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CONTENTS

Sr No	Paper Title	Page No.
1	Global Warming and Climate Change: - Causes, Impact and Future Prediction Saket Tekade, Suyog Kale	1-4
2	To Determine Optimum Dyeing Conditions of Eucalyptus Dye on Fabric Material by Using Optical Density Value. Dattaguru C. Patkar	5-9
3	Climate Change and Impact on Natural Resources Surendra Kumar Maurya	10-12
4	Women's Economic Empowerment in Rural and Urban India: A Comparative Analysis Ansari Abdullah Daniyal Mohammed Aslam, Dr. C.M. Nikam	13-20
5	Wind energy is a sure thing in the future. Dr. Prakash Laxmanrao Dompale	21-25
6	Solid waste management in India: A Geographical Analysis Dr. Pinki Yadav	26-29
7	A Qualitative and Quantitative Analysis of Zooplanktons and Phytoplanktons in the Pedhi River, Amravati District Mahure Y.R., S.K. Zilpe	30-33
8	Road Rain Water Harvesting New concept is Important to Environment: A Geographical Study Dr. Shashikant Rupraoji Kadu.	34-36
9	Study on Biodiversity of Snakes in Pandharkawada Region Yavatmal District, Maharashtra. Mr. Amit S. Olambe	37-41
10	Biodiversity Crisis: Vulture Extinction and Precautions for Sustainability G. M. Pushpanjali, P. R. Ugral	42-45
11	Geographical Review of Irrigation in Osmanabad District Dr. D. S. Itle, Mr. Pandurang Sudhakar Pawar	46-48
12	Comparative Study of Women Health in Rural and Urban Areas of India M.Manju, Dr. I.Uma Devi	49-52
13	Renewable Energy Mrs Rakhi Kothari, Mrs Vijaya Dukare	53-54
14	Agriculture and Environmental Relation in Novels and Poems Preeti Roberts, Dr A.Vijayanand	55-57
15	Assam Government Proactive Initiative for Sustainable Future: The Context of Amrit Brikshya Andolan Nipani Haloi	58-60
16	Utilizing Geospatial Techniques for a Geographical Study of Groundwater in Rohtak District Dr. Jagdish Chand	61-66
17	Green Environment at Work Place-A Study on Employees Comprehension with Special Reference to Dakshina Kannada District of Karnataka State Dr. Ravikala.	67-71
18	Advancing Sustainable Urban Futures: Integrating Green Building Practices And Smart City Solutions. Ms. Jesika Minj	72-75
19	Innovative Practices for Inclusive Education: A Concept Mapping Md Mujahid Alom, Dr. Vijaykumar R.	76-79
20	Hydrochemical Evaluation of Groundwater with Special Reference to Nitrate Contamination in the Jam River Basin at Sinnar, Sangamner and Kopargaon Tehsil, Maharashtra. U. G. Mhaske, V. M. Pagar, C.A. Patil, G. D. Mhaske	80-83
21	Solid Waste Management Mrs Sheetal M. Raghuvanshi, Mrs Kalpana Honale	84-86
22	Deep Ecology in Easterine Kire's Sky is my Father: A Naga Village Remembered Ms. V.Vijayavadivu	87-88
23	A Critical Review on Challenges and Threats and Ways for Securing Wireless Networks Kamal Kishore Prasad	89-94
24	Exploration of Ecological Issues in Amitav Ghosh's "The Hungry Tide" Dr. Pranjali Bhanudas Vidyasagar	95-97

25	Environmental Water Pollution Mula and Mutha River – A Case Study Pune Dr. Santosh Maruti Shinde	98-101
26	Tempered Futures: Projections and Impacts of Temperature Change in India -Effect of Atmospheric Aerosols G. M. Pushpanjali	102-105
27	भारतातील आर्थिक सुधारणा (१९९१ नंतर) काळातील विदेशी थेट गुंतवणुकीचा तुलनात्मक अभ्यास प्रा.दिनेश यादवराव पारखे	106-111
28	भूमितीय पैलू: भंडारा जिल्ह्यातील वैनगंगा नदी खोऱ्यातील उध्व पाणलोट क्षेत्र, आकारमितीय अध्ययन डॉ अरुणा बावनकर	112-120
29	व्यापारिक कृषि विकास से जुडी प्रबंधकीय समस्याएँ एवं निदानात्मक सुझाव तथा कृषि नवाचार डॉ. भुपेन्द्र कुमार जाँगिड	121-126
30	भारतातील जैवविविधता ऱ्हासाची कारणे आणि संवर्धन डॉ. मोतीलाल रामचंद्र दर्वे	127-129
31	आसना नदी खोऱ्यातील बदलत्या हवामानाचा भौगोलिक अभ्यास कु. बाघमारे पार्वती प्रभाकर	130-133
32	खनिज तेलाचे साठे आणि उत्पादन यांचे भारतीय अर्थव्यवस्थेवर होणाऱ्या परिणामांचे अध्ययन करणे. कु. अश्विनी रोहिदास भोईर	134-138
33	ग्रामीण जीवनातील शेतकरी डॉ.शेखर सुभाष खोत	139-142
34	फाईव आईज : खुफिया एजेंसी श्रीमति कांति सिंह काठेड	143-144
35	ग्रामीण कवी मनातील शेतकरी जीवन प्रा.संजय.रावसाहेब चव्हाण	145-149
36	ग्रामीण जीवनातील शेतीचे महत्व सुप्रिया संजय कावळे, डॉ.क्षीरसागर हिरामण मधुकर	150-152
37	सार्वजनिक परिवहन की सुविधायों का विस्तृत मुल्यांकन - जनपद देवरिया का अध्ययन हेमन्त सिंह, डॉ. अखिलेश चन्द्र सेठ	153-157
38	जनपद जौनपुर (उत्तर प्रदेश) के ग्रामीण विकास में अवस्थापनात्मक तत्वों की भुमिका सिद्धान्त कुमार सिंह	158-166



Global Warming and Climate Change: - Causes, Impact and Future Prediction

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Abstract:

Climate change and global warming is one of the most extensively discussed topics in the late 20th and early 21st century on our planet. Climate change refers to significant, long term changes in the global climate due to an increase in the average atmospheric temperature. Increase in the average temperature of the troposphere is called global warming. The associated impacts of global warming and Climate change are sea level changes, increase in average temperature of the earth, melting of ice caps, changing weather phenomenon, effect on agricultural productivity, intensity of heat waves and drought conditions. Therefore an attempt is made here to examine the causes and impacts of global warming and climate change on the surface of the earth. The paper is mainly based on Secondary data and information sources. The information regarding climate change and global warming are discussed mainly in reference to late 20th century to early 21st century Information.

Keywords: Climate Change, Global Warming, Future Prediction

Introduction:

Climate is defined by the Oxford Learner's Dictionary as the regular pattern of weather condition of a particular place. These weather conditions could be classified into mild, temperate, warm and wet depending on season and/ or location. Conclusive evidences however show a drift from the normal pattern of weather condition to a rather harmful and adverse trend as climate is now known to have a negative effect on the environment and invariably on the Ecosystem, both animate and inanimate. Planet Earth is known to be surrounded by an atmosphere composed primarily of Nitrogen and Oxygen and is 149,600,000 Km from the Sun. Gases known as GREENHOUSE GASES contribute to the warming of the Earth's atmosphere by reflecting radiation from the Earth's surface (examples are Carbon dioxide, Ozone and Water Vapor). The term which most appropriately describes the aforementioned process is called Greenhouse Effect, which is the warming of the Earth's surface as a result of atmospheric pollution by gases. It is now feared that the warming effect are being undesirably increased, causing climatic changes and melting Polar Ice caps.

Objectives: The main objective of this paper is to analyze the causes, impacts and future predication of global warming and climate change.

Materials and Methods:

The present study is based on secondary data and information source. The information

regarding climate change and global warming are discussed mainly in reference to late 20th century to early 21st century information. This information is collected through research articles, books and browsing the different websites related to environmental programs on climate change. Collected rough information are processed and analyzed neatly by researchers to understand the major contributors of global warming, its impacts and endeavor to mitigate the problem of global warming over the last century.

Causes of Climate Change

Cutting down forests:

Cutting down forests to create farms or pastures, or for other reasons, causes emissions, since trees, when they are cut, release the carbon they have been storing. Each year approximately 12 million hectares of forest are destroyed. Since forests absorb carbon dioxide, destroying them also limits nature's ability to keep emissions out of the atmosphere. Deforestation, together with agriculture and other land use changes, is responsible for roughly a quarter of global greenhouse gas emissions

Using transportation:

Most cars, trucks, ships, and planes run on fossil fuels. That makes transportation a major contributor of greenhouse gases, especially carbon-dioxide emissions. Road vehicles account for the largest part, due to the combustion of petroleum-based products, like gasoline, in internal combustion

engines. But emissions from ships and planes continue to grow. Transport accounts for nearly one quarter of global energy-related carbon-dioxide emissions. And trends point to a significant increase in energy use for transport over the coming years.

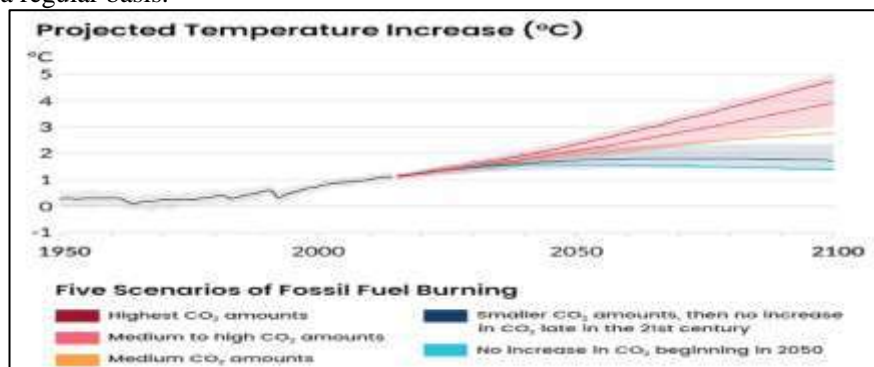
Consuming too much:

Your home and use of power, how you move around, what you eat and how much you throw away all contribute to greenhouse gas emissions. So does the consumption of goods such as clothing, electronics, and plastics. A large chunk of global greenhouse gas emissions are linked to private households. Our lifestyles have a profound impact on our planet. The wealthiest bear the greatest responsibility: the richest 1 percent of the global population combined account for more greenhouse gas emissions than the poorest 50 per cent.

Impact of Global warming and climate change:-

Hotter temperatures: As greenhouse gas concentrations rise, so does the global surface temperature. The last decade, 2011-2020, is the warmest on record. Since the 1980s, each decade has been warmer than the previous one. Higher temperatures increase heat-related illnesses and make working outdoors more difficult. Wildfires start more easily and spread more rapidly when conditions are hotter. Temperatures in the Arctic have warmed at least twice as fast as the global average.

Increased drought: Climate change is changing water availability, making it scarcer in more regions. Global warming exacerbates water shortages in already water-stressed regions and is leading to an increased risk of agricultural droughts affecting crops, and ecological droughts increasing the vulnerability of ecosystems. Droughts can also stir destructive sand and dust storms that can move billions of tons of sand across continents. Deserts are expanding, reducing land for growing food. Many people now face the threat of not having enough water on a regular basis.



The amount of climate change by the end of the century depends on decisions we make today. If we reduce CO₂ amounts to stop increasing after 2050, global average temperature will increase from 1-1.5°C, and this is considered a best case scenario

Loss of species: Climate change risks increase as temperatures climb. Exacerbated by climate change, the world is losing species at a rate 1,000 times greater than at any other time in recorded human history. One million species are at risk of becoming extinct within the next few decades. Forest fires, extreme weather, and invasive pests and diseases are among many threats related to climate change. Some species will be able to relocate and survive, but others will not.

Poverty and displacement: Climate change increases the factors that put and keep people in poverty. Floods may sweep away urban slums, destroying homes and livelihoods. Heat can make it difficult to work in outdoor jobs. Water scarcity may affect crops. Over the past decade (2010–2019), weather-related events displaced an estimated 23.1 million people on average each year, leaving many more vulnerable to poverty. Most refugees come from countries that are most vulnerable and least ready to adapt to the impacts of climate change.

Result and Discussion:-

Predictions of future Global Climate:- Scientists from around the world serve as part of the Intergovernmental Panel on Climate Change (IPCC). These scientists have found that from 1900-2020, the world's surface air temperature increased an average of 1.1° Celsius (nearly 2°F) due to burning fossil fuels that releases carbon dioxide and other greenhouse gases into the atmosphere. This may not sound like much change, but this warming is unprecedented in over 2000 years of records. Even one degree can impact the planet in many ways. Climate models predict that Earth's global average temperature will rise an additional 4° C (7.2° F) during the 21st Century if greenhouse gas levels continue to rise at present levels. Without swift action to reduce greenhouse gas emissions, models project that holding global average temperatures to within a 1.5-2.0°C (2.7-3.6°F) increase may no longer be possible.

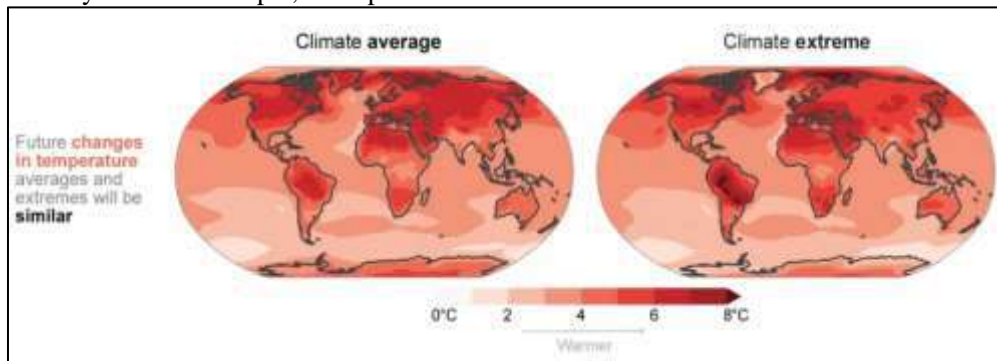
(blue line in graph). If we don't reduce CO₂ and the amounts continue to increase, the worst case scenario warming will be 4.5-5°C (red line in graph).

IPCC Working Group I, 2021

Predicted Impacts of Climate Change:

Climate change is predicted to impact regions differently. For example, temperature

increases are expected to be greater on land than over oceans and greater at high latitudes than in the tropics and mid-latitudes

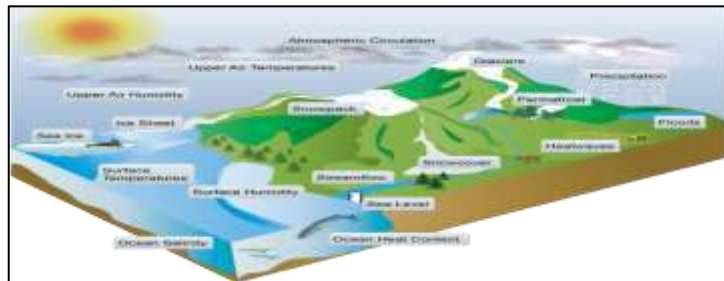


Warming is already occurring in all areas of the globe, but models of future temperatures show that the changes will not be distributed equally. Polar Regions and land areas are expected to see the largest temperature changes. IPCC Working Group I, 2021

Risks to Life on Land:

Changes in temperature, precipitation, and seasonal timing will alter the geographic ranges of many types of plants and animals. Since species can only survive if they are in a habitat that suits their needs, many species will face extinction if the geographic range where they can survive shrinks. If

warming is kept to 2°C, 18% of insects, 16% of plants, and 8% of vertebrate animals are projected to lose over half of their geographic range. However, if we can keep the amount of warming to 1.5°C, the habitat loss to insects, plants, and vertebrates decreases by about a half. On the other hand, the range of some species, such as mosquitoes which carry different types of diseases, may increase due to climate warming. Warming surface temperatures are also predicted to increase the frequency of heat waves and droughts, which can affect crop production, increase the risk of wildfires, and even impact human health.



Climate change is causing many other aspects of Earth to change, including the examples noted in this graphic. Using models, scientists can project how these aspects of Earth are likely to change in the future as the climate continues to warm.

Credit: NOAA NCDC

Conclusion:-

Weather pattern changes in the tropics and mid latitudes as an indicator of global, changes, Changes in the atmospheric circulation, changing Sea life are the indicators of Climate Changes occurring due to effect of Plate tectonics, Solar output, Orbital variations, Volcanism, Ocean variability, Human influences which shows changes in Glaciers, vegetation, ice cores, sea level change. Temperature changes, more Greenhouse gases, influences of aerosols, Solar variation are the causes of Global warming which is expected to cause changes in the overall distribution and intensity of various natural events occurring in our environment, To avoid or reduce the effects of Global warming on

energy sector, construction, insurance, tourism and recreation industries various measures like water conservation, water rationing, adaptive agricultural practices including diversification, construction of flood defenses, changes to medical care and interventions to protect threatened species should be applied.

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To Determine Optimum Dyeing Conditions of Eucalyptus Dye on Fabric Material by Using Optical Density Value.

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Abstract:

The dyeing properties of dye obtained from aqueous extract of eucalyptus leaves on wool and silk fabric material is investigated and optimized in this research work. This aqueous or water extract obtained from leaves of eucalyptus is used as natural dye material. Lab grade mordant such as FeSO_4 , Alum and CuSO_4 were used for dyeing. The absorbance of colour was measured on spectrophotometer. The different types of affecting factors during dyeing process along with dye ability were thoroughly optimized by using percent of absorption. Some factors such as conditions for dyeing, extraction medium extraction time, concentration of dye solution, duration of dyeing along with method of mordanting are involved in this research work. The percent of absorbance value is taken by optical density or absorbance, which was obtained during each above dyeing condition of eucalyptus dye. The optimum value for dyeing condition is also based on concentration of eucalyptus dye and mordant solutions. Therefore the condition which has more desired output with fewer requirements of concentration and time will be optimum and suitable dyeing condition for this eucalyptus dye.

Keywords: Natural dye, eucalyptus tree leaves. Fabric material, mordents, optimization of dyeing Conditions

Introduction:

Natural dyes are colouring agents and used in dyeing of textile substrate such as wool, cotton, silk, leather, etc. These natural dyes can give wide range of colour shades from different plant parts such as leaves, flowers, fruits, bark roots, etc. (Allen, R. in 1971) The interest in application of these natural dyes is growing to a great extent (Samanta, A. K. & Agarwal, P. in 2009). Eco friendly and non toxic characteristics of natural dye shows significant application in various sectors to promote environmental or natural awareness and to avoid hazardous and unwanted effects of synthetic dyes. Small scale manufacturer, dyers, exporters, etc. are also dealing with eco friendly and better quality of textile products that will increase the global or Worldwide development in various natural dyeing processes. (Vankar, P. S. in 2007, Bechtold, T., Samanta, A., Agarwal P. in 2009). Commercial or large scale dyers and exporters are showing interest in possible uses of natural dyeing (Glover B. & Pierce J. in 1993). India is also producing large amount of natural dye for textile (Vankar P. 2007). Large amount of textile material is globally consumed and this demand is continuously increasing yearly with high rate. And therefore the need of suitable textile dyes increases to avoid unwanted effects of unsafe synthetic dyes. Eucalyptus tree can grow in Europe, US, Asia and different reign of world. It is evergreen plant with

several species. Eucalyptus has yellowish colour dye and this will be important natural source of dye. The colour producing substance in eucalyptus is polyphenol and tannin which is about 15%. (Ali & Nisar, 2007). Leaves of eucalyptus contain about 12% of tannin (gallic acid, ellagic acid) as major components and flavonoids (quercetin, rutin) as mainor components. (Chapuis & Bernhard 2002, Conde, & Garcia 1997).

Objective:

- 1) This research work focuses on dyeing of regular used fabric material with natural eucalyptus dye.
- 2) The source which used in this given dyeing work is easily and locally available for dyeing with leaves of eucalyptus tree.
- 3) Research in natural dyeing process is important and this Work may give additional help to the further research in eucalyptus dyeing.
- 4) The suitable and convenient methods are involved in this work for determination of optimum condition during dyeing with eucalyptus dye material.
- 5) The conditions given in this research work are impotent for dyeing with other dye materials

Data and Methodology:

E. calymdalis that is eucalyptus fresh leaves were collected from madhya Pradesh and Maharashtra and dried under sunlight for 30 days. Blender machine were used to crumble these dried

leaves of eucalyptus. Then dye extraction was performed and dried in air under room temperature. Material which used in this dyeing condition were Eucalyptus leaves, wool and silk fabric material, mordant such as FeSO_4 , Alum, CuSO_4 , colorimeter and spectrophotometer.

Conditions for dyeing:

This involve determination of the optimum condition in terms of extraction medium ,extraction time, dye concentration, duration of dying, concentration of mordent and mordanting methods.

$$\text{Percent of absorption} = \frac{Y1 - Y2}{Y1} \times 100$$

Y1 is optical density before dyeing

Y2 is optical density after dyeing

Extraction medium

The eucalyptus dye was extracted by using acidic, alkaline and aqueous medium. 100 ml solution of 1% hydrochloric acid in water is used as acidic solution for extraction. 100 ml solution of 1% Na_2CO_3 in water is used as alkaline or basic solution for extraction and 100 ml clean water is used as aqueous medium for extraction of this dye. To determine optical density the 50 grams of wool fabric and 50 grams of silk fabric material was separately added to above 100 ml acidic , basics and aqueous medium. The optimum condition of dying in terms of extraction medium is determined by percent of absorption.

Extraction time:

The suitable medium is selected for the extraction of eucalyptus dye from source. And extraction time was taken as 35min., 45min. and 55 minutes. Then 100 grams of crumbled leaves of eucalyptus with 1liter (1000ml) distilled water were refluxed for 1 hr at 35min., 45min. and 55 minutes. The known grams of wool and silk fabric material were separately added for 100 ml solution which was prepared under different extraction of time. Then optical density was recorded for above solutions and optimum condition of dying in terms of extraction time is determined with the help of percent of absorption.

Concentration of dye solution:

The dye solution of eucalyptus leaves then filtered. This filtrate then evaporated and also dried. The solution of dye with 2 grams, 4 grams and 6 grams of dye in 100ml aqueous medium was prepared and optical density of each above dye concentration is recorded to calculate percent of absorption in terms of concentration of dye solution.

Duration of dyeing

The dye solution which suitable and selected concentration was used for dying of 50 grams of wool fabric and 50 grams of silk fabric material. The dyeing process of fabric was 40min.,

The value of optical density is determined and used for optimization or analysis of above conditions of dyeing. The optical density value is taken with the help of colorimeter and spectrophotometer (GI.124, Spectro 002) .This optical density value is taken before and after dyeing .The optical density value is used to calculate the Percent of absorption. The Percent of absorption were used to optimize above condition of dyeing. To calculate percent of absorption the formula of percent absorption is given below. (Grover and Sharma in 2005)

50min. and 60min. The percent of absorption was calculated by using optical density value, which was obtained before and after dyeing. The optimum condition of dyeing in terms of duration of dyeing is determined by percent of absorption.

Method of mordanting:

Pre mordanting method, simultaneous mordanting method and also post mordanting method were used with different concentration of mordent. The best mordanting method among these three mordanting methods were optimized by using optical density value and percent of absorption. In this pre-mordanting method the selected mordent solution and desired wool and silk fabric material were separately transfer into the bath. This solution was boiling up to 20 min. And then dyed with eucalyptus dye solution. Simultaneous mordanting method was meta mordanting method which involves dyeing of fabric in presence of suitable mordent. In this method the mordanting procedure and dyeing of wool and then silk fabric material were simultaneously performed in eucalyptus dye bath. In this method the above mentioned fabric material were separately immersed in dyeing bath having mordent components and the extract of eucalyptus dye at normal or room temperature. For post mordanting method the desired fabric material were immersed first in eucalyptus dye solution and then mordanting procedure is performed on that dyed fabric. All these three methods were performed at 70°C and up to 60 minutes.

Result and Discussion:

During the optimization of extraction medium for eucalyptus dye the acidic medium was showing good values for percent of absorption than aqueous medium. This value is given in table.1a and fig.1b. However aqueous medium is selected for extraction due to less economical value and small difference between percent absorption values of acidic medium and that aqueous medium. As per table.2a and fig.2b, the Optimum extraction time

was found to be 45 min. for the extraction of this eucalyptus dye from dried eucalyptus leaves through aqueous medium. The Optimum concentration of eucalyptus dye solution was 6 grams per 100 ml of water and this reported in table.3a and fig.3b,.The Optimized concentration of dye is suitable for both wool and silk fabric material. As per data given in table.4a and fig.4b, the 60 minutes duration is optimized duration of dyeing of desired wool and silk fabric with selected eucalyptus dye solution. The optimum concentration of mordent is shown in table.5a.The 8% mordent solution of alum, FeSO₄ and CuSO₄ mordents is selected for wool and silk fabric material.With selected concentration of

eucalyptus dye solution which is given in table.6a and fig.6b the simultaneous mordanting method was good method for dyeing of desired wool and silk fabric material.Ferrous sulfate and alum mordents are comparatively good mordents while performing simultaneous mordanting method. Brownish yellow colour shade is obtained on fabric material in absence of mordent. Pale brown shade is obtained on fabric material with alum mordent. Dark brown shade is obtained on fabric material with FeSO₄ mordent. Pale olive-green colour shad was obtained on fabric material with CuSO₄ mordent.

Extraction medium	Wool fabric	Silk fabric
Aqueous medium	21.54	21.41
Acidic medium	22.3	22.18
Basic medium	21.47	21.23

Table1: A

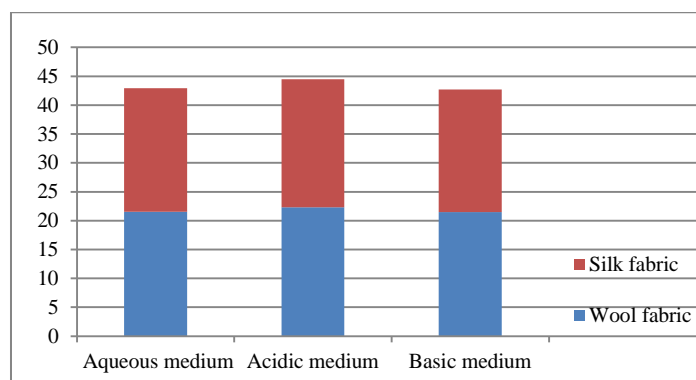


Fig.1B

Extraction time	Wool fabric	Silk fabric
35minutes	23.46	23.14
45minutes	25.51	25.39
55minutes	25.67	25.48

Table2: A

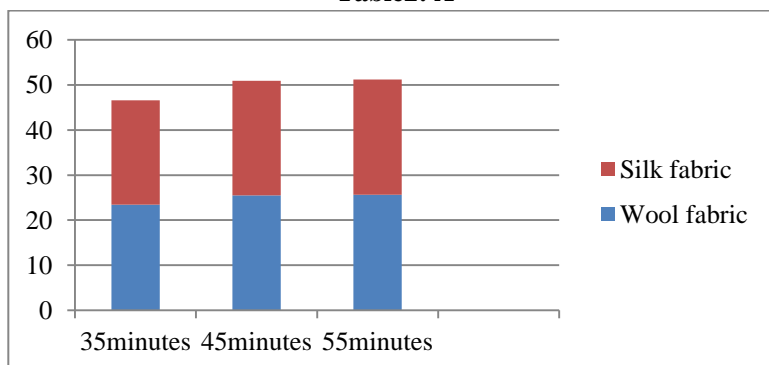


Fig.2: B

Concentration of dye in water	Wool fabric	Silk fabric
2g/100ml	15.43	15.1
4g/100ml	17.37	17.18
6g/100ml	18.26	18.14

Table3: A

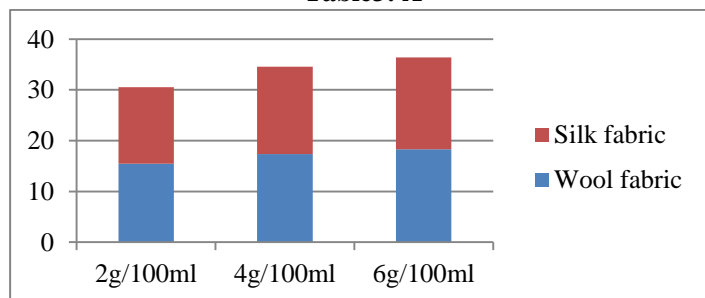


Fig.3: B

Duration of dyeing	Wool fabric	Silk fabric
40 minutes	30.14	29.08
50 minutes	31.77	30.64
60 minutes	31.3	31.18

Table 4: A

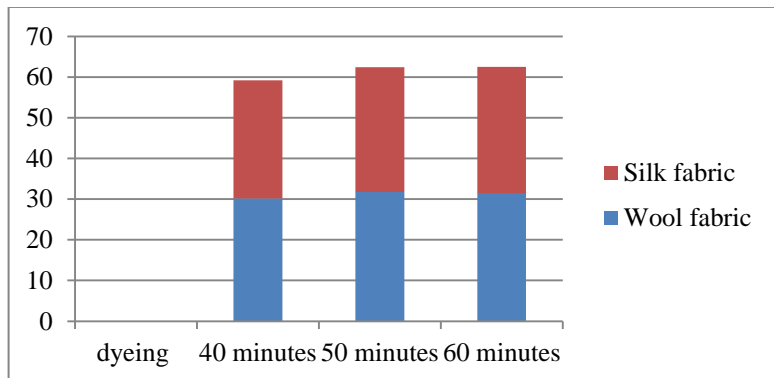


Fig. 4: B

Mordemt	Concentration of mordent in water	Wool fabric	Silk fabric
Alum	4%	12.15	12.08
	8%	13.21	13.17
	12%	13.84	13.74
FeSO4	4%	14.38	13.95
	8%	15.47	15.21
	12%	15.58	15.49
CuSO4	4%	11.74	11.69
	8%	12.37	11.87
	12%	12.51	12.47

Table5: A

Concentration of mordent	Mordanting method	Wool fabric	Silk fabric
8% Alum	Pre mordanting	12.15	12.08
	Simultaneous mordanting	13.21	13.17
	Post mordanting	13..84	13.74
8% FeSO ₄	Pre mordanting	14.38	13.95
	Simultaneous mordanting	15.47	15.21
	Post mordanting	15.58	15.49
8% CuSO ₄	Pre mordanting	11.74	11.69
	Simultaneous mordanting	12.37	11.87
	Post mordanting	12.51	12.47

Table6: A

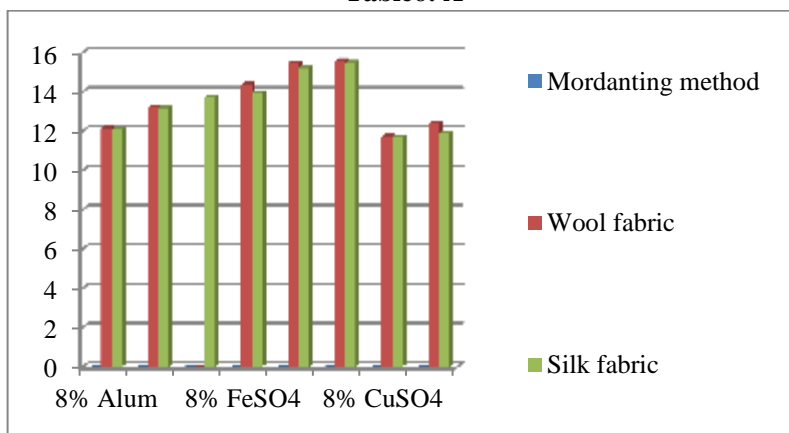


Fig.6: B

Conclusion:

The eucalyptus dye with dye concentration 6 grams per 100 ml was suitable for dyeing clean fabric material of wool and silk. The eucalyptus dye can be extracted through acidic and aqueous medium with 45 minutes extraction time. This will give good yield of dye component from eucalyptus leaves. The 8% solution of FeSO₄ mordent was good mordent solution during dyeing with eucalyptus dye. The simultaneous mordanting method and about 60 min duration of dyeing process was good for dyeing with this eco friendly eucalyptus dye.

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Climate Change and Impact on Natural Resources

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Abstract:

This article tells that climate change is the most unhealthy disease of today's environment, which is increasing so rapidly like a disease like cancer, that one day it will make the world hollow. Ice rocks are melting, sea level is rising, incidents like earthquakes and floods are happening rapidly. We are making excessive use of resources like technology. Due to which the carbon emissions from these are increasing. All types of natural resources are very essential for us. We are using natural resources with increasing needs but we are also depleting the natural resources. It is not possible to live without natural resources, all the natural resources like water, oil, coal, natural gas, metals, stones, Sand, air and soil are all natural resources. Climate change is having a profound impact on these natural resources. Degradation of natural resources is increasing rapidly due to rising temperatures and environmental pollution. The reasons behind climate change and natural resource degradation are increasing population, coal production, consumer habits, industrialization, leakage of poisonous gases etc., and the condition has reached such a level that the rivers are on the verge of drying up. Multi-storey buildings are being built by cutting trees on agricultural land, and the land is being continuously polluted by using chemical fertilizers and pesticides to increase the yield in the fields. If governments do not get serious on climate change, humans will not be able to get pure food to eat, pure water to drink and pure environment to live. Then what will we leave for the future, polluted environment or clean environment?

Keywords: Earthquake, Technology, Degradation, Temperature, Environment, Industrialization, Government.

Introduction:

The problem of climate change is nothing but the problem of searching for happiness in the wrong area. The whole world is searching for happiness with the help of technology. This is called climate change. It is also possible that by taking some technical measures, more carbon will be removed from the atmosphere. There is dioxide, it can be used, but even if this problem is solved, then some other big crisis will come to the living beings, because the main crisis is not climate change, the main crisis is the new uses being made of natural resources. It is being tampered with, this is the reason for climate change and we have been giving harm to nature. Climate change is continuously increasing and taking serious forms. Climate change is having a profound impact on biodiversity. The level of potable water is falling, the land is being continuously polluted by using chemical fertilizers and pesticides to increase the yield in the fields, which will have a huge impact on the yield. In today's time, the impact of climate change is

becoming very visible. If we talk about five years ago and today, many changes have taken place. Glaciers are melting rapidly, deforestation is increasing rapidly due to which the amount of oxygen in the environment is decreasing and carbon dioxide is increasing, which is affecting the living organisms. In today's changing environment, agriculture is becoming completely affected by climate. If we talk about climate change then we talk about hot climate. Periods of extreme high temperatures are likely to become more frequent in the future and will represent a major challenge to agriculture and its dependent industries. Heat waves can cause heat stress in both animals and plants and have negative impacts on food production. Excessive periods of high temperatures are particularly detrimental to crop production. Critical stages of plant development such as seed germination, flowering, and plant growth are disrupted when plants are exposed to heat stress. This can lead to reduced productivity and reproductive capacity, and it can also have negative

effects on the plant's immune system, affecting the plant species and the physiological, anatomical, and morphological characteristics of the plant. If we talk about intensity of rainfall, it will also be responsible for climate change. Due to climate change, the impact of rainfall on agriculture is being seen. Untimely rainfall and excessive rainfall have a deep impact on the yield of crops and after harvest, it has a deep impact till the harvest of crops, such as rainfall from June to July. Due to global warming, it has started happening in the months of November to December as well, due to which disaster like flood occurs which causes huge loss of crops. The reason for unseasonal rain is deforestation, soil erosion, high temperature etc. is causing climate change. If we talk about of Water Due to climate change, glaciers are melting rapidly and may cover more part of the earth in a short term, which will have a negative impact on agriculture in the coastal areas. They may even drown and millions of people will be affected. Severe storms (especially cyclones) will cause greater damage to infrastructure. Livelihood and the density of salt water will increase more storm waves will change in days and A part from the monsoon rains, the amount of unseasonal rains will have a greater impact on the production of food and agricultural products due to which there will be huge losses on crops due to land degradation, land slides, etc. As a result of which a lot of work will be generated and the results will be negative.

Objectives of the study:

1. To reduce the factors that promotes climate change.
2. To Know the impacts of climate change and prevent degradation of natural resources.
3. To Understanding climate change and its Impact on the natural environment and generations.

Data and Methodology:

The data is take place from primary and secondary data source the primary data, both quantitative and qualitative data collected by surveys, semi-structured interviews, focus group discussions, book and website. The primary data sources were: Farmers, community leaders, and private sector. In this study it has been assessed that the increasing level of greenhouse gases is evidence of climate change. Due to the increase of these gases the average temperature of the earth is increasing. A recent UNEP report estimates that the use of coal in power generation will have to be phased out by 2030. The share of gas needs needs to be reduced to 17 per cent by 2030 and to zero by 2040, but given the current situation and climate change, Looking at this, studies indicate that this is impossible. The IPCC 2023 report found climate change caused by burning fossil fuels has caused global warming by 1.1 degrees Celsius, leading to more extreme

weather events, but the IPCC said in the report that efforts to reduce greenhouse gas emissions and mitigate human-caused climate change have been made. There are many social steps to adapt, and they are available now. In this method, climate change will have a deep impact on the lives of poor people who are completely dependent on natural resources.

Result and discussion:

This study has been done to bring an understanding and awareness about climate change among the people, in which the facts of rapid depletion of natural resources and decline in sustainable development and polluting the environment by excessive use of energy have been identified. Climate change is affecting people from every aspect. The study was not limited to permanent climate change and destruction of natural resources. It is indicating the coming "End of the Earth" for the human race, due to which Deforestation is taking place, similarly sand cutting and burning of charcoal have proved to be a major cause of climate change. The findings showed that natural resources are being used up faster than before and the climate is changing more than before. Along with decline in crop yield, seasonal changes like increase in premature rainfall etc. are having negative impacts. The respondents talked about environmental degradation, uncontrolled pollution, high levels of water at some places and drought at others.

Conclusion:

The role of plastic combustion is greater in climate change. The findings showed that plastic pollution is having a negative impact on climate change. At the time we are burning plastic, we do not think about how much harm its burning will cause to the environment. Combustion of plastic will produce toxic gases like carbon monoxide, carbon dioxide, hydrogen cyanide etc. These gases will have a negative impact on biodiversity, which will increase the rapid change in weather. Due to climate change, the natural balance is deteriorating which will prove fatal in the future. The crisis is increasing due to climate change. The poor population of rural areas who are living on the basis of natural resources are being seriously affected by climate change. The impact of climate change is having an impact on wild animals, trees and plants, agriculture, which are causing non-renewable resources like coal, natural gas, water, trees and plants etc., which are depleting rapidly due to which natural resource degradation is increasing day by day. Due to excessive industrialization, poisonous gases are being spread in the atmosphere, which is

causing ozone layer depletion and the entire biodiversity is being affected and the pattern of time has changed.

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Women's Economic Empowerment in Rural and Urban India: A Comparative Analysis

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Abstract:

Women are more connected to their finances and dependent on opportunities to participate in the economy. 2011 census data show a large disparity in labor force participation between urban and rural women; because urban women constitute only half of the workforce as rural women. Existing literature shows how women's work empowers them, but comparative research on the differences between urban and rural women's empowerment is still limited. From this point of view, with the assumption that women's economic power depends on participation, this study tries to compare the economic power of women in rural and urban areas of India by focusing on various aspects of cooperative work. This study is entirely based on secondary data collected from Census of India 2011 and Periodic Labor Force Survey (PLFS) 2019-20. Women's Economic Development Index (EEI) is measured by commonly used methods such as women's participation, information on women's job share, women's cooperation through educational attainment, marriage, women's job share and women's employment. Findings show that rural women are more likely to participate in the workforce across all options. The overall analysis reflected in the EEI proves that rural women have more economic power than urban women.

Keywords: Economic empowerment · Job profile · Standardized technology · Unemployment · Urban and rural women · Women's participation.

Introduction:

Work is one of the sources of income that provides personal motivation. Regardless of gender, having a paid job is the first step to empowerment. This means that financial support comes from participation in paid work. Especially when women work for money, they gain more power by having the power to make decisions for themselves [1, 2] and contribute to their families [3, 4]. For women, employment is the main source of their support [5] and financial independence is important for overall health [6, 7, and 8]. Women who are financially independent and contribute to the family benefit more from their rights and power and have more self-confidence [9,10,11,12,13]. They can earn more money than women who are not financially stable. Energy efficiency [14]. Research has shown that women's participation in work outside the home helps improve their decision-making power and better manage resources [15]. Another study by Van den Broeck & Maertens in 2017 found that women's participation in non-agricultural work increases their income and therefore their level of

happiness [16]. Working conditions also support health, well-being [17, 18] and standard of living [19]. Many famous researchers such as Murdock (1949), D'Andrade (1966), Boserup (1970), Ember and Ember (1971) have established a relationship between work participation and change in society [20, 21, 22, 23]. According to Datta and Sinha (1997), women's participation in agriculture leads to higher status [24]. Likewise, D'Andrade stated in 1966 that participation in the economy makes women more powerful and able to control the work at home [21]. Based on related studies, this study found that women's economic empowerment depends on employee participation.

However, history has proven that in patriarchal societies, women's participation in business life is lower than men, which causes women to rely on their fathers or brothers before marriage and on their husbands after marriage. Unfortunately, India is no exception. In the context of inequality, the healthcare system in the area that Smith mentioned in 1977 asks “who gets what, where and how?” focuses on the question. Social

welfare analysis focuses on inequitable distribution among various groups of people. Analysis of gender differences in this context is included in [24]. They talk about gender inequality in the country; only 25.51% of women participate in the labour market, more than twice as much as men, i.e. 53.26%. As with gender inequality, gender inequality in India also presents a similar picture. Large disparities in labour force participation between rural and urban women were also observed. Across the country, 30.03% of women in rural areas are in business life. With urban women taking part in business life, this figure drops to 15.44%; that is, about half of women in rural areas. Urbanization is often associated with greater independence of women and the disruption of patriarchal power relations and values [25]. Arguing against this, Bhagat said in 2017 that Indian cities have failed to achieve the goal of gender equality because patriarchal culture still plays an important role in relations between cities [26]. While women around the world are joining the debate on their right to equal pay, India needs to follow suit in terms of women's participation in the labour market. The differential incidence of working women in urban and rural India is also an area that policy makers need to address [27].

Data shows how women's work empowers them, but studies compare the difference between urban and rural women's empowerment, there is little. However, some recent PLFS studies have shown that urban women's unemployment rates are higher than those of rural women. In other words, while rural women's employment is higher, the difference between urban and rural women's employment is large. From this perspective, this study aims to compare the participation levels of urban women in India with rural women based on their education, training and experience. Additionally, a section on women's participation in different professions has been added to provide a better understanding of the work they do. In addition, in order to determine the financial support of rural and urban women, five basic points were taken into account, such as women's participation, the literacy-based participation of the female mother, the woman's work indicating her level of education, and the woman's marriage status. Job Therefore, this study is divided into seven sections, each of which provides the proportion of rural and urban women workers in the country and state. In the first part, women's participation in the workforce is analyzed. The second refers to women's participation in terms of literacy, that is, the percentage of women with financial knowledge

relative to the total number of knowledgeable women. The third chapter is devoted to examining women's participation in education. The fourth section assesses the impact of marital status by measuring the ratio of working married women to total married women in rural and urban India. In the fifth chapter, an attempt is made to find the jobs shared by women in various professions. Chapter 6 explains the overall economic empowerment of rural and urban women. Chapter 7 analyses the current situation of women's work in urban and rural areas together. The last section ends with a summary of the research.

Database and Methodology:

This study is quantitative in nature and based on secondary data. All relevant data were taken from different sources of 2011 Census of India [28]. Based on the collected data, relevant statistical methods were applied to the empirical results. Women's Labour Force Participation Rate (WPR) is measured by the formula used in the 2011 Census -
$$WPR = \frac{\text{Total Working Women}}{\text{Total Women}} \times 100$$

Like WPR, other jobs, such as jobs for Literate women, account for 10% of the women's labour force participation rate constitutes. Ratio of total number of literate women, women's participation by education level, employment rate of married women relative to total married mothers, and women's job share by job type are also included in the above model. Besides this, Women's Economic Empowerment Index (EEI) is also measured with the help of the above mentioned. The EEI is a score composed of five subscales. To calculate the index, the generally accepted formula is used here:

$$\text{Index } X_d = \frac{X_d - X_{\min}}{X_{\max} - X_{\min}}$$

Where,

X_d is the observed value of the variable

X_{\max} is the maximum value of the variable

X_{\min} is the minimum value of the variable

It indicates lower levels of economic support. First, use the formula to calculate the values of each variable. In the second step, the EEI of urban and rural women is calculated by adding all index values and dividing by the number of variables. In addition to the census data, Periodic Labour Statistics (PLFS) database [29] was used to find out the current status of women's job share from July 2019 to June 2020. According to the data, LFPR and UR are calculated by the following formula adopted in PLFS 2019-20:

$$\text{LFPR} = \frac{\text{Number of employed women} + \text{Number of unemployed women}}{\text{Total women}} \times 100$$

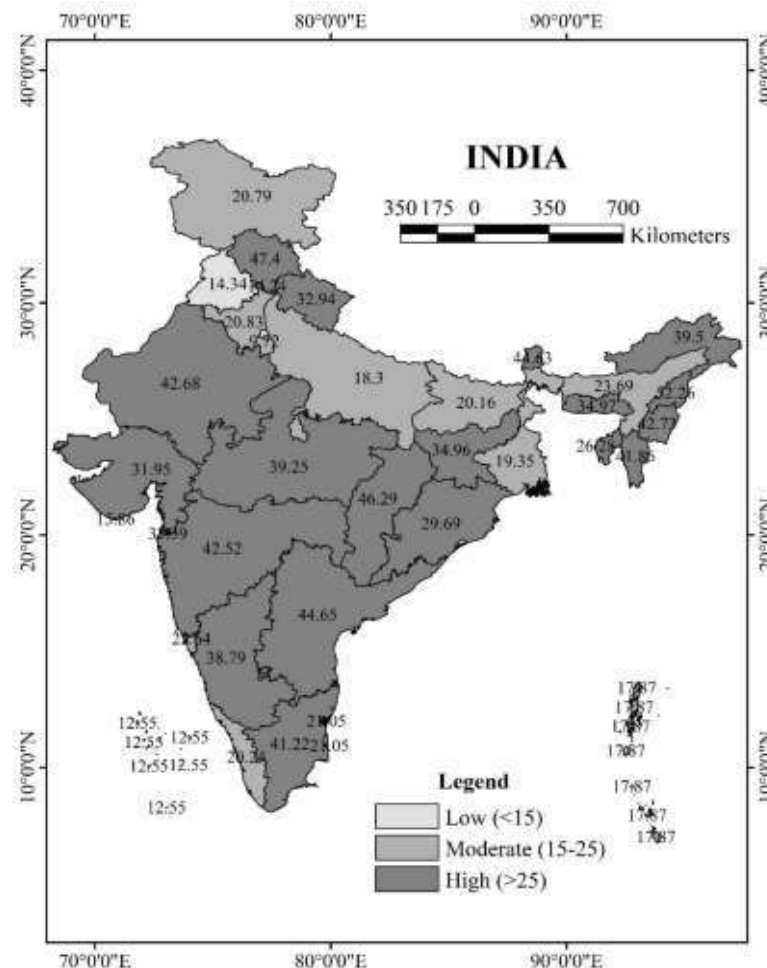
$$\text{UR} = \frac{\text{Number of unemployed women}}{\text{Number of employed women} + \text{No. Women unemployed}} \times 100$$

Result and Discussion:

Rural and urban women's labor force participation in India:

In an international comparison of urban women's labour force participation in 38 countries by Collyer and Lang Lois, India ranks fourth at the bottom; Rates are much higher in developed countries such as the United States, Western European countries and Japan [30]. According to the Press Trust of India (PTI), the WPR of women in urban India is lower and needs to be improved [27]. The study also reveals a large gap in labour force participation between rural and urban women in India. In rural India, women's share of the workforce is twice that of urban women (Figures 1 and 2). Reddy achieved a similar result in 1979; i.e., in all regions of India except Punjab, the employment rate of rural women was higher and the difference between states the gap among rural women is greater than that of urban women. . She believes that the reason for the difference between the activities of women in urban and rural areas is the difference in working styles, the difference in the needs of the job and the

difference in income. Participating in the market is one of the first methods of gaining power. Sinha found in 1971 that the opportunity for higher wages in the city was an important factor in women's participation in the urban minority. He said higher wages for men working in most urban jobs would reduce the financial burden on women workers. Census data from this study show that rural women are more motivated than urban women; this means that rural women in India have higher participation than urban women. While the participation rate of women in rural areas across the country is 30.03 percent, this rate is only 15.44 percent in urban areas, which is approximately half of that in remote regions. Except Delhi and Chandigarh, all states and union territories recorded the same results as the country; that is, the labour force participation of women in urban areas was lower than that of women in the regions. However, the level of women's labour force participation varies in each state. Besides the above national cooperatives, there are 18 rural and urban states/Union Territories in their respective categories.



Spatial view of women's engagement in the workforce based on literacy status:

According to Das and Pathak (2012), literacy is an effective tool for empowerment [32] and Tripathy and Raha in 2019 considered that literacy is the parameter that reflects women empowerment precisely [33]. A person's literacy helps to learn new skills and acquire knowledge quickly, which increases the chance of getting a job. It means there is a positive relationship between literacy status and employment opportunities. Thus, literate women with employment make them more empowered. Chandna et al. in 1980 found that the literacy rate of the urban population is significantly high compared to the rural population in the developing country [34]. In addition to this, it is also found that the literacy rate of urban females is much higher than their rural counterparts. Generally, for urban women it is easy to engage in any workforce as the literacy rate is higher among them than in the rural. However, in India the scenario is quite different. There was a sharp decline in the work participation rate of urban women during the transition from illiteracy to literacy from 1901 to 1961 [30]. At present, there is no change in the situation. As per the 2011 census database of India, at the national level for urban the share of literate women workforce out of total literate women was only 15.76%, which is very less compared to its rural counterpart i.e. 26.04%. In Punjab and three UTs i.e. Chandigarh, Delhi and Andaman & Nicobar Island, the percentage share of literate women work participation was higher in urban areas than rural areas. Except for these, in all the states/UTs proportion of literate women engaged in the workforce was greater in rural areas than its urban counterpart. At the national level and in most states/UTs the proportion of literate rural women is more involved in different economic activities than the urban. Even in Delhi, only 11.78% of urban literate women are in the workforce, which is less than the national level.

