ट्रप्रेम राष्ट्र तेज राष्ट्रहित जोपासणारा मिलिटरी मधील उच्च पदावरील जर्नल किंवा अॅडमिरल यांची वर्णी निवडणूक आयोग चा अध्यक्ष म्हणून लावण्यात यावी जेणेकरून निर्वाचन आयोगाचे हे कलंकित वस्त्र घाण झाले आहे. तो आपल्या प्रामाणिकपणा व राष्ट्रभक्तीच्या साबनाने स्वच्छ व निर्मळ करेल.

5. **मतदान टक्का वाढवणे:** मतदान टक्का वाढवण्यासाठी निर्वाचन आयोगाने काही कडक निर्बंध निर्वाचन आयोगाने मतदाता वरटाकले पाहिजे शासनाच्या अनेक शासकीय लाभांपासून वंचित ठेवणे इत्यादी.

निष्कर्ष:

निवडणूक आयोग हा भारतीय लोकशाही व्यवस्थेचा एक अत्यावश्यक घटक आहे. त्याची भूमिका अत्यंत महत्त्वपूर्ण आहे, कारण तो लोकांच्या निवडीला अभिव्यक्त करतो. निवडणुका स्वतंत्र आणि निष्पक्ष ठेवणे, मतदारांचा विश्वास राखणे, आणि जनतेच्या प्रतिनिधींची योग्य निवड सुनिश्चित करणे ही निवडणूक आयोगाची प्रमुख उद्दिष्टे आहेत. निवडणूक आयोगाचे कामकाज सुधारणे आवश्यक आहे, विशेषतः त्याची स्वायत्तता आणि पारदर्शकता वाढवणे ही काळाची गरज आहे. लोकशाही मजबूत करणे आणि निवडणूक आयोगाच्या कार्यक्षमतेत

सुधारणा करणे एकत्रितपणे भारतीय लोकशाहीला अधिक स्थिर बनवेल.

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2. Frontline
3. Outlook
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