From figure, the regional disparity is sparkling in that in Western and Northern India literate urban women work participation is low compared to Southern and North-Eastern parts. This is because most of the patriarchal societies in the North and North-West purdah (veil) system are still practised which perpetuates women's dependency and curtails their freedom [35]. Among the states, literate women's work share varies from 9.10 to 56.80% for the rural (Fig. 3); and for urban it was 9.12 to 36.60% (Fig.). The maximum work participation of literate women in the rural area has been recorded in Nagaland followed by Himachal Pradesh and Mizoram. More than half of rural literate women are

engaged in economic activities in all three states. Manipur is at the top of the list for urban, followed by Mizoram, Nagaland and Sikkim. On the other side lowest work share in rural has been found in Delhi followed by Punjab and Chandigarh. In urban minimum work share by literate women has been recorded in Jharkhand along with Bihar, Rajasthan and Gujarat. From another angle of view, the gap between rural and urban women work share based on literacy status was 10.28% at the national level. Himachal Pradesh and Nagaland have positioned in the upper part of the list of literate women work participation for both the rural and urban as the schooling revolution has raised the literacy status in general and women in particular in Himachal Pradesh [36], however the gap has been recorded highest in these states i.e. 29.22% and 27.43% respectively. Chhattisgarh, Maharashtra, Rajasthan and Uttarakhand are the states where the gap is more than double the national average. In Daman & Diu, Goa and Jammu & Kashmir the gap was very low. On the other side, in some states, a negative gap has been recorded where a higher proportion of literate women are engaged in the workforce in urban compared to their rural counterparts. Andaman & Nicobar Island, Punjab, Delhi and Chandigarh have fallen in this category. Because of higher mechanization in agriculture and limited growth of the non-agricultural sector in Punjab, it is difficult to get employment, especially for rural women [37, 38]. In Delhi, the opportunity is higher for urban women as there are many IT sectors, start-ups, and private sectors where they can find a job based on their education and skills.

Educational level-wise women work share in India:

Neoclassical theory predicts that increases in women's education will often lead to increases in women's labour force participation. Higher education makes people more productive and therefore increases their earning capacity, giving them greater motivation to join the workforce and replace leisure or household chores with work [39]. This means that learning outcomes have a positive impact on work engagement. Compared to other BRIC or OECD countries, education and income in India are negatively correlated with women's labour force participation [31]. The high educational requirements for jobs outside the home prevent the employment of most uneducated women [40]. From this perspective, this section covers the share of women in employment through education in rural and urban areas. The results show a positive relationship between employment and educational attainment in both rural and urban areas across India. In other words, as the level of education

increases, the division of labour also increases. Similar results were obtained in many states of the country. The reason for the gender gap in urban and rural areas appears to be differences in work patterns, differences in job demands and income differences [40]. According to the 2011 census, women in rural India with less than a college or secondary education are nearly twice as likely to participate in the labour market as urban women. In all states in the country, as well as in rural areas, the percentage of female employees attending both levels of education is higher. In other words, no state in India has such a high proportion of women workers with higher and secondary education in urban areas. Among rural areas, Nagaland recorded the highest number of women working in both education and higher education. Mizoram has the highest labour force participation rate among urban women in the following matrix categories: However, Manipur is at the intermediate level. Not only in these states but in most states of North East India, the participation of women receiving these technical trainings is higher in rural and urban areas than in other parts of the country. On the other hand, in the country's capital, Delhi, most jobs in rural and low-income cities are below 10 percent. Viewed from another perspective, there is a huge difference

between the participation of urban and rural women in Himachal Pradesh at 34.21% and 36.07% respectively. In many states in the south and west of India, inequality in education levels is greater than in other parts of the country. The high unemployment rate among educated women in urban and rural areas also suggests that many women would like to work if suitable jobs are available [40]. The proportion of graduated women of rural India is more engaged in the workforce than the graduated urban women (Table 1). As per the 2011 census, 33.92% of graduated rural women have been recorded as employed at the national level, whereas it was only 28.62% in urban. Only six states/UTs namely Punjab, Chandigarh, Delhi, Arunachal Pradesh, Dadra & Nagar Haveli, Kerala, and Puducherry had a higher proportion of graduated urban women are involved in economic activities as compared to their rural counterparts. However, in the rest of the states/UTs the scenario is the opposite. In Mizoram, the majority of graduated women from rural and urban are engaged in the workforce, i.e. 71.65% and 64.25%. All the north-eastern states have recorded higher women workforce of this educational level. However, in Delhi the

	Literate but below matric/ secondary		Matric/secondary but below graduate		Technical diploma or certificate not equal to degree		Graduate and above other than technical degree		Technical degree or diploma equal to degree or post- graduate degree	
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
India	24.12	11.64	26.64	13.08	39.16	39.50	33.92	28.52	42.16	45.19
Jammu & Kashmir	14.89	9.10	22.59	14.97	34.24	23.00	37.22	33.18	46.28	45.55
Himachal Pradesh	47.06	12.85	54.15	18.08	52.70	40.73	57.16	36.52	57.71	44.16
Punjab	11.38	8.30	14.38	11.85	28.53	31.13	26.57	27.11	34.45	42.25
Chandigarh	9.22	8.06	15.07	11.77	53.33	39.19	32.55	35.47	41.67	47.46
Uttarakhand	31.18	7.01	34.35	9.33	29.90	28.69	37.35	23.74	40.94	37.75
Haryana	17.24	6.97	21.60	9.54	28.17	34.86	28.32	27.21	32.93	39.81
Delhi	6.44	4.99	8.57	7.25	26.34	41.38	22.50	27.54	37.86	46.86
Rajasthan	31.03	7.92	30.99	8.10	44.80	41.00	41.53	23.37	47.64	36.94
Uttar Pradesh	12.56	8.24	17.30	10.39	26.79	34.85	27.95	20.43	38.01	38.41
Bihar	12.17	6.49	20.31	10.54	30.86	23.81	29.83	21.70	37.67	38.32
Sikkim	43.29	16.40	50.68	34.85	50.72	68.20	57.15	53.50	61.27	69.97
Arunachal Pradesh	28.99	14.75	34.28	28.68	55.36	53.10	51.49	52.30	61.02	62.49
Nagaland	55.41	22.81	54.24	31.47	68.68	55.28	62.46	52.02	75.45	63.73
Manipur	37.30	27.27	47.46	37.91	51.57	55.95	58.11	54.39	55.25	56.05
Mizoram	49.62	32.62	49.00	35.51	70.11	61.75	71.65	64.25	68.21	72.47
Tripura	25.09	14.43	23.15	15.07	40.06	34.21	34.54	32.31	44.01	50.98
Meghalaya	37.07	18.52	40.80	26.30	55.99	59.16	61.51	55.36	67.64	68.46
Assam	20.24	9.97	29.77	16.27	49.00	47.86	41.89	35.52	49.28	56.16
West Bengal	16.30	12.69	16.48	12.46	48.01	43.50	30.74	26.08	51.78	49.73
Jharkhand	24.60	6.06	33.28	8.06	45.91	32.85	43.42	20.13	52.35	41.80
Odisha	22.74	9.62	20.88	11.07	42.70	40.68	28.28	25.12	38.64	44.59
Chhattisgarh	41.07	13.21	38.70	10.80	37.87	31.05	51.96	28.64	48.48	41.89
Madhya Pradesh	28.74	11.04	30.21	11.11	27.09	31.37	40.08	25.84	37.97	37.70
Gujarat	27.77	9.00	29.89	9.11	52.01	47.04	29.51	20.51	44.40	40.04
Daman & Diu	15.66	14.03	13.86	13.17	35.20	40.37	27.65	25.15	30.68	50.39
Dadra & Nagar Haveli	22.00	12.47	28.68	13.35	44.16	48.49	24.66	25.14	49.29	50.77
Maharashtra	41.04	12.57	39.05	14.28	32.96	37.24	37.95	34.87	48.05	51.14
Andhra Pradesh	32.10	13.41	30.50	13.60	30.80	31.62	33.57	29.85	36.09	39.83
Karnataka	32.60	15.66	33.73	18.05	47.79	48.34	36.99	34.82	42.13	50.82
Goa	19.43	14.73	23.93	21.09	38.45	38.85	47.07	45.30	64.17	61.15
Lakshadweep	10.84	8.02	20.23	18.92	74.74	68.12	60.38	39.66	58.70	65.02
Kerala	19.79	13.30	19.34	15.20	37.90	37.78	32.44	33.85	46.97	51.30
Tamil Nadu	37.22	18.64	32.24	16.80	37.96	38.80	37.59	34.84	38.98	44.78
Puducherry	18.29	11.54	15.71	12.17	31.74	40.74	28.38	33.82	37.18	47.44
Andaman & Nicobar Islands	15.68	10.81	21.43	20.49	64.97	56.14	44.11	40.01	73.83	61.11

Source: Census of India 2011

proportion of graduated working women in urban is only 27.54%. It has been noticed that women from rural areas are more involved in economic activities until graduation. When it comes to the technical and postgraduate levels, urban women access more working opportunities than their rural counterparts. Because of that, in the field of technical diplomas and technical degrees or postgraduate urban women's work share is higher at the national level and in most states. The high unemployment rate among educated women in urban and rural areas also shows that many women are willing to work if suitable jobs are available [40]. The labour force participation rate of female graduates in rural India is higher than that of female graduates in urban areas (Table 1). According to the 2011 census, the rate of female graduates working in rural areas across the country is 33.92%, while the rate of female graduates working in urban areas is only 28.62%. Only six states/Union Territories like Punjab, Chandigarh, Delhi, Arunachal Pradesh, Dadra and Nagar Haveli, Kerala and Puducherry have women graduates in the urban economy. But in other states/Union Territories the opposite is true. In Mizoram, the majority of rural and urban female graduates have joined the workforce at 71.65% and 64.25% respectively. The number of women in the workforce at this level of education is higher than any other state in the Northeast. However, in Delhi, the proportion of female graduates in the city is only 27.54%. It has noticed that urban women have more employment opportunities than rural women in terms of education and higher education. Therefore, in the country and in most states, urban women have a higher participation rate in graduate school, technical education or higher education.

Conclusion:

In today's world of globalization and liberalization, economic empowerment is the most important basis of freedom. Economic freedom allows people to enjoy their rights and play an important role in domestic and non-familial decisions that are indispensable for living in respect and dignity. Financial independence can be achieved through a successful career. Unfortunately, even after seven decades of independence, women's participation in society remains low in India. Particularly urban women's participation in the workforce is not satisfactory. It is worrying that although urban women have more job opportunities and higher wages than rural women, their participation in the workforce remains low. Literate women also faced similar situations. Although literacy enables women to enter the labour market, urban literate women have a small share in the economy in many states/Union Territories of the

country. On the other hand, the participation of literate women in rural areas in many fields of work earns those higher wages than urban women. Similar views emerge in analyzes of women's participation in education. With the exception of educated/professionals, female labour force participation rates at various levels of education are lower in urban areas than in rural areas in many states/territories. In this context, countries should focus on the employment of literate women in urban areas, even though they face employment discrimination or restrictions in many areas due to gender. In such a situation, the government should take action to distribute jobs according to education and skills, not gender. Most of the time, even if they are educated, they remain unemployed because no suitable job can be found. It's not about their preferences or choices; It's about the discrimination and inequality they often face in the workplace. From this perspective, the central government needs to enact national policies and laws that will ensure good jobs for women and promote them widely. Non-governmental organizations such as NGOs can represent women's rights in the workplace and raise awareness about empowerment. In a patriarchal society, domestic violence against women and the silencing of their voices are frequently featured in the media. In order to get out of this situation, it is necessary to remain independent, to speak out against the violence that happens to you, and to be able to manage your own life even after divorce/separation. The study revealed that while the participation of rural women was satisfactory in most states/Union Territories, the participation of urban women was lower. In addition, another characteristic found in this study is the percentage of women working in rural areas, which is associated with high and medium employment for urban working women. Finally, all the statistics are available in EEI and prove that rural women have more financial power than urban women. This means that rural women are more independent, able to make their own decisions and have more self-confidence. All calculations are based on 2011 Census data taken nearly ten years ago. Due to the current situation in the world, especially in India, it is not yet possible to collect ground data for the census planned to be held in 2021. Therefore, this study is limited to 2011 census data. To strengthen data recovery, the Periodic Labour Force Survey (PLFS) 2019-20 repository published by the Ministry of Statistics and Employment of India has been used here. Monitoring only LFPR, WPR and UR. However, the most important thing is that there is no difference between the two periods in the data on women's labour force participation in urban and

rural India. Due to limited data, the future vision of the study is to analyze the current situation compared to the past with the next census. Similarly, women in urban areas are not expected to participate more than women in rural areas because urban areas are more affected than rural areas during the COVID period. The pandemic and unemployment are also more severe among women working in cities.

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Wind energy is a sure thing in the future.

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Abstract:

Wind energy is energy derived from the air. Air is a renewable energy source. Windmills are used to generate wind energy, which converts the kinetic energy in the air into mechanical energy. Wind energy is renewable and easily available. This energy is very safe and economical. Wind energy does not cause air or water pollution. Besides, wind energy is inexhaustible and cheap. Since ancient times, wind energy has been used to pump water, grind grain, or irrigate gardens. But since the availability of cheap fossil fuels, the use of wind energy has declined significantly. The current focus is on how to make the most of wind energy in windy areas of the earth. Power generation can be profitable in this area. Suitable windmills have been created for that. These mills can generate electricity at a low cost. The energy produced by it is not constant, so the speed of the wind changes and sometimes even slows down. Besides, because the price of mineral oil is very low, it is very difficult and expensive to use wind energy. For these reasons, wind energy is not particularly exploited. But since fossil fuels will run out after some time, wind energy will be used a lot in the future.

Keywords: renewable energy source; cheap energy; pollution-free; very safe; low-cost construction

Introduction:

Wind energy development is seen on a large scale in some western countries. Germany, the United States of America, Spain, India, Denmark, China, etc. are producing electricity from wind energy. In India, wind power stations have been set up in the states of Tamil Nadu, Gujarat, Maharashtra, Karnataka, Rajasthan, Madhya Pradesh, Kerala, West Bengal, etc. In India, in 1985, a wind power station was set up on a commercial basis at Mandvi in Gujarat. It is the first wind power station in Asia. It accounts for 1.6% of India's total energy generation. India ranks fourth in the world in wind power generation after Germany, the United States of America, and Spain. According to information released in 2011, the top 10 wind energy producing countries in the world have a combined capacity of 2,38,351 MW. This is so much, and this capacity is constantly increasing. There are currently 339 wind power plants in India. Out of them, 44 projects are in Maharashtra. India's wind power generation capacity is 49,130 MW. Maharashtra has 5,439 MW. So much energy is generated. Also, about 393 MW of private wind energy projects have been implemented. The first wind power project in the state has been set up at Jamsande in Sindhudurg district. 1.5 MW in Vijaydurg, Sindhudurg district, in 1994. The first

wind farm of this capacity was set up in the state. There are many centres of wind power generation in Satara district, and there are 500 MW on the Vankuswade plateau in this district. The Chalke Wadi wind power project has been developed and is the largest project in Asia.

Objects:

1. Harnessing wind from land or sea and generating electricity.
2. Providing electricity without burning any fuel or polluting the air.
3. Strive to fully meet the future electricity needs of the state.
4. To take initiatives for the development of reserve power generation which will be of value to the company.
5. Diversification in the field of energy generation using solar, wind, wind, hydropower etc. sources.
6. Minimizing carbon emissions through responsible use of fossil fuels.
7. To be committed to generation of fair price electricity by controlling the cost of power generation and maintaining our performance and efficiency consistently.
8. Judiciously expand your industry in a way that will benefit all the stakeholders of the company.

9. Adapting to always be successful in economic cycles and dynamic energy markets.
10. Endeavor to raise the quality of life of the locals working in the area of operation near the power generation station.

Research Methodology: The article is written by adopting theoretical method. As it is impossible to read and write many reference books in a short time, only electronic sources have been used to write the information in this article.

Literature review: There are many books on the subject to write this article on Wind energy is a sure thing in the future. but it is not possible to find it in a short time. Therefore, the researcher has used the website itself.

History:

- Wind energy was used thousands of years ago in Egypt. S. BC It was done in 2,800, while in Iran, etc. It was done in 600. By the end of the nineteenth century, windmills were being used to generate electricity. Today, wind energy is being used all over the world to generate electricity with the help of modern wind turbines. The wind speed must be at least 16 kilometres per hour for power generation. It has to be. Also, there has to be continuity in the flow of wind. As the wind speed increases, the power generation capacity increases.
- The Codex of King Hammurabi (reigned 1750–1792 BC) already mentions windmills for generating mechanical energy. Wind-powered pumps provided water for livestock and steam engines in arid regions such as the Australian outback.
- In July 1887, the first windmill used to generate electric power was built in Scotland by Professor James Blythe of Anderson College, Glasgow. Thus becoming the first house in the world to supply electricity through wind power. In 1887-1888, Charles F. Brush had built a large engineered machine in Cleveland, Ohio. It was operational from 1886 to 1900.
- In the 20th century, small wind stations suitable for farms or residences were developed. The 1973 oil crisis spurred investigations in Denmark and the United States into large-scale utility-scale wind generators that could be connected to the electric power grid for remote use. Today, wind-powered generators range from small stations for battery charging at isolated residences to nearly gigawatt-sized offshore wind farms powering the national electric grid.

What is wind energy?

The kinetic energy of wind on the surface is called wind energy. Wind energy is a form of solar energy because sunlight heats air at different

surfaces. Solar radiation heats every part of the Earth's surface—sand, water, rocks, and different types of soil—but not at the same rate or speed. Different layers absorb, retain, reflect, and release heat, and nights are generally cooler. As a result, the temperature rises and cools at various layers above the Earth's surface. Hot air rises and lowers the pressure of the atmosphere near the Earth's surface, which causes cooler air to replace it. The movement of this air as it cools is called wind. That is, due to the movement of air, wind is generated, which is kinetic energy. When the object is set in motion, due to proper technology, the kinetic energy of the wind can be converted into another form of energy, which is mechanical power.

Importance of Wind Energy:

Humans have been using wind as a source of energy for centuries to convert it into energy. Before building large windmills, scientists and engineers experimented with building small windmills and making energy-generating machines based on them. In the three to four years since 1960, the attention given to wind as a practical and alternative energy source has decreased slightly. This is because other energy sources are more easily available. At that time, energy generated using mineral oil was cheaper than wind energy.

Due to the lack of consistency in such research efforts, they always stumbled. In the 1970s, few people realised that oil reserves are finite and will never be replenished. Also, their production will not run continuously, but there will be obstacles. In the 1970s, few people realised that oil reserves are finite and will never be replenished. Also, their production will not run continuously, but there will be obstacles. And nuclear energy sources that we thought were reliable and cheap are not so. The ever-increasing need for energy, rising fuel prices, depleting underground fuel reserves, and dependence on foreign energy sources all made it imperative to find alternative sources of energy. Therefore, the industrialised nations of the world have once again decided to implement wind energy as an alternative energy source on a large scale. Today, countries that have to rely on other countries for energy have made wind energy an important source of energy to meet their needs to some extent. In order to understand why wind energy is becoming so important, we must first look at the advantages and disadvantages of the energy source.

1. A clean energy variant:

There is no air pollution anywhere when using wind energy. Acid fumes from chemical industries mixed with air and rain, improper drainage of water in cavities created by extracting minerals from mines, toxic substances, pollution in nature, or similar reasons such as thousands of acres of barren,

desolate, and barren land, etc. do not happen at all when using wind energy. Also, the systems that convert this form of energy never harm the environment, which is beneficial to humans. Some forms of energy production produce carbon dioxide gas. Windmill technology is one of the few technological options available to reduce this pollutant generation. This renewable wind energy certainly helps to tackle the two problems of increasing global temperatures in the Earth's atmosphere and acid rain.

2. A renewable energy type:

Wind energy is easily harvested and inexhaustible. On the other hand, mineral oil reserves are limited. Even if man discovers new deposits of underground oil and starts using that oil, it is of no use. Because the consumption of oil is increasing around the world much faster than before. This limited and high-quality energy source of oil is bound to run out at some point in the future as the demand and hunger for oil in industrialised nations and developing nations continue to grow unabated. We can easily predict the future. So one solution to overcome this energy problem is to use wind energy. As energy is emitted from the sun, this source of wind energy will remain renewable.

3. The supply of wind energy is free.

Wind is free, abundant, and readily available. The main thing is that there is no bottleneck in the supply of this renewable energy. As some nations and industries have control over energy sources like mineral oil, natural gas, or nuclear fuels like uranium, no one has control over wind energy sources. As the demand for oil energy continues to increase and the price of petroleum increases, the use of wind energy will become a consideration.

4. There is no danger in embracing wind energy.

Wind energy harvesting systems are very safe to use. Due to the invention of electronic devices such as sophisticated microprocessors, the operation of the wind power plant is becoming fully automated.

The centre can be easily run by a very small staff. Setting up the centre and then maintaining it can also be done safely. Such is not the case with thermal and nuclear reactors. Windmills developed in recent times are designed in such a way that they can be easily erected even in the public places of the village. There is no danger in doing so. The fallout at that time was minimal or often non-existent.

5. Wind power plants do not require extensive space.

Compared to other power plants, wind power plants require very little space. It is easy to set up such centres where conditions are favourable. Such sites are hilltops, flat plains, forests, or deserts,

and even in shallow waters near shores, wind power stations can be constructed. If windmills are erected in agricultural areas, they do not disturb agriculture. Farming can be done right up to the base of the windmill tower.

6. Wind power plants can be set up instantly.

Just as a crop can be harvested on a large scale by farming, a crop of wind can be harvested on a large scale for energy. Therefore, if many small wind power stations are built together, he does not mind using the term 'wind farm'. Because small windmills or generators are small, they can be set up quickly in groups. A lot of flexibility can be kept in mind while planning them. Even before the plan is completed, the first windmills to be erected begin to generate economic returns on the capital invested by generating this energy. If the demand for electricity increases over time, the construction of more wind power stations can be included in the scheme immediately. Such wind power stations can be set up scattered all over the country, or they can be set up in clusters.

7. Minimum maintenance:

The machines of wind power plants are very simple in design, which makes them easy to operate, but they require less maintenance than other power plants.

8. Cost-effective Wind Energy:

As inflation increases the cost of fuel and alternative energy, the cost of wind will never increase, because wind is free. This raw material does not fetch any money at all. This saves you money and fuel. So wind power generation is always cheaper. The cost of running a wind power plant in a world where strong winds blow constantly is always lower than that of a plant that runs on oil or nuclear power. The cost of conventional power generation is constantly increasing. On the other hand, the cost of generating electricity from wind is decreasing rapidly. The increasing reliability of windmills or wind generators indicates that wind energy will be used as an alternative energy source in more and more areas in the future.

Constraints in wind power generation:

Although wind power generation is very favourable, it should be noted that it has the following limitations:

1. Expensive systems and variable factors in use:

Since wind power systems are expensive, they should be built where there is a lot of wind. Such abundant wind sites are sometimes located in very remote places. Getting there can be very difficult. And sometimes high-voltage power lines do not pass near such places. So how do you transport the electricity generated by the wind immediately? The question arises. Electricity consumption often

increases during certain periods and decreases during other periods. It is necessary to produce electricity according to the fluctuating cycle of demand. But since the force of the wind changes anytime and in any way, it does not necessarily depend on the time when electricity is needed from wind power. Hence, this stumbling power generation is not viable. Therefore, where there is no constant demand for electricity or where there is another permanent alternative source of electricity, wind energy can be supplied. Storing electricity is a very expensive and difficult task. Therefore, wind energy should be used in parallel with other energy sources, or where other energy than electricity can be stored, wind energy can be used together. However, if wind power generation is done along with hydropower generation, there is a lot of convenience. With the help of wind energy, water can be raised and stored there. Electricity can be generated from this water when needed. Instead of storing energy in the form of water in such layers, sometimes air can also be stored in that form by compressing and locking it in a small space.

2. Windmills disturb the area.

a) Electromagnetic Interference:

Wireless waves used for radio, television, messaging, etc. are disturbed by large windmills. These waves are therefore scattered. The blades of the windmills rotating in a vertical circle obstruct and disrupt the view of the television. Therefore, the image appears on the screen in a distorted form. But this happens only in the vicinity of windmills. As one moves away from windmills, this interference with radio waves becomes less and less. But wireless waves in the Very High Frequency (VHF) band are affected over several kilometres. Even when the blades of the windmill are not rotating, many ghost images appear on the screen one after the other, affecting the television scene. Therefore, the windmill should be erected at a maximum distance from the television broadcasting station. Also, don't place windmills in the path of microwave waves. Such measures can reduce this problem.

b) Noise pollution:

Noise pollution is a very serious problem in many developed countries. There has been a lot of public opinion against the noise generated by the motion of windmills as noise pollution. Wind energy generation produces two types of noise. The first sound is due to mechanical motion. These noises can be reduced by covering the moving parts of windmills and electric generators that make noise and using suitable gear wheels inside. The second sound was a distinctive 'swish' sound as the blades of the windmill moved through the air. This sound is

also of varying pitch due to the constant movement of the baby.

c) Nature Complex:

Many conservation groups and organisations fear that the windmills will change the migratory routes of the birds. But according to statistical analysis, it is now proven that the fear of windmills is felt by birds flying low above the ground, and that too by very few birds.

d) Aesthetics:

It is true that since the towers of the windmills are tall and the size of the related machinery is huge, the landscape is obstructed. In a way, this should be understood as 'landscape pollution'. (Developed nations are more sensitive in this regard, while the grand view of windmills is considered a sign of danger in developing nations.) In addition, windmills can interfere with low-altitude aircraft navigation, the transmission of radar waves, and other satellite communications.

Although there are some limitations, the benefits of using this wind energy outweigh the limitations. This is the biggest source of wind energy in the future, and it will be in the interest of mankind to use non-conventional energy sources rather than conventional energy sources. In this regard, wind energy is of unique importance. The use of wind energy is the need of the hour.

Conclusion

Electricity is being generated through wind energy across the country thanks to the National Wind Energy Institute. While conducting extensive research in this field, the institute is also providing various types of guidance. Various pieces of equipment in this field are also certified by the institute itself. And if the growing environmental problems are to be curbed, there is no alternative but to use clean sources of energy. Renewable and non-conventional energy sources can be used effectively. But we need technology for that. Although this technology has been developed through research, there are many misconceptions about it. By doing away with it and through science based on strong will, we can build an ideal. This ideal is not only inspiring but can also be enlightening. In the field of wind energy, not only in India but also in Asia, the organisation that dominates is the National Wind Energy Institute. This organisation, located in Chennai, has been successful in creating a large network of wind energy in the country. In some places in the country, wind energy is being farmed. The organisation is conducting in-depth research on wind energy while promoting and disseminating it scientifically. It will have a major impact on the energy potential of the country.

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Solid waste management in India: A Geographical Analysis

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Abstract:

These data confirm that hazardous solid waste, if not suitably managed, might cause adverse health effects on populations living near the sites where they are dumped or processed. The contamination of different environmental matrices, including food, water, soil and air, represents a health risk for these populations. Waste is part of the agenda of the European Environment and Health Process and included among the topics of the Sixth Ministerial Conference on Environment and Health. Disposal and management of hazardous waste are worldwide challenges. In this study, the sources and components of solid waste were identified; type and the quantity of solid waste disposed, methods of solid waste disposal and impact of improper waste management on health were highlighted. The result shows that excreta and other liquid and solid waste from households and the community, are a serious health hazard and lead to the spread of infectious diseases

Keywords: Hazardous Waste; Solid Waste; Industrial Waste; Inventorization

Introduction:

The term “hazardous” waste is variously applied in different countries, loosely defining non-household waste that includes hazardous chemicals. In our search literature, we included the terms “hazardous”, “toxic”, “industrial” waste, excluding the papers about municipal landfills, which have no records of hazardous materials, incinerators, e-waste and radioactive waste disposals. The present review does not consider occupational studies.

Waste, and in particular hazardous waste, is one of the priority areas for the Member States of the World Health Organization (WHO) Regional Office for Europe and was in the agenda of the Sixth Ministerial Conference on Environment and Health. Hazardous waste is a waste that either poses a threat to human life, health or the environment in sufficient quantities and concentrations when it is inappropriately stored, transported, treated or disposed off. The effect of hazardous waste depends on its size, composition, physical, chemical or biological characteristics. Hazardous Waste Impact on Human Health Inadequate storage, handling, processing, treatment and disposal of hazardous waste may affect human health and the environment by releasing contaminants into groundwater, soil, and atmosphere. The population may be adversely affected if toxic waste is absorbed through contaminated water supplies and polluted air and soil pollution can migrate or be transported through infiltration and may eventually enter the human food chain either directly or indirectly by agriculture.

Exposure to hazardous waste can cause a number of health issues, including: skin irritation, impairment and disease, breathing problems, cancer, hormonal disruption, disruption of the nervous system, liver damage, mental retardation, weight loss, etc., depending on the type of waste to which it is exposed. Lead: This affects the central nervous system of humans. It is a toxin caused by ingestion and is mildly annoying. Common air pollutant due to substandard fuel used in the automobile industry, which is now eliminated by the use of unleaded-petrol; and the atmosphere near to industrial facilities where steps are not taken. When exposed to heat or flame, it is flammable in the form of dust. Lead may cause irreversible behavioral changes in young children, babies, and pregnant women, neurological damage and other problems. Exposure at significant levels can cause mental retardation, coma, seizures, and death. Cadmium: Inhalation and other pathways are toxic to humans. It can be joined to the food chain by absorption, intraperitoneal, subcutaneous, intramuscular or intravenous pathways. Excess exposure can increase the risk of lung cancer. Chromium: It occurs in two ways, i.e. chromium trivalent and hexavalent. Hexavalent chromium at higher doses is the cause of digestive tract cancer, cutaneous and nasal mucosal ulcers, and dermatitis. It is a carcinogen. Arsenic contamination in water can also cause damage to the liver and nervous system, vascular diseases, and skin cancer. Mercury: White liquid mercury used in thermometers contains strong neurotoxin that can

trigger severely brain damage and moderate tremor in the fetus and emotional disturbance in adults.

Objectives of the study:

Present studies have some following objectives

1. To know the types of solid waste in the country
2. To trace the percentage of solid waste generation in the country.
3. To find out the role of municipal committee in waste management in the country

Source of data collection and Methodology:

Present study is based on the secondary sources of data which have been collected from different

sources such as municipal committee, research journals and different concern research related the work. After collection of information data are represent with effective diagrams and flow charts.

Type Of Solid Waste:

Depending on their source the solid waste may of different type such as

1. Residential waste
2. Industrial
3. Institutional
4. Construction and demolition
5. Municipal services

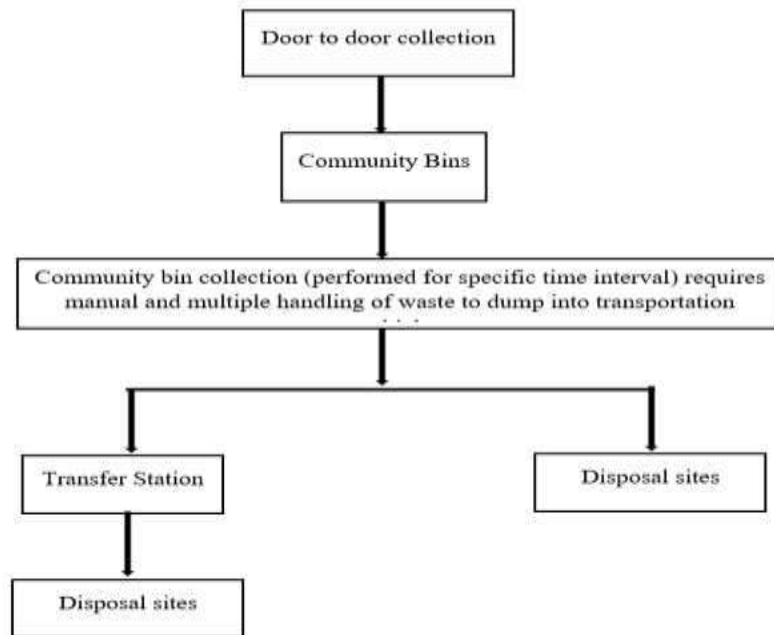


Figure 1:- Flow chart illustrating collection of solid waste

The practices related to urban solid waste management from the point of generation before final disposal can be divided into the six functional components.

1. Generation of waste
2. Storage of waste
3. Collection of waste
4. Transportation of waste
5. Process of segregation
6. Disposal of waste

Modern integrated waste disposal is thus the need for time, whereas sustainability needs to be incorporated into all materials, taking into account the material supply and demand. It's unavoidable that waste is tool now and it's the duty of people if people use it. As is obvious from past experience, if people really find the Planet as "our home" it is not convenient, but not difficult.

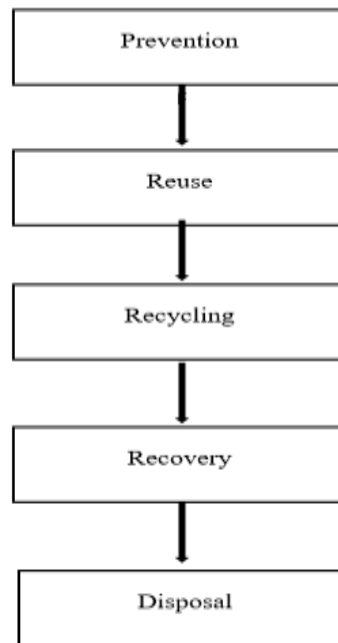


Figure 2:- Block Diagram illustrating solid waste management

The waste management hierarchy witnessed changes in the recent decade and currently recycling and recovery is focused more than the landfilling.

Sustainable use of Resources and management of solid waste is clearly depicted in Figure 2

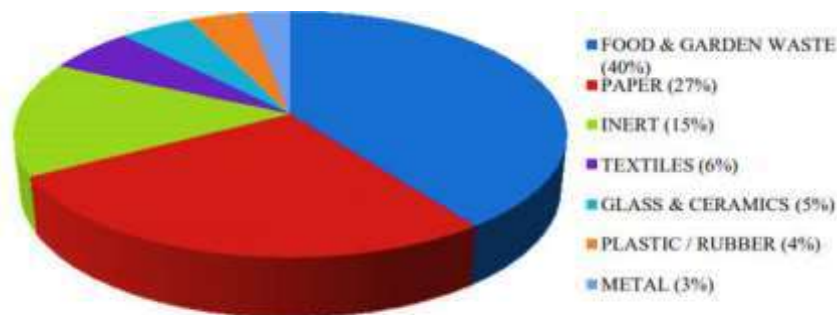


Figure 3:- Composition of Municipal solid waste in India

Both the figures mentioned above, i.e. Figure 3 and 4 depicts the composition of the municipal solid waste in India and typical Indian state(s) respectively.

Disposal of solid wastes:

- **Composting:** It is done by vermin composting of any type of biodegradable wastes such as hotel refuse, biodegradable portion from residence and commercial market, vegetable waste, leaf litter, etc. Size of each vermin composting rack is 6.21 m X 1.56 m X 0.62 m made up of steel. It requires two month.
- **Land Filling:-** Waste is stored on the top of the hill in almost bout five acres area. All inorganic material is used for the land filling and dumping. and potentially risky.

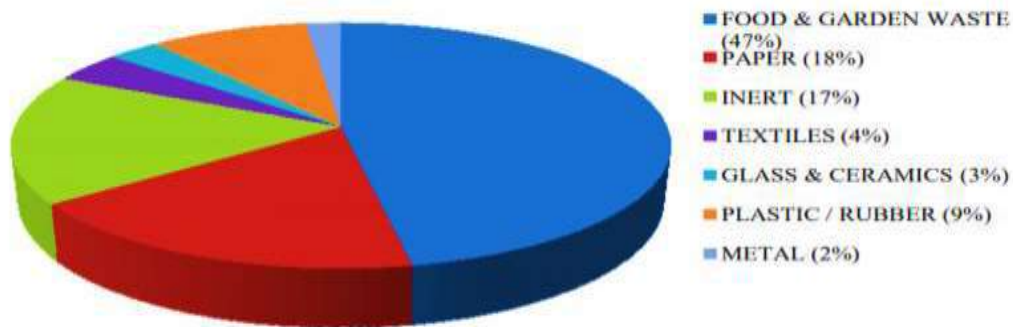


Figure 4:- Composition of Municipal solid waste in a typical Indian state

Suggestions:

- The statistics gathered indicate that the overall proportion of refuse induced by food and vegetable scraps, the percentage of the reuse caused by food and vegetable scraps, the second highest was paper and the third highest was inert material. There was a higher proportion of disposable carry bags, where glass, ceramics and metals were nearly equal to one another.
- Since there is a manual separation plate type of solid waste at the dumping site in villages, it is the most effective way to obtain the recovery and reuse of materials such as metal, plastic, glass and rubber etc. Framework should be based on rules on environmental protection (reduction, recycling, reuse, and recovery).
- Annual report of addition of the strategies for collection of solid waste shall have to be formulated.
- Provision of litter bins at public places shall be made and there will compulsory segregation at all the sources. Community knowledge, political commitment and civic participation are key to the effective application of the regulatory regulations and to an comprehensive approach to efficient disposal of solid urban waste.
- There should be sufficient health and safety provisions for workers at all stages of waste handling.
- As the dump site is several kilometers away and smaller trucks are used for solid waste transportation, it would be ideal to set up recycling plant and save on transportation expenses

Conclusion:

Despite the numerous emerging techniques that arise for solid waste management, landfilling is still the most prevalent approach in the northeastern area of Illinois. Creation and closure of landfills may present potential groundwater threat due to leachate intake, and air quality due to released gases. Although proper care and monitoring is sustained for a relatively long period of time (30 years), this may result in a danger to public health. Such administration, if inaccurate, is inefficient

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A Qualitative and Quantitative Analysis of Zooplanktons and Phytoplanktons in the Pedhi River, Amravati District

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Abstract:

The current study, conducted in Amravati's Pedhi River, District Amravati, aimed to investigate the qualitative and quantitative analysis of zooplankton and phytoplankton. The study spanned three months, from January to February and March of 2023. During the study, 12 zooplankton species and 10 phytoplankton species were identified. Among the zooplankton species, four belonged to protozoa, four to rotifers, and four to crustacea. As for phytoplankton, four species were classified under Bacillariophyceae, four under Chlorophyceae, and two under Myxophyceae. Monthly fluctuations in the abundance of zooplankton and phytoplankton were observed in the study. The highest counts for both zooplankton and phytoplankton were recorded in March, surpassing the counts observed in January and February.

Keywords: Analysis, Qualitative, Quantative, Pedhi, Amravati

Introduction:

Limnology is the specialized field that delves into the study of inland freshwater bodies, with a particular focus on lakes, ponds, and rivers. This comprehensive investigation encompasses the biological, physical, chemical, and hydrological aspects of these water bodies. Plankton, a vital component of aquatic ecosystems, comprises microscopic organisms suspended in water. This category includes small plants known as phytoplanktons, small animals referred to as zooplanktons and bacteria. Planktons are ubiquitous, occurring in both natural water bodies and artificial impoundments such as ponds, tanks, reservoirs, and irrigation channels.

Numerous researchers have undertaken qualitative and quantitative analyses of zooplankton in various regions of Maharashtra. Joshi P (2011) analyzed the zooplanktons of Pedhi River in Buldhana district. Tijare R V (2020) conducted both qualitative and quantitative studies of phytoplankton in the Wainganga River, Markandadeo, District Gadchiroli. Khune CJ et al. (2020) reported on the status of phytoplankton in relation to the physico-chemical characteristics of Siregaon Lake, District Gondia. Gharpure V and Bhatkulkar M (2015) conducted an analysis of zooplanktons, considering seasonal variations in the Vena River of District Nagpur. Khan Rafiullah M and Pathan T D (2016) studied the zooplankton diversity in Triveni Lake at Amravati District.

Kabra P D et al. (2016) focused on the quantitative analysis of zooplanktons in the freshwater ecosystem of Washim town, District Washim. Chavhan J et al. (2021) conducted both qualitative and quantitative studies of zooplankton and phytoplankton in the Rajura lake, District Amravati. The present study focuses on the qualitative and quantitative analysis of zooplankton and phytoplankton in the Pedhi River of Amravati, District Amravati

Material & Methods:

A study on the qualitative and quantitative analysis of zooplankton and phytoplankton was conducted at Pedhi River, located 13 km west of Amravati city in District Amravati, Maharashtra. The sampling took place over three months—January, February, and March. During the study, various biotic factors, including pH, temperature, free CO₂, dissolved oxygen, chlorides, total alkalinity, total hardness, etc., were recorded and analyzed. Water samples were collected three times a month in the morning using plankton nets with a specific mesh size made of blotting cloth. To process the water samples, Lugol's solution was added, and the samples were concentrated using the centrifugation method. The concentrated samples were then preserved in a 4% formalin solution. The isolation and transfer of plankton were carried out using micropipettes. To enhance visibility for analysis, the plankton material was washed two or three times in distilled water or saline solution.

Subsequently, staining was performed by adding a few drops of aqueous eosin stain (1gm eosin in 100ml of distilled water) for a duration of 10 minutes. After staining, the plankton material was washed twice with distilled water. The washed material was observed under a microscope at high magnification to facilitate the quantitative estimation of both zooplankton and phytoplankton.

Result & Discussion:

In the present study, monthly fluctuations and variations were observed in the numbers and species of zooplankton and phytoplankton in the water of Pedhi River. The abundance of these organisms was found to be influenced by the physio-chemical parameters of the water. The recorded temperature ranged from 23°C to 26°C, with the maximum temperature observed in March. The water pH was alkaline, ranging from 8.2 to 8.6. The levels of dissolved oxygen and free CO₂ varied from 6.1 to 6.3 mg/l and 19.3 to 19.8 mg/l, respectively. The water hardness ranged from 162 to 164 mg/l, indicating that Pedhi River water is hard (Table 1).

During the study, a total of 48 zooplankton and 43 phytoplankton species were recorded. Among zooplanktons, 12 species were identified, including 4 Protozoans, 4 Rotifers, and 4 Crustaceans. Rotifers were the most species-rich group, with 17 species, followed by Protozoa (16) and Crustacean (15) (Table 2). Khan Rafiullah M and Pathan T D (2016) reported a dominance of Rotifers among zooplankton in Triveni Lake, Amravati. In terms of phytoplankton, 10 species were recorded, with 4 belonging to Bacillariophyceae, 4 to Chlorophyceae, and 2 to

Myxophyceae. Chlorophyceae was the most species-rich group, with 18 species, followed by Bacillariophyceae (16) and Myxophyceae (9) (Table 3). Tijare R V (2020) reported the abundant presence of Chlorophyceae among phytoplankton in Wainganga River, Gadchiroli, and Khune CJ et al., (2020) recorded the abundance of Chlorophyceae among phytoplankton in Siregaon Lake, Gondia.

The study revealed that Chlorophyceae was the most species-rich group among phytoplanktons. Monthly fluctuations were observed, with the maximum number of zooplankton (17) and phytoplankton (16) recorded in March compared to January and February. In the month of March, the abundance and occurrence of zooplankton and phytoplankton were observed to be higher compared to January and February. This increase is attributed to a rise in temperature and the increased availability of light. The elevated temperature has stimulated the activity of organisms in the water. Moreover, in March, the phytoplankton, which serve as the food source for zooplanktons, were also found to be more abundant than in January and February. This heightened abundance of phytoplankton in March is attributed to the greater availability of food resources during this period.

Conclusion

In the present study, the most dominant community among zooplanktons was found to be the rotifers, while among phytoplankton, the Chlorophyceae group was identified as the richest. The abundance of both zooplanktons and phytoplankton in Pedhi River suggests that the lake is productive.

Table.1 Physiochemical analysis of Pedhi River, Amravati

Sr. No	Parameters	Values		
		January	February	March
1.	Dissolved oxygen (mg/l)	6.1	6.3	6.3
2.	Free carbon dioxide(mg/l)	19.8	19.5	19.3
3.	Chlorides (mg/l)	56.4	56.5	56.3
4.	Total alkalinity (mg/l)	143	145	147
5.	Sulphate (mg/l)	33	33	33
6.	Nitrate (mg/l)	0.492	0.487	0.471
7.	Phosphate (mg/l)	0.032	0.033	0.030
8.	Total Hardness (mg/l)	162	164	162
9.	Calcium Hardness (mg/l)	94	94	93
10.	Magnesium Hardness (mg/l)	12	12	12
11.	pH	8.2	8.4	8.6
12.	Temperature (°C)	23	24	26
13.	TDS Mg/L	214	215	217

Table. 2 Recorded Population of Zooplankton of Pedhi River, Amravati

Taxon	Number of species			Grand Total
	January	February	March	
Protozoa				

Vorticella	1	1	2	04
Euglena	1	1	2	04
Paramecium	2	1	1	04
Ceratium	1	2	1	04
Total	05	05	06	16
Crustaceans				
Cyclops	2	1	1	04
Nauplius	1	2	1	04
Daphnia	1	1	2	04
Moina	1	1	1	03
TOTal	05	05	05	15
Rotifers				
Brachionus	2	1	2	05
Asplanchna	1	2	1	04
Filinia	1	0	2	03
Keratella	2	2	1	05
Total	06	04	06	17
Grand Total	16	15	17	48

Table. 3 Recorded Population of Phytoplankton of Pedhi River, Amravati

Taxon	Number of species			Grand Total
	January	February	March	
Chlorophyceae				
Closterium	1	2	1	04
Denticula	2	1	1	04
Spirogyra	1	2	3	06
Chlorella	2	1	1	04
Total	06	06	06	18
Bacillariophyceae				
Asterionella	1	0	2	03
Synedra	1	1	2	04
Amphora	1	2	1	04
Navicula	2	1	2	05
Total	05	04	07	16
Myxophyceae				
Anabaena	2	1	2	05
Nostoc	1	2	1	04
Total	03	03	03	09
Grand Total	14	13	16	43

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Road Rain Water Harvesting New concept is Important to Environment: A Geographical Study

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Abstract:

A good road network is essential for rapid growth of the economy. Road should not be looked at in isolation but as a part of an integrated multi-model system of transport. Various construction programs for different classes of roads over the past two and a half decades have yielded a significant expansion in network size in India. Efforts are being made for a balanced development of road network (primary, secondary, and tertiary systems). Since 1914 in British Empire the first Cement concrete roads develop in Ceanai. After long years in India new vision for road development.

Objective:

1. Concrete Roads effect in natural Rainfall realizing the amount of water Percolate in soil.
2. How the remedies for natural rainfall percolate in soil.

Hypothesis:

Concrete Road, it is a Harmful think for Nature. Since 2014 Government Developed more

concrete road National level to Village level. So governments' aims move in this matter for Futcher.

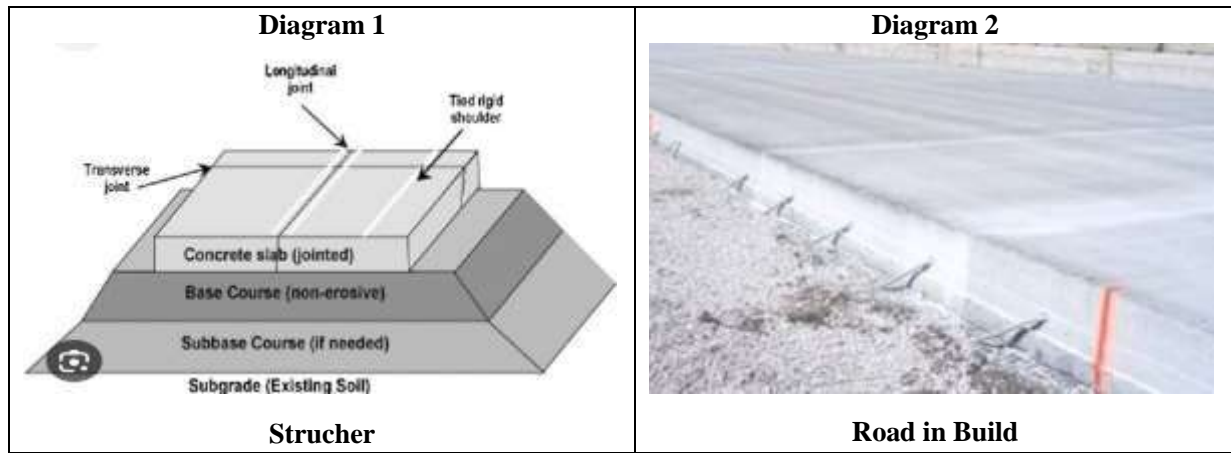
Contents Analysis:

In the Present research paper, the development of road in india as on 31.03.2017 was 58.98 lakh km. The break up Category wise is given below.

Category of Road	Lenth of Road(km)	% share of Total Roads
National Highways	1,14,158	1.94
State Highways	1,75,036	2.97
District Roads	5,86,181	9.94
Rural Roads	41,66,916	70.65
Urban Roads	5,26,483	8.93
Project Roads	3,28,897	5.58

India's road network of 58.98 lakhs kms is the second largest in the word after the united states of America which has a road network of 66.45 lakhs. In the earth 71% is covered by water. If we divided this base, 97.5% of water is fresh water, surface water is 2.5 and atmospheric water is 0.4. so the Natural Rain water storage and rainfall percolate in

soil is must for development. It is important to country to have proper planning while. Road rain water harvesting is a must for that, it is necessary to plan the foundation on the scale of sand stock. The previous estimate will come to mind.



In above diagram1,2,3,4 the structure in Indian road development, diagram 5 the percolate area in road rain water area is important to the road side. Thus area is depth in 6 feet after some minerals sand, coal, lime stone is use to level. Per 100 meter area is reserved to the road for percolate to water. It is a need for the ground water level. In that time the ground water level depth is below so the further plan is apply to the Concrete road development. I think ground water level growth is manage. Natural rainfall obstacle is very important needs for ground water level.

Conclusion:

It is a Natural Hazard Problems create in our Country after some years so government expose and apply to the planning for the road rainwater harvesting. It is a need for Futcher. In our House roof is no water damage in concrete slab, than imagine to Concrete road construction diagram no.1 is more strong to roof in our house. The rain water percolating is must to ground water level than the government and geographers needs to study to the concrete road development diagram no.5. It is useful to the nature, Environment and Society.

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Study on Biodiversity of Snakes in Pandharkawada Region Yavatmal District, Maharashtra.

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Abstract :-

The present paper provides the information about the biodiversity of Venomous, Semi-venomous & Non-venomous snakes species in Pandharkawada region of Yavatmal District, Maharashtra. Snakes belong to the reptiles class, and they can be found on every continent except Antarctica. There are over 3,000 known species of snakes, and they come in various shapes, sizes, colors, and behaviors. Snakes are extremely well- adapted to their habitats namely aquatic, fossorial, arboreal and other terrestrial forms observed in this region. Snakes are very important creatures in the nature because as predators they feed on many harmful bugs and insects those may cause damage to us. snakes play an important role in the natural environment & Ecological food chains in the ecosystem. A total number of 15 different species of snakes reported from Pandharkawada region of Yavatmal District, out of 15 species 04 species were venomous, 02 species were semi-venomous & 09 species were Non-venomous.

Keywords:- Snakes, Biodiversity, Venomous, Non-venomous, Elapidae, Viperidae, Colubridae, Pandharkawada, Maharashtra.

Introduction

Biodiversity includes the mixture of life in all levels of system, classified both by evolutionary and ecological standard. Every species has a specific role in the ecosystem. The enormous diversity of life on the earth has contributed to human need for many years. The diversity among all the species forms organization which supports the improvement of biodiversity. science has developed various techniques to categorize the variability on earth for many years which helps us to understand the association in the environment. The conservation of snake species is crucial for maintaining ecological balance and biodiversity. Unfortunately, many snake populations face threats such as habitat loss, climate change, illegal trade, and persecution due to misunderstandings about their role in ecosystems. Understanding and protecting the biodiversity of snakes is essential for maintaining healthy ecosystems and safeguarding the delicate balance of nature. Research in this area can shed light on the importance of snakes in our world and inform conservation efforts to preserve these remarkable creatures for future generations. The present study is important for the survival, awareness and conservation of snake from Pandharkawda region, Yavatmal District of Maharashtra.

Importance of snake:

Snakes play an integral role in maintaining balance in the ecosystem also play an important role in the natural environment and food webs. They are the essential part of complex food web help to maintain a population balance. They help to control prey species like rats to the natural level. They are the natural pest controllers. Snake venom is very important in synthesizing various drugs. Snakes serve critical role as predators, as preys, as ecosystem engineers, and provide economic and therapeutic benefits to humans. Venomous snakes are used for making anti venom which is used to save the life of a snake bite victim. Snakes are called a farmer's friend as they kill and feed on animals like rats, protecting the crops from being fed on and destroyed.

Material and Methods:

Study Area:

Pandharkawada is a city and a municipal council in Yavatmal district in the Indian state of Maharashtra. Pandharkawada is located on National Highway-7 (NH-7) on Nagpur- Hedrabad Section. Pandharkawada is a Tehsil place. It is 70 km away from district headquarters Yavatmal and 150 km away from orange city Nagpur. Tipeswar wildlife sanctuary and Saikheda dam are situated in Pandharkawada Tehsil.

Methodology:

The study aimed to examine biodiversity of snakes species in various habitats in Pandharkawada region of Yavatmal district, Maharashtra. The data was collected from snake friends volunteers reports from forest offices and locals people when snakes were observed in their houses or in around their areas. It is found that snakes were seen mostly during day time and rarely at night time. The photographs were captured at their natural habitat then they were released. If any injured snake species collected then it was treated with veterinary Doctors and released in forest after some time. Snakes were found at residential areas, forests,

agricultural field and even at road side. It is found that most of species were killed due to human activities, road accidents and encounter during tracking.

Results and Discussion:

This study highlights the diversity of snakes in the Pandharkawda region of Yavatmal district Maharashtra state. During this study A total 15 species were recorded from different areas of Pandharkawda. among these 15 species of snake 04 species were found to be venomous, 02 species were found to be Semi-venomous and 09 species were found to be Non-venomous (Figure 1).

List of Venomous, Semi-Venomous and Non-Venomous Snakes Species observed in Pandharkawda region of Yavatmal District, Maharashtra.

Venomous snakes				
Sr. No	Common Name	Vernacular Name	Family	Scientific Name
1	Spectacled Cobra	Naag	Elapidae	Naja naja
2	Indian common Krait	Manyar	Elapidae	Bungarus caeruleus
3	Russell's viper	Ghonus/Parad	Viperidae	Daboia russelii
4	Saw scaled viper	Furse	Viperidae	Echis carinatus
Semi-venomous snakes				
5	Common vine snakes	Harantol	Colubridae	Ahaetulla nasuta
6	Common cat snakes	Manjrya	Colubridae	Boiga trigonata
Non-venomous snakes				
7	Banded Racer	Dhul nagin	Colubridae	Argyrogena fasciolata
8	Indian wolf snake	Kavdya	Colubridae	Lycodon aulicus
9	Indian rock python	Ajgar	Pythonidae	Python molurus molurus
10	Trinklet snake	Taskar	Colubridae	Coelognathus helena helena
11	Indian Rat snake	Dhaman	Colubridae	Ptyas mucosa
12	Red sand Boa	Mandool	Boidae	Eryx johnii
13	Buff striped keel back	Naneti	Colubridae	Amphiesma stolatum
14	Greenkeel back	Gawatya	Colubridae	Macropisthodon plumbicolor
15	Egg eater snake	Andi khau saap	Colubridae	Elachistodon westermanni



1. Spectacled Cobra (Naja naja)



2. Indian common Krait (Bungarus caeruleus)



3. Russell's viper (*Daboia russelii*)



4. Saw scaled viper (*Echis carinatus*)



5. Common vine snakes (*Ahaetulla nasuta*)



6. Common cat snakes (*Boiga trigonata*)



7. Banded Racer (*Argyrogena fasciolata*)



8. Indian wolf snake (*Lycodon aulicus*)



9. Indian rock python (*Python molurus molurus*)



10. Trinklet snake (*Coelognathus helena helena*)



11. Indian Rat snake (*Ptyas mucosa*)



12. Red sand Boa (*Eryx johnii*)



13. Buff striped keel back (*Amphiesma stolatum*)



14. Greenkeel back (*Macropisthodon plumbicolor*)



15. Egg eater snake (*Elachistodon westermanni*)

Conclusion

It is concluded that in all 15 species of Snakes were recorded which include 04 species were found to be Venomous, 02 species were found to be Semi-venomous and 09 species were found to be Non-venomous in Pandharkawda region. Most of the snakes were reported from the residential area and farmers field. lack of knowledge, fear of bite, misunderstanding & careless behaviour were the main reasons behind the snake killing. The present work thus provides the useful information regarding the Identification, conservation and the awareness about the snakes found in the Pandharkawda region of yavatmal district of Maharashtra. And the study can also be useful for providing proper Guidance to people so that we can reduce snake killings. We can remove misconceptions about snakes. We can also make aware them about snake bite preventions and remedies.

Acknowledgments

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the study area & also thanks to all snake friends to assist in rescue of the snakes.

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Biodiversity Crisis: Vulture Extinction and Precautions for Sustainability

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Abstract:

This research explores the connected history of the vulture extinction in India in the late 1990s, focusing on the significant effects on ecosystems and human health. Vultures, once common, were essential in ensuring that dead animals were disposed of quickly to stop the spread of illness. But for these magnificent hunters, the introduction of diclofenac first thought to be a safe drug frequently used in animal therapy—came to be a silent death sentence. The vultures' diet of animals treated with diclofenac had terrible consequences, causing their numbers to decrease by an astounding 90%. The rapid replacement of vultures by rats, dogs, and other insects unable to properly handle bodies has severe ecological consequences. This disturbance knocked off the delicate equilibrium, making it easier for infections to spread and for water sources to become contaminated. As diclofenac use increased, a worrying trend was observed: areas with high diclofenac usage had a spike in vulture mortality, which was then followed by an increase in the incidence of human deaths. This article highlights concerns about the unanticipated effects on animal and human populations in addition to highlighting the complex ecological system disrupted by the vulture population fall. Understanding this complex relationship is essential to creating long-term, sustainable conservation plans and maintaining the delicate equilibrium between ecosystems and species.

Keywords: Diclofenac, Ecosystem, Vultures

Introduction:

A tragic story was being told across India's various landscapes: vulture numbers had been significantly declining. These once-common birds, valued for their ability to maintain the cleanliness of the environment, are at risk of going extinct. This overview explores the reasons for this, highlighting the effects of harmful medications used in veterinary services, particularly diclofenac. We will discuss the diclofenac restriction in India and why the vultures did not experience the anticipated relief. We'll also examine Nepal, where initiatives have resulted in improvements.

The Importance of Vultures in India: As hunters, vultures are important to India's ecology and provide significant social advantages. Their effective disposal of animal carcasses contributes to the preservation of environmental cleanliness and prevents the transmission of diseases. Vultures have traditionally helped dispose of millions of cow corpses in India, improving the country's environmental quality and lowering the health concerns connected with animal decay. Significant social, economic, and environmental consequences from the vulture population fall, emphasizing the

vultures' critical role in preserving the natural environment and human health in India. The Decline of Vulture Populations in India: Historically, vulture populations were abundant throughout India, acting as vital hunters and playing a crucial ecological function. They were clearly abundant, and widely distributed across the nation. The large vulture populations demonstrated not just their numerical strength but also their vital function in effectively disposing of dead animals and maintaining hygienic conditions in the environment. The four most affected species were the red-headed vulture, the three Gyps vulture species, and the sudden and serious fall of vulture populations in India. In just fifteen years, the Long-billed vulture was predicted to drop by 96.8%, and the White-rumped vulture by 99.9%. Diclofenac, a non-steroidal anti-inflammatory medication (NSAID) used in animal medicine to treat animals but harmful to vultures, was the main factor contributing to this reduction (Saving India's Vultures from Extinction: Policy Statement). Significant ecological, cultural, and economical consequences have resulted from the reduction in vulture populations. These include the need to find alternative methods for disposing of

dead cow bodies and a rise in the number of wild dogs, which increases the danger of rabies and dog attacks (Markandya et.al. 2008). The IUCN **Cause of Decline Veterinary Drug and other Threats:**

The primary cause of the declining vulture populations in India is the veterinary use of diclofenac, a non-steroidal anti-inflammatory medicine (NSAID) that was first used for cattle.

presently classifies the vultures in India as "Critically Endangered," indicating the serious risk of extinction these species face worldwide. Unfortunately, this seemingly innocuous remedy proved toxic to vultures, precipitating a substantial decline in their numbers. Although the ban on the use of diclofenac in veterinary care was a significant step forward and provided some relief for

Vulture species	Global threat status ¹	Est. population in India / global
Oriental white-backed (aka white-rumped) vulture (<i>Gyps bengalensis</i>)	Critically Endangered	6,000/ 8,600
Long-billed (aka Indian) vulture (<i>Gyps indicus</i>)		30,000/ 30,500
Slender-billed vulture (<i>Gyps tenuirostris</i>)		1,200/ 1,800
Red-headed Vulture (aka king vulture) (<i>Sarcogyps calvus</i>)		no India estimate/ 2500-10,000
Egyptian Vulture (<i>Neophron percnopterus</i>)	Endangered	no India estimate/ 50,000
Himalayan Griffon (<i>Gyps himalayensis</i>)	Near-threatened	no India estimate/ 300,000
Cinereous Vulture (<i>Aegypius monachus</i>)		no India estimate/ 15,600-21,000
Bearded Vulture (aka Lammergeier) (<i>Gypaetus barbatus</i>)		no India estimate/ 1,300-6,700
Eurasian Griffon (<i>Gyps fulvus</i>)	Least Concern	no India estimate/ >500,000

Gyps vultures. In addition to the threat posed by pharmaceuticals, vultures in India face other risks.

Fig. 1. Population estimation (Saving India's Vultures from Extinction: Policy Statement)

The numerous difficulties that vultures encounter is highlighted by their unintentional deaths from poison baits, crashes, and electrocutions by electrical equipment. Poison baits, which are usually used to kill wild dogs and other animals that kill animals, also accidentally kill vultures and other scavengers. The increase in these poisoning cases has probably been caused by the increase in wild dog populations, which has been made worse by the scarcity of food that vultures had been eating. Another major threat is the vast electrical infrastructure, which includes power lines, wind turbines, and pylons. Because electricity facilities provide a risk of electrocution and collision. The vulture populations in India are under constant threat, thus it is critical to handle these complex issues totally to ensure their continued survival. These magnificent birds develop a challenging territory. To support a comprehensive approach to conservation, efforts should not only be directed towards pharmaceutical laws but also towards reducing accidental hazards produced by human activity.

Alternative Veterinary Drugs for Vultures:

Efforts have been undertaken to encourage the use of alternative veterinary medications that are not harmful to vultures in response to the restriction on veterinary diclofenac and the need for safe alternatives. Meloxicam is one such substitute; it has been demonstrated to be safe for vultures and has gained popularity as a safe substitute for treating cattle diseases. Furthermore, tolfenamic acid is presently being tested, and initial results suggest that it might provide a safe substitute, but further verification is required. To reduce the hazards that toxic NSAIDs lead to vulture populations, it is crucial to make sure that these safe alternatives are extensively embraced and promoted through education and awareness campaigns. Moreover, a critical first step towards establishing an environment free of toxic NSAIDs in carcasses—which is the current priority for vulture conservation efforts—is the establishment of vulture safe zones (VSZs) based on established criteria, where the amount of toxic NSAIDs is low enough over a large area not to threaten the local vulture population. By

creating vulture-safe zones and promoting the use of

safe veterinary treatments.

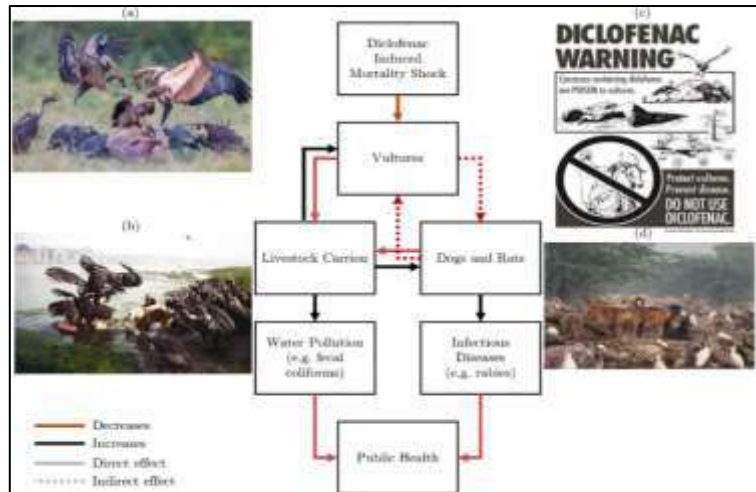


Fig. 2. Diagrammatic representation of relationship between environmental quality and ecosystem interactions

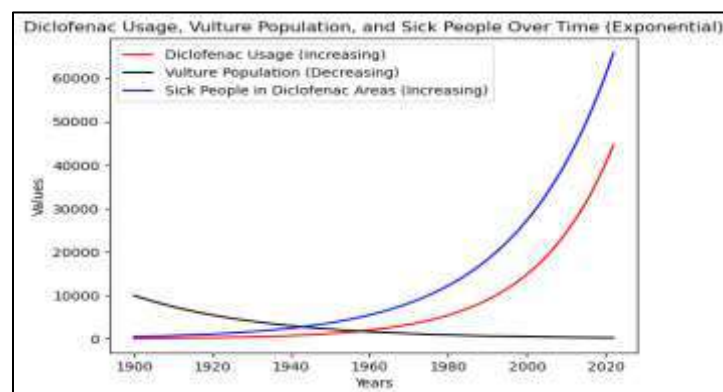
Diagrammatic Representation of Relationship between Environmental Quality and Ecosystem Interactions & Analysis:

Above figure 2 emphasizes the complex interactions between different aspects by providing a visual depiction of the interrelated parts of the coupled natural-human system. The essential elements depicted consist of: A diagram highlights the complex interactions among vultures, wild dogs, rats, and cattle death in an ecosystem, highlighting the effects of wildlife hunters on public health and environmental quality. Solid lines show direct impacts, dotted lines indicate indirect effects, and red and black lines indicate reducing and growing effects, respectively, in the visual depiction. The illustration depicts vulture groupings feasting on carrion and alerting farmers to the dangers of using diclofenac, underscoring the importance of human action in conservation efforts. (Source: Sagar Giri,

Tom Stoddart, The Peregrine Fund, and Anoop Kumar).

Figure 3 represents with each line following an exponential trend, the graph shows how the number of sick individuals in diclofenac areas, the vulture population, and the utilization of the medication varies over time. The graph shows that vulture populations declined noticeably and dramatically at the same time as diclofenac was first used in the 1900s. The number of sick human beings increased in parallel with the decline in vulture populations. Because dogs and other wild animals take the role of vultures, but they are unable to properly clean corpses like vultures can. Therefore, the disease has begun to spread from those unfinished corpses. Python computer programming language is used to construct the graphical depiction for the discussion as shown in following Figure 3.

Fig. 3. Graph of diclofenac usage, vulture population and sick people in diclofenac areas (Graph drawn with python)



Conclusions:

This paper concludes by highlighting the significant effects of vulture extinction on ecosystems and human health, and by describing the complex history of the vultures' fall in late 1990s in India as a result of the introduction of diclofenac. Diclofenac, which was once thought to be safe for use in veterinary medicine, caused a sharp 90% drop in vulture numbers, disrupting hunter functions and causing ecological imbalances. Unexpected effects included a rise in the number of dogs and rats, which contributed to the disease's spread. Diclofenac use on the rise contributed to increased vulture mortality, which in turn affected human health. The study highlights the complex ecological network that is being affected by the decline in vulture populations, highlighting the necessity of comprehensive conservation efforts. It emphasizes how important vultures are to preserving the sustainability of the ecosystem and how their loss hurts the environment and the economy. Diclofenac is still available and continues to be a hazard. The impact of dangerous NSAIDs is to be lessened by the establishment of vulture-safe zones and the promotion of alternative veterinary drugs.

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Geographical Review of Irrigation in Osmanabad District

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Abstract:

Water is vital for plant growth. No plants or crops can exist unless they have access to water in some form. It is therefore crucial to supply crops and plants with water regularly and according to their needs. Irrigation is therefore an irregular and correct supply of water to plants. In 2021, the district had 948,807 hectares of total crop area a total irrigated area was 120,283 hectares surface irrigation was 114,547 hectares and groundwater irrigation was 5,736 ha. Proper utilization of available agriculture resources is essential for balanced economic growth, especially in a district like Osmanabad which is economically and industrially backward. It has an agro-economy that is far behind and a considerable migration of people searching for work. The main objective of this paper is to review the growth of irrigation in the Osmanabad district.

Keywords: Irrigation, surface irrigation, groundwater irrigation, Agriculture.

Introduction:

Irrigation means watering the land to prepare it for agricultural purposes. Irrigation system is the provision of water using artificial canals and canals to the growing crops and plants in the field. Water is vital for plant growth. No plants or crops can exist unless they have access to water in some form. It is therefore crucial to supply crops and plants with water regularly and according to their needs. Irrigation is therefore this intermittent and correct supply of water to plants. Water for this irrigation comes from various sources such as surface water sources large irrigation projects, medium irrigation projects, minor irrigation projects, ponds, rivers, k.t. dams, reservoirs underground water sources dug wells and tube wells, etc.

Objective: To review the growth of irrigation in the Osmanabad district

Database and Methodology:

The present study depends on the secondary data. Collected through census handbook of Osmanabad District, District Statistical Department, Water Resources Department of Osmanabad district, District booklet Showing the Progress and current status of all irrigation schemes of Osmanabad district and socio-economic abstract of Osmanabad District. The collected data are analyzed by statistical and cartographic techniques. The actual growth rate of the specific decade is found by

distributing the difference between the Irrigation Sources of Three decades.

Study Area:

Osmanabad is one of the 8 districts of the Marathwada region. The district lies between 17° 35' N to 18° 40' North Latitude and 75° 16' E to 76° 40' East longitude situated in the Balaghat plateau region. It has a total geographical area of 7512.4 sq. Km. The district of Osmanabad has the following sub-divisions Osmanabad, Tuljapur, Omerga, Paranda, Kalamb, Boom, Lohara, and Washi. It is bounded by Sholapur District to the South-west, Ahemadnagar to the North West, Beed to the North, Latur to the East and North -East, Bidar & Gulbarga district of Karnataka state to the South. The rainfall in the district is 71.2cm which is negligible so the district is drought drought-prone area, Osmanabad is still not developed enough to change agricultural backwardness. Many schemes and programs from central and state governments are implemented in the district for the development of agriculture under these schemes many medium irrigation projects are constructed in the district. The main purpose of my investigation is to highlight the positive impact of water sources on agriculture and socio-economical change in the district.

Irrigation:

Irrigation is defined as the artificial application of water to soil, to supply water essential to plant growth. It is a means by which water is

conveyed to arid areas from rivers, reservoirs, or wells to increase the fertility of the land. Scientific irrigation involves knowledge of the available water supply, its conservation, and application to the land, the characteristics and needs of the different types of soil, and the requirements of various crops to be produced. It is the science of harnessing the source

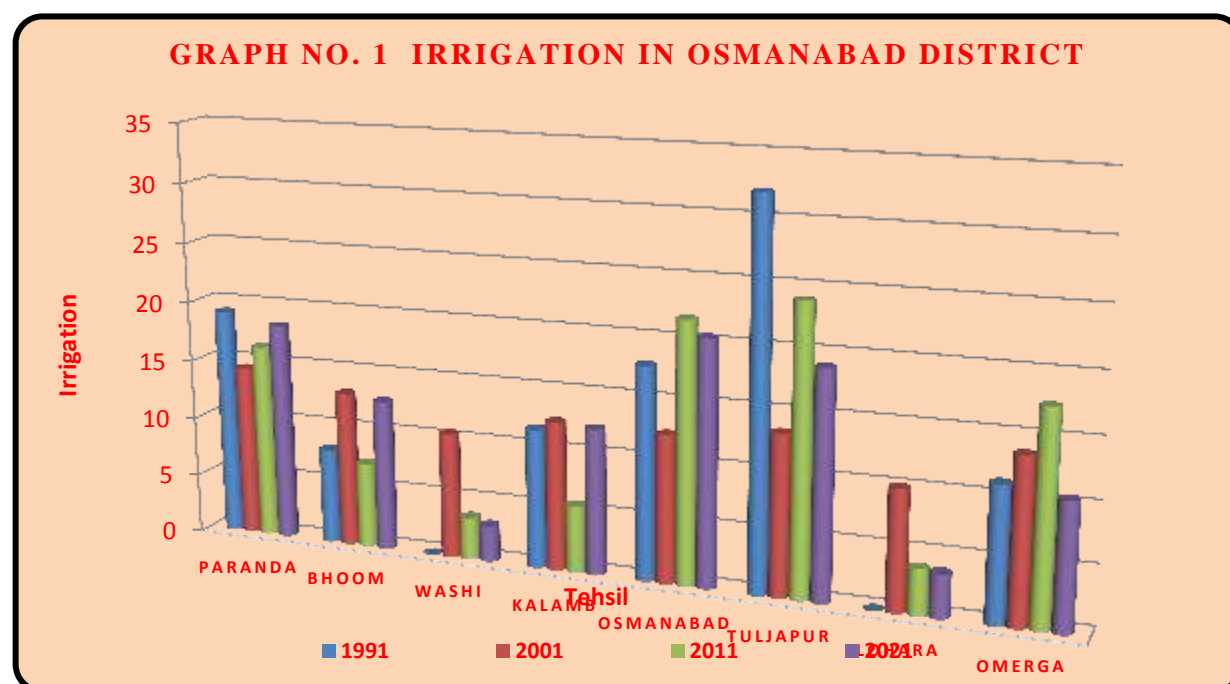
of water and distributing the same for agriculture. In dry regions, water is one of the greatest challenging current and future natural resources issues for sustainable agriculture and a strong economy, water is the key to success. The water for this irrigation comes from various sources such as surface or underground is called total irrigation.

Table No. 1 Total Irrigation in Osmanabad District

Sr. No	Tehsil	1991		2001		2011		2021		Changes	
		Hectares	%	Hectares	%	Hectares	%	Hectares	%	Hectares	%
1	Paranda	18942	19.14	15957	14.40	20219	16.36	22037	18.32	3095	16.34
2	Bhoom	7947	8.03	14465	13.05	8862	7.18	15260	12.69	7313	92.02
3	Washi	00	0.00	11647	10.51	4433	3.59	3701	3.08	-7946	68.22
4	Kalamb	11591	11.71	13813	12.46	6960	5.64	14724	12.24	3133	-27.03
5	Osmanabad	17652	17.83	13705	12.37	26888	21.79	24615	20.46	6963	39.45
6	Tuljapur	31685	32.01	14916	13.46	29633	24.02	22788	18.95	-8897	-28.08
7	Lohara	00	0.00	11158	10.07	4762	3.86	4429	3.68	-6729	-60.31
8	Omerga	11171	11.29	15172	13.69	21651	17.55	12729	10.58	1558	13.95
	District	98988	100	110833	100	123368	100	120283	100	21295	21.51

Source: 1. Socio-Economic Review and District Statistical Abstract. Osmanabad District. 1991,2001,2011,2021.

2. District booklet showing the progress and current status of all irrigation schemes of Osmanabad district 1991,2001,2011,2021.



Total Irrigation in the year 1991, as indicated in the (table-1) Total Irrigation in the district was recorded at 98988 (100%) hectares, and the highest Total Irrigation was recorded at 31685

(32.01%) in Tuljapur tehsil and the lowest Total Irrigation was recorded at 7947 (8.03%) in the Bhoom tehsil. In the year 2001, Total Irrigation in the district was recorded at 110833 (100%) hectares,

and highest Total Irrigation was recorded at 15957 (14.40%) in Paranda tehsil and the lowest Total Irrigation was recorded at 11158 (10.07%) in Lohara tehsil. According to 2011, Total Irrigation in the district was recorded at 123368 (100%) hectares, and highest Total Irrigation was recorded at 29633 (24.02%) in the Tuljapur tehsil and the lowest Total Irrigation was recorded at 4433 (3.59%) in the Washi tehsil. In the year 2021, Total Irrigation in the district was recorded at 120283 (100%) hectares, and highest Total Irrigation was recorded at 24615 (20.46%) in the Osmanabad tehsil, and the lowest Total Irrigation was recorded at 3701 (3.08%) in the Washi tehsil. In the district from 1991 to 2021 irrigation area increased by 21295 (21.51%) hectares and the highest irrigation area increased by 7313 (92.02%) hectares in the Bhoom tehsil and the irrigation area decreased by 6729 (60.31%) hectares in the Lohara tehsil.

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Comparative Study of Women Health in Rural and Urban Areas of India

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Abstract:

In India, women's health has gotten virtually little attention. The health of rural women is slipping behind due to illiteracy and a lack of knowledge about contemporary medicine. In addition, it has been shown that pregnant women have weakened immune systems and decreased stamina. The absence of proper medical services, family poverty, and hunger all contribute to the poor health of rural women. Additionally, traditional medical practices and folk medicine are used by rural women. Living in an urban area lowers the rate of pregnancy and increases the frequency of miscarriages. Women's illiteracy, poverty, and gender discrimination were cited as the three main issues. Urban women report higher rates of sexually transmitted diseases than do rural women. Certain forms of cancer are becoming more common among women in urban areas as a result of increased use of drugs, alcohol, and tobacco. The main cause of women's health issues, particularly in rural regions, is a lack of knowledge and awareness about health issue. This paper discusses about rural and urban women's health problems.

Keywords: women's health, Women illiteracy, poverty, gender discrimination, medical services.

Introduction:

The wide area of women's health encompasses disorders like diabetes and heart disease that may impact women differently from males as well as conditions that are exclusive to women, such as menstruation and pregnancy. An essential component of NICHD's objective is to comprehend and enhance women's health. Research sponsored and directed by the institute focuses on a variety of issues particular to women and girls. These include reproductive health issues like birth control, gynaecological health issues like menstruation, pregnancy and associated subjects like prenatal care, and other disorders like Turner syndrome. Disorders that influence fertility include Primary Ovarian Insufficiency.

We are unable to address every illness and activity related to women's health on this page since it is so broad. Rather, we provide details about a few of the women's health subjects covered by the NICHD's research programme. Resources for individuals, families, healthcare professionals, and researchers are included for each health concern. If you want more specific information, you might wish to go at those websites.

Explore any of the aforementioned health areas to gain further knowledge about the institute's research endeavours concerning women's health. There are several distinct ways in which the health of women and men is different. Women's health is an example of population health, which is described as "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity" by the World Health Organisation.[1] Many groups urge for a larger definition referring to women's general health, better defined as "The health of women." Women's reproductive health is often considered as a standalone concept. These disparities are even worse in underdeveloped nations when women face additional disadvantages and whose health encompasses both risks and experiences.

Although women and men encounter the major causes of death—heart disease, cancer, and lung disease—at equal rates, women's experiences are distinct. As the primary cause of cancer-related mortality among women, lung cancer has surpassed all other cancer subtypes. It is followed by colorectal, ovarian, uterine, cervical, and breast cancers. Although smoking is the primary cause of lung cancer, women who do not smoke have a three

times higher chance of acquiring the disease than males who do not smoke. Despite this, cervical cancer continues to be one of the most common cancers in developing countries and is linked to the human papilloma virus (HPV), a sexually transmitted infection. Breast cancer, on the other hand, is still the most common cancer in women in developed countries and is one of the major chronic diseases affecting women. The HPV vaccination and screening combined hold the key to preventing and treating many illnesses. Osteoporosis, anaemia, depression, dementia, and cardiovascular disease are other significant health concerns for women.

Definitions and Scope:

Women's experiences with health and illness are different from men's because of their own biological, social, and behavioural characteristics. Biological variations show distinct risks for the emergence of illness and range from phenotypic to cellular biology. "A state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity" is how the World Health Organization (WHO) defines health. One example of population health, or the health of a particular, defined population, is the condition of women.

One person compared women's health to "a patchwork quilt with gaps". It has been suggested that "The Health of Women" be used instead of "Women's Health" in order to encompass a broader understanding of women's health that takes into account all aspects of women's health, even though many issues surrounding women's health are related to their reproductive health, such as birth control, menopause, genital and breast health, and maternal and child health. According to the WHO, one of the main obstacles to guaranteeing that all women have access to high-quality healthcare is the overemphasis placed on reproductive health. Osteoporosis and cardiovascular disease are two conditions that affect both men and women, however they present differently in women. Women's health concerns also include medical circumstances when they deal with difficulties unrelated to their biology, such as socioeconomic status and unequal access to healthcare for women based on their gender. Because women are disadvantaged by pervasive inequality worldwide, women's health is especially important.

Women's Health in India:

India is among the few nations in the world where the life expectancy of men and women at birth is almost equal. The absence of the traditional female advantage in life expectancy in India raises the possibility that women's health issues are systemic. Indian women die at significant

rates, especially when they are young and trying to conceive.

Indian women's position in society is inextricably related to their health. Studies on women's status have revealed that Indian women's contributions to families are frequently disregarded and instead seen as financial liabilities. Given that boys are expected to take care of their parents as they age, there is a significant desire for sons in India. This desire for sons combined with the high expense of dowries for females might lead to the abuse of daughters. Indian women also have low rates of formal labour force involvement and education.

Objectives:

1. To study the difference between rural and urban women health status.
2. To analysis the problems of Indian women health.

Methodology:

This study methodology is descriptive in the women's health of rural and urban in India. The information data is used in this study has been collected from various sources different websites and published research papers.

Rural Women's Health:

The National Rural Health Association (NRHA), a nonprofit with 22,000 members, is the main force behind better health care for rural America. The member-driven Rural Health Congress and Board of Trustees review and establish formal organisation policy.

The NRHA policy paper that was created and accepted in November 2005 has been updated with this one. This policy document includes specific NRHA policy views and provides an update on women's health, including how current laws and broader societal developments impact it.

Urban Health:

More than half of the world's population already resides in cities, and over the next three decades, growth in lower-income and lower-middle-income nations is predicted to pick up speed. Urbanization needs to be carefully controlled to make sure that city spaces are prepared to support the health of their increasing populations and that of future residents in order for it to be inclusive, safe, and sustainable.

Access to health treatments for the populace is severely hampered by the country's densely concentrated population and logistical issues. Additionally, this state of affairs has made it extremely difficult to conduct viral tests and get accurate data about the health crisis's effects on the nation. A further effect of the rise in cases and the breakdown of health systems has been the disregard

for other medical requirements unrelated to COVID-19.

People who live in informal settlements, particularly women and children who do not have access to health care, have been disproportionately affected by this issue. To ensure that the populace receives care and essential services in this situation, the work of non-governmental groups and civil society is crucial.

We would want to discuss a project in this context that is being carried out by the Mumbai-based NGO Shena, which aims to address issues pertaining to women's and children's health in informal settlements. In order to lessen maternal and newborn mortality and sickness, child malnutrition, and gender-based violence, SHENA especially offers help in four areas: maternity care and services, child nutrition, violence against women and children, and adolescent health.

Replicability-wise, the agency has educated over 6000 public health workers to date, executed over 20 such projects in Mumbai, and successfully forged partnerships with both public and private institutions to maximise effect.

Mental Health:

Depression affects women twice as often as it does men. According to a recent nationwide research, 2.7% of women reported having serious psychological discomfort and 14% reported having depression. Higher risk factors for women include age, education level, single status, unemployment, and poor income; rural women may be more susceptible. According to one study conducted at a community health centre in the rural South, 44.3% of the female patients experienced serious depressive disorder. These results are comparable to research conducted in a rural community health centre in Central Virginia, where it was discovered that 41% of female customers had depression, as opposed to the average 13–20 percent prevalence rates in metropolitan areas. Suicide rates are also higher in non-metropolitan areas; a recent study estimated that suicide rates among rural residents are “37% higher than the rate among suburban residents.”

In non-metropolitan locations, suicide rates are also higher. According to a recent study, rural inhabitants' suicide rates are “37% higher than the rate among suburban residents.”

Rural populations are considerably less likely to obtain mental health care, which contributes to these inequities. Many obstacles prevent people from seeking and receiving mental health care, such as the expense of care, stigma associated with mental illness, lack of knowledge about mental illness, lack of belief that treatment is required, lack of time, and confusion about where to

get resources. Due to the lack of anonymity in rural areas, the time and distance to services, and the higher rates of poverty and uninsurance among rural inhabitants compared to their urban counterparts, some of these hurdles are especially severe in rural and frontier communities.

Certain features of living in a rural area may shield women's mental health. According to one research, women who work on farms perform better than average on tests of their mental health. Furthermore, compared to non-rural areas, people in the Midwest may exhibit lower symptoms of depression.

Types of Women's Health Issues:

Women must exercise greater caution and awareness of the concerns related to their health. Let's examine some of the major health issues that women nowadays confront.

Female Cancer:

According to studies, cancer can take two different forms. These include breast cancer and cervical cancer, which together account for about a million female deaths annually, particularly in developing nations where women's health care is in appalling condition and early detection and awareness are few. If both malignancies are found in their early stages, they may be stopped or treated.

Breast cancer can result from a variety of circumstances. It may be caused by genetics, obesity, radiation, drugs, irregular menstruation, or breast biopsies.

Depression in Women:

Women are more likely than males to experience depression and other psychiatric problems, according to several studies. Around 12 million women experience depression annually, nearly twice as many as men do. This information comes from a recent poll. Women commit suicide at a far higher rate than males do due to stress and sadness.

The hormonal changes that occur in women during and after pregnancy, particularly during menopause, can be utilised to identify the forms of sadness that these women experience. Additional causes include prescription medicines, heart conditions, divorce, other deadly illnesses, drug and other substance addiction, work-related stress, and many more.

Sexually Transmitted Diseases:

Sexually transmitted illnesses, or STDs, also disproportionately impact women and men in the same way as many other diseases. There are many different STDs, some of which have the potential to be lethal. For women, the most frequent and lethal STD is HIV+/AIDS. Gonorrhoea, chlamydia, syphilis, trichomoniasis, and herpes are among the other STDs and illnesses. While the signs and

treatments for each of these illnesses vary greatly, they may all be stopped or treated if caught early.

If a woman in excellent health is productive, then society benefits from it. It is crucial to give them access to quality healthcare and education in order to stop needless, unhealthy, and deadly deaths.

Heart Disease:

Heart disease accounts for one out of every four fatalities among women in the US. Despite the public's perception that heart disease mostly affects men, about equally as many women as men are affected by it. However, just 54% of women are aware that the leading health concern to their gender is heart disease. In the US, 49% of consumers smoke, have high blood pressure, or have high cholesterol—conditions that increase the risk of heart disease.

Pregnancy Issues:

An expectant mother's and her unborn child's health may be jeopardised by pre-existing illnesses that exacerbate. If left untreated throughout pregnancy, depression, diabetes, and asthma can have negative effects on both the mother and the unborn child.

Anaemia (low red blood cell count) in a healthy woman can occur during pregnancy, and sadness can also be brought on. If a reproductive cell implants outside the uterus, continued gestation becomes impossible, which is another issue. Fortunately, obstetricians are qualified to diagnose, manage, and treat both common and uncommon health problems that arise throughout pregnancy.

Suggestions:

1. A good policy climate, well-targeted resources, and a strong and ongoing government commitment are necessary for improving women's health.
2. The government must to take proactive measures to enhance the quality and quantity of current rural health care services by expanding the number of rural health centres and hiring enough medical personnel to ensure that the populace has access to appropriate medical treatment.
3. Redesigning the health care system is necessary. A panchayat, or group of them, should assume complete authority over primary health facilities and sub-centers.
4. Since the environment plays a significant role in determining the health of rural women, emphasis should be placed on improving environmental sanitation, including the provision of clean drinking water and adequate drainage and sewage services.
5. Redesigning the health care system is necessary. A panchayat, or group of them, should assume

complete authority over primary health facilities and sub-centers.

6. Since the environment plays a significant role in determining the health condition of rural women, emphasis should be placed on improving environmental cleanliness in the study region, as well as providing safe drinking water and adequate drainage and sewage services.
7. Both public and commercial institutions ought to offer complimentary medical camps in places that are in need, especially those that are distant.

Conclusion

According to the current study, there is still a need to raise awareness of the value of healthcare and the existence of health centres, since a sizable portion of women are turning to untrained medical professionals and seeking home remedies as their primary source of health advice.

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Renewable Energy

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Abstract:

What is renewable energy?

Renewable energy is energy derived from natural sources that are replenished at a higher rate than they are consumed. Sunlight and wind, for example, are such sources that are constantly being replenished. Renewable energy sources are plentiful and all around us. Fossil fuels - coal, oil and gas - on the other hand, are non-renewable resources that take hundreds of millions of years to form. Fossil fuels, when burned to produce energy, cause harmful greenhouse gas emissions, such as carbon dioxide. Generating renewable energy creates far lower emissions than burning fossil fuels. Transitioning from fossil fuels, which currently account for the lion's share of emissions, to renewable energy is key to addressing the climate crisis. Renewables are now cheaper in most countries, and generate three times more jobs than fossil fuels.

Benefits of Renewable Energy:

The advantages of renewable energy are numerous and affect the economy, environment, national security, and human health. Here are some of the benefits of using renewable energy in the United States:

1. Enhanced reliability, security, and resilience of the nation's power grid
2. Job creation throughout renewable energy industries
3. Reduced carbon emissions and air pollution from energy production
4. Increased U.S. energy independence. (United States energy independence is the concept of eliminating or substantially reducing import of petroleum to satisfy the nation's need for energy.)
5. Increased affordability, as many types of renewable energy are cost-competitive with traditional energy sources
6. Expanded clean energy access for non-grid-connected or remote, coastal, or islanded communities

Here are a few common sources of renewable energy:

Solar Energy:

Solar energy is the most abundant of all energy resources and can even be harnessed in cloudy weather. The rate at which solar energy is intercepted by the Earth is about 10,000 times greater than the rate at which humankind consumes energy. Solar technologies can deliver heat, cooling, natural lighting, electricity, and fuels for a host of applications. Solar

technologies convert sunlight into electrical energy either through photovoltaic panels or through mirrors that concentrate solar radiation. Although not all countries are equally endowed with solar energy, a significant contribution to the energy mix from direct solar energy is possible for every country. The cost of manufacturing solar panels has plummeted dramatically in the last decade, making them not only affordable but often the cheapest form of electricity. Solar panels have a lifespan of roughly 30 years, and come in variety of shades depending on the type of material used in manufacturing.

Wind Energy:

Wind energy harnesses the kinetic energy of moving air by using large wind turbines located on land (onshore) or in sea- or freshwater (offshore). Wind energy has been used for millennia, but onshore and offshore wind energy technologies have evolved over the last few years to maximize the electricity produced - with taller turbines and larger rotor diameters. Though average wind speeds vary considerably by location, the world's technical potential for wind energy exceeds global electricity production, and ample potential exists in most regions of the world to enable significant wind energy deployment. Many parts of the world have strong wind speeds, but the best locations for generating wind power are sometimes remote ones. Offshore wind power offers tremendous potential.

Geothermal Energy:

Geothermal energy utilizes the accessible thermal energy from the Earth's interior. Heat is extracted from geothermal reservoirs using wells or other means. Reservoirs that are naturally sufficiently

hot and permeable are called hydrothermal reservoirs, whereas reservoirs that are sufficiently hot but that are improved with hydraulic stimulation are called enhanced geothermal systems. Once at the surface, fluids of various temperatures can be used to generate electricity. The technology for electricity generation from hydrothermal reservoirs is mature and reliable, and has been operating for more than 100 years.

Hydropower:

Hydropower harnesses the energy of water moving from higher to lower elevations. It can be generated from reservoirs and rivers. Reservoir hydropower plants rely on stored water in a reservoir, while run-of-river hydropower plants harness energy from the available flow of the river. Hydropower reservoirs often have multiple uses - providing drinking water, water for irrigation, flood and drought control, navigation services, as well as energy supply.

Hydropower currently is the largest source of renewable energy in the electricity sector. It relies on generally stable rainfall patterns, and can be negatively impacted by climate-induced droughts or changes to ecosystems which impact rainfall patterns.

The infrastructure needed to create hydropower can also impact on ecosystems in adverse ways. For this reason, many consider small-scale hydro a more environmentally-friendly option, and especially suitable for communities in remote locations.

Ocean Energy (Tidal Energy):

Ocean energy derives from technologies that use the kinetic and thermal energy of seawater - waves or currents for instance - to produce electricity or heat. Ocean energy systems are still at an early stage of development, with a number of prototype wave and tidal current devices being explored. The theoretical potential for ocean energy easily exceeds present human energy requirements.

Bioenergy:

Bioenergy is produced from a variety of organic materials, called biomass, such as wood, charcoal, dung and other manures for heat and power production, and agricultural crops for liquid biofuels. Most biomass is used in rural areas for cooking, lighting and space heating, generally by poorer populations in developing countries.

Modern biomass systems include dedicated crops or trees, residues from agriculture and forestry, and various organic waste streams. Energy created by burning biomass creates greenhouse gas emissions, but at lower levels than burning fossil fuels like coal, oil or gas. However, bioenergy should only be used in limited applications, given potential negative environmental impacts related to large-scale increases in forest and bioenergy plantations, and resulting deforestation and land-use change.

Closure:

Limitation of using renewable energy sources-

It's hard to produce the same amounts as non-renewable sources. It can be difficult to generate quantities of electricity that are as large as those produced by traditional fossil fuel generators but till this is the requirement for Sustainable Development .“There is one forecast of which you can already be sure: someday renewable energy will be the only way for people to satisfy their energy needs. Because of the physical, ecological and (therefore) social limits to nuclear and fossil energy use, ultimately nobody will be able to circumvent renewable energy as the solution, even if it turns out to be everybody's last remaining choice. The question keeping everyone in suspense, however, is whether we shall succeed in making this radical change of energy platforms happen early enough to spare the world irreversible ecological mutilation and political and economic catastrophe.”



Agriculture and Environmental Relation in Novels and Poems

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Abstract:

Agriculture is an important industry on which the whole human civilization cherishes. Often Poets and Novelists exhibit their feelings to give strong message through different products of agriculture. Their aim is just not to give a powerful message but also to draw the attention of their viewers towards different environmental issues like climate change, soil degradation, cutting of trees. Through their writings they not only take environmental issues into consideration but in some poems they give the message of rebirth where the narrator says "I will not be gone long" show a happy mood or give a powerful message of gathering and sharing experiences the union of two nations through metaphorical use of tomatoes realizing that war is not good or showing a happy mood through "Fiesta melons" a poem by Sylvia Plath or a kitchen table to sustain life during war. A kitchen table is compared to the world and different cycles of life.

Keywords: Environmental, Climate-Change, Soil-Degradation, Rebirth, Gathering, Fiesta, Cycles Of Life

Introduction:

Different Poets and Novelists exhibit their feelings in different objects and different products of agriculture. Agriculture is one of the basic sources of subsistence for man over thousands of years. It is vitally linked with the production of the basic constituents of man's food, shelter and clothing which is derived from plants and animals. It is an important aspect which supports other important aspect of human life. It plays an exceptionally important role right from history. Basically literature reflects human activity in a particular society. Literature helps to expose societal activities. The reflection of literature on agriculture is vivid. In general meaning agriculture word is used to denote the many ways in which crops, plants and domestic animals sustain the human population by providing food and other products. The English word agriculture derives from the Latin word "ager" [field] "culture" [cultivate] signifying when combined the Latin agricultural field or land tillage. But the word has come to subsume a very wide spectrum of activities that are integrated to agriculture and have their own descriptive terms such as cultivation, domestication, horticulture, arboriculture and vegculture as well as forms of livestock management such as mixed crop, livestock farming, pastoral and transhumans..

Over the years food agriculture and rural life have been the source of inspiration for poets and novelists. Understanding agriculture helps us in several ways. It helps us grasp the agriculture related imagery used in and reading poetry with agriculture related imagery gives us a peek into the way of life unfamiliar to many of us. It helps us from a historical perspective when we read poetry which examines a way of life that is in the past and reading poetry set in cultures different from our own helps gives us a multicultural perspective.

The poem included with the lesson provides some good examples, if one knows that crop-rotation involves planting different crops in the same field, with each season, one can better understand the progression described in Gordon Baltomley's poem "The Ploughman". It also helps us to know that the word "corn" in the past was used for any grown, not just what we know as corn which was called "maize".

In the poetry "The Pasture" the poet talks about a farmer who has little bit of work that needs to be done. He is soothingly telling someone else that he won't be gone for long. The end of each stanza has the line "Ishan't be gone for long=You come too providing a refrain or regularly recurring verse.

The theme of the poem is rebirth in the setting of spring. We can see the farmer helping the farm in

the process of rebirth and watching over the new life that is growing. In the refrain, we see that this farmer has a loving relationship with the person he is speaking to as he invites his friend to come along with him.

In another poem "Ode to Tomatoes" written by Pablo Neruda is a metaphorical poem on the relations between two nations Chile and Spain. During the summer season, tomatoes invade the streets of Chile. The poet describes the abundance of tomatoes halves the light of summer. It looks as if tomato juice had overflowed the streets of Chile. It alludes to the invasion of Chile by Spain. The tomato juice signals the bloodbath during invasion. In summer the tomatoes are said to have invaded the kitchen alluding how Spain invaded Chile and how two races were mixed. The presence of tomatoes on the kitchen countertops displays its own light of majesty. However the tomatoes must be cut down to prepare salad indicating the killing of people during the war. Its wedding with onion indicates the union of two races by marriages. Its juice and seeds populate the salads. It indicates the mating of two races and mixed breed coming from it. Tomatoes is then made the star of the earth. It is praised for its fertility, complexity, its canals and abundance. The great thing is as a gift that a tomato offers is that it does not leave any waste. It is liked for its coolness and fiery color.

In one of the poem written by Sylvia Plath "Fiesta Melons" the main theme of the poem is melons which are numerous as referred by the poetess. The mood in the poem is happy and generally having fun as the word "Fiesta" in the title suggests. Fiesta melons is about having fun in the beautiful climate. This poem was written when the poetess wanted to remember her honeymoon in Southern Spain.

"Perhaps the world ends here" is written by Jot Harjo. Uses the extended metaphor of the kitchen table to examine themes like collective unity and concepts like gratitude. Written as an extended metaphor in which Harjo's speaker compares the ubiquitous kitchen table to the world and the cycle of life. "Perhaps the world ends here" is a stark argument -during times of global war, climate change and overall fragmentation -for recognizing the similarities of all humanity rather than its differences.

Indian poets like Kedar Nath Singh has also shown his boundless love for the pains of farmers. Some of his lines

"Mai usse barso se jaanta tha

Ek adhed kisan

Thoda thaka hua

Thoda jhuka hua

"The Indian Farmer" by Rajesh Thankappan is a poem of Indian agriculture is a predominantly

dependent upon rains, especially the monsoon rains. If the rains play a prank and fails, farmers are in doldrums. Another factor that haunts the farming community is the unseasonal rains that destroys the standing crops and reduces yield. A practical solution needs to be found and implemented at the grassroots levels so as to alleviate their sufferings.

Sugathakumari known for her engagement with poet, environmental activism, charity works and sociocultural initiatives. In her poem "Marathnu Stuthi [An ode to the tree]" has become a powerful symbol of the protest and it turned the opening song at many "Save the Silent Valley" campaign meetings held across the state.

"Silent Spring" is an environmental science book by Rachel Carson, a book documented the environment harm caused by the indiscriminate use of pesticides. Carson accused the chemical industry of spreading discrimination and public officials of accepting the industry's marketing claims unquestionably.

Indian environmentalist – Amitav Ghosh -while primarily known as a renowned novelist. Amitav Ghosh's works often incorporate the themes of nature, climate change and environmental issues. His novels explore the complex interactions between humans and the environment examining the ways in which human activities and ecological changes intersect.

Objectives:

1 To learn about how Poets and Novelists reflect on agriculture and its products.

2 To learn about the powerful message that Poets and Novelists give through agriculture and its products.

3. To learn about how Poets and Novelists manifest their feelings of love, hate through agriculture and its products.

4. To learn how these messages in literature can help improve the society.

5 To learn about different environmental issues from the writings.

Data and Methodology

Data is collected from already published texts in the public domain. Literature sources can include textbooks, government and private companies reports, online papers and articles.

Methodology-Literary research is used.

Impact of literature on Agriculture

Impact of literature on Agriculture

The study of literature helps one to understand the importance of agriculture in human life. Even poets and novelists are aware of its importance. They do feel that this is the only one industry that provides humans with food and because of it human population

grows and develops. And so they reflect their feelings in literature showing mood of happiness as in Sylvia Plath's *Fiesta Melons* " is about having fun in a beautiful climate where the poetess remembers her honeymoon in southern Spain. The mood is happy as the poetess uses the word 'fiesta'. Several more words like "melo-eating", "thumpable". The main theme is melons as she refers to them several times.

"Perhaps the world ends here" is a poem written by Joy Harjo is a poem written in metaphorical form in which the poet compares the ubiquitous kitchen table to the world and the cycles of life. Basically the poem is based on gathering and sharing.

Like wise "Ode to tomatoes" shows the abundance of tomatoes in Chile. Shows the two countries coming up together realizing the drastic results of war and the results are marriages resulting in birth of new breed.

Indian poet Rajesh Thankappam realizes the importance of monsoon and how farmers suffer when there are no monsoons and also the sufferings of farmers due to unwanted monsoons.

"When there is no rain

Farmers groan in pain

And with unseasonal rain

There produce flood the drain" +9| Im. Sugatha Kumari known for her engagement with poet, environmental activism, charity works and sociocultural initiatives. In her poem "Marathnu Stuthi [An ode to the tree]" has become a powerful symbol of the protest and it turned the opening song at many "Save the Silent Valley" campaign meetings held across the state.

"Silent Spring" is an environmental science book by Rachel Carson, a book documented the environment harm caused by the indiscriminate use of pesticides. Carson accused the chemical industry of spreading discrimination and public officials of accepting the industry's marketing claims unquestionably.

Indian environmentalist – Amitav Ghosh -while primarily known as a renowned novelist. Amitav Ghosh's works often incorporate the themes of nature, climate change and environmental issues. His novels explore the complex interactions between humans and the environment examining the ways in which human activities and ecological changes intersect.

Conclusions:

The discussions made above are enough to conclude that how poets and novelists show their concern in agriculture in their writings and bring out a powerful message from the different products of agriculture. Examples can be checked from the above lines like melons, tomatoes and kitchen tables, pasture and many more. Different Indian poets have

shown their concern about monsoon in their poems showing their concern about environment, climate change, soil degradation and different environmental issues.

Different novelist like Sugathakumari and Amitav Ghosh have acted as an environmental activist and have drawn the attention of their viewers towards agriculture.

In all this the name of Rachel Carson cannot be forgotten who has written a science book in which she has accused chemical industries on the indiscriminate use of pesticides.

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Assam Government Proactive Initiative for Sustainable Future: The Context of Amrit Brikshya Andolan

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Abstract:

This paper mainly tries to focus the Assam government initiatives for protection and preservation of environment. Till today, there are many initiatives has been taken by government of Assam for encouraging people to involve in protecting the environment. Among such initiatives Amrit Brikshya Andolan is very significant which tries to bring the responsibility among the citizen for protecting the environment with a motive of sustainable future. The Assam State Government has started this Amrit Brikshya Andolan Yojana to prevent indiscriminate cutting of trees and give financial assistance to the Assam State Citizens, so that the citizens are encouraged to plant saplings and the citizens acquire positive results by taking benefit of the yojana. However, this initiative has faced a lot of criticism from different stakeholders with regard to timing of plantation that has been chosen by the government.

KeyWords: *Amrit Brikshya Andolan, Sustainable Future, Govt. of Assam.*

Introduction:

Environment protection is a shared responsibility, for ensuring a better future for ourselves and future generations. The term "environmental protection" refers to policies, plans, and initiatives that lower the hazards that pollutants like fuels, oils, hazardous wastes, and hazardous materials provide to the environment.¹ With the provision of protocols for handling these commodities properly, the inspection of storage vessels and sites, and the designation of preventative maintenance methods, these programmes address pollution prevention measures and regulatory compliance. Plans for environmental emergencies, which outline what should be done in the case of a leak or discharge, are also included.

The preservation of the environment is essential to modern society, yet many individuals don't even know the rudimentary understanding of what they can do. Depletion of natural resources and environmental devastation are serious, ongoing problems.

Assam is blessed with unique biodiversity and rich forest areas that cover more than one-third of the state's total geographical area. A sizable portion of Assamese people have historically lived close to forests and relied on their supplies. The

potential effects of climatic variability could include and consequently harm these tribes' means of subsistence in the Assam jungles. As a mitigation strategy, forest protection is essential to lower vulnerability to climate change and increase the resilience of these communities.²

Objective:

1. To study the Assam Government proactive initiative for sustainable future.
2. To study about the initiative of Amrit Brikshya Andolan for protection of environment.

Background:

Assam, a state in northeastern India, is renowned for its many communities, stunning scenery, and rich cultural history. The Assam administration has made tremendous progress over the years in improving the state's citizens and promoting sustainable development in a number of industries. Social welfare, economic progress, and environmental conservation have been accorded priority by the government through a variety of well-crafted schemes and initiatives. One among

¹ "Environmental Protection", *Pen State*, 2023, Retrieved from <https://ehs.psu.edu/environmental-protection>, Accessed on 16 December, 2023.

² Karma Tse-ring, Eklabya Sharma, Nakul Chettri and Arun Shrestha, *Climate Change Vulnerability of Mountain Ecosystems in the Eastern Himalayas*, International Centre for Integrated Mountain Development, Kathmandu, Nepal, June 2010, pp.37.

such initiatives is Amrit Brikshya Andolan with regard to environment protection.³

Chief Minister Himanta Biswa Sarma underlined the significance of ensuring that at least 80% of these saplings live through this programme, helping to realise Prime Minister Narendra Modi's aim of achieving net-zero emissions.⁴ The Chief Minister also announced the government's ambition to plant eight crore seedlings in 2024 and a further ten crore saplings in 2025, with the goal of suppressing its own records. The importance of concentrating on commercially viable tree species was underlined once more by him, as he realised that doing so would support the local green movement as well as strengthen the local economy.

Assam Amrit Brikshya Andolan:

The Assam Government has embarked on a significant endeavor known as the Amrit Brikshya Andolan, under the leadership of Chief Minister Shri Hemanta Biswa Sarma. The goal of this project is to plant one crore seedlings in order to promote a more sustainable and green environment throughout the state. The Andolan, which will formally begin operations on June 8, 2023, aims to increase the state's green space and foster a tree-based economy. This Andolan encourages all citizens to plant tree saplings, and those who do so will receive Rs 100 for the first tree and Rs 200 for the second.

Goals of Amrit Brikshya Andolan:

The Assam government started a large-scale tree planting campaign in 2023 called the Assam Amrit Brikshya Andolan. There are four primary goals for the Andolan. To significantly enhance the amount of greenery in Assam, the main objective of the Amrit Brikshya Andolan is to plant one crore seedlings throughout the state. First is Direct Benefit Transfer (DBT). By offering members financial assistance through a Direct Benefit Transfer programme, the project hopes to encourage their active participation in planting trees. Second, the Andolan seeks to boost the state's tree-based economy by promoting the development of trees, which will create chances for sustainable employment and livelihood. Third, increasing green coverage beyond historical levels will improve the state's overall environmental health. Fourth, increasing green coverage beyond historical levels

will improve the state's overall environmental health.

Significance of Amrit Brikshya Andolan for sustainable future:

The Assam Amrit Brikshya Andolan is a testament to the state's unwavering commitment to promoting sustainable development and environmental preservation.⁵ With its distinct approach to tree planting and maintenance, bolstered by strong financial incentives, the Andolan communities have the potential to significantly impact Assam's thriving ecosystem. In addition, it has the ability to strengthen local communities and move them towards a sustainable, wealthy future.

It is expected that with this initiatives, Assam's green landscape will clearly improve as a result of the effort, creating a more lively and healthful atmosphere. Seedlings will be given to all participants, regardless of their financial situation. This strategy guarantees fair access and promotes widespread involvement. Andolan will help the people of Assam by opening up new paths for economic growth and livelihoods through the promotion of a tree-based economy. In order to promote a sense of shared responsibility and involvement, the Andolan actively involves a variety of groups, including as Self Help Groups, ASHA workers, educational institutions, and community organisations.

Conclusion:

Hence, the Amrit Brikshya Andolan is a grassroots movement that originated with the goal of nurturing and protecting the environment. The movement encourages individuals, communities, and organizations to come together for a common cause: to restore and maintain the delicate balance of the ecosystem. The movement aims to have a beneficial effect on the environment by mobilising people and communities to take collective action. Participating in this movement offers not only personal satisfaction but also contributes to the well-being of future generations.

Nevertheless, the policies like Amrit Brikshya Andolan of Assam government demonstrate its dedication to the general well-being and advancement of its populace. Such initiatives prioritise equality, sustainability, and economic growth; have set the groundwork for an improved future for citizens of Assam. To optimise the effects of these programmes and build a more prosperous and just society, it is imperative that the state

³ "Assam Government Schemes: Empowering Communities and Driving Progress", Marg ERP Ltd, June 15, 2023, <https://margcompusoft.com/m/assam-government-scheme/>, Accessed on December 29, 2023.

⁴ "Assam attempts to set None world records with Amrit Brikshya Andolan", G Plus News, Sep 18, 2023, Retrieved from <https://guwahatipius.com/assam/assam-attempts-to-set-nine-world-records-with-amrit-brikshya-andolan>, Accessed on 12 October, 2023.

⁵ Shubham Mittal, "Assam's Amrit Brikshya Andolan 2023", Oliveboard, 1 December 2023, Retrieved from <https://www.oliveboard.in/blog/amrit-brikshya-andolan-2023/>, Accessed on 23 December, 2023.

maintain effective implementation, ongoing monitoring, and assessment.

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Utilizing Geospatial Techniques for a Geographical Study of Groundwater in Rohtak District

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Abstract:

The groundwater resource is one of the key factors in making the country self sufficient in food production. Groundwater-irrigated agriculture plays an important role in poverty alleviation and has greatly increased food production. Until now, availability of groundwater has not been a constraint to agricultural development. But this resource is increasingly facing various problems including quality hazards in many areas where the exposure to pollution from agriculture, urbanized areas and industrial sites as well as arsenic contamination in shallower groundwater aquifers makes the water unfit for human consumption and in some cases even for irrigation purposes. High rates of pumping for irrigation and other uses from the shallow aquifers in coastal areas may result in widespread saltwater intrusion, downward leakage of arsenic concentrations and the general degradation of water resources. Besides, use of agrochemicals may cause contamination of shallow groundwater and sediments. Continuous decline of groundwater tables due to over-withdrawal has also been reported from some areas. Thus the overall situation calls for urgent groundwater management for sustainable development. Groundwater management must adopt an integrated approach taking into account a wide range of ecological, socio-economic and scientific factors and needs. The water level of Rohtak district has been studied and mapped in twice a year 2010, i.e. Pre-monsoon (June), and Post-monsoon (October) period using Inverse Distance Weighted (IDW) method of Spatial Interpolation (Geospatial Techniques).

Keywords: Groundwater, Poverty Alleviation, Resource, IDW; and Interpolation.

Introduction:

Groundwater is the most precious natural resource of the earth and is of utmost importance in every facet of human life. Although, it is a more dynamic renewable natural resource, its availability with good quality and proper quantity is of significant importance. Groundwater resource comprises of two parts- dynamic resources in the zone of water table fluctuation, which reflects seasonal recharge, and discharge of aquifers and static resource below this zone (Das, 2006). The dynamic groundwater resource, which is recharged annually, is exploited for irrigation, domestic and industrial purposes. Rainfall is the principal source of recharge, though in some areas canal seepage, return flow from irrigation and seepage from water harvesting structures also contribute significantly to the groundwater recharge (Chatterjee and Purohit, 2009). As a result of burgeoning population, urbanization and deforestation, pressure is continuously increasing on this valuable precious resource of nature. It has been observed over a period of time that Haryana is facing two types of problems related to exploitation and utilization of

groundwater resources i.e. rising as well as declining trends. Rising trends in the areas of poor groundwater quality whereas declining trends in the areas where groundwater quality is fresh resulting into overexploitation by farmers. The use of Geographic Information System is not new in groundwater studies. Different Researchers (Chaudhary, 1996 and Central Groundwater Board, 2013) have successfully used GIS technology for studying various aspects of groundwater (quality, availability, potentiality etc.) in different parts of Haryana state. These studies reveal that in some areas, there is continuous decline of groundwater over a period of time. These are the areas where the quality of groundwater is fresh. Central part of Haryana is witnessing rise in the water table leading to waterlogging and salinization. These areas are dominated by poor quality of groundwater. In the light of the above discussion, present article describes the groundwater scenario of Haryana state as in 2011 with regard to the volumetric assessment of availability and draft. It also assesses the spatial variations in per unit availability, draft and stage of

groundwater development with the help of GIS technology.

Study Area:

Rohtak district of Haryana lies between $28^{\circ} 40'$ to $29^{\circ} 05'$ North latitudes and $76^{\circ} 13'$ to $76^{\circ} 51'$ East longitudes (Fig 1.1). Total geographical area of the district is 1745 sq.km. Rohtak district is one of the 22 districts of Haryana State in Northern

India. Rohtak district is located in southeastern part of Haryana State and constitutes a major part of eastern Haryana plain. Rohtak District, a part of eastern Haryana plain is bordered by Sonapat in northeast and Jind districts in the north, Jhajjar District in the South, Hissar district in the North West and Bhiwani in the West.

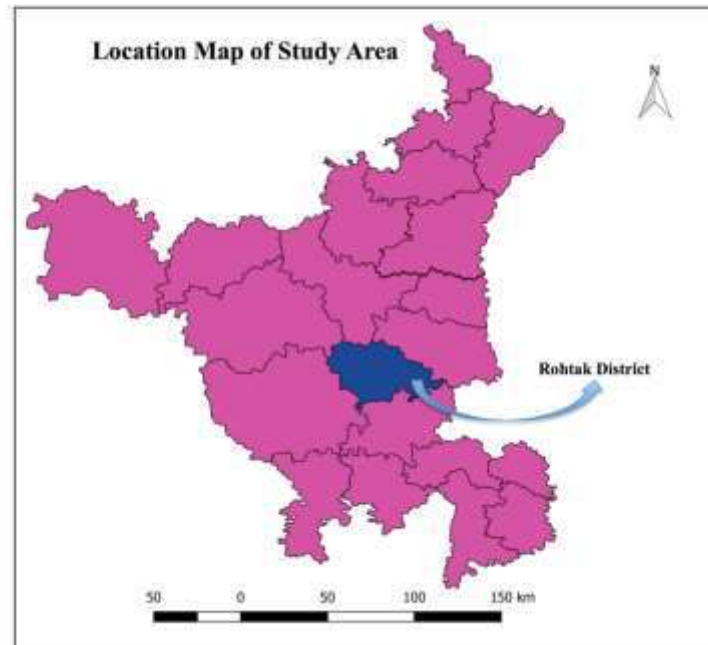


Fig 1.1

Review of Literature:

Ground water is a vital natural resource available in the planet earth. Depending on its usage and consumption it can be a renewable or a non-renewable resource. It is estimated that approximately one third of the world's population use ground water for drinking (Nickson et al. 2005). Ground water is the major source of water supply for domestic purposes in urban as well as rural parts of India. Among the various reasons, the most important are non-availability of potable surface water and a general belief that ground water is purer and safer than surface water due to the protective qualities of the soil cover (Mishra et al. 2005). In the present report, the application of remote sensing and GIS techniques has been used to study the level and changes of ground water over the decade of Rohtak District. Sitender and Chaudhary (2015) studied that groundwater is the most precious natural resource of the earth and is of great importance in every facet of human life. As a result of burgeoning population, urbanization and deforestation, pressure is continuously increasing on this valuable resource of

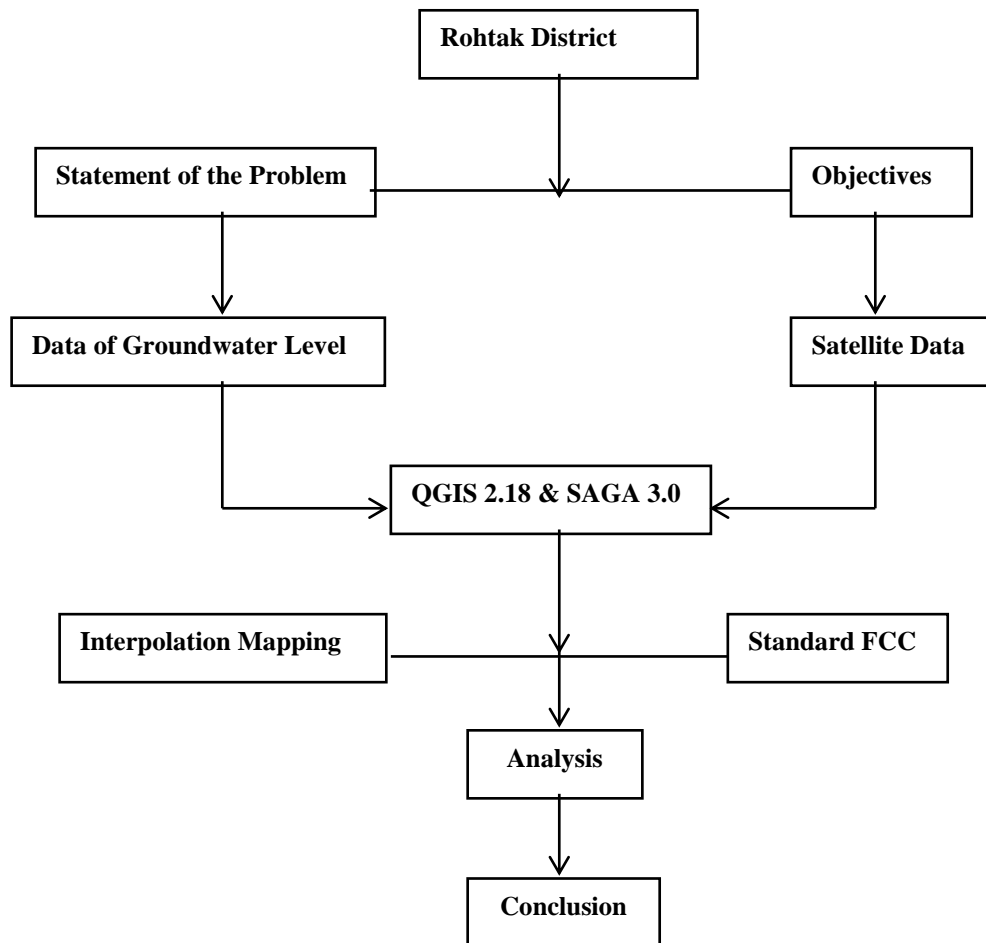
nature. Amarjeet et al. (2015) was carried out to assess the suitability of Meham Block ground water for domestic and agriculture purpose. Parmar et al. (2015) examined that water logging is one of the major environment issue and hurdle in development of the area. The study was carried out to identify the water logged area in Rohtak District, Haryana. Rani and Chaudhary (2015) has made attempt to understand the spatial distribution pattern of suitability of groundwater quality for domestic use in Hissar district of Haryana state, India by using Geographical Information System (GIS) techniques. Paudyal et al. (2016) specified that waterlogging is one of the major problems of land degradation processes. GIS environment was used to prepare and overlay different thematic maps and to extract the desired information. Based on satellite imagery, about one per cent of the study area was affected by surface waterlogging during the pre-monsoon period of 2010. Management strategies were suggested depending on the nature of the problem i.e. surface or sub-surface waterlogging as well as depth and quality of groundwater.

Objective:

Modern techniques like remote sensing and GIS are increasingly becoming important day by day in all real life problems, which are geo-spatial in nature. Field of hydrology and water resources development is also the area having extensive scope

Methodology: The methodology used for the study of groundwater level in Rohtak district is following:

of deriving benefits from these tools of geo-informatics. Therefore this study will fulfilled the specific objectives by utilization GIS method. The main objective of the study area is to analysis the groundwater level and examines the leading problems of the Rohtak district.

**Data source:**

The LANDSAT 8 (ETM+) satellite data acquired on 19 October 2016 was used for the study of the groundwater level of the Rohtak district. The village wise data of the groundwater level were collected from the Groundwater Cell, Directorate of Agriculture, Panchkula. Village wise spatial distribution of groundwater level was mapped using QGIS 2.18 and SAGA 3.0 software's and final maps of the study area, FCC and interpolation maps were prepared. These maps were then analyzed to explain the leading problems of the study area.

Groundwater Level of Rohtak District, 2010

The study of the groundwater data, exact interpolation method of spatial interpolation has been used. Further, groundwater data has been interpolated with the help of Inverse distance

weighted (IDW) method. IDW is a local exact interpolation technique, which is based on standard geographic assumption that the unknown value of point is influenced more by its neighbouring points than those further away. The weight/degree of influence is expressed by the inverse of the distance between points raised to a power i.e. as the distance increases the influence decreases over the unknown points. The weight/degree of influence is expressed by the inverse of the distance between points raised to a power. The power of 1.0 means constant rate of change. The power of 2.0 suggests that the rate of change in values is higher near a known point and level off away from it.

The equation for IDW method is:

$$Z_o = \frac{\sum_{i=1}^s Z_i \cdot \frac{1}{d_j^k}}{\sum_{i=1}^s \frac{1}{d_j^k}}$$

Where

Z_o = estimated value at point 0

Z_i = Z value at control point i,

d_j = distance between control point i and point o

s = the number of control points used in estimation

k = specified power.

Groundwater Level of Rohtak District, 2010:

The water level of Rohtak district has been studied and mapped (Fig 1.2 & 1.3) in twice a year, i.e. Pre -monsoon (June), and Post monsoon (October) period. In the month of June water level (Fig 1.2) is 1.8 metre whereas in October it increases 0.4 metre (Fig 1.3). The ground water level is high in the Northern parts of the study area where villages comprises Nandal, Guga Heri,

Lakhan Majra, Bainsi, Kharainti and Ajaib, Girawar, Central (Madina Korsan, Nidana, Kharkara, Madina Gidhran, Bahu Akbarpur, Mokhra Khheri Roz, Mokhra Khas, Sampal, Lahli), East (Rithal Narwal, Kiloj Dopana, Kiloj Khas, Rurki) and in the Southern parts of the Rohtak, where villages are Kanheli, Pehrawar, Shimli, Karontha, Baland, Ritauli.

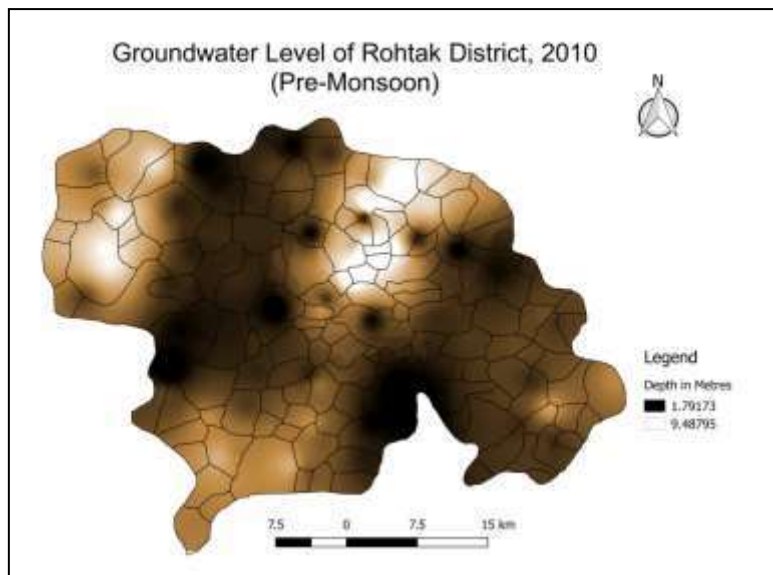


Fig 1.2

The continuous raising of ground water level it leads to waterlogging and salinity problems of the study area. This occurs due to poor irrigation practices and more uses of fertilizers in agriculture. Salinity has adverse effect on soil and reduces soil fertility and further leads to degrade of agricultural activities. Drinking water also affected this problem so people

face many health problems. The groundwater problem in Rohtak district has two dimensions. The first is that of rising groundwater level in the areas with low quality aquifers, leading to secondary salinization and waterlogging. The second is that of declining water level due to over-pumping of groundwater in fresh water quality aquifer zones.

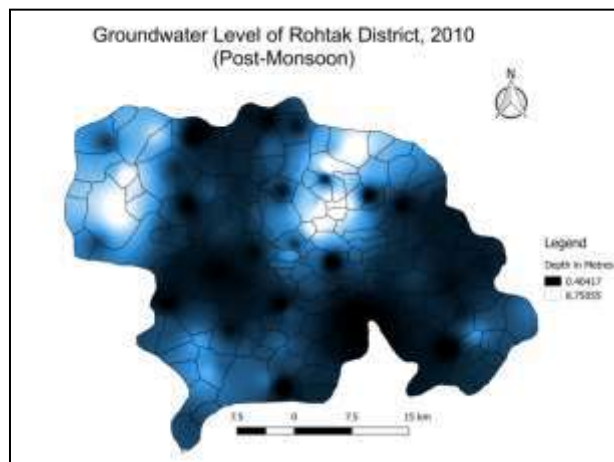


Fig 1.3

The visual interpretation of the standard false colour composition (Fig 1.4) of the study area also supports the findings from the interpolation analysis (Fig 1.2 & 1.3) as we can see that regions in the district

having more agricultural activities (red colour) have higher problem of water logging. On the other hand inhabitant areas have relatively lesser water logging problems (light grey colour).

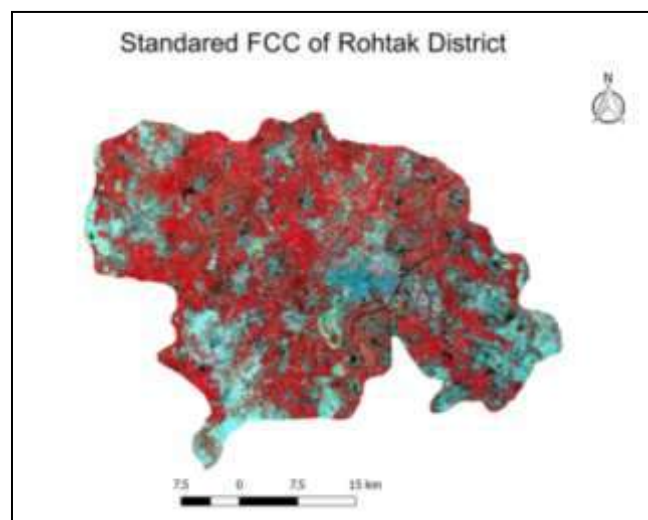


Fig 1.4

Conclusion:

The water level of Rohtak district has been studied and mapped in twice a year 2010. The continuous rising of ground water level it leads to waterlogging and salinity problems in Rohtak district. It happened due to poor irrigation practices and more uses of fertilizers in agriculture. The first is that of rising groundwater level in the areas with low quality aquifers, leading to secondary salinization and waterlogging. The second is that of declining water level due to over-pumping of groundwater in fresh water quality aquifer zones. To minimize the groundwater problem in study area there should be timely availability of farm inputs such as good- quality water, salt-tolerant germplasm, and introduction of groundwater abstraction regulations and promotion of saline agriculture through crop diversification options such as salt- tolerant medicinal and aromatic plant species

can improve the capacity of individual farmers to be productive.

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Green Environment at Work Place-A Study on Employees Comprehension with Special Reference to Dakshina Kannada District of Karnataka State

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Abstract:

As mankind, we must all work together to keep our home planet clean, to preserve it for future generations and to fully enjoy our own lives. Companies and organizations today employ environmentally sustainable working practices and place a strong emphasis on the environment to reduce the harm to their operations on both an internal and external level. Employees also play a crucial part in creating an environmentally friendly workplace because they are the ones who put sustainability measures into action. This paper is an empirical investigation into the awareness and environmental sustainability practices used by workers in the Dakshina Kannada District of the Indian state of Karnataka. A survey of 150 Dakshina Kannada employees working for various organizations, including banks, private and public companies, cooperative societies, educational institutions, supermarkets, hotels, and small business stores, is used to gather primary data. The incorporation of secondary data comes from journals, newspapers, and online resources. The main objectives of the study are to determine the degree of employee awareness about the environmental sustainability practices used by their organizations and the extent to which employees are involved in those initiatives to increase their accountability to put those practices into practice in those organizations.

Keywords: Sustainable environmental practices, Employees' level of awareness, Ecological Green, Employees' accountability

Introduction:

Sustainability and environmental protection are now major challenges that need to be addressed. Each person is responsible for preserving the ecological system of the environment and creating a society free from pollution to keep the Earth habitable for future generations and to enjoy our lives to the fullest. Though industrialization has contributed to the rapid economic development of many nations throughout the world by bringing about several changes in people's lifestyles and ensuring a higher quality of living, it also tells a very horrible story of harming the environment. It is extremely upsetting to learn that adopting ways to assure environmental protection and sustainability is now necessary for the very future of humans. Today's businesses and organizations employ environmentally sustainable workplace practices and place a strong emphasis on the environment to reduce the harm that their enterprises suffer both internally and externally. The need to build a healthy and sustainable workplace that correlates to happier employees, enhances productivity, and reduces work-related illnesses is necessary for them to have a significant effect on their customers and

the world. An eco-friendlier workplace suggests a better work-life balance. It can bring the team together for a worthwhile cause.

Green Environment at Work Place:

Employees can be employed as champions to promote green environments and environmental sustainability at work since they have creative ideas for protecting the environment and are essential in putting eco-friendly work practices into effect. By incorporating the staff, the following basic measures can be put into practice at work to reduce environmental damage:

1. Adopting a recycling program, purchasing recycled goods, printing, or copying on both sides of the page.
2. Reusable plates, water bottles, coffee mugs, and other items can be used in place of disposable ones.
3. Donating unused goods to educational institutions or other nonprofit organizations.
4. Utilizing sleep mode on the computer rather than screen savers.
5. Utilizing energy-saving light bulbs.
6. Opting for eco-friendly packaging and labeling

7. Provide rewards to workers who engage in eco-friendly behaviors like carpooling, biking, or taking the bus.
8. Reducing paper use. Using cloud-based collaboration tools like Google Drive and moving to electronic files.

Objectives Of Study:

The present study is based on following objectives

1. To learn how well-informed employees are about the environmental sustainability strategies used by their organizations.
2. To ascertain the level of employee participation in organizations' sustainability activities.

Rationale And Significance Of Study:

Since environmental sustainability is currently a significant issue, all nations and all of humankind are required to adopt and adhere to environmental sustainability plans, regardless of caste, race, religion, or other distinctions. For establishing a sustainable cycle, every positive activity, no matter how tiny, is regarded as important. To build a sustainable Earth and economy for future generations, environmental sustainability practices development and promotion have today become a huge global movement. This study has a greater impact in this aspect.

Literature Survey

Previous studies relating to the present study highlighted below

1. Fernando Ruiz-Pérez, Alvaro Lleo et al. (2021) in their research paper "Employee sustainable behaviors and their relationship with Corporate Sustainability: A Delphi study" opined that studies should focus on the best strategies for corporations to encourage sustainable behavior among their workers. The development of in-field validated assessment tools for staff behaviors towards environmental sustainability is thus required to demonstrate how an increase in these sustainable behaviors improves sustainability.
2. Rita Góralska-Walczak, Ewa Rembiałkowska et al (2023) in their research article "Initial Insight into the Environmental Awareness of Employees in the Catering Sector in the City of Rybnik, Silesia" stated that it is important to educate everyone who is in charge of catering for the public, including school principals, chefs, caterers, and instructors, on green public procurement, organic foods, and sustainable systems. Because it is crucial to educate both the public and parents.

The review of the literature revealed that no studies were conducted in the Dakshina Kannada District of Karnataka to ascertain how employees comprehended environmental sustainability

practices in their workplaces. This study was therefore done to fill this knowledge gap.

Research Methodology:

A survey of 150 employees in the Dakshina District of Karnataka who work for a variety of organizations, including banks, private and public companies, cooperative societies, educational institutions, supermarkets, hotels, and small businesses stores, was used to carry out this empirical study. To gather primary data, a google form with a structured questionnaire was sent to all employees via email and WhatsApp groups. Respondents were selected using the convenience sample technique. The secondary data was obtained from publications like newspapers, journals, and websites.

Hypotheses:

H1. Employees of Dakshina Kannada District agree with the environmental sustainability practices adopted by their organizations.

H2: Employees' comprehension of the environmental sustainability initiatives adopted by their

organizations vary significantly depending on their gender, age, educational background,

occupation, and level of monthly income (i.e., demographic characteristics).

Limitations Of Study:

The opinions of 150 employees of Dakshina Kannada District served as the foundation for the information in this report. It is a micro study. To learn more about the actual working circumstances, a thorough investigation can be conducted in this subject.

Result and Discussion:

Data from 150 employees of various organizations in the Dakshina Kannada District was gathered with the help of a structured questionnaire, and data analysis was done to extract meaningful information from the data. To analyze and interpret data, SPSS software was utilized. Statistical methods such as percentage analysis, mean, standard deviation, percentage mean, and chi square test were used for the interpretation of data

Finding Of Study:**Demographics:**

It is evident from Table 1 that both male and female employees of various age groups, professions, educational backgrounds, and monthly salary groups are surveyed to gather their perspectives. It indicates that survey respondents have a varied demographic profile.

Comprehension level of Employees about environmental sustainability practices adopted by their organisations:

To know the Comprehension level of Employees about environmental sustainability practices adopted

by their organisations, responses were measured on 5 point Likert rating scale, 'Very Poor' (1), 'Poor' (2), 'Average' (3), 'High' (4) and 'Very High' (5). Mean Value, Standard Deviation and % Mean was found out and interpretations were made based upon % Mean Value as, if % mean is 0% - 20 % 'Very Poor', 21% - 40% 'Poor', 41%-60% 'Average', 60%-80% 'High' and 81%-100% 'Very High' level of awareness. The results are shown in Table 2.

Testing of Hypothesis:

H1. Employees of Dakshina Kannada District agree with the environmental sustainability practices adopted by their organizations.

Study revealed that comprehension level of respondents about environmental sustainability practices adopted by their organizations was 'High' with Mean and Standard Deviation $3.66 \pm .83671$ and % Mean 73.2%. So, the alternative hypothesis 'Employees of Dakshina Kannada District agree with environmental sustainability practices adopted by their organizations' is justified.

H2: Employees' comprehension of the environmental sustainability initiatives adopted by

their organizations vary significantly depending on their gender, age, educational background, occupation, and level of monthly income (i.e., demographic characteristics).

Values obtained about Respondents' level of comprehension about environmental sustainability initiatives adopted by their organizations based on demographic factors was compared by using Chi square test and presented in Table 3. The test result in Table 3 reveals that there is a significant difference in the comprehension level of respondents about environmental sustainability initiatives adopted by their organizations based upon demographic variables, as $p = 0.000 < 0.01$ on each of the demographic factors such as Gender, Age, Educational qualifications, Occupations and Monthly income level of respondents. So alternative Hypothesis **H2: Employees' comprehension of the environmental sustainability initiatives adopted by their organizations vary significantly depending on their gender, age, educational background, occupation, and level of monthly income (i.e., demographic characteristics) is accepted.**

Employees' participation in sustainability initiatives of their organizations:

Respondents were asked to rate their opinions of their participation in various initiatives taken by their organizations to ensure environmental sustainability on a 5-point scale (Very high =5, High =4, Average =3, Poor =2, Very Poor =1) in order to better understand how participated their employees

are in sustainability initiatives within their organizations. Mean Value, Standard Deviation, and % Mean was discovered. Based on % Mean Value, interpretations were made, such as: if % mean is 0% - 20% "Very Poor," 21% - 40% "Poor," 41% - 60% "Average," 60% - 80% "High," and 81% - 100% "Very High" level of participation in sustainability initiatives of their organizations. Table 4 presents the outcomes. According to the study's findings, employee participation in sustainability projects within their organizations was "High" for each initiative taken on by those organizations, with a mean score of more than 70% for each element. It denotes that employees in the Dakshina Kannada District are actively supporting their employers in their attempts to decrease environmental damage because they recognize the value of environmental sustainability.

Suggestions:

Though employees of Dakshina Kannada District are sufficiently aware of the value of a green workplace and actively participate in their organizations' environmental sustainability practices, they still need to pay more attention to problems like pollution brought on by industrialization, climate change, and deforestation, loss of biological variety, melting polar icecaps, which pose a serious threat to even the existence of humans on Earth. Environmental protection measures need to be prioritized more at every stage of operations, not as a requirement but as a fundamental duty of every person inhabiting the planet. This study revealed that employees' participation in their organizations' environmental sustainability practices is not very high. In this sense, enormous effort is needed.

Conclusion:

In addition to being a healthy environment, a green workplace will inspire and motivate its staff, increasing their productivity. According to earlier studies, a positive work atmosphere can increase an employee's productivity by 21%. It is common knowledge that the workplace environment has a significant impact on employees' attitudes, moods, and levels of productivity. Furthermore, a good working environment is crucial to ensuring that staff are happy in their jobs. To maintain tranquil living and a healthy eco-system, it is our primary obligation to keep our homes and workplaces clean and pollution-free.

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Appendix

Table 1: Demographic profile of Respondents

Demographic factors	Classification	Number of Respondents	Percent
Gender	Male	72	48.0
	Female	78	52.0
Age group	Less than 25	31	20.7
	25 to 35 years	43	28.7
	35 to 45 years	41	27.3
	45 years to 55 years	23	15.3
	55 years & above	12	08.0
Monthly Income of the respondents	Less than Rs.15,000	24	16.0
	Rs.15,000- Rs.30,000	23	15.3
	Rs.30,000- Rs.45,000	45	30.0
	Rs.45,000- Rs.60,000	40	26.7
	Rs.60,000 & above	18	12.0
Educational qualification	SSLC	08	05.3
	PUC	20	13.4
	Graduation	90	60.0
	Post Graduation	20	13.3
	Other qualification	12	08.0
Occupation	Office Attenders	09	06.0
	Office clerks	55	36.7
	Supervisors	35	23.3
	Managers	30	20.0
	Others	21	14.0

Source: primary data

Table 2: Distribution of respondents on the basis of their Comprehension level about environmental sustainability initiatives adopted by their organisations

Factor	Very poor No. & %	Poor No. & %	Average No. & %	High No. & %	Very High No. & %	Mean / Standard Deviation	Percentage Mean
Comprehension level of respondents	6 (4%)	8 (5.3%)	58 (38.7%)	56 (37.3%)	22 (14.7%)	3.66±.83671	73.2%

Source: Primary data

Table 3: Chi square test results of values obtained about Respondents' level of comprehension about environmental sustainability practices adopted by their organisations based on demographic factors.

Demographic factors	Chi square value	d.f	P	Significance
Gender	26.810	1	0.000	Highly Significant
Age group	14.650	1	0.000	Highly Significant
Monthly income	11.867	1	0.000	Highly Significant
Occupation	15.456	1	0.000	Highly Significant
Educational Qualification	13.432	1	0.000	Highly Significant

Source: primary data

Table 4: Distribution of respondents based on their participation in environmental sustainability practices adopted by their organisations.

Factors	Very poor No. & %	Poor No. & %	Average No. & %	High No. & %	Very High No. & %	Mean / Standard Deviation	Percentage Mean
Switch off lights whenever leaving a room	00 (0%)	00 (0%)	48 (32%)	90 (60%)	12 (8%)	3.8920± .58968	77.84%
Reading documents on screen rather than printing them out	00 (0%)	00 (0%)	44 (29.3%)	94 (62.7%)	12 (8%)	3.9240± .57287	78.48%
Taking part in recycling program	00 (0%)	00 (0%)	47 (31.3%)	87 (58%)	16 (10.7 %)	3.7320± .62164	74.64%
Printing or photocopying double sided	00 (0%)	00 (0%)	32 (21.3%)	104 (69.3%)	14 (9.3%)	3.9860± .54497	79.72%
Using public transportation or Walking or riding a bicycle rather than driving a car	00 (0%)	00 (0%)	55 (36.7%)	95 (63.3%)	00 (00%)	3.74± .49193	74.8%

Source: Primary data



Advancing Sustainable Urban Futures: Integrating Green Building Practices And Smart City Solutions.

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Abstract:

This topic investigates the intricate relationship between green building practices and smart city solutions, emphasizing their pivotal roles in achieving sustainable urban futures amid rapid urbanization and environmental challenges in consideration of SDGs. It encompasses discussions on cutting-edge technologies for energy-efficient buildings, water conservation methods, and sustainable construction materials. Urban planning considerations, including mixed-use development and efficient public transportation, are explored for their potential in minimizing environmental impacts. Waste management strategies, the integration of smart technologies like ICT, and community engagement efforts are scrutinized to highlight the effective approaches to urban sustainability. The discourse extends to resilient and adaptive urban design principles, particularly in the face of climate changes. Moreover, the abstract underscores the significance of policy frameworks, showcasing the impact of green building codes and international collaboration in driving a global shift towards sustainable urban development. This summary encapsulates a comprehensive exploration of diverse strategies needed to shape cities that meet current needs while preserving opportunities for future generations.

Keywords: Sustainable, Governance, Sustainable Development Goals

Introduction:

According to the IPCC (2022), the implementation of efficiency policies in buildings and construction has the potential to significantly decrease greenhouse gas (GHG) emissions, with a reduction of up to 90% in developed countries and 80% in developing countries. This approach could also contribute to lifting approximately 2.8 billion people in developing countries out of energy poverty. Despite these considerable benefits, the building and construction sector is not on course to fully realize its mitigation potential. Currently, it is responsible for around 37% of energy and process-related CO₂ emissions and constitutes over 34% of global energy demand (UNEP, 2022). Moreover, it is noteworthy that, as of 2050, half of the buildings anticipated for that period have yet to be constructed (UNEP, 2017).

Apart from that it serves as a notable source of gases in the earth's atmosphere that trap heat. (GHG) emissions, buildings also endure substantial impacts from climate change. A typical building currently in use or under construction is expected to persist beyond the year 2070, yet the climate conditions it will experience are projected to undergo significant transformations (UNEP, 2021). By 2050, around 1.6 billion urban residents are anticipated to regularly face extreme high temperatures, while over 800 million people in more than 570 cities will be

susceptible to rising sea levels and coastal flooding (UN DESA, 2018).

To mitigate emissions in the building sector, four key transformations are essential: [1] lowering the emissions intensity of energy consumption, [2] diminishing embodied carbon emissions from construction, [3] minimizing surplus floor area, and [4] decreasing energy intensity. Efforts are needed at various levels, including national and sub national governments, international cooperation, businesses, investors, private and development banks, and both private sector and public citizens.

Sustainable Development Goals 7 highlight about access to affordable and clean energy. Ensure accessible, affordability, reliability and modern energy for all is one of key priority in international goal.

Access to reliable and sustainable energy sources is a linchpin for human and economic development. However, this critical aspect remains a challenge in many parts of the world. The environment offers a diverse array of energy sources, both renewable and non-renewable, ranging from solar and wind to hydropower, geothermal, biofuels, natural gas, coal, and uranium. This article delves into the significance of energy access, the implications of increased fossil fuel usage, and the role of sustainable practices in mitigating climate change and disaster risks.

SDG 7.3 - Enhancement of Energy Efficiency
Sustainable Development Goal 7.3 sets a target for global advancement in energy efficiency by aiming to double the rate of improvement in energy efficiency on a global scale by the year 2030.

Measurement of SDG 7.3

The metric used to assess progress toward SDG 7.3 is energy intensity, broadly defined as the quantity of energy utilized to generate a specific output or service. The specific measurement for SDG 7.3 is captured by the SDG 7.3.1 indicator, which gauges the relationship between primary energy consumption and GDP. This indicator serves as a proxy to monitor progress at the national or global level.

Utilizing sector-specific energy efficiency indicators, where outputs or services are more clearly identified provides a means to enhance decision-making. For instance, monitoring progress in terms of energy consumption per unit of floor area in buildings or energy consumption per passenger kilometer in road travel offers improved granularity for assessing and guiding energy efficiency improvements in specific sectors.

The Challenge of Limited Energy Access:

A lack of access to energy supplies and transformation systems acts as a significant constraint to human and economic progress. Millions of people worldwide still lack reliable access to electricity, hindering education, healthcare, and economic opportunities. Addressing this challenge requires a comprehensive approach that considers the diverse energy resources available in the environment.

Renewable and Non-renewable Energy Sources:

The environment provides a rich tapestry of energy sources, classified into renewable and non-renewable categories. Renewable sources include solar, wind, hydropower, geothermal, and biofuels, offering sustainable options that can be harnessed without depleting finite resources. On the other hand, non-renewable sources such as natural gas, coal, petroleum, and uranium provide energy but pose challenges due to their finite nature and environmental impact.

Global Climate Change Implications:

The increased reliance on fossil fuels, without concurrent efforts to mitigate greenhouse gas emissions, carries profound implications for global climate change. Greenhouse gases released through the combustion of fossil fuels contribute to the warming of the Earth's atmosphere, leading to shifts in climate patterns, rising sea levels, and extreme weather events. Recognizing the interconnectedness of energy consumption and climate change is essential for steering towards sustainable practices.

Energy Efficiency and Renewable Adoption:

To address the challenges posed by climate change, there is a growing emphasis on energy efficiency and the increased use of renewable energy sources. Energy efficiency measures aim to optimize the use of energy, reducing waste and environmental impact. The adoption of renewable, such as solar and wind power, contributes significantly to climate change mitigation by providing cleaner alternatives to fossil fuels.

Disaster Risk Reduction:

Sustainable energy practices not only mitigate climate change but also play a crucial role in disaster risk reduction. As the frequency and intensity of natural disasters increase, a shift towards sustainable energy becomes imperative. Renewable energy sources are often decentralized and resilient, reducing vulnerabilities associated with centralized energy systems during disasters. Additionally, the transition to cleaner energy sources lessens environmental degradation, contributing to overall resilience.

Ecosystem Preservation for Energy Development:

Maintaining and protecting ecosystems are vital components of sustainable energy practices. Ecosystems support a variety of renewable energy sources, particularly hydropower and bioenergy. Hydropower, generated from the flow of water, requires the preservation of water ecosystems. Similarly, bioenergy, derived from organic materials, necessitates sustainable agricultural and forestry practices to ensure a continuous and renewable source of fuel.

The idea of "green structure rehearses," as we figure it out today, with an emphasis on supportability and natural contemplations, didn't exist in that frame of mind in a similar structure. In any case, there are instances of antiquated Indian design that consolidated rules that line up with current supportability objectives.

Vaastu Shastra: Vaastu Shastra is an old Indian building science that underlines the agreeable connection between the constructed climate and nature. While it isn't precisely a "green structure" idea, Vaastu Shastra considers factors like direction, normal light, and ventilation in the building plan.

Jharokha Design: In customary Rajasthani engineering, especially in places like Jaipur, you track down the broad utilization of Jharokhas—overhanging encased galleries with latticed windows. These engineering components add tasteful worth as well as add to inactive cooling by permitting air flow.

Step wells: Step wells, like the Rani Ki Vav in Gujarat, were water capacity structures that highlighted multifaceted compositional subtleties.

The plan considered cooler temperatures at lower levels, and the step-like design worked with access to water at various levels depending on the season.

Utilization of Nearby Materials: Antiquated manufacturers in India frequently utilized privately obtained materials, lessening the ecological effect of transportation. For example, locally accessible stone was frequently used to build sanctuaries and designs in various areas.

Water Reaping: A few historical designs included techniques for gathering water. For instance, it is acknowledged that the Incomparable Shower at Mohenjo-daro, an archaeological site of the ancient Indus Valley Human Progress, had a sophisticated waste framework.

While these practices may not align impeccably with contemporary green structure principles, they do reflect a specific degree of environmental mindfulness and a craving to work as one with nature. It's essential to take note that the inspirations driving old development were often established in social, strict, or commonsense contemplations as opposed to expressly ecological ones.

Urban Dynamics: The Shifting Landscape of Global Cities

The Global Urban Hierarchy Unveiled

The positioning of urban areas and the peculiarity of megacities give an intriguing look into the elements of worldwide urbanization. Tokyo, a rambling city, as of now holds the title of the world's biggest city, boasting an agglomeration of 37 million occupants. Not a long way behind, New Delhi follows with 29 million inhabitants, while Shanghai and the powerful teams of Mexico City and São Paulo each oblige around 22 million individuals. Today, crowded urban communities like Cairo, Mumbai, Beijing, and Dhaka are on the cusp of joining the 20 million-occupant club.

A Shifting Paradigm: Projections for Tokyo and Delhi

Projections for 2020 anticipate a turning point for Tokyo as its population is expected to commence a decline. In stark contrast, Delhi, with its relentless growth, is projected to ascend to the pinnacle of urban population, potentially becoming the world's most heavily inhabited city by 2028. These projections underscore the dynamic nature of urban demography and the shifting centers of global population density.

The Rise of Megacities: A Glimpse into the Future Looking ahead to 2030, global projections forecast the emergence of 43 megacities, defined by populations exceeding 10 million inhabitants. Strikingly, these megacities are expected to burgeon predominantly in developing regions, underscoring the rapid urbanization occurring in these areas. However, the urbanization narrative extends beyond

sheer size, as some of the most rapid urban agglomerations are transpiring in cities with populations of fewer than 1 million residents. Notably, many of these burgeoning urban centers are concentrated in the dynamic regions of Asia and Africa.

Urban Diversity: Beyond Megacities

While megacities captivate attention with their size and influence, it is crucial to recognize the diversity within the urban landscape. Contrary to the popular notion of densely populated megacities, nearly half of the world's urban dwellers reside in settlements considerably smaller, with fewer than 500,000 inhabitants. These smaller urban hubs are scattered across the globe and play a significant role in shaping the socio-economic fabric of their respective regions. The Metropolitan Cities is much of the time viewed as banter discussion point, which has a critical effect on the arrangement outlining in the lengthy run. For an extremely extensive period of time, local strategies have been related to provincial financial issues, and metropolitan arrangements have been connected to land use and climate supportability. In summary, the intricate web of global urbanization is marked by the rise of megacities, the shifting fortunes of major urban centers like Tokyo and Delhi, and the burgeoning growth in smaller yet influential urban agglomerations. As we peer into the future, understanding the nuances of urban dynamics becomes essential for policymakers, researchers, and citizens alike.

In conclusion, the intersection of energy access, climate change mitigation, and disaster risk reduction underscores the urgency of adopting sustainable energy practices. The diverse range of energy sources available in the environment provides a foundation for addressing the challenges of limited access and environmental degradation. As the global community strives for economic development, it is imperative to do so in a manner that is mindful of the environmental consequences. By prioritizing energy efficiency, embracing renewable sources, and preserving ecosystems, we can navigate towards a future where energy is both accessible and sustainable, fostering human development while mitigating the impacts of climate change.

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Innovative Practices for Inclusive Education: A Concept Mapping

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Abstract:

The New Education Policy (NEP) 2020 was introduced with a vision of transforming Indian education. Before NEP 2020, the education system was governed by the National Policy on Education (NPE) 1986 and the Right to Education Act 2009, both of which emphasized integrating the physically and mentally challenged child with the general child. Innovative practices in the classroom focus on pedagogy, technology, policy, and administration. Teacher-led innovative techniques to create diversity that helps inclusive education. Inclusive practices include curriculum, teacher, learner, and learning context. NEP 2020 focuses on economically and socially disadvantaged groups to create inclusive and equitable education. The study's main objective is to discuss various innovative practices for inclusive education. Based on secondary data, this paper focuses on creative practices for inclusive education in the Indian context. Data from sources like e-books, articles, journals, and commission reports has been collected. The paper briefly describes innovative practices of inclusive classrooms, the importance of inclusive classrooms, and the challenges of inclusive approaches in the school.

Keywords: Inclusive Education, NEP-2020, Inclusion, Innovative Practices.

Introduction:

Every pupil has the equal right to quality education, which is fundamental for all children aged between 6 and 14. Right to Education Act (RTE-2009) and Sarva Shiksha Abhiyan focus on children with disabilities learning together in regular schools. SSA focuses on increasing access to education, enrolment, and improvement of quality education: Integrated Education for Disabled Children (IEDC) 1974, the central govt. The scheme was last revised in 1992. This scheme provides educational opportunities to all children with regular schools to integrate and facilitate ultimate retention in the standard school system. The areas (IEDC) focuses on linkages of the mainstream schools with exceptional schools, providing facilities of available resources for children with disabilities, appointing experienced teachers, training mainstream and special school teachers, appropriate resource room support, training of the academic staff, monitoring, integration of specially-abled children, pre-school facilities, adequate and proper instructional materials support, assessment, and evaluation. The Rehabilitation Council of India (RCI) 1992 was enacted by the parliament. This regulatory body monitors the training of rehabilitation personnel or professionals to encourage research in special education; that body is also responsible for recognizing institutes and standardizing curriculum, research, development, training, and workforce

development. Persons with Disability Act (PWD-1995) ensures equal opportunities, protection, and full participation; the act provides both promotional and preventive aspects, rehabilitation like research and workforce development, education, reservation, employment, and vocational training, restoration of the disabled child, unemployment and establishment of homes for disabled children and creation of the barrier-free environment. Education for All (2010), a global monitoring report, argues for quality primary education for all children. The New Education Policy (NEP-2020) introduced the education system differently. It entered the era of inclusive education where children with disabilities, with a particular focus on socially and economically backward children, are allowed into the mainstream education system, and nobody is denied admission under any circumstances.

Objectives: The main aims of the study are to understand the concept of inclusive education, innovative practices for inclusive classrooms, and the importance and barriers of inclusive approaches in the school.

Methodology:

This paper is based on conceptual, theoretical secondary analysis that focuses on inclusive education and innovative practices for inclusive education. Data from sources like e-books, articles, journals, and other commission reports has been collected. This paper briefly describes

inclusive education, innovative practices in inclusive classrooms, the benefits of inclusive practices in an inclusive classroom, and barriers to inclusive practices.

Concept of Inclusive Education:

Inclusive education allows all students from different backgrounds to learn together in the same school and classroom. Inclusion of all those children who have traditionally been excluded from mainstream education, not only special-abled children but also different language groups or minority groups. Inclusion is a dynamic process constantly evolving or developing according to context and culture (Stubbs, 2008). Salamanca states that educational institutes should accommodate all students regardless of their social, emotional physical, linguistic, intellectual, or other conditions. Convention on the Rights of the Child article (28) ensures all children have equal education rights without discrimination. The Universal Declaration of Human Rights (UDHR article 26) also ensures that every pupil has the right to education. New Education Policy (2020) provides the full participation of economically and socially disadvantaged groups. Nobody can deny admission under any circumstances.

Inclusion refers to full participation in all aspects of school life and supports the culture, policies, and practices. In an inclusive education system, all children succeed and achieve well-being through every stage of learning. To meet the challenges of inclusive practices in the classroom, the involvement and cooperation of teachers, family, and community members are vital to creating better inclusive approaches in the school. The environment of inclusiveness provides a sense of belonging, respect for each other, access to opportunity for all, a common purpose, and appreciation of individual attributes and values. The inclusion of the education system needs a wide range of policy strategies, processes, and practices for quality education for pupils.

Some Components of Inclusive Classroom:

1. Leadership
2. School Climate and Structure
3. Collaborative Practices
4. Student Placement
5. Funding
6. Family and Community Involvement
7. Supplementary Aid and Services
8. Refocused use of assessment
9. Use of effective program models and classroom practices (Lindsay, 2003).

Inclusive Practices in the Classroom:

Inclusive practices in the classroom focus all students learning together, valuing others'

cultures and perspectives, teachers learning to expand their skills, celebrating diversity and individuality, nurturing shared respect and empathy, honoring the needs of all learners equally, giving teachers assistance and support, connecting individuals with innovative learning styles, and focus on abilities, not disabilities. Govt. of Assam elementary education major interventions for inclusive practices in the classrooms different activities have been conducted, significant interventions for inclusive education provide the barrier-free environment, awareness creation, corrective strategy, curriculum adaptation, and distribution braille book, a celebration of world disabled day and braille day, conducting of a daycare center, identification, and enrolment, providing transport and escort allowances, assessment and distribution of aids and appliances. The effective practices of inclusive classrooms depend on planning and educational processes and systems, organizations, educational strategies, teacher training, professional development, differentiated and personalized teaching, and the needs of students (Kozibroda et al., 2020). Respectful and positive classroom climate and teamwork, new curricula, appropriate school policy, efficient teacher education, and teacher beliefs, attitude, and behavior are the most influencing factors (Schwab et al., 2015), inclusive design, inclusive practice, and inclusive design (Page et al., 2021) promoting inclusive values, collaboration, family involvement, lesson planning, scheduling, coordination, assessing or reporting student behavior is the applicable practices (Jackson et al., 2000) digital technology and internet creating the innovations of inclusive practices and influencing factors are economic trends, technological trends, social and demographic changes (Hamburg, 2017) institutional factors, funding, legal factors, access and pedagogy (Larysa, 2020). Inclusive classroom practice, awareness about legislation, and teachers' awareness about inclusive practices (A, Binuraj Abbas, Faiza; Zafar, Aneeka; Naz, 2016). However, the best practices of inclusive classrooms are universal design for learning, classroom community building, and collaborative participation in a digital environment with a physical environment.

Benefits of Inclusive Practices:

Inclusive practices in the classroom provide equal learning opportunities, promote conversation, and are beneficial for all students; students work together and model appropriate behavior. Students learn the significance of equality and diversity; it helps children develop self-confidence and a creative way of problem-solving and acknowledges other needs. Inclusive practices provide flexible

practices with groups engaging in collaborative ways to learn each other from the group (Tiernan et al., 2020). It is also helpful for lower achievers students to interact with groups and caring classroom environments (Singh, 2016); researchers also indicated that students gain more knowledge from reaching inclusive classroom settings that provide opportunities to develop relationships. Practices of inclusivity give assurance and accountability, improve employment outcomes, increase recruitment and retention, increase staff and student satisfaction, and improve teaching and learning quality.

Barriers to Inclusive Practices: Barriers to inclusive practices in the classroom practices by teachers depend on several factors-

1. Lack of awareness about new trends or lack of understanding of the importance of innovations.
2. Inappropriate infrastructural support, the majority of schools in India need to be better designed.
3. Lack of skills and competencies of teachers and teacher training program.
4. Lack of highly qualified teachers for working with exceptional children.
5. Lack of resources human resources, educational, methodical, and unique resources.
6. The ineffective mechanism for assessing students with special educational needs.
7. The insufficient practice of inclusive cultures, policy, and lack of pedagogical inclusive educational exercise.
8. The negative attitude of teachers and families, inappropriate curriculum, and inadequate funding are significant barriers to inclusive practices.

Teachers should ensure diverse cultures among students with exceptional children in classrooms and provide appropriate support to encourage their valued participation. Respect the diversity of pupils and different talents to offer a variety of perspectives to create a peaceful and productive environment.

Conclusions:

The classroom is a complex environment. Every day, changes come to our lives and our education systems. The New Education Policy 2020 vision also transforms our Indian education system. Inclusive classroom practices are the idea of a new era that creates learning opportunities for all. Inclusive practices in the classroom focus on all students learning together, valuing others' cultures and perspectives, teachers learning to expand their skills, and celebrating diversity. This paper discussed the concept of inclusive education, innovative practices for inclusive classrooms, and

the benefits and barriers of inclusive practices in education.

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Hydrochemical Evaluation of Groundwater with Special Reference to Nitrate Contamination in the Jam River Basin at Sinnar, Sangamner and Kopargaon Tehsil, Maharashtra.

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Abstract:

Water, which we have always believed to be abundant and a free gift from nature, is a vital natural resource for maintaining life and the environment. Nitrate pollution from agricultural land has been a major worry in recent years. The goal of the hydrochemical study was to evaluate the nitrate contamination of the groundwater in the Jam River Basin and determine its current condition. Sixty typical samples of the groundwater from the study area were collected for this investigation. In 2020, the samples were examined both before and after the monsoon season. The different physicochemical parameters like pH, EC, TDS and major ions such as Ca, Mg, Na, K, SO₄, PO₄, NO₃ and Cl were determined. The majority of the samples in the study came from overly watered agricultural areas and it was discovered that these samples had NO₃ levels more than 45 mg/l. The current study helps to prevent significant health issues in the area and the dangers of nitrate poisoning.

Keywords: Hydrochemistry, Nitrate contamination, nitrogenous fertilizers.

Introduction:

Water, which we have long believed to be a plentiful and free gift from nature, is a vital natural resource for maintaining life and the environment. A significant supply of drinking water in both urban and rural regions is groundwater. Groundwater is able to dissolve and carry a wide range of chemicals and other compounds in solution. Over 90% of people living in rural areas use groundwater for household needs. Excessive levels of fluoride, arsenic, and nitrate in some regions of the country's groundwater are causing serious issues for the nation (Sunitha *et al.*, 2012). Because of extensive farming practices, urbanization, and industrialization, groundwater quality usually decreases over time (Mhaske *et al.*, 2022, Wagh *et al.*, 2020). Rainwater's ability to undergo chemical change is influenced by a multitude of factors, including the sorts of minerals that dissolve, the interaction between soil and water, and human activity (Umar and Ahmed, 2007). Total dissolved solids increase in the post-monsoon season as a result of minerals being dissolved by water percolating through underlying layers and worn zones (Pandian and Sankar, 2007). According to Sehmi *et al.* (2000), nitrate pollution is caused by the following: misuse of nitrogenous fertilisers,

incorrect management of irrigation systems, improper disposal of livestock waste, and the exploitation of virgin land. Groundwater resources with high nitrate concentrations (> 45 mg/l; Pawar and Shaikh, 1995) pose a threat to the environmental system. The soil and groundwater environment has deteriorated as a result of these forces working together. As a result, it is crucial to assess groundwater quality in the Jam River basin in relation to the state of nitrate contamination.

Study Area:

The Jam River, a tributary of the Godavari River, originates from the high Mhasha hill in Sinnar tehsil in Nashik district and enters the Godavari River close to Kopargaon tehsil in Ahmednagar district. The basin has 636.67 square kilometres in total. It moves 52.2 kilometres, from Sinner Tehsil's eastern region to Kopargaon Tehsil's southwest region. The study region is situated between 19°44'27" to 19°52'18" N latitudes and 74°6'28" to 74°25'56" E longitudes in the Deccan Plateau, an eastern extension of the Kalsubai range (Fig.1). With average annual rainfall (Sinnar: 568.6 mm, Sangamner: 510.57 mm, and Kopargaon: 483.9 mm) from south-west monsoonal winds, blowing from June to September. Numerous settlements in Sinnar, Kopargaon, and Sangamner tehsil benefit

from this river for their drinking and irrigation needs.

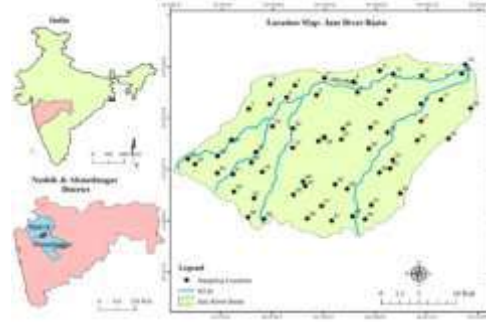


Fig.1 Study area map with groundwater sampling sites

Materials and Methods:

The current study was carried out in the Jam River basin to assess the geochemistry of groundwater. The main subject of the study was how intensive farming practices affected the groundwater regime in the area under investigation. In the current study, throughout the 2020 pre- and post-monsoon seasons, sixty representative ground water samples were taken from various dug and bore wells based on geographic variation. To reduce the possibility of contamination, groundwater samples were gathered and appropriately labelled in

one-liter plastic cans that had been pre-treated. Additionally, samples were sent to an analytical lab for physicochemical analysis using the American Public Health Association's standard procedures (APHA 2005). Using a multiparameter tester, the field measured the pH, EC and TDS. In a lab setting, the major cations and anions were measured. The analytical techniques, software and tools used to complete this work are included in the approach and are listed in Table 1. The analytical precision is confirmed by the ion balance error, which is within $\pm 5\%$.

Table 1. Materials and methods used for analysis

Parameters	Materials and methods
Base map preparation	Survey of India toposheet 47 I/1, 47 I/2, 47 I/5 and 47 I/6 on 1:50000 scale
pH, EC and TDS	Multi-parameter tester
Ca, Mg and Cl	Titrimetric method
Na and K	Flame Photometer (Elico CL361)
NO ₃ , SO ₄ and PO ₄	Spectrophotometer (Shimadzu UV-1800)
Spatial distribution maps	Arc GIS 10.8 v(IDW technique)

Results and Discussion: The hydro-chemical results and statistical overview is given in table 2.

Table 2. Physicochemical characteristics of groundwater samples in pre- and post-monsoon seasons of 2020

Parameters	(DL-PL) BIS (2012)	Average		Range		% of samples above DL		% of samples above PL	
		Pre	Post	Pre	Post	Pre	Post	Pre	Post
pH	6.5-8.5	7.90	7.61	7.1-8.5	7.1-8.2	100	100	1.66	0.00
EC	0	1763.82	1586.82	108-6710	109-7170	0.00	0.00	0.00	0.00
TH	300-600	781.87	492.87	320-2120	120-2110	100	63.33	71.66	15
Ca ²⁺	75-200	236.24	131.12	60.52-561.12	48.09-370.1	96.66	73.33	56.66	10
TDS	500-2000	1054.81	949.5	97-3820	76-4188	75	71.66	13.33	10
Mg ²⁺	30-100	138.39	92.96	7.89-350.4	4.86-331.69	96.66	91.66	61.66	26.66
Na ⁺	200	267.81	196.10	20.18-1080.2	4.80-880.70	0.00	0.00	26.66	23.33
K ⁺	12	2.06	2.00	0.1-7.43	0.1-7.17	0.00	0.00	0.00	0.00
Cl ⁻	250-1000	483.20	419.80	98.6-1704	90.16-1682.32	61.66	50	11.66	5
SO ₄ ²⁻	200-400	177.84	62.48	33.1-1207.49	30.85-192.26	15	0.00	11.66	0.00
PO ₄ ²⁻	0.2-1	0.68	0.22	0.02-1.94	0.01-1.12	71.66	18.33	33.33	11.66
NO ₃ ⁻	45	26.27	29.86	5.17-66.14	3.1-79.69	0.00	0.00	11.66	21.66

DL desirable limit, PL permissible limit

Note: All major ions and TDS are expressed in mg/lit while pH on scale and EC in $\mu\text{S}/\text{cm}$.

pH value ranged from 7.1 to 8.5 and 7.1 to 8.2 with an average of 7.90 and 7.61 respectively, indicating an alkaline nature; the elevated pH values are attributable to the weathered basalt. In pre- and post-monsoon seasons, EC ranges from 108 to 6710 $\mu\text{S}/\text{cm}$ (avg. 1763.82 $\mu\text{S}/\text{cm}$) and 109 to 7170 $\mu\text{S}/\text{cm}$ (avg. 1586.82 $\mu\text{S}/\text{cm}$). The range of TDS values in the pre- and post-monsoon seasons was 97-3820 mg/l and 76-4188 mg/l, respectively, with average values of 1054 and 949 mg/l (Table 2). It has been shown that the ideal limit was surpassed by 75% in the premonsoon and 71.66% in the post monsoon seasons, and the permitted limit was exceeded by 13.33% and 10% of the samples (Table 2).

During the pre- and post-monsoon seasons, calcium ranges from 60.52-561.12 mg/l (on average 236.24 mg/l) and 48.09-370.1 mg/l (on average 131.12 mg/l), respectively (Table 2). 56.66% and 10 % of the samples are above the allowable limit. Magnesium concentrations range from 7.89 to 350.4 mg/l and from 4.86 to 331.69 mg/l. While the average TH is 781.87 and 492.87 mg/l in the pre- and post-seasons, the total hardness values range from 320 to 2120 mg/l and 120 to 2110 mg/l, respectively. According to analytical findings, in the pre-/post-monsoon season, 100% and 63.33% of samples above the desired level (300 mg/l), while 71.66 and 15% of samples exceeded the permissible limit (600 mg/l) (Table 2). Because of the use of hard water in household activities, urolithiasis and cardiovascular diseases are caused (Morrison *et al.*, 2001). An average of 267.81-196.10 mg/l of sodium present in each litre of water, respectively. Drinking water with a high salt

concentration can cause heart, kidney and circulation problems (Vasant *et al.*, 2016). Potassium for all of the samples is shown to be within the threshold level (12.0 mg/l).

Chloride levels range between 98.6-1704 mg/l (an average of 483.20 mg/l) and 90.16-1682.32 mg/l (an average of 419.80 mg/l) (Table 2). The causes of chloride in groundwater include fertilisers. (Wagh *et al.*, 2017). According to BIS standards, in the pre- and post-monsoon seasons, 61.66 and 50% of the samples were above the acceptable level (250 mg/l). Sulphate concentration ranges from 33.1 to 1207.49 mg/l, 30.85 to 192.26 mg/l, with an average of 177.84 and 62.48 mg/l, and 11.66% of samples exceed the permitted limit during summer. In pre- and post-monsoon seasons, respectively, the phosphate concentration ranges from 0.02-1.94 mg/l, 0.01-1.12 mg/l, with average values of 0.68 and 0.22 mg/l, and 33.33% and 11.66% of samples exceed the allowable limit. (Table 2).

Spatial variation of nitrate in study area

Before and after the monsoon season, the nitrate levels vary between 5.17 and 66.14 mg/l and 3.1 and 79.69 mg/l. The post-monsoon samples with surplus values have been found to be 11.66% and 21.66%. The primary sources of nitrate are fertilisers high in nitrogen and animal excrement (Panaskar *et al.*, 2014). Using nitrate-rich water affects blood oxygenation and causes methemoglobinemia (Sunitha *et al.*, 2012). High nitrate concentrations are seen in northeastern regions with heavy agricultural operations, according to the nitrate spatial variation maps. Compared to summer, winter has more of it (Fig. 2).

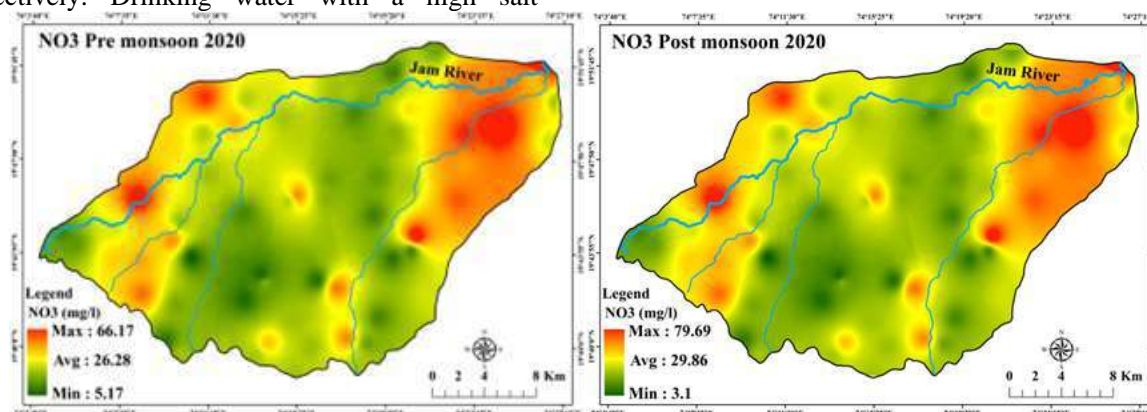


Fig.2. Spatial distribution of NO₃ in pre and post monsoon season 2020

Nitrates in drinking water have been related to a number of health problems, including multiple sclerosis, methemoglobinemia, Alzheimer's disease, vascular dementia and gastrointestinal cancer in humans (Deshmukh, 2012, Mhaske *et al.*, 2022).

Conclusion:

The BIS (2012) states that several parameters, such as pH, Ca, Mg, Na, Cl, NO₃, TH, and TDS, exceeded the desired and authorised limits

and ultimately resulted in poor groundwater quality. Hydro-chemical research indicates that groundwater is consistently hard and alkaline. The increased EC is caused by the inorganic pollution load in groundwater and salt dissolution. The high levels of Cl, NO₃ and TDS are brought on by the region's intensive agriculture and human inputs. The post-monsoon season is known to have a significant detrimental effect on groundwater quality due to a

number of factors, including excessive chemical fertiliser application, percolation and salt dissolution in aquifer and promotion of agricultural runoff. Anthropogenic activity is most likely to blame for the elevated NO_3^- that was found in 11.66% of pre-monsoon and 21.66% of post-monsoon samples, both of which were over the permitted limit. High nitrate concentrations are seen in northeastern regions with heavy agricultural operations, according to the nitrate spatial variation maps. Compared to summer, winter has more of it (Fig. 2). Local government representatives in the Jam River Basin districts of Ahmednagar and Nashik may find it useful to use the study's findings to determine which regions are susceptible to groundwater resource management.

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Solid Waste Management

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Abstract:

Solid waste is the unwanted or useless solid materials generated from human activities in residential, industrial, commercial areas. Solid waste has become a major consequence of development and modernization, yet some of the greatest challenges to its management are felt most keenly in the developing countries. This is part of the larger paradox of development; namely, that factors that create the most intransigent problems currently facing the developing countries are invariably those which derive from development itself. Solid waste is a problem that must be properly managed to protect the human health and environment and preserve the natural resources. Many do not realize that solid wastes also make a definite impact on the climatic change. The manufacturers, users and distributors of the products as well as the disposal of the resulting wastes all results in emission of the atmospheric gases 'Green House Gases' which has affected the earth's environment to a large extent. The paper begins by delineating the varied sources and characteristics of solid waste, underscoring the significance of understanding its diverse origins. It proceeds to highlight the pressing challenges in managing solid waste, especially in rapidly urbanizing areas, where inadequate infrastructure leads to environmental degradation and health hazards. Statistical data from sources like the World Health Organization (WHO) emphasizes the global impact of improper waste management on public health, with millions affected by air pollution and related diseases.

Keywords: - solid and liquid waste, recycle, reuse, WWTP, EPA

Introduction:-

In contemporary society, many of the items used daily are designed to be used and discarded. Single-use packaging and the disposable items defines many of our consumers pattern with increased availability of the disposals it has added to the problem of how to get rid of all these wastes. Removing garbage from homes and businesses without greater attention to what was then carried out with it has also been the priority of municipal SWM in several cities of developing countries. In most developing countries, garbage collected from households is disposed of in landfills or dumpsites, the majority of which are projected to reach their capacities within a decade. The unsustainable approach of dumping or burning waste in an open space, usually near poor communities on the city edge, or throwing garbage into water bodies was an acceptable garbage disposal strategy. Similarly, several cities still use old-generation or poorly managed facilities and informal uncontrolled dumping or open-air waste burning. Often, these practices affect marginalized social groups near the disposal sites [10]. Moreover, this approach poses several sustainability problems, including resource depletion, environmental pollution, and public

health problems, such as the spread of communicable diseases.

Objectives:-

1. Minimize the production of waste.
2. Reduce pollution effects
3. Protect ground water sources.
4. Ensure sustainability.
5. Promote public awareness.
6. Foster social equality, equity and inclusion.

Waste Management Strategies:-

A. Waste Minimization:

At the forefront of effective waste management lies the principle of waste minimization. Implementing strategies such as source reduction, encouraging reuse, and promoting repair initiatives significantly mitigates waste generation. According to the Environmental Protection Agency (EPA), in the United States alone, recycling and composting prevented over 186 million metric tons of carbon dioxide equivalent emissions in 2019, equivalent to removing more than 40 million cars from the road for a year.

B. Recycling and Resource Recovery:

Understanding the recycling process for various materials—plastics, glass, paper, metals—is crucial. Globally, the recycling rate for plastics stood at

around 9% in 2020, as per the Our World in Data report. However, advancements in recycling technologies and increased awareness have the potential to significantly improve these rates.

C. Waste-to-Energy and Treatment Technologies:

Waste-to-energy technologies, including incineration and anaerobic digestion, offer alternative disposal methods. The Global Waste to Energy Market Report projected a compound annual growth rate (CAGR) of 5.8% from 2021 to 2026 due to increasing waste volumes and the need for sustainable energy sources.

D. Policy and Regulations:

Government policies wield considerable influence in shaping waste management practices. The European Union's Waste Framework Directive, revised in 2018, established ambitious recycling targets to transition towards a circular economy. This initiative led to significant progress, with the EU achieving a recycling rate of 47.1% in 2021, surpassing previous milestones. Similarly, the United States Environmental Protection Agency (EPA) reports that stringent regulations, such as the Resource Conservation and Recovery Act (RCRA) of 1976, have contributed to a substantial reduction in hazardous waste disposal in landfills, decreasing from 53 million tons in 1980 to approximately 25 million tons in 2018.

E. Technological Advancements:

Recent technological innovations are revolutionizing waste management practices globally. Smart waste management systems, integrating its sensors and data analytics, optimize waste collection routes, leading to a reported improvement of up to 30% in waste collection efficiency, as per a study by Frost & Sullivan. Artificial intelligence (AI) applications in waste sorting facilities have also shown significant promise. Robots equipped with AI algorithms, such as those developed by Waste Robotics Inc., achieved sorting accuracies exceeding 90% for various plastics, surpassing human capabilities and enhancing recycling purity rates.

Methods of solid waste disposal and management are :-

Open burning:- Possible only in coastal cities. Refuse shall be taken in barges sufficiently far away from the coast (15- 30 km) and dumped there. Very costly. Not environment friendly

Sanitary Landfilling of Solid Wastes: Simple, cheap, and effective. A deep trench (3 to 5 m) is excavated. Refuse is laid in layers. Layers are compacted with some mechanical equipment and covered with earth, leveled, and compacted. With time, the fill would settle. Microorganisms act on the organic matter and degrade them.

Decomposition is similar to that in composting. Facultative bacteria hydrolyze complex organic matter into simpler water soluble organics. Too much refuse shall not be buried – fire hazard. Moisture content – not less than 60% for good biodegradation

Incineration of Solid Waste: A method suited for combustible refuse. Refuse is burnt. Suited in crowded cities where sites for land filling are not available. High construction and operation costs. Sometimes used to reduce the volume of solid wastes for land filling. Primary chamber – designed to facilitate rapid desiccation of moist refuse and complete combustion of refuse and volatile gases. A ledge or drying hearth is provided for this purpose

Waste to Energy Combustors: Incinerators – Refuse was burned without recovering energy – exhaust gas is very hot – exceeds the acceptable inlet temperature for electrostatic precipitators used for particulate emission control. Modern combustors – combine solid waste combustion with energy recovery.

Combustors for Solid Waste: Storage pit – for storing and sorting incoming refuse. Crane – for charging the combustion box. Combustion chamber consisting of bottom grates on which combustion occurs. Grates on which refuse moves. Heat recovery system of pipes in which water is turned to steam. Ash handling systems. Air pollution control systems

Composting: Similar to sanitary landfilling. Yields a stable end product – good soil conditioner and may be used as a base for fertilizers. Popular in developing countries. Decomposable organic matter is separated and composted

Methods:

1. Open window composting
2. Mechanical composting

Open window composting: Refuse is placed in piles, about 1.5m high and 2.5m wide at about 60% moisture content. Heat build up in the refuse piles due to biological activity – temperature rises to about 70 degree. Pile is turned up for cooling and aeration to avoid anaerobic conditions. Moisture content is adjusted to about 60. Piled again – temperature rises to about 70 degree C. The above operations are repeated. After a few days (~ 7 to 10 weeks) temperature drops to atmospheric temperature – indication of stabilization of compost

Mechanical composting: Process of stabilization is expedited by mechanical devices of turning the compost. Compost is stabilized in about 1 to 2 weeks. To enrich compost – night soil, cow dung etc. are added to the refuse. Usually done in compost pits. Arrangements for draining of excess moisture are provided at the base of the pit. At the bottom of the pit, a layer of ash, ground limestone,

or loamy soil is placed – to neutralize acidity in the compost material and providing an alkaline medium for microorganisms. The pit is filled by alternate layers of refuse (laid in layers of depth 30 – 40 cm) and night soil or cow dung (laid over it in a thin layer)

Vermicomposting: Ideal for biodegradable wastes from kitchens, hotels etc. At household level, a vessel or tray more than 45 cm deep, and 1 x 0.60m may be sufficient. A hole shall be provided at one end in the bottom for draining the leachate out into a tray or vessel. Lay a 1” thick layer of baby metal or gravel at the bottom of the tray. Above that lay an old gunny bag or a piece of thick cloth, a layer of coconut husk upside down over it and above that a 2” thick layer of dry leaves and dry cow dung (powdered). Lay the biodegradable waste over it. Introduce good quality earthworms into it (~ 10 g for 0.6 x 0.45 x 0.45 m box). If the waste is dry, sprinkle water over it daily. Rainwater should not fall into the tray or vessel or box. Keep it closed. If the box is kept under bright sun earthworms will go down and compost can be taken from the top. Compost can be dried and stored. Continue putting waste into the box. Add little cow dung at intervals. Do not use vermiwash directly. Dilute in the ratio 1:10 before use

Disposal by hog feeding

- Not common in India. Refuse is ground well in grinders and then fed into sewers. Disposal of garbage into sewers – BOD and TSS increases by 20-30%. Disposal of residual refuse – still a problem

Conclusion:-

In conclusion, the complexities of solid waste management necessitate a multifaceted approach encompassing policy interventions, technological innovations, and community engagement. Statistical data and real-world case studies affirm the efficacy of diverse strategies in mitigating waste-related challenges. Collaboration among governments, industries, and communities remains crucial for sustainable waste management practices that safeguard the environment and public health. The paper concludes by advocating for collaborative efforts among governments, industries, and communities to realize a future where effective waste management practices safeguard both the environment and public health.

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Deep Ecology in Easterine Kire's *Sky is my Father: A Naga Village Remembered*

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Abstract:

In this novel, Kire exposes the linkage between nature and human beings in unique form without adding any artificiality. Deep ecology explores the inclusiveness of nature embedded in the life on earth. In this paper, I have used the Deep Ecology philosophy to understand the ecological sustainability themes prevailing throughout the novel.

Keywords: Deep Ecology, Sustainability

Depth relationship between Ecology and Life:

For Pramod K. Nayar "Deep Ecology believes in the fundamental interconnectedness of all life forms and natural features". In this novel, the life of Naga people was attached closely with nature. "In the early evening, they came to the Themhiru river just as the sun was setting behind them, and birds were making their roosting sounds.....Morning came in the call of a thebuora." (Kire, 4)

Khonoma, the village chosen by Kire was the background of the novel. Here birds are the representation of life form which awakes the feature of nature-morning and evening.

Blessings of nature:

"The sun and rain are the Creator's blessings." (Kire, 13)

For the villagers of Khonoma, agricultural field earns much than the battlefield. So they show lot of respect in harvesting food grains. The elders in the village pronounce blessings at the field by telling that paddy had to be abundant as it would be food of generations. Deep ecology integrates the natural world and human world.

"Khonoma was well defended.. and the sheer rock face that made it a natural fortress." (Kire, 2)

Under British rule, the caves of Khonoma village afforded as natural shelters to protect from cannon attacks. For Arne Naess, both human and non-human life forms have intrinsic forms.

Sustainability of natural resources:

"The women would set out before dawn to fetch firewood for the day. But if they already had firewood for their households, they could be seen fetching water in their bamboo carriers." (Kire 1-2) The central tenet of Deep ecology is environmental

sustainability. It is exposed through preservation of natural resources and avoidance of exploitation through self-sufficient Khonoma village in this novel. For example women in the village collect sufficient firewood and water from nature. The people in the village allocates khunuo lievi day as a genna day (no-work day) in order to prevent damage to crops by animals.

Celebration of nature:

The villagers in the Khonoma village perform the rhoutho ritual of seed-sowing to appreciate the bonding between the land-the important aspect of ecology and them. "Out in those wide green spaces, he sang songs known as the songs of the forest." (Kire, 77) Here Lato sings joyfully the forest songs which express the depth bonding with nature. "Sky is my father, Earth is my mother." (Kire, 71) These words express strongly the philosophy of Deep ecology and natural lifestyle of all living organisms in this novel

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A Critical Review on Challenges and Threats and Ways for Securing Wireless Networks

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Abstract:

Wireless security is the avoidance of unlawful access or impairment to computers using wireless networks. Wireless network security has been the favorite subject of researchers for the past two decades with no previous solution found on what security method should be used to prevent illegal data access. The aim of this study was to review some literatures on wireless security in the areas of attacks, threats, vulnerabilities and some solutions to deal with those problems. It was found that attackers (hackers) have different mechanisms to attack the networks through bypassing the security trap developed by organizations and they may use one weak point to attack the whole network of an organization. However, the author suggested using firewall in each wireless access point as the counter measure to protect data of the whole organization not to be attacked.

Keywords - Wireless network, network security, WAP2, WEP, hackers, Firewall

Introduction:

Wireless networks, like Wi-Fi or WLAN, are becoming super popular because they're easy to set up and don't need cables [1]. Lots of places, like offices and public spots, are using wireless Internet, and even people at home are getting into it. This is happening because technology is getting better, and it's not too expensive, making it flexible for different uses. But, going wireless also brings some security issues that might mess with people's privacy at home or work. It's like, because it's easier for things

to connect, it's also easier for bad guys to do sneaky stuff like grabbing data or quietly listening in on what's going on with the system. This risk becomes more apparent when switching from using physical cables to wireless LAN technology.

Take a look at Figure 1, which shows how wired and wireless networks are different. It points out how wireless access points help laptops and phones get data. Both kinds of networks need strong security so that only the right people can get to the information.

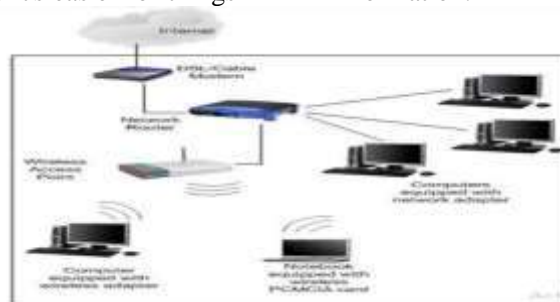


Figure 1: Showing the architecture of wired network and wireless network.

Now, let's talk about how to keep things safe in wireless networks. Because there are so many types of wireless networks using different methods, we need better ways to keep them secure [2]. Wireless security is all about stopping bad guys from getting into computers that use wireless networks. It's a bit different from how we usually secure networks with cables. The report mentions two common ways to secure wireless networks: Wired Equivalent Privacy (WEP) and Wi-Fi Protected Access (WPA). But,

there are criticisms of a standard called IEEE 802.11, saying it has design problems. So, it's important to focus on making sure the network is always available, messages are real, communication is secret, nothing gets changed without permission, and we know where messages come from. In the end, the report tries to explain the most important parts of keeping wireless networks safe. It talks about keeping the network available all the time, making sure messages are real, keeping

communication secret, making sure nothing gets changed without permission, and knowing where messages come from. The goal is to help people understand the basics of wireless network security and be ready for any problems that might come up.

Background and literature survey Network Security Challenges, Attacks, and Threats:

Network security has evolved significantly, bringing forth various challenges and threats. Around 2000, a surge in public awareness of network threats occurred as wireless equipment prices declined. [2] exploration questioned computer security fundamentals, urging a deeper understanding of network infrastructure and cost-effective protection. Denial of Service (DoS) attacks, a severe security risk identified by [3], can compromise the availability and integrity of broadband wireless networks. Integration of computing technology in wireless networks, as highlighted by [4], introduces security and privacy concerns, hindering widespread adoption.

Intrusion detection in wireless ad-hoc networks faced challenges, explored by [5]. Despite the popularity of Wireless Mesh Networks (WMNs) for internet connectivity, security in WMNs remained in its early stages [6]. The Internet of Things (IoT) raised security concerns, addressed by [7]. Security weaknesses in mobility support were emphasized by [8], stressing the need for authentication. Wireless Sensor Networks (WSNs) faced security issues due to sensor nodes in unattended environments [9]

Unique security challenges in Vehicular Clouds (VCs) were highlighted by [10], including authentication difficulties and trust-building. Cryptographic solutions for security challenges in Vehicular Ad-hoc Networks (VANETs) were explored by [11].

Security enhancements for 3G protocols were proposed by [12], focusing on non-repudiation. Identity theft, credit card fraud, and corporate fraud were identified as obstacles to wireless technology development [13].

Wormhole attacks were recognized as serious threats by [14], affecting ad hoc network routing protocols. The loss of confidentiality, integrity, and

the threat of DoS attacks in wireless communications were outlined by [15].

Routing and security issues in Mobile Ad-hoc Networks (MANETs) were studied by [16], categorizing attacks into active and passive with distinctions between insider and outsider attackers. Rushing attacks prompted the development of Rushing Attack Prevention (RAP) by [17]. The lack of rigid security standards in current wireless technologies, noted by [18], has led to significant investments by companies to secure their wireless networks. Continuous research and innovation are crucial to counter evolving threats in the dynamic digital landscape.

b) Osi Model in Network Security:

The OSI model, a crucial framework in network security, provides a systematic approach to implementing protocols and ensuring network integrity. Comprising seven layers, it maintains a hierarchical structure, with layers 1-4 dealing with data transfer and layers 5-7 handling application-level data. The functionalities of the seven layers, as per [19], are delineated in Table 1. Despite its structured design, each layer is susceptible to various attacks, as explored by [20]. Vulnerabilities span the Physical, Link, Network, Transport, Session, Presentation, and Application Layers, encompassing issues like power deficiency, MAC address spoofing, route spoofing, weak authentication, and program logic errors. MANETs, discussed by [21], may face heightened vulnerability due to their susceptibility to unlawful data manipulation.

Security attacks in MANETs are classified across layers, as illustrated by [22]. Cryptographic primitive attacks, both related and unrelated to cryptography, are outlined by [23]. Understanding vulnerabilities and potential threats at each layer is crucial, allowing for the implementation of robust security measures to safeguard network integrity and functionality. In summary, the OSI model offers a foundational structure, but addressing vulnerabilities is essential for effective network security.

Table 1: Seven layers Architecture and their functionalities

OSI Model : 7 Layers & Architecture				
	Assigned Layer Number	Data units type	OSI model layer	Layer function
Host Layers	7	Data	Application	<ul style="list-style-type: none"> • Applications interface • Interpreting program requests & info requirements
	6	Data	Presentation	<ul style="list-style-type: none"> • Data compression • Data representation • Encryption
	5	Data	Session	<ul style="list-style-type: none"> • Communications of interhost
Media Layers	4	Segments	Transport	<ul style="list-style-type: none"> • End-to-end connections • Properly sequence of packets
	3	Packets / datagram	Network	<ul style="list-style-type: none"> • Establish network connection • Translate network addresses • Transmitting individual packets across a network • Logical addressing: IP
	2	Bit / frames	Data link	<ul style="list-style-type: none"> • Physical addressing
	1	Bits	Physical	<ul style="list-style-type: none"> • Physical network connection signal management • Binary bit transmission • Media

Source- Gupta, S. S. (2013).

C)Some Network Security Solution:

Various network security solutions have been proposed to tackle the dynamic challenges in safeguarding information systems.[24] advocates the adoption of Security-Aware ad hoc Routing (SAR), a new routing technique that incorporates security attributes into ad hoc route discovery. SAR introduces security as a negotiable metric, elevating the importance of routes exposed by ad hoc routing protocols. To combat wormhole attacks, [25] introduces packet leashes as a mechanism, offering a general solution for detection and protection. Cryptographic algorithms, proposed by [26], provide a modest solution to protect Vehicular Ad-hoc Networks (VANETs).

Cryptography emerges as a dominant security tool, offering authentication, confidentiality, integrity, and non-repudiation services [23]. However, the vulnerability of cryptographic primitives to undiscovered attacks is acknowledged. [25] propose a secure aggregation protocol for wireless networks, tailored for low-cost sensor devices.

[22] advocate centralized server-based solutions like Remote Authentication Dial-In User Service

(RADIUS) for wireless LAN security. Wi-Fi Protected Access (WPA) is highlighted as a solution addressing vulnerabilities in Wi-Fi networks, significantly improving data security. [21] introduce Variable Threshold-value Authentication (VTA), a lightweight and tolerant authentication prototype for Wireless Mesh Networks (WMNs).

In conclusion, these network security solutions, encompassing routing techniques, cryptography, and authentication protocols, contribute to bolstering the resilience and protection of networks against diverse threats. Ongoing development and implementation of such solutions are crucial to adapting to the ever-changing landscape of network security challenges.

D)Wpa And Wpa2 Technology:

WPA (Wi-Fi Protected Access) and its successor, WPA2, represent advancements in wireless network security, developed by the Wi-Fi Alliance to address vulnerabilities in the predecessor WEP (Wired Equivalent Privacy). A comparison between WEP and WPA in Table 2 highlights the need for enhanced security protocols, leading to the emergence of WPA2, the current standard since 2006.

Table 2: Showing comparison between WEP and WPA

	WEP	WPA
Encryption	Flawed, cracked by scientists and hackers	Fixes all WEP flaws
	40-bit keys	128-bit keys
	Static – same key used by everyone on the network	Dynamic session keys. Per user, per session, per packet keys
	Manual distribution of keys – hand typed into each device	Automatic distribution of keys
Authentication	Flawed, used WEP key itself for authentication	Strong user authentication, utilizing 802.1X and EAP

Source- Chen. Et. al (2011).

Both WEP and WPA utilized the susceptible RC4 stream cipher, with WPA introducing TKIP for added security. However, WPA's reliance on RC4 still posed vulnerabilities. In contrast, WPA2 employs the robust Advanced Encryption Standard (AES) and CCMP, offering significantly enhanced security and resistance to brute-force attacks. Table 2 emphasizes the differences between WPA and WPA2, underlining the importance of robust security measures in wireless networks.

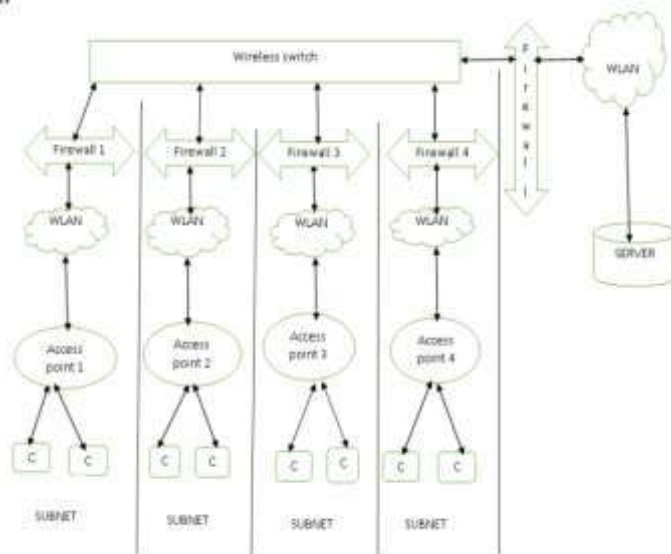
Table 2 emphasizes the differences between WPA and WPA2, underlining the importance of robust security measures in wireless networks.

	WPA	WPA2
Abbreviation stands for	Wi-Fi Protected Access	Wi-Fi Protected Access 2
Definition	A security protocol developed by the Wi-Fi Alliance in 2003 for use in securing wireless networks; designed to replace the WEP protocol	A security protocol developed by the Wi-Fi Alliance in 2004 for use in securing wireless networks; designed to replace the WEP and WPA protocols.
Methodology	As a temporary solution to WEP's problems, WPA still uses WEP's insecure RC4 stream cipher but provides extra security through TKIP.	Unlike WEP and WPA, WPA2 uses the AES standard instead of the RC4 stream cipher. CCMP substituted WPA's TKIP.
Security and Recommendations	Somewhat. Superior to WEP, inferior to WPA2.	Yes, though more secure when Wi-Fi Protected Setup (WPS) is disabled.

Source- Sari, Arif & Karay, Mehmet. (2015).

Despite the common use of firewalls, the Figure 3 suggests that protecting each access point with an

individual firewall may incur high costs but is necessary for comprehensive security.

**Figure 3**

Conclusion:

According to visited literature reviews which bring about the secondary data sources and some few primary data sources, it seems that there

are still difficulties in totally securing the wireless network against attacks, threats and vulnerabilities. The purpose of this study was to visit different literature in wireless network security and propose

some network security solutions which will be more capable of securing wireless network compared to the existing solutions. Most of the literatures indicated that securing totally wireless network is not an easy job but some parts of that network can be secured but not the whole network. So, figure 3 is suggested in this study even though it is expensive but it may secure some network portion as it brings challenge for the attacker to visit every node in order to access the whole network which may lead for an attacker to be detected.

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Exploration of Ecological Issues in Amitav Ghosh's "*The Hungry Tide*"

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Abstract:

The environment is the collection of the socioeconomic, biological or chemical factors that make up the surroundings of a human. In representing our environment, literature plays a critical role. 'Eco-criticism' is the term for the association among literature and the environment. As a separate movement or school of literary criticism, ecocriticism started developing in the 1990s. By analogy, ecocriticism is concerned with the relationships between literature and environment or how man's relationships with his physical environment are reflected in literature. 'Ecology' is delineated as the scientific study of the relationship between the organisms and the environment. The theory Ecological Imperialism insinuates that colonization or annexation was not only a way of cultural and political oppression or tyranny, but also a kind of environmental intimidation and violence.

Now, literary writers focus upon the major environmental issues in their writing to highlight the problems of ecosystem. Amitav Ghosh is one of them. His novel *The Hungry Tide* is set in the Sundarbans meaning "Beautiful forest" which comprises of more than ten thousand square kilometers, the tide country- narrates the history of the forced evaluation of refugees from the island of Morichjhapi.

Keywords: Nature, ecosystem, hungry tide, Morichjhapi, island, suffering, environment, refugees, tiger, co-existence

Introduction:

Eco is short of ecology, which is concerned with the relationships between living organisms in their natural environment as well as their relationships with that environment. The relationship between man and nature is not just interdependent but also interrelated. The word "Eco criticism" first appeared in William Rueckert's essay —Literature and Ecology: An Experiment in Ecocriticism in 1978. However, it was only in the 1990s that ecocriticism emerged as a separate discipline although it is a fact that the relationship between man and his physical environment had always been interesting to literary critics (Volkman pg. 370). An eminent ecologist Haeckel outlined the term 'Ecology' as the scientific study of the relationship between the organisms and the environment. The writers in their works extensively used this concept of ecology. Nature has been closely integrated with life in Indian tradition. It delineates with ecological issues like global warming, climate change, deforestation, species annihilation and other ecological destructions. In many literary works in English, nature has been a prime issue.

Amitav Ghosh is one of the greatest novelists of Indian English Literature of modern times. He was born on 11 July, 1956 in Kolkata and

grew up in India, Sri Lanka and Bangladesh. He completed his schooling from the Doon School in Dehradun. After schooling, he completed his further education from St. Stephen's College, Delhi University, and Delhi School of Economics. Ghosh won the Inlaks foundation Scholarship for D.Phil. in social anthropology at St. Edmund Hall, Oxford. Firstly, he worked in Indian Express newspaper in Delhi. Thereafter, he worked as a faculty in college and university.

Indian government has awarded him Padam-Shri in 2007. His contribution in Indian English Literature is remarkable. His works may be categorized into two parts Fiction and Non-fiction. Like, in fiction, *The Shadow Lines*, *The Calcutta Chromosome*, *The Glass Palace*, *The Hungry Tide*, *The Ibis* trilogy and *Gun Island* are popular work. In Nonfiction, *In an Antique Land*, *Dancing in Cambodia* and at large in *Burma*, *Countdown*, *The Imam* and *India* and *The Great Derangement: Climate Change and the Unthinkable*.

In the present article, it is intended to focus on the impact of nature on the lives of the characters of Amitav Ghosh's *The Hungry Tide*, their travails in order to battle with the extreme forces of furious nature and how it rules their lives. It also emphasizes the pathetic ordeal of the displaced refugees facing all the odds in search of their

identity in Morichjhapi. It advocates the importance of environment and the need to strive for the peaceful co-existence between humans and nature.

The Hungry Tide: Ecological Issues in Indian English Fiction:

Amitav Ghosh's *The Hungry Tide* (2005) is one of the first Indian novels to strongly raise ecological issues in Indian fiction. Ghosh's novel reveals the interactions between the state, the poor, the fauna and flora, and the physical environment, and in doing so this work highlights both the tragedy and the hypocrisy that were inherent in the conservation efforts in the Sundarbans. *The Hungry Tide* is set in the Sunderbans, an island in the Bay of Bengal which is not just beautiful but also fascinating. For settlers, the Sunderbans offer an extremely unpredictable and insecure life. The novel is divided into two parts – the *Ebb* and the *Flood* and is a story of three people – Piya, Kanai and Fokir. Piyali Roy is a young American of Indian descent. A Marine Biologist by profession, Piya comes to Lusibari on her research work on a rare endangered river dolphin "*Orcaella brevirostris*". Kanai Dutt, a linguist and an interpreter runs a Bureau of Translators and Interpreters in New Delhi. Kanai Dutt is also heading towards Lusibari on his aunt's (Nilima Bose) request. His aunt informs him about a notebook left by his uncle (Nirmal Bose) before his death. Major protagonist of the novel, Fokir is an illiterate fisherman.

"There are no borders here to divide fresh water from salt, river from sea. The tides reach as far as three hundred kilometers inland and every day thousands of acres of forest disappear underwater, only to re-emerge hours later. The currents are so powerful as to reshape the islands almost daily—some days the water tears away entire promontories and peninsulas; at other times it throws up new shelves and sandbanks where there were none before." (THT p.7)

At the beginning of the novel Ghosh reveals the power of Nature through these lines. In this novel, Ghosh tries to portray the picture of conflict between man and nature. Sometimes Man gets victory over nature and sometimes nature dominates its presence upon man. Amitav Ghosh's *The Hungry Tide* constantly discusses the conflict between man and nature in the context of the Sundarbans in India and Bangladesh. The novel reflects the conflicts between the residents and the aquatic and wild life of the Sunderbans. Amitav Ghosh has warned mankind against the overt exploitation of nature. The people of Morichjhapi are destroying Natural resources to, fill their stomach and build house for living. Overuse of environment resulted of climate change and depletion of Natural resource in Morichjhapi.

Amitav Ghosh presents how the poor island-dwellers encounter the disastrous environment to obtain their daily single meal. Being a poor fisherman, Fokir could scarcely manage to meet both the ends. He faces his wife's resentment and disappointment when he returns from his fishing journey with just a few crabs because "there was no food in the house and no money either" (Ghosh, 2009, p. 209). Whenever the men go into the waters for fishing, their wives remove their marital symbols and wear white saris. Widowhood is common to the women of Sundarbans. The setting of *The Hungry Tide* is in the heart of Nature. Novel knowingly deals with ecological issues of the Sunderbans, the mangrove forests between the plains and the sea of Bengal. Biodiversity of Sundarbans is slowly imbalanced due to modern activity of human beings to make alive themselves and their family.

Ghosh portrays another eco-critical element - the "BonBibi" myth in this novel. The villagers strongly believe that Bonbibi is responsible for their prosperity and adversity and saves them from the tigers and the tides. They believe that 'bonbibi' goes to her own place on Fridays and if anybody goes to *jungle* on Friday, will be inviting danger.

Although Kanai and Piya are educated and belong to elite class, Piya rejects Kanai's proposal and gets drawn towards Fokir though she does not understand his language. Nilanshu Kumar Agarwal accurately says, "Kanai is unable to communicate with the heart of Piya, while the illiterate fisherman is able to enter the emotional tide of her heart" (Agarwal, p. 190). In spite of love story Ghosh includes ecological issues, Language problem and sophisticated relationships among Piyali, Fokir and Kanai.

He intelligently solves this perplex relationships by the climatic ending in the novel with a cyclone which kills Fokir, while saving the life of Piya. Climate change is the notable thing in the novel. Due to climatic disorder in the environment of Sunderbans that rare species of Dolphins and other fishes are languishing. At the same time the population of tigers is dwindling day by day. A minute misbalanced in ecosystem leads to dangerous in ecological chain. As Piya reveals:

"Some kind of crabs actually laundered the mud they lived in, scrubbing it grain by grain. Their feet and their sides were lined with hairs that formed microscopic brushes and spoons. They are used these to scrape off the diatoms and other dibble matter attached to each grain of sand. They were a sanitation department and a janitorial team rolled into one: they kept the mangroves alive by removing their leaves and litter; without them the trees would choke on their debris. Didn't they represent some fantastically large proportion of the system's

biomass? Didn't they outweigh even the trees and the leaves? Hadn't someone said that intertidal forests should be named after crabs rather than mangroves since it was they –certainly not the crocodile or the tiger or the dolphin –who were the keystone species of the entire ecosystem?" (THT p.142)

Ghosh tries to show the power of Humans and Animals. Sometimes Human came in power and sometimes men overwhelmed upon animals but there are the loss of both. Due to overpopulation human being knowingly destroys the forest and constructs their mansion. These all activities effect the emotions of animals because forest and caves are safe place for them and they can easily get everything what a needs for their survival. Animal feels helpless and some they get angry when he saw their enemy in the form of human being and try to take revenge from them because they think that they came to kill him or destroy their area. That's why animals use their power to save their life and sometimes to make human as their food.

Piyali Roy comes to do survey of the marine mammals of the Sundarbans. She is interested in Gangetic Dolphins and Irrawaddy Dolphins. Piya tries to depict the description of dolphins- their discovery, history, and problems faced by them. Fokir accepts Piya's request and takes her to Garjontola pool where the species of dolphins is found. Kanai also goes on this expedition as a translator to Piya and Fokir as they don't understand each other's language. They engage Horen's bhotbhoti 'Megha' and start their expedition by towing Fokir's small boat to it. Fokir's love for the river and Piya's passion for Irawaddy dolphins form the base for their affection for each other. They are trapped in a terrible storm. They take shelter on a branch of a mangrove tree trunk. Piya sits facing the trunk and Fokir sits behind her shielding and protecting her from getting injured and eventually Fokir sacrifices his life to save Piya. Piya stays back in Sundarbans to take the responsibility of Fokir's family.

Through the novel, Ghosh hints at the fact that globalization far reaching impact upon the people who are considered backward and uncivilized. Through the globalization, even these sections of people have benefitted a lot and the transfer of knowledge and effect of communication will pave the way for further education and advancement in technologies and ideas. However, Ghosh shows the negative aspects of globalization as well. This is seen in the inhuman and different attitude shown by the urban people towards the settlers of the Morichjhapi.

Conclusion:

Nature is seen in its beauty and in its fury as well based on the human actions. Human beings cannot escape the natural disasters. At the same time nature also suffer the harm caused by human beings. Therefore, human beings and nature are interrelated and interconnected in the string of ecosystem. Amitav Ghosh's *The Hungry Tide* confirms very clearly that nature, no doubt has a great impact on human beings and it rules over the lives of people. The novel clearly shows the terror of nature and the dire need to protect our ecosystem. It makes the reader sensitized to understand the importance of environment and the need for the peaceful co-existence between humans and nature.

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Environmental Water Pollution Mula and Mutha River – A Case Study Pune

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Abstract-

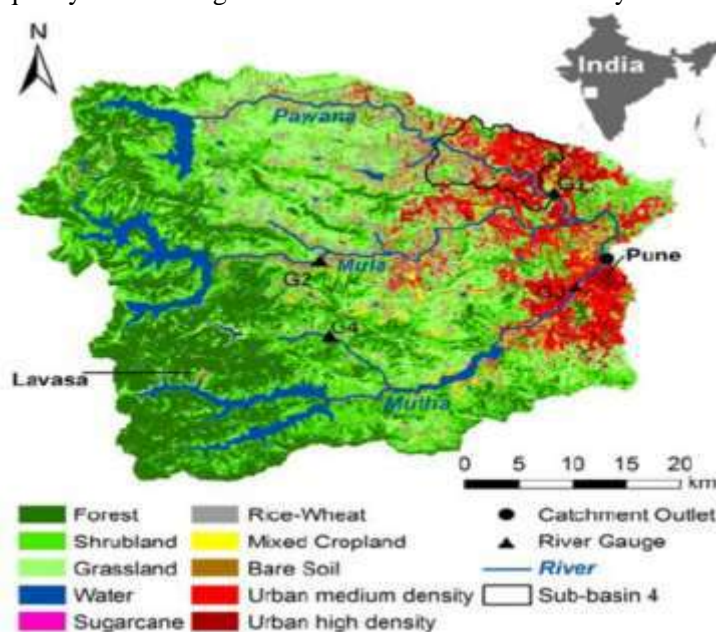
In Pune city Mula and Mutha River is an important water body following through the city. However, because of the rapid global changes, status of the river is very critical from environmental, aesthetic, and commercial usage point of view. Henceforth, this research work focused on assessing the current as well as predicting its future situation using different scenarios while considering key drivers of global changes namely climate change and population growth. Comparison of simulated water quality parameters for the current simulated scenarios clearly indicates that the water quality by 2041 will rapidly deteriorate and will be not suitable for many aquatic lives in terms of simulated water quality parameters. Results from scenario with mitigation measures suggest current planned wastewater treatment plants and policies are not sufficient to achieve desirable river water quality, and hence call for immediate and inclusive action.

Keywords – water pollution, Sewage, WEAP

Introduction-

Pune has an abundance of water from the Khadakwasla dam, but its intra-city distribution is extremely uneven. Some areas get as much as 600 litres per capita per day while others get barely 100. This results in enormous quantities of wastewater and sewage and despite having an installed capacity to treat 599 million litres a day (MLD) of sewage, its two main rivers, the Mula and Mutha, remain severely polluted. The Mula-Mutha River water in Pune had deteriorated in quality. Its biological

oxygen demand, an indicator of organic pollution, has risen to over 30 mg/l, more than ten times the permissible limits for bathing. Reason: Pune is a classic case of over consumption; the Municipal Corporation is currently supplying water sufficient for the projected population in the year 2050. More water means more sewage; beyond the quantum its sewage treatment plants can treat. As a result, there is greater pollution loads discharged in to the Mula-Mutha, two rivers that confluence within city limits and serve to flush away Pune's excreta.



Mula River –

The Mula is a river in Pune, India. It is dammed near the Western Ghats at the Mulshi Dam that forms the Mulshi Lake. Further downstream, in Pune city, it merges with the Pawana River on the left bank and Mutha River on the right bank to form the Mula-Mutha river, which later meets the Bhima River. The river forms the boundary between the limits of the Pimpri-Chinchwad Municipal Corporation and the Pune Municipal Corporation. This river goes from centre of Pune city.

Mutha River –

The Mutha River is a river in western Maharashtra, India. It arises in the Western Ghats and flows eastward until it merges with the Mula River in the city of Pune. It has been dammed twice, first at the Panshet Dam used as a source of drinking water for Pune city and irrigation. The water released here is dammed again at Khadakwasla and is an important source of drinking water for Pune. One more dam has been built later on the Mutha river at Temghar. After merging with the Mula River in Pune, it flows on as the Mula-Mutha River to join the Bhima River. In 2014, the Government of Maharashtra announced that the Pune Municipal Corporation would build new Sewage treatment plants to ensure that no sewage would be dumped into the river.

PMC Projection from year 2021-2041 -

Water demand is normally classified as domestic water demand and non-domestic water

demand. Domestic water demand covers the use of water for drinking, washing, bathing, flushing etc. Nondomestic water demand includes the water demand for industries and other uses. Water demand is necessarily assessed for 100% satisfaction of the consumers. Although in existing scenario and up till 2031, adequate water supply is there conforming to the CPHEEO standards, but to cater the target year population, augmentation of entire water supply system is needed. In case of Pune water demand has been calculated on the basis of CPHEEO Manual at the following rates.

1. Net Domestic Supply at consumer's end = 150 LPCD
2. Provision for Non-Domestic supply = 30 LPCD
3. Losses in the system at 15 percent = 30 LPCD
4. Total gross Supply = 210 LPCD Table 3.4: Population growth estimate
5. Existing water requirement = 671 MLD
6. Assumed Net water supply (as per PMC) = 786 MLD, so there is no gap in case of water supply Future requirement for the year of 2041 = 1827 MLD
7. Existing install capacity of water treatment plants = 1318 which is sufficient till 2031
8. Future requirement for the year of 2031-2041 = 1827-1318 = 509 MLD

Pune City Sewage generation-



As a result of rapidly expanding populations, haphazard development, urban Sprawl, and inadequate or poorly designed and malfunctioning sewage treatment facilities, in urban areas untreated sewage is often discharged into rivers. This practice has serious repercussions to human health, river aquatic system, ecosystem and the already fragile economies. Consequently, there is an urgent need to increase wastewater treatment in the urban areas, which is presently far below the required levels. Improved sanitation results in improvement of health, reduction in child

mortality/morbidity, improved water quality, environment and economic growth of a city.

Although in case of Pune city, the coverage of sewer network is good but because of untreated wastewater (29%) Mula and Mutha River is getting polluted. Total Water Disposal Sewerage system in Pune was laid in the late 1915, which covered core central areas of Pune. In 1997, the total main sewer length in all administrative zones was approximately 146.83 km, while currently it is 1260.6 km in length. Presently, Pune city is equipped with well-designed and regularly maintained underground sewerage

system. Stoneware pipes are used for up to 300mm dia sizes and RCC Hume pipes Internship Report B. Tech Final Sem VIT, Pune 8 varying in diameter from 300 mm to 1200 mm for sub-mains/mains/outfall sewers. PMC has a decentralized system for sewerage. Pune Municipal Corporation divided whole sewerage system in 17 sewage districts.

- Topography
- Alignment of natural Drainage channels
- Alignment and diameter of existing trunk and outfall of all sewers
 - Location and Capacity of existing sewerage treatment plants
- Availability of land for augmentation of existing sewage treatment plan
- Available sites and their sizes for the new sewage treatment plants.

PMC Each district has a specified area of service. These zones are different from the administrative wards. All developed areas in the city are provided with sewer collection network and sewage is collected and pumped through nine pumping stations located at different places. The collection efficiency of sewerage network is estimated to be 73.35% against 100% of Service Level Benchmark (SLB) standard

The WEAP Approach -

WEAP operates on the basic principle of a water balance and can be applied to municipal and agricultural systems, a single watershed or complex transboundary river basin systems. Moreover, WEAP can simulate a broad range of natural and engineered components of these systems, including rainfall runoff, base flow, and groundwater Internship Report B. Tech Final Sem VIT, Pune 20 recharge from precipitation; sectoral demand analyses; water conservation; water rights and allocation priorities, reservoir operations; hydropower generation; pollution tracking and water quality; vulnerability assessments; and ecosystem requirements. A financial analysis module also allows the user to investigate cost-benefit comparisons for projects. The analyst represents the system in terms of its various supply sources rivers, creeks, groundwater, reservoirs, and desalination plants withdrawal, transmission and wastewater treatment facilities; water demands; pollution generation; and ecosystem requirements. The data structure and level of detail can be easily customized to meet the requirements and data availability for a particular system and analysis.

WEAP applications include several steps -

Study definition: The time frame, spatial boundaries, system components, and configuration of the problem are established. Current accounts: A snapshot of actual water demand, pollution loads,

resources and supplies for the system are developed. This can be viewed as a calibration step in the development of an application. Scenarios: A set of alternative assumptions about future impacts of policies, costs, and climate, for example, on water demand, supply, hydrology, and pollution can be explored. (Possible scenario opportunities are presented in the next section.) Evaluation: The scenarios are evaluated with regard to water sufficiency, costs and benefits, compatibility with environmental targets, and sensitivity to uncertainty in key variables.

WEAP consists of four main views -

- 1) Schematic - GIS tools allow you to configure your system, including “drag and drop” capability to create and position system elements easily and quickly. Add ArcGIS and other standard GIS vector or raster files as background layers. Quickly access data and results for any element in the system.
- 2) Data - model-building tools help you create variables and relationships, enter assumptions and projections using mathematical expressions, and dynamically link to Excel for data importing and exporting.
- 2) Results - detailed and flexible display of all model outputs can be viewed in graphs, tables and on the map. The graph and map formats allow for animated viewing of results through time.
- 4) Scenario Explorer - design a group of summary graphs to highlight key system indicators for quick review. Explore how changes in data can affect results

Conclusion -

1. This work gave a detailed picture of water quality of Mula Mutha River of Pune City, for both current time using different scenario analyses.
2. Simulated result clearly indicated that Mula-Mutha River is moderately to severely polluted throughout the stretch.
3. In addition, for the business as usual scenario, the quality status will become worse by year 2030. However, considering the scenario with mitigation measures as mentioned in local master plan for water resources management, the quality of water will improve significantly.
4. However, water quality at downstream areas like PMC, Deccan and Near Mundhwa Bridge does not comply with desirable water quality, and will need further attention.
5. Some of the other potential reasons behind the poor status of water quality are: 1) at current stage, despite the considerable capacity of existing WTPs, the wastewater coming to these plants are not sufficient because of poor sewerage collection rate or poor connection between each household and main sewerage

line. The reason behind this is the non-willingness to pay the expensive connection fee by the local residents; and even once, connected they have to pay more money in terms of water or sewerage treatment bills; 2) lack of proper coordination between different actors/stakeholders involved in water management to implement the master plan in a timely manner.

6. Possible solutions to overcome these barriers can be: 1) to create a political space where different stakeholders other than government agencies also have direct involvement to influence the governing processes and government decisions; 2) provision of some monetary help like financial incentives in terms of tax exemption to encourage local people to connect their households to the main sewerage line; 3) raising people awareness about the benefits of better water environment in terms of good health, good business opportunities by tourism; 4) as creating different hard measure (wastewater treatment) is financial burden for many developing countries and that's why many projecting are running behind their scheduled progress rate.
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Tempered Futures: Projections and Impacts of Temperature Change in India - Effect of Atmospheric Aerosols

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Abstract:

This study explores the dynamic patterns of temperature changes in India throughout from the beginning of 20th century i.e. from 1900 to the present year 2023. India has had a relatively slight increase in temperatures of about 1.2 (estimated) degrees Celsius, compared to an average increase of 1.30 degrees Celsius worldwide. India's geographical location—which it shares with the equator and the tropics—becomes a crucial element in determining its temperature patterns. India's proximity to the equator causes a moderate rise in temperature, in contrast to larger increases in temperature seen closer to the poles. This is because places around the equator experience complicated transfer of heat actions. Aerosols, which are microscopic particles floating in the atmosphere, are essential in regulating the temperature of India. The aerosols are, a result of both human activity and natural climatic processes, scatter sunlight, reducing the amount of heat that reaches the earth. Interestingly, pollution is a major producer of these aerosols and has the unexpected benefit of moderating India's rising temperatures. This research explains how pollution and the Indian climate combine to increase the number of aerosols in the atmosphere, which in turn affects temperature trends and patterns. The study highlights the complicated effects of human activity on regional temperature dynamics and advances our understanding of India's climate by explaining these delicate linkages and adds to a broader knowledge of India's climate.

Keywords: Aerosols, Temperature trends & patterns, Tropic region, Heat transfer phenomenon

Introduction:

The scattering of solid or liquid particles in the atmosphere that come from both naturally occurring and man-made sources are known as atmospheric aerosols, and they play an important role in determining the conditions of the environment and public health. These microscopic particles affect local weather patterns and contribute to the fluctuation of the global climate, with far-reaching effects. Understanding and reducing environmental concerns requires an understanding of atmospheric aerosols since their significance extends to warming effects and possible health consequences. Research on atmospheric aerosols has attracted a lot of attention in India, indicating a developing understanding of their complex impacts. The paper explores important research topics such

as warming, climatic impact, aerosol characterization, and health consequences while offering a brief overview of the state of atmospheric aerosol research in India. This work is focused on shedding light on the function of atmospheric aerosols in the Indian atmospheric environment.

Data Analysis:

A. Temperature Study from 1900's:

Global temperature study: Temperature data from 1900 to 2023, which illustrates the temperature's steady rise over time. From 1900 until 1922, the temperature didn't change from 13.7°C; after that, it began to rise due to industrialization. Between 1931 and 1940, the temperature increased by 0.3°C, and after that, it increased by 0.1–0.2°C per ten years.

The Fig. 1. Graph depicts the progression of temperature values over the years at global level. Temperature change

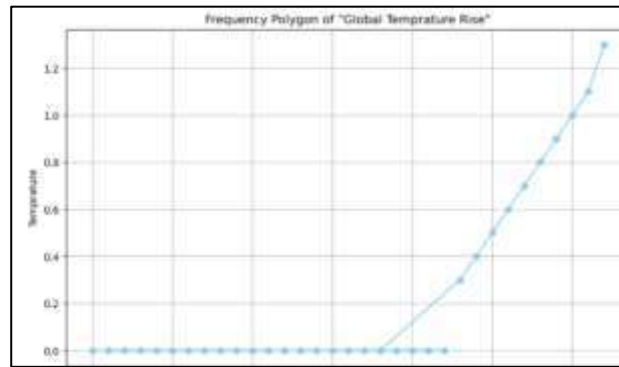


Fig. 1. Rise in Temperature from 1900 to 2023 (Drawn with Python)

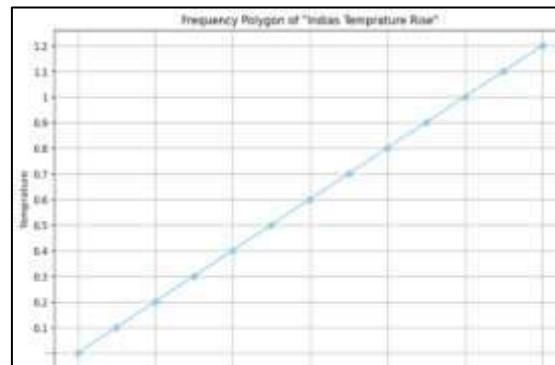


Fig. 2. Rise in Temperature from 1900 to 2023 in India.

data is given below. The Fig. 2. Represents the progression of temperature in India and it is estimated in 2023 to be 1.2 which is less than 1.3. i.e. Difference of 0.1-degree Celsius. (Drawn with python).

Source of data set 1. (Source from 1900-2000: Temperature data: NASA Goddard Institute for Space Studies (GISS) GISS Surface Temperature Analysis (GISTEMP) Version 4. This global, land-

Data Set 1: Global temperature increase

ocean temperature dataset is widely used by scientists). (Source from 2001-2020: Temperature data: NOAA National Centers for Environmental Information (NCEI) State of the Climate: Global Climate Report.). (Source from 2021-2023 (estimated): Temperature data: Based on trends observed in the 2001-2020 data combined with preliminary reports and data releases from agencies like NCEI and GISS.

Range	Temperature (°C)	Increase (°C)
1900-1909	13.7	0
1901-1910	13.7	0
1902-1911	13.7	0
1903-1912	13.7	0
1904-1913	13.7	0
1905-1914	13.7	0
1906-1915	13.7	0
1907-1916	13.7	0
1908-1917	13.7	0
1909-1918	13.7	0
1910-1919	13.7	0
1911-1920	13.7	0
1912-1921	13.7	0
1913-1922	13.7	0
1914-1923	13.7	0
1915-1924	13.7	0
1916-1925	13.7	0
1917-1926	13.7	0
1918-1927	13.7	0
1919-1928	13.7	0

1920-1929	13.7	0
1921-1930	13.7	0
1922-1931	13.7	0
1931-1940	14	0.3
1941-1950	14.1	0.4
1951-1960	14.2	0.5
1961-1970	14.3	0.6
1971-1980	14.4	0.7
1981-1990	14.5	0.8
1991-2000	14.6	0.9
2001-2010	14.7	1
2011-2020	14.8	1.1
2021-2023 (est.)	15	1.3

Data Set 2. India's Temperature increase

Decade	Average Temperature (°C)	Temperature Increase (°C)
1900-1910	24.3	-
1910-1920	24.4	0.1
1920-1930	24.5	0.2
1930-1940	24.6	0.3
1940-1950	24.7	0.4
1950-1960	24.8	0.5
1960-1970	24.9	0.6
1970-1980	25	0.7
1980-1990	25.1	0.8
1990-2000	25.2	0.9
2000-2010	25.3	1
2010-2020	25.4	1.1
2020-2023 (estimated)	25.5	1.2

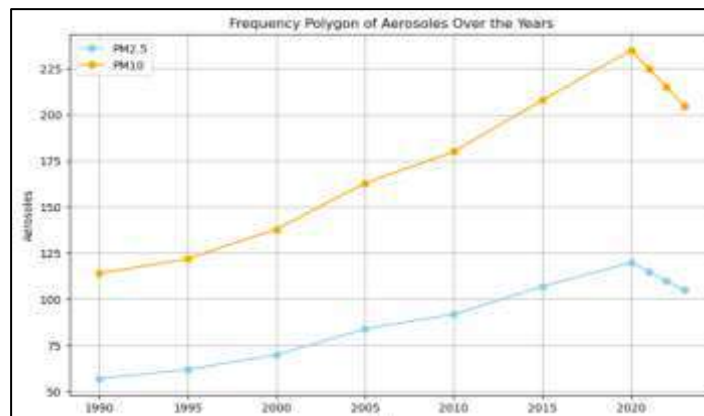
(Source India Meteorological Department (IMD) Climatological Data)

B. Aerosoles Data analysis from 1990's in India:

Aerosols, which are microscopic particles floating in the atmosphere, have an impact on the Indian climate that can be both positive and negative. There are two types of aerosols 1) Natural: Volcanic emissions, smoke from wildfires, dust, and saltwater from the sea. 2) Anthropogenic: particulate pollution from burning biomass, industry, and automobiles. The following data set shows the number of aerosols in the Indian atmosphere from

1995 to till date the features it consists it described: PM2.5 and PM10 refer to particulate matter with diameters less than 2.5 microns and 10 microns, respectively, and are major components of aerosol pollution. (D.S. 3). D.S. 3 Refers to data set 3. (Data sources include the India Meteorological Department (IMD), Indian Institute of Tropical Meteorology (IITM), and System Of Air Quality And Weather Forecasting And Research (SAFAR))

Fig. 3. Represents increase in the number of aerosols in India over the years.



Data Set 3: Amount of Aerosoles

Year	PM2.5 Concentration ($\mu\text{g}/\text{m}^3$)	PM10 Concentration ($\mu\text{g}/\text{m}^3$)
1990	57	114
1995	62	122
2000	70	138
2005	84	163
2010	92	180
2015	107	208
2020	120	235
2021	115	225
2022	110	215
2023 (Oct)	105	205

One can observe from figures 1, 2, and 3 as well as the data set provided in this research paper that, there is a 0.1-degree Celsius difference between the global temperature increase and the temperature increase in India. This difference may be caused by an increase in the number of aerosols in the Indian atmosphere.

Conclusions:

Finally, this comprehensive examination explores the dynamics of temperature changes in India between 1900 and the present. Interestingly, India has seen a spike in temperature that is 1.2 degrees Celsius—compared to the 1.30 degrees Celsius average increase observed worldwide. The geographic location of the nation—which it shares with the tropics and equator—becomes a crucial element in determining its patterns of temperature. Because of the complex heat transmission mechanisms near the equator, this site generates a small increase in temperature, as opposed to more significant increases observed in places closer to the poles. Aerosols, which are tiny particles floating in the atmosphere, are essential in regulating the temperature of India. These aerosols, which come from both human activity and natural climate processes, scatter sunlight and reduce the amount of heat that reaches the Earth's surface. It's interesting to note that pollution, a major cause of aerosol formation, accidentally cools India's rising temperatures. This study reveals the surprising impact of human activity on regional temperature changes by elucidating the complex link between pollution, climate and aerosol. The study explores deeply the effects of aerosols on India's climate, demonstrating a complex relationship between temperature patterns and aerosol concentrations. This newfound insight highlights the necessity for varied ways of resolving environmental problems and makes a vital contribution to the greater understanding of India's climate. Essentially, the study focuses on the complex relationships between pollution, human activity, and regional climate patterns in addition to highlighting the influence of aerosols on India's temperature patterns.

This information is essential for developing sustainable policies that reduce environmental problems and promote plans which is stronger and more sensitive to climate change.

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3. Data set 3: Data sources include the India Meteorological Department (IMD), Indian Institute of Tropical Meteorology (IITM), and System of Air Quality and Weather Forecasting and Research (SAFAR).
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प्रस्तावना :-

कोणत्याही देशाच्या आर्थिक वृद्धीसाठी भांडवल निर्मिती हा महत्वाचा व प्रभावी घटक आहे. भारतासारख्या विकसनशील देशाला जलद आर्थिक विकाससाठी आणि वाढत्या मनुष्य बळाला रोजगार उपलब्ध करून देण्यासाठी मोठ्या प्रमाणात भांडवल निर्मितीची आवश्यकता असते. परंतु देशांतर्गत पातळीवर भांडवल निर्मितीचा दर अल्प असल्याने आर्थिक विकासाला मर्यादा येतात. विदेशी गुंतवणूक हे विकसनशील देशांसाठी प्रगत भांडवल निर्मिती करण्यासाठीचे महत्वाचे साधन आहे. भारत सरकार मध्ये १९९१ साली नरसिंहराव सरकार मध्ये डॉ. मनमोहन सिंग अर्थमंत्री असतांना आर्थिक सुधारणा धोरणांतर्गत विदेशी गुंतवणूक दारांना बीएचएआरटीएटी प्रत्यक्ष आणि भांडवल बाजारामार्फत गुंतवणूक करण्यास विविध आर्थिक क्षेत्रे खुली केली. आर्थिक सुधारणा काळात जगातील अनेक वित्तीय संस्था आणि उद्योजकांनी भारतात मोठ्या प्रमाणात भांडवल गुंतवणूक केली आहे. त्यामुळे भारताचा आर्थिक विकास जलद जीएटीआयएनई होण्यास विदेशी गुंतवणुकीची महत्वाची भूमिका आहे. विदेशी थेट गुंतवणूक हा विदेशी गुंतवणुकीचा एक महत्वाचा घटक आहे. आर्थिक विकासाच्या साधनातील एकमेव कर्ज विरहित भांडवलाचा आर्थिक स्रोत मानला जातो. देशांतर्गत बचत आणि गुंतवणूक यातील तफावत भरून काढण्याचे काम विदेशी थेट गुंतवणूक करते.

FDI विदेशी गुंतवणुकीबरोबरच विदेशी आधुनिक तंत्रज्ञान, भौतिक उपकरणे आणि आधुनिक उत्पादन पद्धती सोबत घेवून येते. FDI मुळे विदेशी चलन साठ्यात वाढ होते आणि त्याचा उपयोग विदेशी तंत्र ज्ञान, आधुनिक उपकरणे आयात करता येतात. भारताने आर्थिक उदरीकरणाच्या धोरणात विदेशी गुंतवणूकदारांना FDI च्या रूपाने भारतात गुंतवणूक करण्यास अनुकूल धोरण स्वीकारले. त्यामुळे भारतात FDI चा सातत्याने वाढत आहे. भारतात 1991 ते 2004 या 14 वर्षांच्या कालावधीत FDI च्या रूपाने 70731 दशलक्ष डॉलर एवढी विदेशी गुंतवणूक आली. तर 2004 ते 2022 या 18 वर्षांच्या कालावधीत FDI च्या रूपाने 871034 दशलक्ष डॉलर होती. परिणामी भारताच्या दीर्घकालीन भांडवल गुंतवणुकीत FDI ने मोलाची भर घातली. त्याचबरोबर तंत्र ज्ञान, हस्तांतरण, धोरणात्मक क्षेत्राचा विकास, नाविन्यता, स्पर्धा आणि रोजगार निर्मिती यात FDI चे महत्वपूर्ण योगदान आहे त्यामुळे जागतिक पातळीवर FDI ला अविकसित आणि विकसनशील देशांच्या आर्थिक वृद्धीचे प्रेरक मानले जाते. त्यामुळे सादर शोध निबंधात देशात आर्थिक सुधारणा (१९९१ नंतर)

काळातील विदेशी थेट गुंतवणुकीचा तुलनात्मक अभ्यास करण्याचा प्रयत्न केला आहे.

संशोधन साहित्याचा आढावा :-

1. सय्यद अझहर आणि के.एन मारि मथुर(2012):- यांनी आपल्या लेखात 2000 ते 2010 या कालावधीत भारतातील FDI च्या फायद्याचे विश्लेषण दुय्यम माहितीच्या आधारे केले आहे. त्यांनी आपल्या लेखात FDI चे घटक त्याची आवश्यकता याचे विश्लेषण केले आहे त्यांच्या मते भारतातील पायाभूत सुविधा आणि सरकारी धोरणे यामुळे भारत जगातील पहिल्या तीन देशात FDI आकर्षित करणाऱ्या देशात येतो.

2. विनय कुमार (2014):- यांनी त्यांच्या Trends of FDI in India and its impact on economic growth या संशोधन पर लेखात भारतातील FDI मधील वाढीची प्रवृत्ती आणि FDI, FPI आणि GDP यांच्यातील सह संबंधावर लक्ष केन्द्रित केले त्यांच्या मते भारतात FDI चा ओघ सतत वाढत असला तरी इतर विकसित देशांच्या तुलनेत भारतातील ओघ हा खूपच कमी आहे. सरकारने FDI मधील मंद वाढीची कारणे शोधावी आणि अधिक गुंतवणूक वाढीसाठी सकारात्मक प्रयत्न करावेत असे मत संशोधनात मांडले.

3.तेली.आर.बी.(2014):- यांनी आपल्या संशोधनात 1991 ते 2012 या कालावधीतील FDI चा ओघ यावर अभ्यास केला आहे. त्यांच्यामते FDI च्या 65.79 टक्के हिस्सा समभागातील सरकारी मंजूरीद्वारे आणि 34.21 टक्के पोर्टफोलियो गुंतवणुकीद्वारे आला होता.मॉरिशस आणि सिंगापूर हे देश भारतात गुंतवणूक करण्यास अग्रेसर होते. भारतात सर्वात जास्त गुंतवणूक सेवा क्षेत्राने आकर्षित केली होती त्यांचा भारतीय अर्थव्यवस्थेतील सेवा क्षेत्राचे राष्ट्रीय उत्पन्नातील वाढ होण्यास मदत झाली आहे त्यांनी आपल्या संशोधनात सरकारने अनिश्चितता टाळून अनुकूल धोरणाद्वारे जास्तीत जास्त विदेशी गुंतवणूक आकर्षित केली पाहिजे असे सूचित केले.

4. हरि पंढरी वंगरवार (2023):- यांनी आपल्या संशोधन पर अभ्यासात भारतातील FDI चे क्षेत्रनिहाय,वर्षनिहाय आणि देशनिहाय तुळणात्मक विश्लेषण केले.FDI मधील विदेशी पोर्टफोलिओ गुंतवणुकीचा वाटा शोधला,भारताच्या आर्थिक विकासात FDI ची भूमिका अधोरेखित केली आहे.

संशोधनाची उद्दिष्ट्ये:-

1. विदेशी थेट गुंतवणुकीची संकल्पना समजून घेणे.
2. भारतातील थेट गुंतवणुकीचा प्रवाह अभ्यासणे.
3. भारतातील थेट विदेशी गुंतवणुकीतील विविध देशांचा आणि आर्थिक क्षेत्राचा वाटा अभ्यासणे.

संशोधन पद्धती:- संशोधन हे पुर्णपणे दुय्यम माहितीवर आधारित आहे. त्यासाठी विविध नियतकालिके,मासिके,वर्तमान पत्रे,वेबसाइट विशेषतः उद्योग आणि अंतर्गत प्रोत्साहन विभाग,RBI चे मासिक आणि वार्षिक अहवाल याचा उपयोग करण्यात आला आहे.विविध अहवालातून प्राप्त केलेल्या सांख्यिकीयमाहितीवर प्रक्रिया करण्यासाठी शेकडेवारी,सरासरी वार्षिक वृद्धीदर,निर्देशांक या साख्याकीय साधनाचा वापर करण्यात आला आहे.

विदेशी थेट गुंतवणूक संकल्पना:-

भारतीय कंपनीच्या समभागात(Equity Shares) किंवा पुर्णपणे परिवर्तनीय ,अनिवार्य परिवर्तनीय बंधपत्रे (Debentures)किंवा पुर्णपणे,अनिवर्यपणे परिवर्तनीय प्राधान्य शेअर्समध्ये अनिवासी व्यक्ति दोन मार्गाने गुंतवणूक करू शकतात.

1. स्वयंचलीत मार्ग(Automatic Route):- स्वयंचलीत मार्गातर्गत ,अनिवासी गुंतवणूकदार किंवा विदेशी कंपनीला

गुंतवणुकीसाठी भारत सरकारच्या कोणत्याही मेनीतेची आवश्यकता नसते.

2. सरकारी मार्ग(Government Route):- शासकीय मार्गातर्गत,अनिवासी गुंतवणूकदार किंवा विदेशी कंपनीला गुंतवणुकीसाठी भारत सरकारची पूर्वपरवानगी घेणे आवश्यक आहे शासकीय मार्गातर्गत परकीय गुंतवणुकीचे प्रस्ताव संबधित शासकीय मंत्रालय किंवा विभागाकडे मान्यतेसाठी दिले जातात.

वरील दोन्ही मार्गांनी येणाऱ्या विदेशी गुंतवणुकीचे FDI आणि FPI अशा दोन भागात विभागणी केली जाते.

1) विदेशी थेट गुंतवणूक (FDI):- DPIIT file no 5(2)/2020-FDI policy of 15th October 2020च्या परिपत्रकानुसार--- विदेशी थेट गुंतवणूक म्हणजे असूचीबद्ध भारतीय कंपनीत भारताबाहेर राहणाऱ्या व्यक्तीने भांडवली साधनांद्वारे केलेली गुंतवणूक किंवा सूचीबद्ध भारतीय कंपनीच्या समभाग विक्रीतून जमा झालेल्या भाग भांडवलच्या 10 टक्के किंवा त्याहून अधिक गुंतवणूक होय.

2) विदेशी पोर्टफोलिओ गुंतवणूक (FPI):- भारताबाहेर राहणाऱ्या व्यक्तीने भांडवली साधनांद्वारे केलेली कोणतीही जी गुंतवणूक सूचीबद्ध भारतीय कंपनीच्या समभाग विक्रीतून जमा झालेल्या भाग भांडवलच्या 10 टक्क्यापेक्षा कमी कोणवा सूचीबद्ध भारतीय कंपनीच्या विविध भांडवली साधनाच्या माध्यमातून जमा झालेल्या भांडवलच्या 10 टक्क्यापेक्षा कमी असेल त्यास FPI असे म्हणतात.

3) एकूण विदेशी गुंतवणूक(TFI) :- FDI आणि FPI ची बेरीज म्हणजे एकूण थेट विदेशी गुंतवणूक होय. पत्र विदेशी गुंतवणूकदार ,अनिवासी भारतीय,परकीय चलन परिवर्तनिय रोखे,अमेरिकन डिपोजितरी रिसीट्स इ. मार्गाने येणाऱ्या गुंतवणुकीचा समावेश एकूण विदेशी गुंतवणूक यात केला नाही.

भारतातील विदेशी थेट गुंतवणुकीचा प्रवाह (1991-2022)

:- भारतात विदेशी गुंतवणुकीचा जो प्रवाह झालेला आहे.त्याची विभागणी विश्लेषणासाठी दोन विभागात करण्यात आली. 1) 1991 ते 2003-04 2) 2004-05 ते 2021-22.

1) 1991 ते 2004:- या कालावधीत FDI,FPI आणि TFI त्याची मागील वर्षाच्या तुलनेत प्रतिशत वाढ त्याची आकडेवारी पुढील तक्ता क्र.1 मध्ये दर्शविली आहे.

तक्ता क्र.1 भारतातील विदेशी गुंतवणूक प्रवाह (1991 ते 2004)

वित्तीय वर्ष	FDI (डॉलर मध्ये)	FPI (डॉलर मध्ये)	TFI (डॉलर मध्ये)	स्तंभ 2 मागील वर्षाच्या तुलनेत प्रतिशत वाढ	स्तंभ 3 मागील वर्षाच्या तुलनेत प्रतिशत वाढ	स्तंभ 4 मागील वर्षाच्या तुलनेत प्रतिशत वाढ	FDI चे TFI शी प्रमाण
1991-92	129	4	133	33	-33	29	97
1992-93	315	244	559	144	600	320	56
1993-94	586	3567	4153	86	1362	643	14
1994-95	1314	3824	5138	124	7	24	26
1995-96	2144	2748	4892	63	-28	-5	44
1996-97	2821	3312	6133	32	21	25	46
1997-98	3557	1828	5385	26	-45	-12	66
1998-99	2462	-61	2401	-31	-103	-55	103
1999-00	2155	3026	5181	-12	5061	116	42
2000-01	4029	2760	6779	87	-9	31	59
2001-02	6130	2021	8151	52	-27	20	75
2002-03	5035	979	6014	-18	-52	-26	84
2003-04	4322	11377	15699	-14	1062	161	28
1991-04	35096	35635	70731	--	--	--	50

संदर्भ:-RBI Bulletin Sept. 1998-2009

वरील तक्ता क्र .1 वरून असे दिसून येते की,1991-2004 या 14 वर्षांच्या कालावधीत केवळ 1998-99,1999-00,2002-03,आणि 2003-04 या 4 आर्थिक वर्षांत FDI मध्ये मागील वर्षाच्या तुलनेत घट झाली आहे तर FPI मध्ये अशी घट 1991-91,1995-96,1997-98,1998-99,2000-01,2001-02 आणि 2002-03 अशी 7 वेळा झाली.एकूण विदेशी गुंतवणुकीतील FDI प्रमाण भारतात कमी दिसून येते 1991-2004 या कालावधीतील TFI चे

2) 2005 ते 2022:- या कालावधीत FDI,FPI आणि TFI त्याची मागील वर्षाच्या तुलनेत प्रतिशत वाढ त्याची आकडेवारी पुढील तक्ता क्र.2 मध्ये दर्शविली आहे.

तक्ता क्र.2 भारतातील विदेशी गुंतवणूक प्रवाह (2005 ते 2022)

वित्तीय वर्ष	FDI (दशलक्ष डॉलर मध्ये)	FPI (दशलक्ष डॉलर मध्ये)	विदेशी एकूण गुंतवणूक (दशलक्ष डॉलर मध्ये)	FDI निर्देशांक	FPI निर्देशांक	TFI निर्देशांक	FDI चे TFI शी प्रमाण
2005-06	8900	12492	21392	149	135	140	42
2006-07	22739	6891	29630	380	74	94	77
2007-08	34727	27597	62324	580	298	409	56
2008-09	41707	-13855	27852	697	-150	183	150
2009-10	33108	32376	65484	553	349	429	51
2010-11	27829	16931	44760	465	183	293	62

2011-12	32955	17410	50365	551	188	330	65
2012-13	26953	27769	54722	450	300	359	49
2013-14	30765	5029	35794	514	54	235	86
2014-15	34427	40923	75350	575	442	494	46
2015-16	44907	-3643	41264	750	-39	271	109
2016-17	42215	7766	49581	705	84	328	84
2017-18	39431	22165	61596	659	239	404	64
2018-19	43302	-405	42797	723	-4	281	101
2019-20	56006	552	56558	936	6	371	99
2020-21	54927	38725	93652	918	418	614	59
2021-22	56231	-14071	42160	939	-152	276	133

संदर्भ:-RBI various Bulletin.

वरील तक्ता क्र 2 वरून असे दिसून येते की, 2004-05 ते 2021-22 या कालावधीतील भारतातील FDI ची सांख्यिकीय आकडेवारी दिली असून त्याचा 2004-05 हे आधार वर्ष मानून निर्देशांक काढण्यात आला आहे. FDI निर्देशांक या कालावधीत 100 पासून सर्वोच्च 939 हा 2021-22 झाला. FPI चा निर्देशांक अस्थिर असून 2004-05 साली 100 असलेला निर्देशांक 2008-09, 2015-16, 2018-19 आणि 2021-22 या कालावधीत ऋणात्मक होता. परिणामी TFI च्या निर्देशांक 100 पासून 276 एवढीच वाढ झाली. सन 2004 ते 2022 या 18 वर्षांच्या काळात 2008-09, 2015-16 आणि 2018-19 या वर्षात FPI च्या माध्यमातून केली जाणारी विदेशी गुंतवणूक ऋणात्मक होती. अर्थातच विदेशी गुंतवणूक दारांनी भारतीय बाजारात गुंतवणूक करण्याऐवजी अस्तित्वातील गुंतवणूक भारतीय बाजारातून काढून घेतली. 2008-09 आणि 2018-19 या काळात FPI काढून घेण्याचे मुख्य कारण आंतरराष्ट्रीय वित्तीय संस्थांनी जागतिक वित्तीय मंदी येण्याची व्यक्त केलेली भीती हे होय. विदेशी थेट गुंतवणुकीत 2008-09 या काळात 20 टक्के वाढ झाली होती मात्र FPI या काळात ऋण -13855 दशलक्ष डॉलर होती. तर 2018-19 या

आर्थिक वर्षात FDI मध्ये 10 टक्के वाढ झाली तर FPI ऋण -405 दशलक्ष डॉलर होती. यावरून असे दिसून येते की, आर्थिक मंदीच्या काळात FPI ही आर्थिक अस्थिरता निर्माण करते मात्र FDI वर आर्थिक मंदीचा खूप कमी परिणाम होतो. 1991-2004 या काळात FDI चे TDI शी असलेले प्रमाण जवळपास 50 टक्के होते ते वाढून 2004 ते 2022 या कालावधीत 73 टक्क्या पर्यंत वाढले म्हणजेच विदेशी थेट गुंतवणूक दारांची भारत सरकारची विदेशी गुंतवणूक धोरणे आणि भारतीय अर्थव्यवस्था यावरील विश्वास वाढला आहे. या उलट FPI ची 1991 ते 2004 या काळात भारत सरकारचे गुंतवणूक धोरण व भारतीय अर्थव्यवस्था यावर असलेला विश्वास कमी झाल्याचे दिसून येते.

भारतातील FDI गुंतवणुकीतील विविध देशांचा आणि आर्थिक क्षेत्राचा वाटा (1991 ते 2023) :- भारतात विविध देशातून 1991 ते 2005 या कालावधीत FDI च्या रूपाने 33351 दशलक्ष डॉलर विदेशी गुंतवणूक झाली त्यातील 69.7 टक्के गुंतवणूक 10 देशातून झाली ते पुढील तक्ता क्र.3 वरून लक्षात येईल.

तक्ता क्र.3 भारतातील FDI गुंतवणुकीतील विविध देशांचा वाटा (1991 ते 2005) टक्केवारीत

देश	वाटा (टक्केवारीत)
मॉरिशस	27.3
यू.एस.ए.	11.6
जपान	5.7
नेदरलंड	5.4
युनायटेड किंगडम	5.3
जर्मनी	4.5
सिंगापूर	3.0
फ्रांस	2.6
साऊथ कोरिया	2.3
स्वीझर्लंड	2.0
इतर देश	30.3

संदर्भ:- Fact sheet on foreign direct investment (FDI), department for promotion of industry and internal trade of commerce and industry. Government of India.

वरील तक्ता क्र.3 असे दर्शवितो की भारतात 1991 ते 2005 या कालावधीत एकूण FDI गुंतवणुकी पैकी मॉरिशस(27.3) ,यू.एस.ए. (11.6),जपान (5.7),नेदरलंड(5.4),युनायटेड किंगडम(5.3),तर जर्मन चा वाटा (4.5)होता.त्याशिवाय सिंगापूर,फ्रांस,साऊथ कोरिया

आणि स्वीझर्लंड यांचा देखील विदेशी थेट गुंतवणुकीतील वाटा महत्वाचा आहे. परंतु 2006 ते 2023 या कालावधीतील विविध देशांचा थेट गुंतवणुकीतील वाटा बदलला आहे.ते आपल्याला पुढील तक्ता क्र.4 वरून लक्षात येईल.

तक्ता क्र.4 भारतातील FDI गुंतवणुकीतील विविध देशांचा वाटा (2006 ते 2023) टक्केवारीत

देश	वाटा (टक्केवारीत)
मॉरिशस	25.8
सिंगापूर	23.3
यू.एस.ए.	9.5
नेदरलंड	6.9
जपान	6.1
युनायटेड किंगडम	5.3
यू.एस.ई	2.5
केमन बेटे	2.4
जर्मनी	2.2
सायप्रस	2.0
इतर देश	14.0

संदर्भ:- Fact sheet on foreign direct investment (FDI), department for promotion of industry and internal trade of commerce and industry. Government of India.

वरील तक्ता क्र.4 असे दर्शवितो की, 2006 ते 2023 या कालावधीत सर्वाधिक गुंतवणूक मॉरिशस त्या खालोखाल सिंगापूर या देशाने केली आहे.त्याचबरोबर यू.एस.ए.,नेदरलंड,जपान आणि युनायटेड किंगडम या देशांचा वाटा 5 टक्क्यापेक्षा जास्त आहे.

विदेशी थेट गुंतवणूकीचा विविध क्षेत्रातील ओघ :- भारतात 1991 ते 2005 या कालावधीतील क्षेत्रनिहाय विश्लेषण

तक्ता क्र.5 FDI चा विविध क्षेत्रनिहाय ओघ (2000 ते 2023)

क्षेत्र	वाटा
सेवा क्षेत्र	16.2
संगणक,सॉफ्टवेअर आणि हार्डवेअर	15.0
ट्रेडिंग	6.2
आटोमोबाईल उद्योग	5.5
दूरसंचार सेवा	6.2
औषधे आणि रसायने (खत वगळून)	2.7
बांधकाम विकास	4.7

लक्षात घेता असे दिसून येते की,एकूण गुंतवणुकी पैकी सर्वाधिक गुंतवणूक इलेक्ट्रिक उपकरणे(11.9),परिवहन उद्योग(8.6),दूर संचार क्षेत्र(7.9),सेवा क्षेत्र (8.0)तर इंधन(ऊर्जा आणि तेल शुद्धिकरण) (7.0)या क्षेत्रात झाली. खालील तक्ता क्र.5 मध्ये क्षेत्र निहाय FDI च ओघ (डॉलर मध्ये) दर्शविला आहे.

संदर्भ:- Fact sheet on foreign direct investment (FDI), department for promotion of industry and internal trade of commerce and industry. Government of India.

वरील तक्ता क्र.5 असे दर्शवितो की, 2000 ते 2023 या कालावधीत 636564 दशलक्ष डॉलर गुंतवणूक भारतात आली.त्यातील सर्वाधिक 102856 दशलक्ष डॉलर सेवा क्षेत्रात,त्या खालोखाल 94912 दशलक्ष डॉलर

संगणक,सॉफ्टवेअर आणि हार्डवेअर या क्षेत्रात झाली.त्याच बरोबर ट्रेडिंग,दूरसंचार सेवा आणि आटोमोबाईल उद्योग या क्षेत्रात FDI चा ओघ आकर्षिला गेला आहे.

सारांश:-

1991 साली भारत सरकारने नवीन आर्थिक धोरण स्वीकारले. या धोरणांतर्गत भारतात विविध विदेशी उद्योजक आणि गुंतवणूकदारांना गुंतवणूक करण्यास परवानगी देण्यात आली. भारत सरकारने विदेशी गुंतवणूक आकर्षित करण्यासाठी आपल्या धोरणात वेळोवेळी बदल केले. विदेशी थेट गुंतवणूक हा विदेशी गुंतवणुकीचा नावाजलेला प्रकार असून ही गुंतवणूक FDI आणि FPI अशा दोन प्रकारे विभागली आहे. भारतात 1991 ते 2004 या कलावधीत 70739 दशलक्ष डॉलर विदेशी गुंतवणुकीच्या माध्यमातून आली. त्यातील FDI चा वाटा 50 टक्के होता. FDI च ओघ 2004 ते 2022 या कलावधीत मोठ्या प्रमाणात वाढला त्यात FDI च वाटा 50 टक्क्यावरून 80 टक्क्या पर्यंत वाढला. हा वाटा भारतीय अर्थव्यवस्थेच्या दृष्टीने महत्वाचा आहे. भारतात सर्वाधिक गुंतवणूक मॉरिशस व सिंगापूर या देशाकडून आली.

धोडक्यात भारत सरकारने आर्थिक सुधारणा काळात विदेशी गुंतवणूक आकर्षित करण्यासाठी अनेक अनुकूल धोरणे राबविली. परिणामी विदेशी गुंतवणूकदारांनी भारतात विविध क्षेत्रात मोठ्या प्रमाणात गुंतवणूक केली आहे त्यामुळे भारतासारख्या विकसनशील देशाच्या आर्थिक विकासाला बळ देण्यासाठी विदेशी थेट गुंतवणुकीचे महत्वपूर्ण योगदान आहे.

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भूमितीय पैलू : भंडारा जिल्ह्यातील वैनगंगा नदी खो-यातील उर्ध्व पाणलोट क्षेत्र, आकारमितीय अध्ययन

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प्रस्तावना :

वैनगंगा नदी ही भंडारा जिल्ह्यातील महत्त्वाची नदी असून ती गोदावरी नदीची उपनदी आहे. वैनगंगा व वर्धा या दोन नद्यांच्या संयुक्त प्रवाह (प्राणहिता नदी) गोदावरी नदीला डाव्या तीरावर मिळतो. तसेच भंडारा जिल्ह्यातून जेव्हा वैनगंगा नदी वाहत जाते तेव्हा तिला चांदपूर सुर व वाकडा लहान-लहान प्रवाह सुद्धा येऊन मिळतात. या सर्व लहान मोठ्या प्रवाहांनी भंडारा जिल्ह्याच्या उजवीकडील उर्ध्व भागात एक प्रकारचे प्रवाह प्रणालीचे जाळे तयार केलेले आहे. या नदीप्रणालीला उप-पाणलोट क्षेत्रात विभागून वैनगंगा नदी खो-यांच्या आकारमितीचा अभ्यास केलेला आहे. आकारमिती म्हणजे कोणत्याही प्रदेशाचे किंवा नदी खो-याचे भूरूपीय स्वरूपांचे गणितीय किंवा संख्यात्मक स्वरूपात केलेले अध्ययन होय. भूगोल अभ्यासकाला भूगोलशास्त्रातील नदी खो-याचा अभ्यास महत्त्वपूर्ण ठरतो. संशोधनातही नदीखोरे, त्यांचा विस्तार, नद्यांचे जाळे यासंबंधीची विविध सूत्रे, आलेख व सांख्यिकी विश्लेषण करून योग्य ते निष्कर्ष काढावे लागतात. वैनगंगा नदी खो-यातील उजवीकडील उर्ध्व पाणलोट क्षेत्राचा आकारमितीय दृष्टिकोनातून भूरूपीय पैलूंचा (Relief Aspects) चा अभ्यास प्रस्तुत शोधनिबंधात करण्याचा प्रयत्न केलेला आहे.

अभ्यास क्षेत्र : भंडारा जिल्ह्याचे भौगोलिक स्थान हे २१°०१' अंतर अक्षांश आणि ७९°६५' पूर्व रेखांशावर वसलेले असून एकूण क्षेत्रफळ ३७१६ चौ.कि.मी. आहे. भंडारा जिल्ह्यात एकूण ७ तालुके आहेत. भंडारा जिल्ह्याच्या पूर्वेला गोंदिया व पश्चिमेला नागपूर जिल्हा आहे. उत्तरेला मध्य प्रदेश तर दक्षिणेला गडचिरोली व चंद्रपूर जिल्हे आहेत. एकूण लोकसंख्या २०११ च्या जनगणनेनुसार १२००३३४ एवढी आहे.

उद्दिष्टे : प्रस्तुत लघुशोध निबंधाची उद्दिष्टे पुढीलप्रमाणे आहेत.

- १) भंडारा जिल्ह्यातील वैनगंगा नदी खो-यातील उजवीकडील उर्ध्व भागातील प्रवाह प्रणाली व पाणलोट क्षेत्राचे अध्ययन करणे.
- २) पाणलोट क्षेत्राच्या भूरूपीय पैलूंचा अभ्यास करणे.
- ३) उठावाची उंची, उतार, घर्षण, सुचकांक आदींचा अभ्यास करणे.

भूरूपीय पैलू (Relief Aspects) :

नदी पाणलोटालातील भूउठावाचे भूरूपिकीय स्वरूप हे त्रिमितीय भूरूपांशी संबंधित असते. ज्या अंतर्गत भूरूपांचे क्षेत्र, आकारमान, विस्तार व उंचीचे विविध आकारमितीय पद्धतीद्वारा अध्ययन केले जाते. या पैलूंतर्गत भूउठावाची उंची, आकार, विरता, उतार इ. मापन केले जाते व त्याचे प्रस्तुतीकरण हे प्रत्यक्ष व सापेक्ष उंची, उच्चतादर्शी वक्र, प्रवणतादर्शी वक्र, तुंगतमिती वक्र, प्रक्षेपित, अध्यारोपित, संयुक्त, परिच्छेदन इ. द्वारे केले जाते. याशिवाय सरासरी भूपृष्ठीय उतार, सापेक्ष उंची, उंची गुणोत्तर, घर्षण सुचकांक इ. चा समावेश केला जातो. कोणत्याही प्रदेशाची उंची प्रदेशाच्या भूभागावरील उर्ध्व स्वरूपाचे सत्य दर्शन होय.

प्रत्यक्ष उंची (Absolute Relief) :

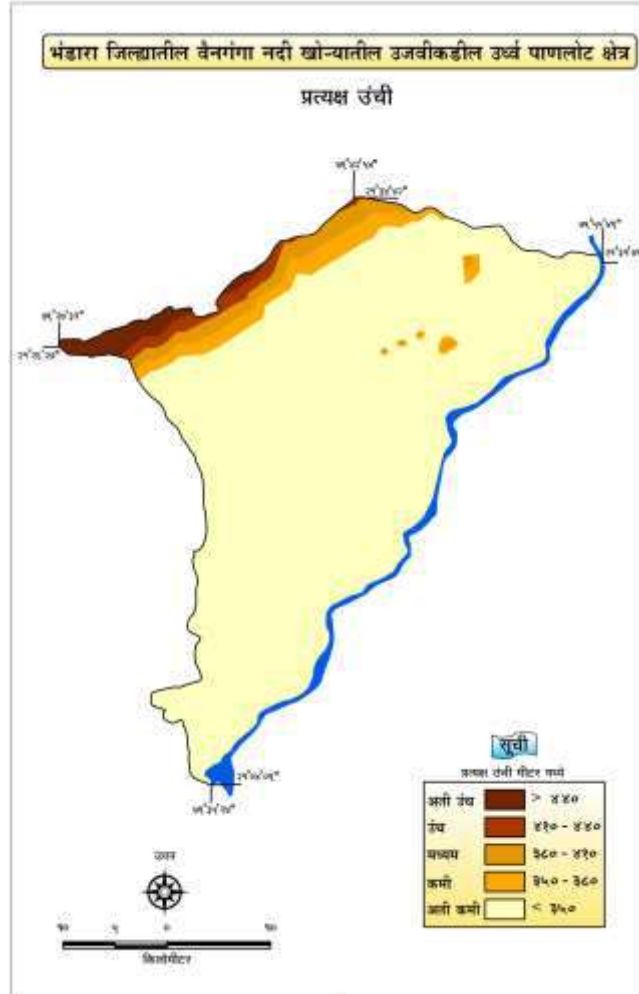
प्रत्यक्ष उंची हा संरचनात्मक व विनाशत्मक शक्ती व प्रक्रियेचा क्रियाशील घटक होय. उंचीचा प्रत्यक्ष व प्रादेशिक वितरणातील फरक हे याचे दोन घटक आहेत. वैनगंगा उर्ध्व पाणलोटाला क्षेत्रातील उंचीच्या गटावर आधारीत ५ भाग करण्यात आले आहेत.

भंडारा जिल्ह्यातील वैनगंगा नदी खो-यातील उजवीकडील उर्ध्व पाणलोट क्षेत्र प्रत्यक्ष उंची (Absolute Relief)

अ. क्र.	उंची (मीटर)	वर्गवारी	क्षेत्रफळ चौ.कि.मी.	%
१	४४० पेक्षा जास्त	अती उच्च	२३.००	२.०३
२	४१०-४४०	उच्च	१९.००	१.६८
३	३८०-४१०	मध्यम		३.५३

४	३५०-३८०	कमी	४०,००	५.०३
५	३५० पेक्षा कमी	अती कमी	५७.०० ९९३.००	८७.७३
	एकूण		११३२.००	१००.००%

स्त्रोत : संशोधक स्वतः



सारणी व नकाशा मध्ये वैनगंगा नदीच्या पाणलोटाला भूउठाव व भूरचना दर्शविलेली आहे. वैनगंगा नदीच्या पाणलोट क्षेत्राच्या प्रत्यक्ष भूउठावाचे उंचीच्या वर्गवारीच्या आधारावर ५ गटात विभागणी करण्यात आलेली आहे.

१) अती निम्न भूउठाव :

या गटांतर्गत ३५० मीटर पेक्षा कमी उंचीच्या प्रदेशाचा समावेश यात होतो. मुख्यतः वैनगंगा नदीच्या पाणलोट क्षेत्रफळातील सर्वात जास्त ९९३.०० चौ.कि.मी. (८७.७३%) क्षेत्र समाविष्ट झालेले दिसून येते. या आधारे भूउठाव गटांतर्गत पाणलोटाला हे सर्वाधिक व्यापलेले क्षेत्र आहे. ज्यात संपूर्ण पाणलोटाला वायव्येकडचा भाग वगळता तसेच चांदपूर उप-पाणलोटाला टेकड्यांचा भाग वगळता संपूर्ण पाणलोटाला सर्वाधिक भाग निम्न भूउठावांतर्गत येतो.

२) निम्न भूउठाव :

या पाणलोट क्षेत्रातील ३५० ते ३८० मीटर उंची दरम्यानचा प्रदेश या गटात मोडतो. याने संपूर्ण पाणलोटाला ५७ चौ.कि.मी. क्षेत्र (५.०३%) व्यापलेले आहे. चांदपूर टेकड्या व अंबागड तसेच गायमुख टेकड्यांच्या उत्तरेकडील भागाचा यात समावेश होतो. या उंचीचा प्रदेश सुद्धा प्रस्तुत पाणलोट क्षेत्राच्या उत्तरेस आढळून येतो.

३) मध्यम भूउठाव :

सर्वसाधारणपणे ३८० ते ४१० मीटर उंचीदरम्यानचा प्रदेशाचा यात समावेश होतो. या उंचीच्या पाणलोट क्षेत्राचे ४ चौ.कि.मी. (३.५३%) क्षेत्र व्यापलेले आहे. या उंचीने पाणलोटाला वायव्येकडील फार थोडा भाग व्यापलेला आहे.

४) उच्च भूउठाव :

प्रस्तुत पाणलोट क्षेत्रातील ४१० ते ४४० मीटर उंची दरम्यानचा प्रदेशाचा यात समावेश होतो. या उंचीने

पाणलोट क्षेत्राचे १९ चौ.कि.मी. (१.६८%) व्यापलेले आहे व हे उंचीचे क्षेत्र पाणलोट क्षेत्राच्या वायव्येकडे आढळून येते.

५) अती उच्च भूउठाव :

वैनगंगा नदीच्या पाणलोट क्षेत्रातील सर्वात उंच म्हणजे ४४० मीटर उंचीच्या वर असलेला भूभाग यात समाविष्ट होतो. एकूण प्रदेशाच्या २३ चौ.कि.मी. (२.०३%) क्षेत्र येते. यात वैनगंगा पाणलोटाला अती वायव्येकडील भाग ज्यात सूर व चांदपूर नदीच्या उप-पाणलोटाला अंतर्भाव होतो. त्याने सूर नदीच्या उप-पाणलोटाला क्षेत्र जास्त व्यापलेले आहे. संपूर्ण वैनगंगा पाणलोट क्षेत्राचा विचार करता अतिशून्य भूउठावाखाली ८७.७३% क्षेत्र असून वाकडा नाला उप-पाणलोटाला पूर्ण भाग व चांदपूर तसेच सूर उप-पाणलोटाला बहुतांश भाग यात समाविष्ट होतो. सर्वाधिक उंचीचे क्षेत्र फार कमी म्हणजे २.०३% असून ते जास्तीत जास्त करून सूर पाणलोटाला अंतर्गत येते.

एकंदरीत या पाणलोट क्षेत्राचा भाग सामान्यतः सपाट भूभाग म्हणजे पठारी स्वरूपाचा भूभाग आहे.

सापेक्ष उंची (Relative Relief) :

दर चौ.कि.मी. ला कमाल व किमान उंचीमधील फरकाला सापेक्ष उंची असे म्हणतात. डब्ल्यू. एस. ग्लाक यांनी सापेक्ष उंचीऐवजी 'भूउठाव पैलु' या शब्दाचा वापर केला. उंच भागाचा वरचा पृष्ठभाग व नदीच्या दरीची खोली प्रदर्शित करते. खणनाची संपूर्ण प्रक्रिया व क्षमता स्पष्ट करण्यात सरासरी (प्रत्यक्ष) उंची कमी पडत असल्यामुळे भुरूपशास्त्राचे लक्ष सापेक्ष उंचीकडे केले. (स्मीथ १९३५, पान क्र. २७५) सापेक्ष भूउठावाची संकल्पना सर्वप्रथम पारटेच (१९११) यांनी मांडली व क्रेट्स (१९२२) यांनी ती स्विकारली. स्क्रिफर, कालनेर (१९३०) आणि स्मीथ (१९३५) व अनेकांनी या संकल्पनेवर संशोधन केले आहे. कमाल व किमान उंचीतील फरक स्पष्ट करणारी ही पद्धत स्थलाकृतिक घटकांची तीव्रता स्पष्ट करते.



भंडारा जिल्ह्यातील वैनगंगा नदी खो-यातील उजवीकडील उर्वर पाणलोट क्षेत्र सापेक्ष उंची (Relative Relief)

सापेक्ष उंची (मीटर)	क्षेत्रफळ (चौ.कि.मी.)	%
८० पेक्षा जास्त	५१.००	४.५१
४० ते ८०	३०५.००	२६.९४
२० ते ४०	१२४.००	१०.९५
१० ते २०	७१.००	६.२७
१० पेक्षा कमी	५८१.००	५१.३३
एकूण	११३२.००	१००.००%

स्रोत : संशोधक स्वतः

सारणी व नकाशा मध्ये दिल्याप्रमाणे प्रस्तुत पाणलोटाला उतार वायव्येकडून आग्नेय दिशेला आहे. तसेच

सर्वाधिक ५८१.०० चौ.कि.मी. (५१.३३%) क्षेत्र १० मीटर पेक्षा कमी सापेक्ष उंचीचा मंद उताराचा सपाट मैदानी क्षेत्र

आहे. तर सर्वात कमी भाग ८० मीटरपेक्षा जास्त सापेक्ष उंचीचे, तीव्र उताराचे असून ते पाणलोटाने वायव्येला अंबागड टेकड्यांच्या भागात आहे.

परिच्छेदन (Profiles)

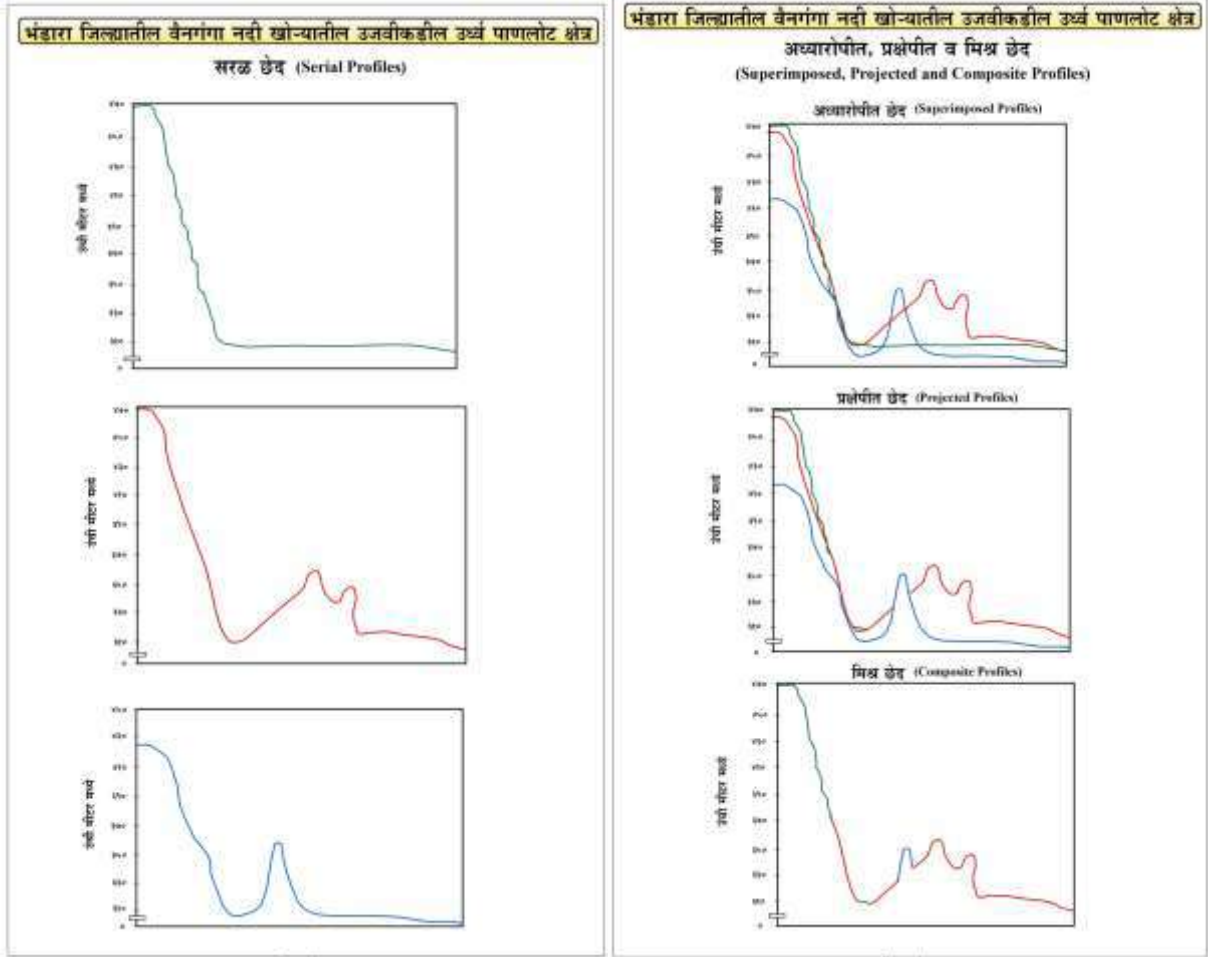
कोणत्याही प्रदेशाची उंची प्रत्यक्षपणे लक्षात येण्याकरीता विविध छेद / परिच्छेदिका काढल्या जातात व छेदावरून त्या प्रदेशाच्या उंचीचा भाग सहजपणे लक्षात येतो. म्हणूनच वैनगंगा नदीच्या पाणलोट क्षेत्राचा भुउठाव

किंवा उंची स्पष्ट करण्याकरीता विविध छेद / परिच्छेदिका काढण्याचा प्रयत्न केलेला आहे.

१) सरळ छेद (Serial Profiles) :

वैनगंगा नदी खो-यातील उजवीकडील उध्व पाणलोट क्षेत्रासाठी सरळ परिच्छेदिका तयार केल्या. समोच्चतादर्शक रेखांच्या नकाशात दिल्याप्रमाणे या पाणलोटाने जास्तीत जास्त





उंची ४७० मीटर व कमीतकमी उंची ३१० मीटर एवढी आहे. उतार वायव्येकडून आग्नेय दिशेकडे मुख्य वैनगंगा नदीच्या उजव्या किना-याकडे आहे.

२) अध्यारोपित परिच्छेदन (Superimposed Profile) :

सर्व संरळ छेद / संरळ परिच्छेदिका आलेख मध्ये दिल्याप्रमाणे एकाच चौकटीत एकावर एक अध्यारोपित करूनही परिच्छेदिका तयार केली व प्रत्येक संरळ परिच्छेदिका ओळखायला यावी म्हणून रंगांचा वापर केलेला आहे.

३) प्रक्षेपित परिच्छेदन (Projected Profile) :

अध्यारोपित परिच्छेदिकेतील पहिल्या क्रमांकाची परिच्छेदिका सुरुवातीला पूर्ण काढून क्रमाने येणाऱ्या परिच्छेदिकेचा पुर्वीच्या परिच्छेदिकेवर येणारा भाग तेवढा काढला जातो.

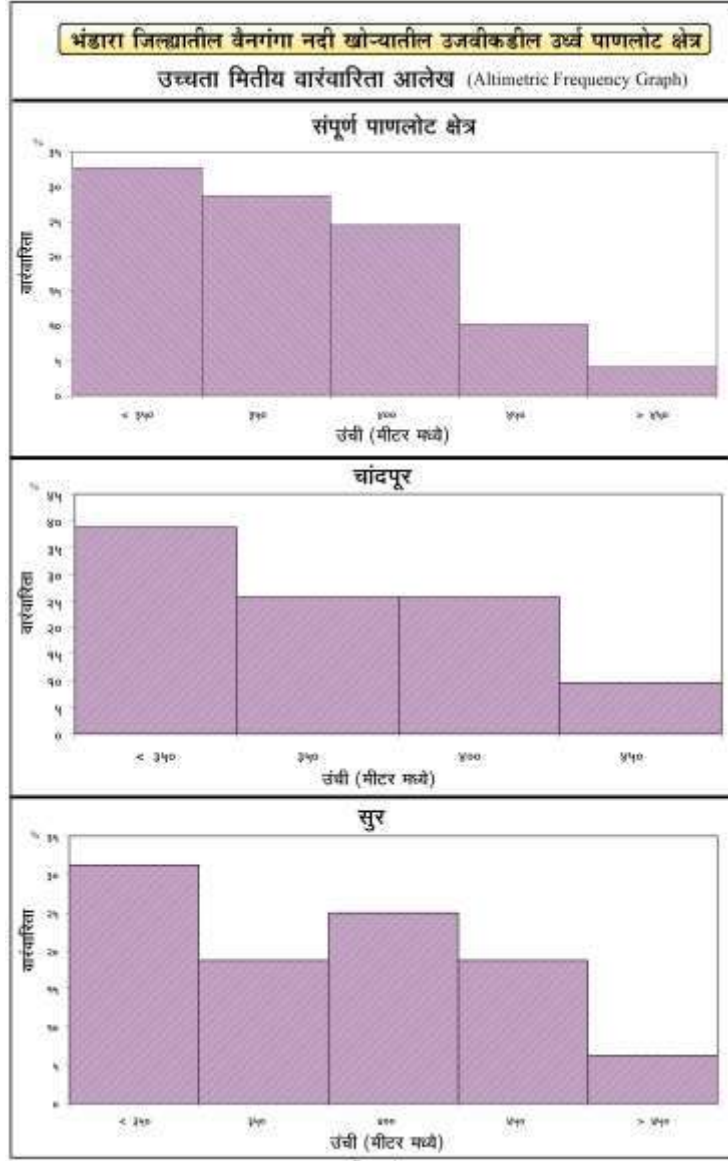
४) संयुक्त परिच्छेदन (Composite Profile) :

यात प्रक्षेपित परिच्छेदिकेतील केवळ वरचा उंच भाग (वाहेरील) काढून ही परिच्छेदिका तयार केली. हे सर्व अध्यारोपित, प्रक्षेपित, संयुक्त पार्श्वचित्र आलेख मध्ये

दर्शविले आहेत. (सिंह, सविन्द्र २००३, पान क्र. ३७२ ते ३७५)

उच्चतामितीय वारंवारिता विश्लेषण (Altimetric Frequency Analysis) :

प्रारंभिक अवस्थेतील 'खणन भूपृष्ठाच्या' निर्धारणासाठी विशिष्ट क्षेत्राच्या उंचसखल भागाच्या अभ्यासाकरीता उच्चतामितीय वारंवारिता विश्लेषण केले जाते. हे विश्लेषण आलेखाद्वारे दर्शविले जाते. असे म्हटले जाते की, उंच भूभाग प्रारंभिक खणन भूपृष्ठाच्या अवशेषास सुरक्षित ठेवतात. तसेच हे अवशेष उंच भूभाग (शिखरांचे पृष्ठभाग) नष्ट होत नाहीत. तोपर्यंत तेही नष्ट होत नाहीत. उच्चतामितीच्या विविध पद्धतीने प्राप्त आकडेवारी वारंवारिता आलेखाद्वारे (histogram) प्रदर्शित केले जाते. अभ्यासक्षेत्रांतर्गत येणा-या वैनगंगा पाणलोटालाचे संपूर्ण पाणलोट क्षेत्र तसेच चांदपूर व सूर उप-पाणलोटालासाठी उच्चतामितीय वारंवारिता आलेख दर्शविलेला आहे.



भंडारा जिल्ह्यातील वैनगंगा नदी खोऱ्यातील उजवीकडील उर्ध्व पाणलोट क्षेत्र उच्चतामितीय वारंवारिता विश्लेषण
(Altimetric Frequency Analysis)

उंची (मीटरमध्ये)	पाणलोट					
	चांदपूर		सुर		एकूण	
	वारंवारिता	%	वारंवारिता	%	वारंवारिता	%
८३५०	२४.००	३८.७१	१०.००	३१.२५	३२.००	३२.६५
३५०.००	१६.००	२५.८१	६.००	१८.७५	२८.००	२८.५७
४००.००	१६.००	२५.८१	८.००	२५.००	२४.००	२४.४९
४५०.००	६.००	९.६८	६.००	१८.७५	१०.००	१०.२०
४५०	-	-	२.००	६.२५	४.००	४.०८

स्त्रोत : संशोधक स्वतः

अंशमितीय वक्र (Hypsometric Curve) :

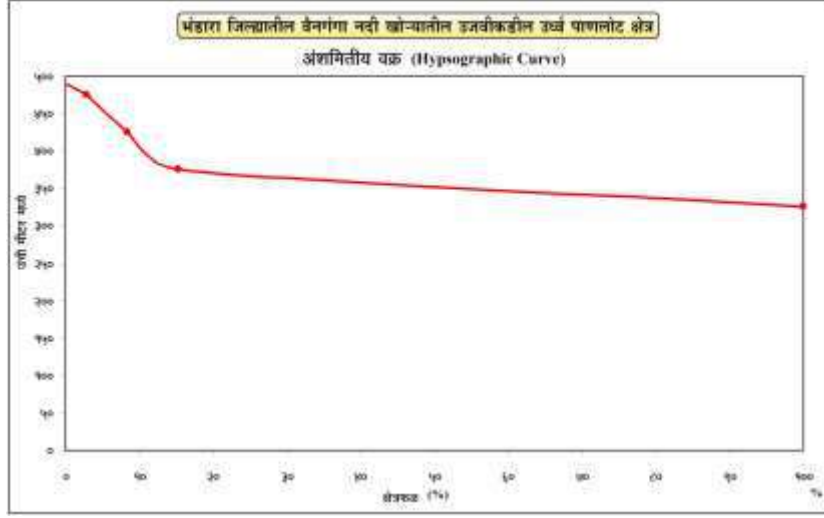
अंशमितीय वक्राद्वारे निश्चिप्त डाटम रेपेच्या वर किंवा खाली विविध उंचीवरील भूषणाच्या क्षेत्रफळाच्या गुणोत्तरास दर्शविले जाते. अंशमितीय वक्र काढण्याकरीता त्या विशिष्ट प्रदेशाचे क्षेत्रफळ व उंची संबंधी आकडेवारी प्राप्त करावी लागते. आलेख मध्ये भंडारा जिल्ह्यातील

वैनगंगा नदी खोऱ्यातील उजवीकडील उर्ध्व पाणलोट क्षेत्राचा अंशमितीय वक्र झालेला आहे. (सिंह, सविन्द्र २००३, पान क्र. ३६४)

सारणी व आलेख मध्ये दिल्याप्रमाणे ३०० ते ३५० मिटर उंची दरम्यान पाणलोट क्षेत्रातील सर्वात जास्त

म्हणजे ८४.७४ टक्के प्रवाह लांबीचा समावेश होतो. तर ३५० ते ४०० मिटर उंची दरम्यान ६.८२ टक्के प्रवाह लांबीचा प्रदेश येतो. ४०० ते ४५० मिटर उंचीच्या प्रदेशात ५.५४ टक्के प्रवाह लांबीचा समावेश होतो. तर सर्वात कमी प्रवाह लांबी २.९० टक्के ही ४५० ते ५०० मिटर दरम्यान

आढळते. अर्थातच वाढत्या उंचीनुसार प्रवाह लांबी कमी होते तर कमी उंचीच्या प्रदेशात प्रवाहांची लांबी वाढते कारण अनेक प्रवाहांना उतारावर (कमी उंचीवर) अनेक प्रवाह येऊन मिळतात.



भंडारा जिल्ह्यातील वैनगंगा काही खो-यातील उजवीकडील उर्ध्व पाणलोट क्षेत्र अंशमितीय वक्र (Hypsometric Curve)

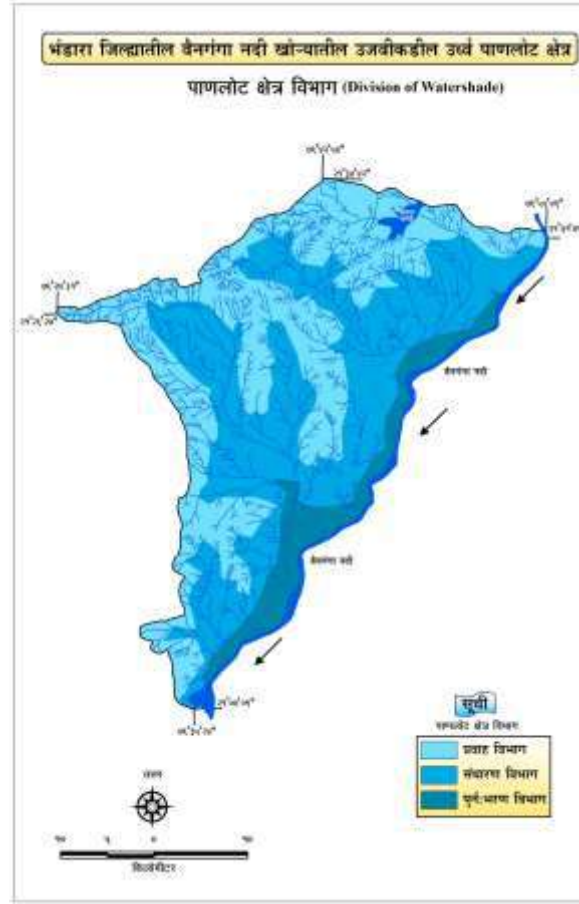
उंची (मीटरमध्ये)	उंची मध्य (Mean Height)	एकूण लांबी	टक्केवारी (%)
३००-३५०	३२५.००	६४.२०	८४.७४
३५०-४००	३७५.००	५.१६	६.८२
४००-४५०	४२५.००	४.२०	५.५४
४५०-५००	४७५.००	२.२०	२.९०
	एकूण	७५.७६	१००.००

स्त्रोत : संशोधक स्वतः

भंडारा जिल्ह्यातील वैनगंगा नदी खो-यातील उजवीकडील अर्ज पाणलोट क्षेत्र - पाणलोट क्षेत्र विभाग :

कोणतीही मुख्य नदी वाहत असतांना तिला येऊन मिळणा-या लहान-मोठ्या उपनद्यांमुळे हळूहळू विस्तृत अशा नदीखो-याची निर्मिती होत असते, या मुख्य नदीला ज्या लहान-मोठ्या उपनद्या वाहत येऊन मिळतात त्या नद्यासुद्धा लहान खो-यांची निर्मिती करतात. परंतु या लहान नद्यांची खोरी आकाराने लहान असल्यामुळे त्यांना त्यांचे पाणलोट क्षेत्र (Watershed) असे म्हणतात. अशा पाणलोट क्षेत्रांमुळे नदी खोऱ्याचे अध्ययन करणे सुलभ होते. प्रस्तुत वैनगंगा नदी खो-याला ३ उप-पाणलोट क्षेत्रात विभागून या पाणलोट क्षेत्रातील भूमी उपयोजनाचा अभ्यास करण्याचा प्रयत्न केलेला आहे. वैनगंगा नदीच्या उर्ध्व खो-यातील उप-पाणलोट क्षेत्र, लहान, लघु व लघुत्तम पाणलोट क्षेत्र यात

आढळून येणारे एकूण क्षेत्र व या क्षेत्राचा वेगवेगळ्या घटकाखाली होणारा उपयोग म्हणजेच पाणलोट क्षेत्रातील उपलब्ध क्षेत्राचा उपयोग कोणत्या घटकाखाली केलेला आहे याचा अभ्यास करण्याचा प्रयत्न केलेला आहे. तसेच प्रस्तुत पाणलोट क्षेत्राचे जसे विविध पाणलोट क्षेत्रात वर्गिकरण केलेले आहे. तसेच या पाणलोट क्षेत्राचे वेगवेगळ्या विभागात सुद्धा विभागणी केलेली आहे. प्रस्तुत अध्ययन क्षेत्रातील पाणलोट क्षेत्र हे तीन विभागात विभाजित केले आहे. १) प्रवाह विभाग (Runoff Zone), (२) संधारण विभाग (Storage Zone), ३) पुर्नःभरण विभाग (Recharge Zone). (सिंह, सविन्द्र २०३ पान क्र. ३४७, ३४८)



भंडारा जिल्ह्यातील वैनगंगा नदी खोऱ्यातील उजवीकडील अर्थ पाणलोट क्षेत्र-पाणलोट क्षेत्र विभाग

पाणलोट क्षेत्र विभाग	क्षेत्र चौ.कि.मी. मध्ये	%
प्रवाह विभाग	४९०.००	४३.२९
संधारण विभाग	५१९.००	४५.८५
पुर्नःभरण विभाग	१२३.००	१०.८६
एकूण	११३२.००	१००.००%

स्त्रोत : संशोधक स्वतः

१) प्रवाह विभाग (Runoff Zone) :

या विभागात एकूण अभ्यासक्षेत्रापैकी ४९०.०० चौ.कि.मी. क्षेत्र (४३.२९%) येतो. हा विभाग पाणलोट क्षेत्राच्या उत्तरेकडील डोंगराळ तसेच जंगलव्याप्त क्षेत्राचा आहे. यात प्रामुख्याने प्रथम श्रेणी प्रवाह क्षेत्राचा अधिक समावेश झालेला आहे.

२) संधारण विभाग (Storage Zone) :

संधारण विभागांतर्गत एकूण ५१९.०० चौ.कि.मी. क्षेत्र (४५.८५%) व्यापलेले अरे. अभ्यासक्षेत्राचा मध्य तसेच पूर्वेकडील भाग या विभागांतर्गत येतो. या क्षेत्राने प्रस्तुत नदी खोऱ्याचा सर्वात जास्त भाग व्यापलेला आहे.

३) पुर्नःभरण विभाग (Recharge Zone) :

पुर्नःभरण विभागांतर्गत १२३.०० चौ.कि.मी. क्षेत्र (१०.८६%) येते. हे क्षेत्र वैनगंगेच्या उजव्या तीराला

लागून अभ्यासक्षेत्राच्या पूर्वेला आहे. या क्षेत्राने या नदीखोऱ्याचा सर्वात कमी भाग व्यापलेला आहे.

निष्कर्ष :

भूआकारमितीय पद्धती मधील भूरूपीय पैलूचे घटक अभ्यासले असता त्यामधील प्रत्यक्ष उंची व सापेक्ष उंची हा घटक घेण्यात आला व त्या अंतर्गत भूमीउपयोजन पाहिले असता असे दिसून येते की, जास्त उंचीच्या क्षेत्रात जंगलव्याप्त क्षेत्राचे प्रमाण जास्त आढळून येते तर कमी उंचीच्या क्षेत्रात पडित क्षेत्र, लागवडीस उपलब्ध नसलेले क्षेत्र त्याचप्रमाणे लागवडीखालील क्षेत्राचे प्रमाण जास्त आढळून येते म्हणजेच जसजशी उंची वाढत गेलेली आहे तसतसे लागवडी योग्य जमिनीचे क्षेत्र व सिंचित व असिंचित क्षेत्राचे प्रमाण खुप वाढत गेलेले आहे. म्हणूनच प्रत्यक्ष उंची व एकूण भूमीउपयोजन यांच्यामधील सर्व घटकांचा सहसंबंध उच्चस्तरीय असून तो धनात्मक स्वरूपाचा आढळून येतो. त्याचप्रमाणे सापेक्ष उंची (दर चौ.कि.मी. ला) व भूमी उपयोजन यांचा अभ्यास केला

असता असे दिसून येते की, जसजशी सापेक्ष उंची वाढत जाते तसतशी जंगलक्षेत्रात वाढ झालेली दिसून येते, परंतु जसजशी सापेक्ष उंची कमी झाली असता पडित क्षेत्र, लागवडीस अलब्ध नसलेले क्षेत्र व लागवडीखालील क्षेत्राचे प्रमाण वाढत गेलेले दिसून येते. त्याबरोबर सिंचित क्षेत्राचे प्रमाण सुद्धा वाढत गेलेले दिसत आहे. तसेच या दोहोंमधील सहसंबंध उच्चस्तरीय असून धनात्मक स्वरूपाचा आढळून येतो.

संदर्भ :

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- २) डॉ. नागतोडे पी. एम. आणि डॉ. लांजेवार हरिष द. (२००९) नकाशाशास्त्र व प्रात्यक्षिक व प्रात्यक्षिक भूगोलशास्त्र पिंपळापुरे प्रकाशन, नागपूर, पान क्र. २२९, २३०
- ३) प्रो. तिवारी विश्वनाथ (१९८४), भूआकृती विज्ञान का स्वरूप कल्याणी पब्लिशर्स, नवी दिल्ली १९८४, पान क्र. ४५०
- ४) प्रा. दाते सु. प. (१९९५), प्राकृतिक भूगोल, विद्या प्रकाशन, नागपूर पान नं. २००९ पान क्र. २२९-२३०



व्यापारिक कृषि विकास से जुड़ी प्रबंधकीय समस्याएँ एवं निदानात्मक सुझाव तथा कृषि नवाचार

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भूमिका :

देश की 'अर्थव्यवस्था की रीढ़' अब भी कृषि ही है। कृषि एक ऐसा उद्योग है जिसमें हमेशा लागत से अधिक उत्पादन होता है। 'प्रकृति का अनमोल उपहार है कृषि।' कृषि के साथ जुड़ा हुआ है पशुपालन, मत्स्यपालन, फल व सब्जी का उत्पादन, जल व भूमि संरक्षण, पर्यावरण की रक्षा और करोड़ों लोगों के रोजगार का अभूतपूर्व साधन। इसके साथ ही पोषण की उचित व्यवस्था है लेकिन आज के समय बीज—खाद माफिया के कारण देश का किसान परेशान है और आत्म हत्या करने को मजबूर है। बड़े किसान फिर भी अपना काम चला रहे हैं लेकिन छोटे व मझले किसान अपनी जमीन से दूर हो चुके हैं और शहरों में मजदूरी करने को मजबूर हैं। जो कभी खेत के मालिक होते थे, वे भी अब छोटी—मोटी नौकरी के लिए मजबूर हैं।

इन सभी समस्याओं के लिए कृषि से जुड़ी विभिन्न प्रकार की समस्याएँ जिम्मेदार हैं जो कृषि कार्य में लगातार बाधा डालती है एवं इसके उत्पादन को प्रभावित करती हैं। कृषि समस्याओं के लिए खाद, बीज, सिंचाई की सुविधा, कृषकों को उचित प्रशिक्षण का अभाव आदि सभी कारक जिम्मेदार हैं। इन सभी कारकों ने किसान के हाथ की ताकत छीन ली है। फसलों के पौध रोपण से लेकर उनके उत्पादन तक फसलों में कई प्रकार की बीमारियाँ एवं रोग लग जाते हैं। जिससे पौधों का सही विकास नहीं हो पाता तथा इसका सीधा असर फसलोत्पादन पर पड़ता है। कई बार फसलों में ऐसे रोग लग जाते हैं जो पौधों को ही सुखाकर खत्म कर देते हैं। इससे कृषकों को कई प्रकार की हानि उठानी पड़ती है।

स्वतंत्रता पूर्व और स्वतंत्र भारत के पश्चात् एक लम्बी अवधि व्यतीत होने के बाद भी भारतीय किसानों की दशा में सिर्फ 19–20 का ही अंतर दिखाई देता है। जिन अच्छे किसानों की बात की जाती है उनकी गिनती उंगलियों पर की जा सकती है। बढ़ती आबादी, औद्योगीकरण एवं नगरीकरण के कारण कृषि योग्य क्षेत्रफल में निरंतर गिरावट आई है। देश की लगभग 70 प्रतिशत आबादी गाँवों में निवास करती है और कृषि कार्य पर निर्भर है। ऐसे में किसानों एवं उनकी फसलों से सम्बन्धित समस्याओं की बात सभी करते हैं और उनके लिए योजनाएँ भी बनाते हैं, किन्तु उनकी मूलभूत समस्या ज्यों की त्यों बनी रहती है।

शर्मा, बी.एल. एवं भारद्वाज, पलक (2003) द्वारा कृषि क्षेत्र में किया गया शोध कार्य उल्लेखनीय है। प्रस्तुत पुस्तक "कृषि भूगोल" में कृषि के सैद्धान्तिक पहलुओं का अध्ययन तथा कृषि भूगोल के व्यावहारिक तथ्य को नये आयाम तथा प्रतिमान के रूप में समझाया गया। शोध में कृषि में प्रादेशिकरण की समस्या का उल्लेख किया गया। डंकल प्रस्ताव, पेटेंट नियम एवं उदासीकरण जैसी नीतियाँ का समावेश, कृषि भूमि भूगोल में नये आयाम प्रस्तुत करता है।

बैरवा, दीपचन्द (2018) ने झालावाड़ जिले में कृषि के स्वरूप का अध्ययन किया है। साथ ही व्यापारिक कृषि के परिदृश्य, उसमें किसानों द्वारा अपनाये गये नवाचारों, कृषि आधुनिकीकरण पर विशेष कार्य किया है।

प्रस्तुत लेख में व्यापारिक कृषि से जुड़ी विभिन्न प्रकार की समस्याओं को उठाते हुए उनके निराकरण की जरूरत तथा कृषि नवाचार पर जोर दिया है।

➤ कृषकों से जुड़ी विभिन्न प्रकार की प्रबंधकीय समस्याएँ एवं समाधान:

व्यापारिक कृषि का विकास विषय के गहन अध्ययन हेतु कृषि का सर्वे कार्य निदर्शन के आधार पर किया गया है। इसके

अन्तर्गत सीमांत कृषक, लघु कृषक, बड़े कृषक तथा खेतिहर श्रमिकों से प्रश्नावली, साक्षात्कार तथा मौखिक चर्चा की गई। जिसमें आधुनिक साधनों के प्रयोग तथा परम्परागत साधनों के प्रयोग से प्राप्त उत्पादन एवं उत्पादकता के अध्ययन के साथ-साथ कृषकों को होने वाली समस्याएँ, खेतिहर श्रमिकों को होने वाली समस्याएँ, ग्रामीण कृषकों की समस्याएँ तथा आधुनिकीकरण में आने वाली अन्य समस्याओं का गहनता से मौलिक अध्ययन किया गया है तथा कृषकों के मुंह—जुबानी बताई गई समस्याओं का भी अध्ययन किया है तथा प्रत्यक्ष अवलोकन में आने वाली समस्याओं के अन्तर्गत, भूमि सम्बन्धी समस्याएँ, श्रम सम्बन्धी समस्याएँ, पूँजी सम्बन्धी समस्याएँ, प्रबन्ध सम्बन्धी समस्याएँ तथा अन्य समस्याओं का भी बिंदुवार उल्लेख किया गया है तथा इन समस्याओं के कारण कृषकों में उत्पादन वृद्धि की प्रेरणा का ह्रास होता है।

भारतीय कृषि में मूलभूत परिवर्तन पंचवर्षीय योजनाओं के बाद कुछ देखने को मिला था। इसी सन्दर्भ में भट्ट तथा मुखर्जी ने महाराष्ट्र के कोल्हापुर तथा गंगा यमुना दोआब घाटी की कृषि विशेषताओं का अध्ययन किया। इसी प्रकार प्रकार विभिन्न क्षेत्रों में भिन्न—भिन्न फसलों का अध्ययन भौगोलिक कारकों के प्रभाव को लेकर सेन, लहरी, घाटी, बनर्जी, सिन्हा आदि भूगोलवेत्ताओं द्वारा किया गया।

कृषकों की प्रमुख समस्याएँ निम्नानुसार हैं –

1. भूमि सम्बन्धी समस्याएँ:

(क) भूमि की उर्वरा शक्ति में गिरावट : व्यापारिक कृषि उत्पादकता में बाधक का प्रथम तत्व भूमि की उर्वरा शक्ति में निरंतर गिरावट आना है। कृषकों द्वारा भूमि पर निरंतर फसलों के उत्पादन करने के कारण होने वाले पोषक तत्व की कमी को पूरा करने के लिए आवश्यक मात्रा में खाद एवं उर्वरकों का उपयोग नहीं करने से भूमि की उर्वरा शक्ति निरंतर कम होती जाती है। हवा व पानी से भूमि के कटाव, भूमि पर निरंतर पानी भरा रहना, उचित फसल चक्र का अभाव भूमि की उर्वरा शक्ति ह्रास में वृद्धि करते हैं।

(ख) जोतों के उपविभाजन एवं अपखण्डन : भूमि सम्बन्धी दूसरी प्रमुख समस्याओं में प्रचलित उत्तराधिकारी कानून के कारण जोत का आकार निरंतर कम होता जा रहा है एवं भूमि के खण्ड एक—दूसरे से कम होते जा रहे हैं। अतः कृषि जोतों का विभाजन व्यापारिक कृषि के लिए आर्थिक दृष्टि से लाभकारी नहीं होती है।

(ग) अनार्थक जोतें : व्यापारिक कृषि विकास का प्रमुख बाधक तत्व अनार्थक जोतें हैं। बढ़ती जनसंख्या, प्रति व्यक्ति आय में कमी होना, भूमि का आकार एवं भविष्य में अनिश्चितता व्यक्ति में भूमि के प्रति विशेष मोह उत्पन्न करता है। वह किसी भी प्रकार अपने स्वामित्व

की भूमि को अपने पास बनाये रखना चाहता है। इसका सबसे बड़ा कारण कानून है, जिसके प्रावधान अनुसार भूमि का भूमि हिनो में वितरण तथा भूमि का उस व्यक्ति के पास होना है जो उसे स्वयं जोतता है। इस प्रकार के सरकारी कानून के कारण एक कृषक खेत को बटाई पर देने में भी हिचकता है। खेत का आकार छोटा होने के कारण व्यक्ति अपनी आजीविका हेतु पूर्णतः कृषि पर निर्भर नहीं रह सकता है। इस कारण व्यक्ति खेत को बटाई पर नहीं देकर बिना जोते ही रखना अधिक सुरक्षित एवं लाभदायक मानता है। परिणामतः उपलब्ध भूमि का अनुकूलतम उपयोग नहीं हो पाता। यदि किसी प्रकार समझौते या अनुबन्ध द्वारा खेत को बटाई पर दिया जाता है तो बटाई पर दी गई भूमि की स्थिति अत्यंत दयनीय होती है। गाँवों में बटाई पर खेत प्रायः सीमान्त कृषक लेते हैं जिनके पास थोड़ी बहुत स्वयं की भूमि होती है।

ये सीमान्त कृषक अपनी जोतें बढ़ाने हेतु, बटाई पर भूमि ले लेते हैं लेकिन उस भूमि के प्रति न्याय नहीं करते। ऐसे कृषकों के मन में सदैव यह बात बनी रहती है कि यह भूमि मेरी स्वयं की नहीं है। अतः अपने संसाधनों का उपयोग वे स्वयं की छोटी जोतों पर लगाते हैं बटाई की भूमि पर नहीं। कभी-कभी तो बटाई पर ली गई भूमि के स्वामी द्वारा दिये गये रासायनिक खाद आदि को भी स्वयं की भूमि पर प्रयोग कर लेते हैं। इस प्रकार बटाई पर ली गई भूमि को समय पर खाद-पानी नहीं मिलता। बटाई पर भूमि लेने वाले लोगों की भूमि के प्रति उदासीनता ऐसे खेत की उत्पादकता कम रखती है।

2. कृषि शिक्षा:

जिस देश में 138 करोड़ के लगभग आबादी निवास करती हैं और देश की 70 प्रतिशत आबादी कृषि पर आधारित है। उस देश में कृषि शिक्षा के विश्वविद्यालय और कॉलेज नाम मात्र के हैं उमें भी गुणवत्ता परक शिक्षा का अभाव है।

भूमण्डलीकरण के दौर में कृषि पर आधुनिक तकनीकी बहुराष्ट्रीय कम्पनियों के माध्यम से जो देश में आती है उसे कृषि का प्रचार-प्रसार तंत्र उन किसानों तक पहुँचाने में लाचार नजर आता है। यह गंभीर एवं विचारणीय विषय है। प्रदेश अथवा जिला स्तर पर कृषि शिक्षा के शोध संस्थानों के अभाव में कृषि से सम्बन्धित शोध समाप्त प्रायः से है। कृषि शिक्षा संस्थानों का अभाव हो अथवा गुणवत्ता परक शिक्षकों का अभाव हो, जिनके कारण हरित क्रान्ति के बाद फिर कोई उल्लेखनीय कार्य नहीं हुआ है। अधिकांश किसान आज भी घास-फूस की झोपड़ी कच्चे मकान एवं खपरेल वाले घरों में रहते हैं, जहाँ पर्याप्त जगह नहीं है। आज भी अधिकांश गाँवों में झाड़-फूंक एवं अन्य अनेक प्रकार के साधनों के माध्यम से बीमारी का इलाज करते हैं, पर्याप्त मात्रा में चिकित्सा सुविधा उपलब्ध नहीं है। अधिकांश कृषक आज भी निरक्षर, अनपढ़ व अशिक्षित हैं, जिससे वे कृषि के आधुनिक उपकरणों का उपयोग करने में हिचकते हैं।

भारत के किसान आज भी कृषि के लिए ईश्वरीय कृपा पर निर्भर है। कृषि शिक्षा का व्यापक प्रचार-प्रसार ग्रामीण क्षेत्रों में होना चाहिए। उन लोगों का उपयोग कृषि के निचले स्तर के व्यापक प्रचार-प्रसार और उत्पादन वृद्धि में किया जाना चाहिए, इससे कृषकों को कृषि का ज्ञान मिलेगा एवं फसल का अधिक उत्पादन किस प्रकार होगा, इसका भी सम्पूर्ण ज्ञान कृषि शिक्षा के माध्यम से ही मिलेगा। इससे वे अपनी फसलों के उत्पादन को बढ़ा सकेंगे।

3. बीज की समस्या:

किसानों द्वारा की जाने वाली व्यापारिक फसलों की कृषि में एवं उसके उत्पादन में बीजों का महत्वपूर्ण स्थान है। बीज खेती में आने वाला एक महत्वपूर्ण आदान है जिसकी गुणवत्ता पर खेती की सम्पूर्ण पैदावार निर्भर करती है। अतः बीज की गुणवत्ता उच्च स्तर की बनी रहे, इसके लिए आवश्यक है कि किसानों को बीज की समस्या को दूर करने के लिए उत्पादन तकनीक में वैज्ञानिक विधि अपनाई जानी चाहिए और किसानों को उन बिन्दुओं पर विशेष ध्यान रखना चाहिए जिनसे बीज की गुणवत्ता पर सीधा प्रभाव पड़ता है।

व्यापारिक कृषि उत्पादन में बीज प्रमुख कड़ी है। उचित गुणवत्ता वाले बीज के अभाव में किसान द्वारा काम में लिये गये अन्य सभी आदान जैसे — उर्वरक, पौध संरक्षण, रसायन, सिंचाई आदि पर किया गया व्यय एवं उसकी मेहनत सभी व्यर्थ चले जाते

हैं। आवश्यकता इस बात की है कि उन्नत किस्मों के बीज उत्पादन, विद्यायन, परीक्षण, भण्डारण आदि के सन्दर्भ में बीज उत्पादकों एवं विद्यायन केन्द्रों द्वारा बीज गुणवत्ता संरक्षण के बारे में पूर्ण जागरूकता बरती जाये।

बीज की प्रमुख समस्या को हल करने के लिए एवं व्यापारिक फसलों के लिए उत्तम किस्म के बीजों को किसानों तक पहुँचाने के लिए, राज्य सरकारों ने ऐसी योजनाएँ चला रखी हैं जिनका लाभ किसान ले सकें। प्रमुख रूप से कोई भी कृषक जिसकी स्वयं की कृषि योग्य भूमि व सिंचाई का निश्चित साधन है। निगम के बीज उत्पादन कार्यक्रम में भाग ले सकते हैं।

बीज उत्पादन कार्यक्रम अपने खेत पर लेने के लिए सर्वप्रथम कृषक को पंजीकरण कराना अनिवार्य है। जिसके लिए उसे अपने क्षेत्र के निगम कार्यालय से सम्पर्क स्थापित कर निर्धारित पंजीकरण फार्म भरकर एवं करार करके निर्धारित पंजीकरण शुल्क जमा कराना आवश्यक है। तत्पश्चात् निगम द्वारा उपलब्ध कराये गये प्रजनक की बताई गई विधि अनुसार बुवाई करनी होती है। अन्य बीज का मिश्रण वर्जित है। बीज फसल उग आने के पश्चात् इसका प्रमाणीकरण संस्था प्रतिनिधि द्वारा समय-समय पर फसल निरीक्षण होना अनिवार्य है। ऐसा न होने की स्थिति में समीप के निगम कार्यालय से सम्पर्क कर सकते हैं।

कृषि हेतु अच्छी प्रजाति के बीजों की व्यवस्था सुनिश्चित की जानी चाहिए और खेत या किसान चिन्हित किए जाए, उन्हें ये बीज उपलब्ध कराये जाने चाहिए। फसल की बुवाई के समय कृषि क्षेत्र की तकनीकी विशेष द्वारा कृषक को सलाह दी जानी चाहिए तथा उन पर होने वाली बीमारियों, आवश्यक उर्वरकों, सिंचाई, निराई-गुड़ाई आदि कार्य आवश्यकतानुसार समय-समय पर कृषि विशेषज्ञों की सलाह एवं निर्देशन से कराना चाहिए। जिससे व्यापारिक कृषि का उत्पादन बढ़ेगा और किसान भी व्यावहारिक दृष्टि से इसके ज्ञान से प्रशिक्षित होंगे।

4. भूमि प्रबन्धन:

आजादी के बाद भी किसी प्रकार की भूमि एवं फसल प्रबन्धन की बात किसी कोने में दिखाई नहीं देती और अधिकांश नीतियों और प्रबन्धन का संचालन वे लोग करते हैं जिन्हें क्षेत्र विशेष की कोई जानकारी नहीं होती। भूमि प्रबन्धन की बात की जाए तो व्यापारिक कृषि के लिए इसका महत्वपूर्ण स्थान है। यह नीति बनाई जानी चाहिए कि विभिन्न जिनसों की कितनी खपत है, यह किस क्षेत्र में है, इसके अतिरिक्त भविष्य के लिए कितने भण्डारण की आवश्यकता है। साथ ही हम कितना निर्यात कर सकेंगे। किस्मवार उतने उत्पादन की व्यवस्था क्षेत्रवार करनी चाहिए। इसके अतिरिक्त जो भूमि शेष रहती है उस पर ऐसे उत्पादों को बढ़ावा देना चाहिए, जो किसानों के लिए व्यावसायिक सिद्ध हो तथा निर्यात की संभावनाओं को पूर्ण कर सकें। यहाँ हमें यह भी देखना होगा कि जिस फसल को हम बोना चाहते हैं उनके लिए आवश्यक जलवायु, पानी, भूमि आदि भौगोलिक दशाएँ कैसा होना चाहिए। इसका परीक्षण कर सम्बन्धित किसानों को शिक्षित किया जाए, ताकि वे सुझावानुसार कार्य करने के लिए सहमत हो।

5. भूमि अधिग्रहण नीति:

राज्य सरकारों अथवा राज्य के अन्तर्गत गठित विभिन्न जिलास्तरीय विकास प्राधिकरणों द्वारा भूमि अधिग्रहण की नीति में कृषि योग्य भूमि को ध्यान में रखते हुए परिवर्तन किया जाना परमावश्यक है। औद्योगिक विकास, आधारभूत संरचना विकास व कई प्रकार की सरकारी एवं गैर सरकारी आवासीय योजनाओं हेतु ऐसी भूमि का अधिग्रहण किया जाना चाहिए जो कृषि योग्य नहीं हो। कृषि उपयोग में लाए जाने वाली भूमि का अधिग्रहण और उस पर निर्माण प्रतिबंधित कर देना चाहिए।

कृषि उपयोग में लाई जाने वाली भूमि का अधिग्रहण और उस पर निर्माण प्रतिबंधित कर देना चाहिए। सरकारी एवं गैर सरकारी आवासीय योजनाओं औद्योगिक एवं ढांचागत निर्माणों के लिए कृषि योग्य भूमि अत्यधिक संकुचित होती चली जाएगी, जो तीव्र गति से बढ़ती हुई जनसंख्या के भरण-पोषण हेतु खाद्य पदार्थ के उत्पादन में कमी होगी। भूमि अधिग्रहण कारक द्वारा व्यापारिक कृषि को भी नुकसान पहुँचा है। अधिकांश किसानों की भूमियों को भूमाफियों द्वारा खरीद लिया जाता है और उनमें कई प्रकार के

उद्योग एवं आवासीय योजनाएँ बना दी जाती है। इससे व्यापारिक कृषि प्रभावित हुई है।

6. प्रबन्धन/साख सुविधा:

पंचायत अथवा ग्राम सभा स्तर पर एक कृषि केन्द्र होना चाहिए। जहाँ ग्रामीण कृषि क्षेत्र से सम्बन्धित सभी कर्मचारी आवासीय सुविधाओं के साथ कार्यालय में कार्य कर सकें। यहाँ एक सरकारी समिति भी होनी चाहिए अथवा कृषि सहकारी समिति का विक्रय केन्द्र भी होना चाहिए। जिस पर कृषि मानकों के अनुसार सभी किसानों को बीज, उर्वरक, कीटनाशक आदि की व्यवस्था कराई जाए, जो किसानों को ऋण के रूप में उपलब्ध हो साथ ही ऐसे उपकरण जिनकी किसानों को थोड़े समय के लिए आवश्यकता पड़ती है वह उपलब्ध रहने चाहिए। जैसे निराई, गुड़ाई, बुवाई तथा कीटनाशकों के छिड़काव से सम्बन्धित यंत्र अथवा कीमती यंत्र जिन्हें किसान व्यक्तिगत आय से खरीदने में असमर्थ रहता है आदि। संभव हो तो ट्रेक्टर, थ्रेशर, कंबाइन, हार्वेस्टर आदि की सुविधाएँ भी किराए पर उपलब्ध होनी चाहिए, ताकि छोटा या लघु सीमान्त वर्ग के किसान बिना किसी बाधा के खेती कर सकें।

खेती में जो भी व्यापारिक फसलें बोई जाए उस फसल को सहकारी समिति के माध्यम से बीमाकृत कराया जाए और सरकार की नितियों में आवश्यकतानुसार परिवर्तन करके यह सुनिश्चित किया जाना चाहिए कि जिस किसान की फसल को जिस तरह से भी नुकसान हुआ जैसे – अतिवृष्टि, सूखा, ओलावृष्टि, आग, चोरी, बाढ़ या अन्य कारण तो उस किसान को उसके नुकसान की भरपाई तुरंत की जानी चाहिए। जिससे की किसान अपनी 6 माह से पालन-पोषण करके तैयार की गई फसल की बर्बादी से गरीबी की ओर जाने से बच सकें।

पंचायत स्तर पर 50 प्रतिशत से अधिक नुकसान होने पर उस पंचायत के किसान को बीमा का लाभ मिलता है। यह बिल्कुल अन्यायपूर्ण बात है। बीमा कराना ही पर्याप्त नहीं है बल्कि बीमा कंपनी की यह समीक्षा भी होनी चाहिए कि क्षेत्र के कितने किसानों को इसका लाभ हुआ है। अधिकांश बीमा कंपनी बीमा करने के बाद इसकी खबर नहीं लेती और यदि किसान सम्पर्क भी करता है तो उसे कानूनी दांव-पेंच में फंसाकर परेशान कर देती हैं। जिससे वह इसके लाभ से वंचित रह जाता है। कृषि उपज प्रबन्धन के लिए बीमा अति महत्वपूर्ण और उपयोगी है जिससे सभी किसानों को ऋणग्रस्तता से बचाया जा सकता है।

विचार करने वाली बात यह है कि किसान की फसल 6 माह में तैयार होती है और उस फसल को तैयार करने के लिए आज भी किसान नंगे पाव सर्दी, गर्मी, बरसात में खुले आकाश के नीचे रात-दिन परिश्रम करके अपनी फसल तैयार कर लेता है। खेतों में रात-दिन कार्य करते समय दुर्भाग्यवश यदि कोई जानवर काट लेता है या कोई दुश्मन उसकी हत्या कर देता है तो ऐसी दशा में उसका कोई बीमा नहीं होता। ऐसे में उनके बच्चे सड़क पर आ जाते हैं। दिन-रात एक करके देश की सूरत बदलने वाला किसान व उसका परिवार न केवल भूखा सोने को मजबूर होता है बल्कि हमेशा के लिए निराश्रित हो जाता है। अतः कृषकों को फसल बीमा के अलावा कृषक बीमा भी कराया जाना चाहिए जिससे विपत्ति के समय सहायता मिल सके।

व्यापारिक कृषि को बढ़ावा देने के लिए किसानों को ऋण दिये जाने की व्यवस्था एवं सुविधाओं को मजबूत तथा उदार बनाने की आवश्यकता है। किसानों के लिए किसान क्रेडिट कार्ड जो व्यवस्था की गई है वह अच्छी तो है लेकिन उसका व्यावहारिक पक्ष देखा नहीं गया है। जैसे, कोई समिति अपने कार्य क्षेत्र के बाहर ऋण नहीं दे सकती और उस समिति से ही धन एवं कृषि उपयोगी सामग्री प्राप्त होती है। तब उसके किसान क्रेडिट कार्ड का कोई मतलब नहीं है। किसान के पास सहकारी समिति की पासबुक शुरू से ही दी जाती है जिसमें उसका विवरण अंकित होता है। उसकी ऋण सीमा भी स्वीकृत की जाती है। उस ऋण सीमा के अन्तर्गत वह नगद या वस्तु के रूप में ऋण प्राप्त कर सकता है।

किसानों को व्यापारिक कृषि के अन्तर्गत बोई जाने वाली फसलों के लिए कई प्रकार की साख सुविधाओं की आवश्यकता होती है। ये आवश्यकताएँ दो तरह की होती हैं, एक अल्पकालीन और दूसरी दीर्घकालीन। अल्पकालीन व्यवस्था के अन्तर्गत सरकार

का विशेष ध्यान रहता है परन्तु दीर्घकालीन ऋणों में किसान तुलना में अधिक है। किसान की अन्य आवश्यकताओं के लिए ऋणों का कोई प्रावधान की आवश्यकता पर विशेष अल्पकालीन ऋणों की दीर्घकालीन व्यवस्था में नहीं है। जिससे एक ही किसान को दोहरे मापदण्डों का सामना करना पड़ता है।

इस व्यवस्था में बेहद सुधार की आवश्यकता है। परियोजना आधारित ऋण वितरण को समाप्त कर ऋण सीमा स्वीकृत करते हुए सस्ती ब्याज दरों पर ऋण तथा किसान क्रेडिट कार्ड उपलब्ध कराए जाने चाहिए। जिससे व्यापारिक फसलों के उत्पादन को बढ़ावा मिल सके एवं कृषकों की आर्थिक स्थिति में भी सुधार हो।

7. क्रय-विक्रय व्यवस्था:

व्यापारिक कृषि को बढ़ावा देने के लिए किसानों के लिए फसलों की उपज का क्रय-विक्रय की व्यवस्था का होना नितांत आवश्यक है। जब किसान अपने कृषि उत्पाद को लाता है तो उसके मूल्य निरंतर गिरने लगते हैं और मध्यस्थ सस्ती दरों पर उसका माल क्रय कर लेते हैं। दुर्भाग्य है कि व्यापारिक कृषि घाटे का व्यवसाय बना हुआ है और संबंधित लोग औद्योगिक क्षेत्रों के उत्पादन की दरें, लागत, मांग एवं पूर्ति को ध्यान में रखते हुए निर्धारित करते हैं किन्तु किसान की जीन्सों का मूल्य या तो सरकार या क्रेता द्वारा निर्धारित किया जाता है। उसमें भी शीघ्र नष्ट होने वाले उत्पाद की बिक्री के समय किसान असहाय दिखाई देता है। ऐसी दशा में क्रय-विक्रय व्यवस्था को मजबूत और पारदर्शी बनाया जाना चाहिए और उसके उत्पाद का मूल्य भी मांग पूर्ति और लागत के आधार पर किसान को निर्धारित कर लेने देना चाहिए। यह सर्वविदित है कि किसानों का उत्पाद इतना अच्छा और अधिक हो जाता है कि वह विक्रय के अभाव में सड़ने लगता है। किसान उसे फेंकने को मजबूर हो जाता है और कभी-कभी उत्पादन इतना कम होता है कि उसे मध्यस्थ सस्ती दरों पर क्रय कर उच्च दरों पर बिक्री कर बीच का मुनाफा ले लेता है और किसान उगा सा रह जाता है।

उत्पाद मूल्य के व्यापक प्रचार-प्रसार के लिए सूचना विभाग भी जिम्मेदार है। आज भी किसान के पास ऐसा माध्यम नहीं है जो यह तय कर सके कि उसके उत्पाद का उचित मूल्य आज किस बाजार में क्या है और भविष्य में मूल्य घटने-बढ़ने की क्या संभावनाएँ हैं। जब वह अपने उत्पाद को मण्डी में ले जाता है तब उसे उस दिन का भाव पता चलता है। किसान अपने उत्पादन पुनः घर वापस लाने पर किराया-भाड़ों का बोझ, परेशानी आदि को देखकर मजबूर होकर क्रेता के चुंगल में फंसता है और क्रेताओं का संगठित गिरोह उसके उत्पाद को मनमाने दामों में क्रय कर लेते हैं। इसलिए किसानों को उनके उत्पाद का उचित मूल्य मिलने के लिए उन्हीं के मध्य व्यक्तियों के माध्यम से कोई सम-सामयिक रणनीति बनाई जानी चाहिए। ताकि व्यापारिक कृषि को उचित दाम मिल सके और आगे किसान इसके उत्पादन एवं कृषि करने को अग्रसर हो।

8. भण्डारण व्यवस्था:

किसान का ऐसा उत्पाद जो विभिन्न समितियों के माध्यम से क्रय किया जाता है उसके किसी न किसी गोदाम में रखने की व्यवस्था अथवा निर्यात की व्यवस्था की जानी चाहिए। उसके क्रय किये गये उत्पाद की ग्रेडिंग व्यवस्था भी होनी चाहिए, ताकि कुल उत्पाद की मात्रा पर उसके ग्रेड के अनुरूप बिक्री मूल्य मिल सके।

9. भाग्यवादी किसान:

उत्पादन सम्बन्धी व्यापारिक कृषि के सम्बन्ध में किसानों को पर्याप्त अनुभव नहीं है। किन्तु अनेक बार शीत लहर, पाला व अनेक बार ओले अथवा सर्द हवाएँ फसल को नष्ट कर देते हैं। उसे अपने श्रम का उचित प्रतिफल प्राप्त नहीं होता। अतः वह कृषि को व्यवसाय के रूप में नहीं, बल्कि जीवनयापन की प्रणाली के रूप में अपनाता है। स्वभावतः वह वांछनीय मात्रा में उत्पादन उपलब्ध नहीं कर सकता। किसान की इसी भाग्यवादी प्रवृत्ति में परिवर्तन करने की एक रीति यह है कि उसे अधिकाधिक शिक्षित करने का प्रयत्न किया जाए। इसके अतिरिक्त प्राकृतिक संकटों का सामना करने के लिए वैज्ञानिक साधनों का प्रयोग करने की चेष्टा करनी चाहिए। जिससे व्यापारिक कृषि को बढ़ावा मिल सके।

10. खाद/उर्वरकर

किसानों के पास पशुओं की संख्या अधिक होती है और उनके मल तथा मूत्र से कई टन खाद प्राप्त की जा सकती है इसके अतिरिक्त कम्पोस्ट तथा अन्य बेकार वस्तुओं से भी कई टन खाद उपलब्ध हो सकती है। दुर्भाग्य से गोबर का अधिकांश भाग ईंधन के रूप में जला दिया जाता है क्योंकि ग्रामीण क्षेत्रों में अन्य सस्ते ईंधन का अभाव है। फलस्वरूप खेतों को पर्याप्त मात्रा में खाद नहीं मिल पाती है। जिससे व्यापारिक कृषि उत्पादन की स्थिति अच्छी नहीं रह पाती है। वर्तमान में व्यापारिक कृषि के विकास में रासायनिक उर्वरकों ने महत्वपूर्ण भूमिका निभाई है। पोषण की दृष्टि से उर्वरकों की प्रति हैक्टेयर खपत पहले की तुलना में अब काफी मात्रा में बढ़ी है। कृषक कृषि में अधिक उत्पादन पाने के लिए अधिक से अधिक उर्वरकों का प्रयोग कर रहे हैं। तथापि मृदा की सीमांत उत्पादकता व्यापारिक कृषि के लिए अभी भी चुनौती बनी हुई है। इसके लिए व्यापारिक कृषि करने वाले किसानों को मृदा विश्लेषण के आधार वर्णित एवं उचित पौषणों के अनुप्रयोग की आवश्यकता है, जिससे व्यापारिक कृषि में आ रही उत्तम खाद की जरूरत पूर्ण हो सके एवं उत्पादन में वृद्धि हो सके।

11. सिंचाई:

यह व्यापारिक कृषि ही नहीं अपितु सम्पूर्ण भारतीय कृषि की समस्याओं में एक महत्वपूर्ण समस्या कृषि में सिंचाई की है। आज भी भारतीय किसान अपनी कृषि उत्पादन के लिए मानसून पर निर्भर है। व्यापारिक कृषि के अलावा अन्य कृषि फसलों पर वृहत और मध्यम सिंचाई योजनाओं के जरिए सिंचाई की पर्याप्त संभावनाओं का सृजन किया गया है। कृषि की मानसून निर्भरता का प्रभाव यह होता है कि अधिकांश भाग की कृषि प्रकृति की दया पर निर्भर है। दूसरी महत्वपूर्ण बात यह है कि जब तक सिंचाई की पूर्णतया व्यवस्था नहीं होती, तब तक भूमि में खाद देना भी संभव नहीं है क्योंकि खाद का उचित मात्रा में प्रयोग करने के लिए काफी जल की आवश्यकता होती है। इसके बिना कृषि फसलों के सूखने का भी भय रहता है और कई बार किसानों द्वारा की गई मेहनत पर पानी फिर जाता है। सिंचाई की यह कमी प्रदेश के कई भागों में महसूस की जा सकती है। यहाँ औसत वार्षिक वर्षा की अधिक अनिश्चितता एवं अनियमितता होने के कारण कई भागों में सिंचाई के साधनों का अभाव है। जिससे वहाँ की सम्पूर्ण कृषि व्यवस्था पूर्णतः मानसून पर ही निर्भर है। सिंचाई व्यवस्था का पूर्ण विकास व्यापारिक कृषि को बहुत आगे बढ़ा सकता है। अतः व्यापारिक फसलों में सिंचाई के साधन प्रमुख भूमिका निभाते हैं। इसलिए सिंचाई के साधनों का विकास अत्यन्त ही महत्वपूर्ण वर्षा के अभाव में खेतों को कृत्रिम ढंग से जल पिलाने की क्रिया को 'सिंचाई' कहा जाता है। पौधे की वृद्धि एवं विकास में सिंचाई का महत्वपूर्ण योग होता है। जिससे उत्पादन में वृद्धि होती है।

बाली (1981) ने "जल ग्रहण प्रबन्धन-संकल्पना एवं रणनीति का अध्ययन किया है। जल ग्रहण की परिभाषा, सीमांकन एवं विधियों को बताया है। जिसमें परम्परागत एवं आधुनिक विधियों के माध्यम से जल ग्रहण प्रबन्धन की विवेचना की है।"

जिस प्रकार मानव को जल की एक निश्चित मात्रा की समय-समय पर आवश्यकता होती है उसी प्रकार किसी भी पौधे या फसल की वृद्धि के लिए भी सिंचाई आवश्यक साधन है। जल के अभाव में कोई भी पौधा अपनी वृद्धि नहीं कर पाता है। उसे समय-समय पर आवश्यकतानुसार पानी (सिंचाई) की आवश्यकता होती है। सिंचाई के साधनों की पर्याप्त व्यवस्था नहीं होने के कारण भी देश में व्यापारिक कृषि का उत्पादन कम होता है। ग्रामीण क्षेत्रों में नदी, नाले, कुएँ व तालाब के माध्यम से कृषक सिंचाई करते हैं जिसका पानी प्रायः एक-दो बार फसलों को देने से सूख जाता है और बिजली व डीजल की पर्याप्त व्यवस्था नहीं होने से भी फसलों की सिंचाई सही ढंग से नहीं हो पाती है। किसानों को सिंचाई के समय विद्युत आपूर्ति की पर्याप्त मात्रा नहीं होने से फसलों की सिंचाई नहीं हो पाती। पाँच या छः घण्टे ही किसानों को बिजली मिलती है। जिससे फसलों को पर्याप्त सिंचाई नहीं होगी। अतः उत्पादन पर प्रतिकूल प्रभाव पड़ता है।

12. कृषि रोग की समस्या:

व्यापारिक फसलों की एक महत्वपूर्ण समस्या फसलों में रोग रही है। कभी-कभी फसलों की अनेक बिमारियाँ, बाढ़, ओले, पाला, शीत-लहर, विभिन्न कीड़े-मकोड़े व वन्य जीव भी फसलों को हानि पहुँचाते रहते हैं। जिसमें भूमि का वास्तविक उत्पादन कम रह जाता है। फसल की बुवाई से लेकर उसके बड़े होने एवं कटने तक उसमें विभिन्न प्रकार के रोग लग जाते हैं। जिससे पौधा तो प्रभावित होता ही है साथ ही उसके फैलाव पर भी विपरित प्रभाव पड़ता है। वह पौधा धीरे-धीरे समीप के अन्य पौधों को भी रोगग्रस्त कर देता है इससे फसल उत्पादन पर विपरित प्रभाव देखने को मिलता है। वह पौधा इतना उत्पादन नहीं दे पाता जितनी उसकी क्षमता होती है। कृषकों को अपनी फसलों को रोगों से बचाव के लिए फसल की बुवाई से पूर्व ही खेत की अच्छी तरह से गर्मी में जुताई कर देना चाहिए। रासायनिक उर्वरकों के स्थान पर वर्मी कम्पोस्ट, देशी खाद का प्रयोग करना चाहिए। बीजों को बोने से पूर्व उनका उचित ढंग से बीजोपचार करे, उसके बाद ही बीजों की बुवाई करे। खेत से कीट प्रकोपित पौधे को अन्य पौधे से अलग कर दें एवं नजदीकी कृषि विज्ञान केंद्र में जाकर उचित परामर्श लेकर कीटनाशक दवाइयों का प्रयोग करे। इस प्रकार के उपाय अपनाकर कृषक अपनी फसल की रक्षा कर सकते हैं एवं अपने उत्पादन को बढ़ा सकते हैं।

13 परिवहन की उचित व्यवस्था का न होना:

व्यापारिक कृषि का विपणन व्यवस्था में पिछड़ने का प्रमुख कारण परिवहन की सही समय पर किसानों को उचित व्यवस्था का न होना है। अधिकांश किसानों के पास अपने उत्पादन को मण्डियों तक पहुँचाने के समय पर परिवहन की व्यवस्था नहीं हो पाती है और हो भी जाती है तो वह अपना उत्पादन देरी से बाजार में लाने से उनको उपज का उचित मूल्य नहीं मिल पाता है। अतः अधिकांश किसान अपने उत्पादन को ग्रामीण स्तर पर ही स्थानीय व्यापारियों एवं साहुकारों को कम मूल्य में बेचने में सुविधा का अनुभव करते हैं।

14 मण्डियों में माल बेचने हेतु लम्बी कतारों का होना:

किसान जैसे-तैसे अपने उत्पादन को मण्डियों तक ले जाते हैं लेकिन वहाँ भी उन्हें निराशा की हाथ लगती है उन्हें उत्पादन की बिक्री के लिए कई दिनों तक इन्तजार करना पड़ता है और कई किसानों के उत्पादन तो प्राकृतिक प्रकोप एवं वर्षा के कारण खराब हो जाते हैं जिससे गुणवत्ता में कमी हो जाती है और उनके उत्पादन का उचित मूल्य नहीं मिलता है। इस प्रकार किसानों की आर्थिक स्थिति पर विपरीत प्रभाव पड़ता है।

15 कृषि मूल्य की जानकारी का अभाव:

देश के अधिकांश किसान पिछड़े हुए ग्रामीण क्षेत्र के होते हैं। अतः फसल आने पर बाजार के मूल्य की जानकारी नहीं होती, जिसका परणाम यह होता है कि वह अपने उत्पादन को प्रचलित कीमत से कम बेचने पर ही विवश रहते हैं और वह वही मूल्य स्वीकार कर लेते हैं जो उन्हें स्थानीय व्यापारी बताते हैं। इस प्रकार कृषि मूल्यों की जानकारी के अभाव में किसान अपने उत्पादन को उचित मूल्य में नहीं बेच पाते हैं। किसानों को आवश्यकता इस बात की है कि उसकी फसल का उचित मूल्य प्राप्त हो। सभी किसान उत्साहपूर्वक रूप से व्यापारिक कृषि विकास में सहायक सिद्ध हो तो यह आवश्यक है कि उनकी फसल के लिए उचित विपणन व्यवस्था का निर्माण किया जावे। इसके लिए सरकार को चाहिए कि वह श्रेणी विभाजन एवं मानकीकरण के अनुसार व्यापारिक कृषि उत्पादन पर जोर दे। कृषि मण्डियों में पक्के माल गोदाम का निर्माण करें, आकाशवाणी के द्वारा दूरदर्शन के द्वारा तथा सरकार अपनी मशीनरी के द्वारा समय-समय पर किसानों को उपज मूल्य की सही-सही जानकारी उपलब्ध करवाने की व्यवस्था करें। इसके साथ-साथ सरकार को चाहिए कि नियंत्रित मण्डियों के स्वरूप के साथ-साथ ग्रामीण स्तर पर छोटी-छोटी नियंत्रित मण्डियाँ हो। जिससे छोटे किसान भी अपनी फसल को सही दाम पर बेचकर अपनी फसल का उचित मूल्य प्राप्त कर सकें।

गौतम (2010) ने "अपनी पुस्तक कृषि भूगोल में कृषि प्रादेशीकरण, भूमि उपयोग, कृषि पद्धतियों और कृषि समस्या व विकास कार्यक्रमों का विवरण प्रस्तुत किया है।"

➤ कृषि नवाचार :

कृषि क्षेत्र के संसाधनों की कमी, बढ़ती जनसंख्या, भूमि की घटती उपलब्धता एवं उत्पादकता ने यह सोचने पर बाध्य कर दिया है कि भविष्य में किस प्रकार किसान अपनी भूमि का सर्वश्रेष्ठ उपयोग करे, जिससे प्रति इकाई भूमि से अधिक उत्पादन प्राप्त कर सकें। इसके लिए कृषि के क्षेत्र में नवाचार की दिशा में अधिक ध्यान देने की आवश्यकता है। बढ़ती जनसंख्या को कृषि के अतिरिक्त अन्य आवश्यकताओं की पूर्ण से जमीन की उपलब्धता एवं उत्पादकता में समय के साथ-साथ कमी होती जा रही है। जिसका प्रभाव व्यापारिक कृषि पर प्रमुख रूप से देखा जा सकता है।

कृषि नवाचार से तात्पर्य, कृषि कार्य में विभिन्न वैज्ञानिक तकनीकों एवं प्रविधियों के समग्र प्रयोग से है। कृषि कार्य करने में नई तकनीकी, मशीनीकरण, रासायनिक खाद, नई किस्म के उन्नत पौधों एवं कीटनाशक दवाओं का प्रयुक्त होना ही कृषि आधुनिकीकरण या कृषि नवाचार है। किसानों द्वारा उपयुक्त विधियों के प्रयोग से केवल कृषि का आधुनिकीकरण संभव नहीं है वरन् इन सबके अतिरिक्त किसानों का नवीन दृष्टिकोण भी आधुनिकीकरण के लिए सबसे महत्वपूर्ण कारक माना जाता है। व्यापारिक कृषि फसलों का अवलोकन करे तो देश कई फसलों का उत्पादन करने में अग्रणी रहा है। यहाँ पर व्यापारिक कृषि फसलों के विकास के लिए कई प्रकार के आदानों का प्रयोग यहाँ के किसानों द्वारा किया जाता रहा है। व्यापारिक कृषि फसलों का उत्पादन किसान निरन्तर कर रहे तथा वे अपनी कृषि करने की पद्धति में परिवर्तन भी कर रहे हैं। फिर भी अधिकांश किसान उचित जानकारी के अभाव में प्राचीन परम्परागत तौर तरीके से ही कृषि क्रिया को अपना रहे हैं। अधिकांश किसानों के पास उचित साधनों के अभाव एवं दूसरों पर निर्भरता के कारण परम्परागत कृषि तरीके को ही अपनाना पड़ता है। अधिकांश किसान निर्धन एवं अशिक्षित होने के कारण समय के साथ हो रहे बदलाव एवं कृषि क्रिया में नवीन पद्धति को अनजाने के तौर तरीके नहीं सीखे हैं। जिसका परिणाम यह है कि वह भाग्यवादी होता जा रहा है, परन्तु धीरे-धीरे समय के साथ किसानों ने अपनी पुरानी सोच को छोड़ फसलों से अधिक उत्पादन करने पर जोर दिया है। किसान निरन्तर अपनी फसलों में नये-नये तौर-तरीके अपनाकर कृषि कार्य करने लगे हैं जिससे उनकी फसल उत्पादन की प्रक्रिया बदल रही है एवं फसलों का उत्पादन भी बदल रहा है।

आधुनिक युग को 'तकनीकी विकास' एवं 'कृषि आधुनिकीकरण का युग' कहा जाता है क्योंकि आज जो भी उन्नति हुई है उसका श्रेय विकसीत तकनीकी एवं प्रौद्योगिकी तथा वैज्ञानिकता को दिया जाता है। कृषि विकास स्तर, पशुपालन, उत्खनन, परिवहन और उद्योग जैसे अनेक कार्यों में नई तकनीकी का उपयोग आम बात हो गई है। इस आधुनिकीकरण ने आर्थिक व सामाजिक प्रगति को एक नई दिशा एवं दशा तथा आयाम प्रदान किया है। तकनीकी एवं प्रौद्योगिकी विकास के बल पर मानव समाज जिन इकाइयों को आज छूने लगा है उसकी कल्पना भी कुछ समय पहले असंभव लगती थी। कृषि विकास स्तर एवं उत्पादन की बढ़ोतरी के लिए नवीनतम तकनीक एवं प्रौद्योगिकी पर बने हुए यंत्रों जैसे ट्रैक्टर, औजार, ड्रिलिंग मशीन, सिंचाई की नवीन तकनीकी या विभिन्न प्रकार के हल एवं फसल निकालने की मशीन और सिंचाई के साधनों का योगदान सर्वविदित है। कृषि में उपयुक्त रासायनिक उर्वरकों व खनिजों के उत्खनन में भी विकसित तकनीकों से कई गुना उत्पादन प्राप्त किया जाने लगा है।

परंपरागत कृषि यंत्रों में कुल्हाड़ी, खुरपा, कुदाली, हांसिया, हल, बैल, पशु के कृषि कार्यों से वर्तमान में कृषि भूमि पर बढ़ रही जनसंख्या भारत के लिए यह प्राचीन कृषि यंत्र उचित नहीं हैं। 1960 के दशक में इंग्लैंड में हुए औद्योगिक क्रांति के साथ-साथ कृषि भूमि पर कृषि आधारित औद्योगिक कच्चे माल का भार बढ़ने लगा। घटती हुई कृषि भूमि, बढ़ती हुई मानवीय आवश्यकताओं को देखते हुए कृषि विस्तार स्तर में तकनीकीकरण, यंत्रीकरण एवं औद्योगिककरण के महत्व को अधिक बढ़ावा दिया। प्राचीन समय 10 कृषक कृषि भूमि में 1 दिन में काम करके उसको संपन्न करते थे, परन्तु आधुनिक तकनीकी एवं मशीनी युग में उस काम को ट्रैक्टर, थ्रेसर, ट्रॉली, डीलिंग इत्यादि नवीनतम तकनीकी व प्रौद्योगिकी द्वारा

निर्मित मशीनों के माध्यम से एक या दो घंटों में ही पूरा कर लिया जाता है। कृषि विकास में आधुनिकीकरण से कृषि भूमि की उत्पादन क्षमता में वृद्धि हुई और मानवीय श्रम व समय की बचत हुई है।

1. कीटनाशक दवाइयों का प्रयोग : पौधों के विकास में केवल उन्नत किस्म के पौधों का होना ही आवश्यक नहीं है। बल्कि समय-समय पर कीटनाशक दवाइयों का प्रयोग व रासायनिक महत्वपूर्ण है। क्योंकि अच्छे पौधों केवल उन्नत किस्म खाद द्वारा ही नहीं बन जाते हैं वरन् उनमें लगने वाले रोगों की रक्षा करना आवश्यक है। अच्छी किस्म के पौधे उपलब्ध होने के साथ-साथ उनमें समय-समय पर कीटनाशक दवाइयों का भी प्रयोग किया जाता है जिससे किसानों को उत्पादन प्रक्रिया में लाभ मिलता है।

2. जैविक उर्वरकों का प्रयोग : किसानों द्वारा फसलोत्पादन को अधिक बढ़ाने के लिए रासायनिक खादों के अन्धाधुन प्रयोग से मिट्टी की उर्वरता शक्ति में धीरे-धीरे कमी आयी है। जिससे फसलोत्पादकता में भी कमी आई है। किसानों को अपनी फसलों के उत्पादन को बढ़ाने के लिए चाहिए कि वे जैविक खेती की ओर अग्रसर हों। जैव उर्वरक जैसे - गोबर की खाद, कम्पोस्ट या केंचुआ खाद आदि का प्रयोग करना भूमि के लिए लाभदायक माना गया है। इसके अतिरिक्त जीवाणु कल्चर (राइजोबियम) या एजोटोबेक्टर का उपयोग भी किसानों की फसल उत्पादन बढ़ाने में सहायक है। जैविक खाद के साथ-साथ उर्वरकों के उचित प्रयोग से उच्च पैदावार प्राप्त होती है। जैव-उर्वरक कम लागत के अदान हैं और तुलनात्मक रूप से इनसे लाभ भी अधिक प्राप्त होता है। किसानों के द्वारा गोबर के उपले बनाकर उसे ईंधन के रूप में प्रयोग किया जाता है, अगर इसी गोबर को गोबर गैस में प्रयोग में लेने के बाद यदि जैविक खाद में प्रयुक्त किया जाये तो किसानों को अधिक उत्पादन प्राप्त होगा। फसलोत्पादन में पोषक तत्वों का महत्वपूर्ण स्थान होता है। इनकी आपूर्ति के लिए रासायनिक उर्वरक, देशी खाद, जैविक खाद, कम्पोस्ट आदि का उपयोग मुख्य रूप से किया जाता है। कृषि उत्पादकता बढ़ाने में जैविक खाद का महत्वपूर्ण स्थान हो सकता है। इसका अधिक से अधिक मात्रा में प्रयोग कर उर्वरकों की खपत कम की जा सकती है तथा फसल उत्पादन में लगी लागत में भी कमी की जा सकती है।

3. उन्नत सिंचाई विधि का प्रयोग : किसानों को खेत में सिंचाई करने की परम्परागत विधियों को छोड़कर नवीन तकनीकी विधियों को अपनाना चाहिए, जिससे समय की बचत के साथ-साथ जल का भी उचित प्रबन्धन हो सके। उन्नत सिंचाई के साधनों से किसान समय-समय श्रेय पानी की बचत कर सकता है और इससे पौधों का विकास भी बेहतर होता है। इसके लिए किसानों को खेती करने के तरीकों में नवाचार को अपनाने की जरूरत है। इन नवाचारों के उपयोग को अपनाकर किसान अपनी फसल का उत्पादन अधिक मात्रा में कर सकता है। सिंचाई करने की नवीन विधियों को अपनाना चाहिए जिसमें कतार (अलटरनेट), सिंचाई, फुहार सिंचाई (स्प्रिंकलर), टपक सिंचाई (ड्रिप) आदि सिंचाई विधियों एवं तकनीकों का उपयोग करके सिंचाई करनी चाहिए। इस प्रकार किसानों को अपनी फसलों में सिंचाई की नवीन विधियों को अपनाना चाहिए, जिससे फसल की आवश्यकतानुसार सिंचाई कर सके एवं पानी की बचत भी कर सकें। इससे किसानों को अधिक उत्पादन प्राप्त होगा। सिंह (1976) ने "राजस्थान के भू-जल सम्भाव्यता क्षेत्रों को खोजने हेतु दूरसंवेदन के अनुप्रयोग को वर्णित किया है। राज्य के दूरसंवेदी अनुप्रयोग केन्द्र, जोधपुर द्वारा जल संभर विकास एवं मृदा संरक्षण विभाग, जयपुर के सहयोग से 'राजस्थान का जलसंभर एटलस' भी बनाया गया है।"

4. मृदा स्वास्थ्य प्रबन्धन : किसानों को अपने खेत की मृदा का उचित प्रबन्धन करना आवश्यक है क्योंकि कृषि व्यवसाय में कम लागत में अधिक उत्पादन प्राप्त करने के लिए मृदा प्रबन्धन का उतना ही महत्व है। जितना मानव के स्वास्थ्य हेतु चिकित्सक जांच एवं सलाह का है। मिट्टी के रासायनिक एवं भौतिक गुण, कार्बनिक तथा जैविक गतिविधियां कृषि उत्पादन को सतत बनाये रखने के लिए महत्वपूर्ण हैं। ये सभी मिलकर मृदा उर्वरता और उत्पादकता के निर्धारित करते हैं। किसानों को मृदा के उतम स्वास्थ्य को बरकरार रखने के लिए निम्न उपाय अपनाने चाहिए, क्योंकि स्वस्थ मृदा ही स्वस्थ उत्पादन प्रदान करती है।

- किसान मृदा की जैविक गतिविधियों को बढ़ाकर फसलों को उपलब्ध पानी एवं उर्वरकों में सुधार करना चाहिए।
- मिट्टी की नमी में वृद्धि करनी चाहिए।
- मिट्टी के कटाव एवं पोषक तत्वों एवं कृषि रसायनों के निक्षालन से होने वाले नुकसान को कम करना चाहिए।
- मृदा संरचना में सुधार के लिए कार्बनिक पदार्थ की मात्रा को बढ़ाना चाहिए।
- फसल चक्र, सम्बन्धित उर्वरक प्रबन्धन को अपनाना चाहिए।
- कार्बनिक व अकार्बनिक उर्वरकों, अन्य कृषि रसायनों का उचित मात्रा में उचित विधि से उपयोग करना चाहिए जिससे मृदा स्वास्थ्य को किसी प्रकार का नुकसान न हो।

सिंह (1997) ने "भारत में भूमि संसाधन प्रबंधन का उल्लेख किया, जिसमें वर्तमान समय में बढ़ती कृषि विस्तार के कारण भूमि का सुनियोजित उपयोग किस तरह से किया जाए एवं प्रबंधन कैसे किया जाए? इसका वर्णन किया।"

इस प्रकार किसान मृदा स्वास्थ्य सम्बन्धी नवाचार को कृषि किया में अपनाकर अपने खेत की मिट्टी को फसल उत्पादन के लिए अधिक उपयोगी बना सकते हैं। कृषि भूमि व फसल की उत्पादकता बढ़ाने के लिए व उत्पादन की लागत को कम करने के लिए किसान नवीन कृषि नवाचार का प्रयोग करे और सरकार द्वारा कृषि उत्पादन के समर्थन मूल्य को ध्यान में रखे। इसके अलावा किसान विभिन्न कृषि कार्यक्रमों में भागीदारी बढ़ायें, जिससे उन्हें कृषि करने की नवीनतम से नवीनतम जानकारी प्राप्त हो सके।

निष्कर्ष :

वर्तमान समय में कृषि परिदृश्य में परिवर्तन हो रहा है। पहले किसान जहाँ खाद्यान्न फसलों का उत्पादन करता था। वहीं वर्तमान में उसका रुझान व्यापारिक कृषि की ओर बढ़ा है। किसानों ने कृषि कार्य करने के प्राचीन तौर तरीकों को छोड़कर नवीनतम पद्धतियाँ अपनाई है तथा समय-समय पर कृषि विभागों द्वारा देय सहायता एवं सुविधाओं का लाभ उठाकर किसान उन्नति कर रहे हैं। इसका प्रमुख कारण किसानों द्वारा कृषि के पुराने तरीकों को छोड़कर नवीन कृषि नवाचार को अपनाना है। आज अधिकांश किसान समस्त कृषि कार्य मशीनीकरण से करने लगे हैं। वे खेत की जुताई से लेकर कटाई और फसल निकलाई तक में मशीनीकरण का उपयोग करने लगे हैं जिसका प्रभाव यह हुआ है कि किसानों की फसल उत्पादन में वृद्धि हुई है और वे और अधिक व्यापारिक कृषि करने की ओर अग्रसर हुए हैं। राजू (1987) ने "भारत में पेय जलापूर्ति के लिए भूजल का प्रबंधन का अध्ययन किया है। पेय जलापूर्ति के मानदण्डों का अध्ययन किया और शहरी एवं ग्रामीण स्तर के मानदण्डों की विवेचना की है। जिसमें भूजल स्तर का प्रबंधन करना आवश्यक बताया है।" आज किसान सभी व्यापारिक फसलों में कृषि नवाचार की प्रक्रिया को अपनाकर उत्पादन में निरन्तर वृद्धि कर रहा है। खेती करने की नवीन-नवीन विधियों को अपनाकर उसने कृषि नवाचार को बढ़ाया है एवं इस प्रकार की खेती को देखकर अन्य किसान भी इसकी ओर अग्रसर हुए हैं। कृषि परिदृश्य को बदलने में कृषि विभागों द्वारा कृषकों को समय-समय पर दी जाने वाली विभिन्न प्रकार की सहायता, अनुदान एवं नवीन जानकारीयों प्रमुख हैं। इसलिए व्यापारिक कृषि फसलों के उत्पादन से जुड़े किसानों का अधिक उत्पादन और इसकी समृद्ध खेती की ओर रुझान बढ़ा है। व्यापारिक कृषि फसलों का और अधिक उत्पादन करने के लिए अभी और नवीन जानकारीयों एवं उन्नत तकनीकी की आवश्यकता है।

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भारतातील जैवविविधता न्हासाची कारणे आणि संवर्धन

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सारांश :

जैवविविधता हा शब्द अधिक प्रचलित होण्यासाठी रिओडी जानेरो या ब्राझिलमधील पहरात इ.स. 1992 मध्ये संपन्न वसुंधरा पिखर परिशद महत्वाची ठरली. जैवविविधतेमुळेच 'भारत हा विविधतेने नटलेला देश आहे' असे म्हटले जाते. भारतात वनस्पती, प्राणी, सस्तन प्राणी आणि सरपटणाऱ्या प्राण्यांच्या असंख्य प्रजाती आहेत. मात्र लोकसंख्या वाढ, औद्योगिकरण, शिकार आणि शिकारीसारख्या कारवायांमध्ये वाढ झाल्याने या वन्यप्राण्यांना धोका निर्माण झाला आहे. युनायटेड नेशन्स ऑफिस ऑन इन्व्हायरमेंट प्रकाशित झालेल्या अहवालानुसार जगातील एकूण वन्यजीव प्रजातीपैकी 6.5 टक्के भारतात आहेत. मात्र इंटरनॅशनल युनियन फॉर कन्झर्वेशन ऑफ नेचरने 2022 मध्ये प्रकाशित केलेल्या रेड लिस्टनुसार पक्ष्यांच्या 15 प्रजाती, सस्तन प्राण्यांच्या 10 प्रजाती, सरपटणाऱ्या प्राण्यांच्या 5 प्रजाती आणि माशांच्या 5 प्रजाती संकटग्रस्त यादीत सामील झाल्या आहेत. संपूर्ण सजीव सृष्टीचे अस्तित्वच मुळात ज्यावर निर्भर आहे अशा जैवविविधतेचे संवर्धन होणे ही काळाची गरज आहे. जैवविविधतेमुळेच पर्यावरण संतुलन राखले जाते. मानवी जीवन सुखकर करण्याची ती गुरुकिल्ली आहे. यासाठी सर्वच स्तरावर जैवविविधतेचे संवर्धन होणे आवश्यक आहे.

बिजसंज्ञा : जैवविविधता, भौगोलिक विभाग, जैवविविधता न्हास, कारणे, संवर्धन.

प्रास्ताविक :

निसर्गाने मानवाला दिलेल्या अनेक देणग्यांपैकी जैवविविधता ही एक देणगी आहे. जैवविविधतेत 20 लाखांहून अधिक सजीव आढळतात. मात्र काळाच्या ओघात वनस्पती, प्राणी व सूक्ष्म जीवांच्या जाती व प्रजाती नामपेश होताना दिसत आहेत. जैवविविधता न्हासाच्या मुळाशी अनेक कारणांपैकी निसर्गातील मानवाचा अविवेकी हस्तक्षेप व वाढते औद्योगिकरण हे दोन घटक अधिक जबाबदार आहेत, ही बाब पुढे आली आहे. जैवविविधतेच्या बाबतीत भारतातील जंगले ही औशधी वनस्पतींची माहेरघर आहेत. यातील शिकेकाई, अफू, इसबगोल यासारख्या बऱ्याच दुर्मिळ व वनोशधी वनस्पती निर्यातक्षम आहेत. याशिवाय भारतात हिरडा, बेहडा, आवळा, कोरफड इ. औशधी वनस्पतीचे महत्व अनादी काळापासून सर्वज्ञात आहे. तसेच भारतात पुरातन काळापासून संस्कृती विकासाच्या प्रक्रियेत प्राण्यांचे महत्व तितकेच अधिक आहे. याचा प्रत्यक्ष संबंध मानवाच्या अस्तित्वाशी निगडित असल्याने जैवविविधतेचा होणारा न्हास, कारणे आणि त्याचे संवर्धनाकडे लक्ष वेधून घेणे व त्याच्या संवर्धनार्थ उपाय सूचविण्याच्या हेतून पोथनिबंधाचे लेखन केले आहे.

उद्दिष्टे :

1. भारतातील जीव भौगोलिक विभाग अभ्यासणे.
2. भारतातील वनस्पती व प्राणी प्रजातींचा अभ्यास करणे.
3. भारतातील जैव विविधता न्हासाच्या कारणांचा अभ्यास करणे.
4. जैव विविधता संवर्धनार्थ उपाययोजना सूचविणे.

गृहितके :

1. भारतात 10 जीव भौगोलिक विभाग आहेत.
2. भारतातील वनस्पती व प्राणी प्रजातींची संख्यात्मक माहिती उपलब्ध आहे.
3. भारतातील जैवविविधता प्रजातींचा न्हास होत आहे.
4. जैवविविधता संवर्धन करण्यासाठी उपाय योजता येतात.

अभ्यास पद्धती :

प्रस्तुत पोथ निबंध तयार करण्यासाठी दुय्यम स्त्रोतांचा संदर्भ म्हणून उपयोग केला आहे. या संदर्भ ग्रंथांमधील सर्वच ग्रंथ हे आयएसबीएन प्रमाणित आहेत. वर्तमानातील संख्यात्मक माहितीचे विप्लेशन करण्यासाठी ऑनलाईन विकीपीडियाचा वापर

केला आहे. भारतातील जैवविविधतेची सद्यःस्थिती समजून घेताना तिच्या संवर्धनार्थ मौलिक उपाययोजना सूचविण्यासाठी हे ग्रंथ उपयोगी ठरले आहेत.

विषय विवेचन :

गेल्या हजारो वर्षांपासून मानव आपल्या असंख्य गरजांच्या पूर्ततेसाठी जैवविविधतेचा वापर करीत आला आहे. मानवी जीवनाच्या प्रत्येक संस्कृतीची वाढ व विकास यासाठी ती साहाय्यभूत ठरली आहे. मात्र ज्यांनी त्याचा टिकाऊपणे वापर केला त्या संस्कृती टिकून राहिल्या याउलट नैसर्गिक जैवविविधतेचा गैरवापर करणाऱ्या संस्कृती रसातळाला गेल्या. कान्झर्वेशन इंटरनॅशनल व युनायटेड नेशन्स इन्व्हायरमेंट कार्यक्रमानुसार भारत हा 17 महाविविधता केंद्रांपैकी एक आहे. जगाच्या 2.4 टक्के भूमीचे क्षेत्रफळ लाभलेल्या भारतात जगातील जैवविविधतेच्या 6.5 टक्के जैवविविधता आढळते. जागतिक जैवविविधता सूचीनुसार भारत हा जगात आठव्या क्रमांकावर आहे.

भारतातील जैवविविधता :

भारताच्या संदर्भात जैवविविधतेचा अभ्यास करताना येथील भौगोलिक जडणघडण, हवामान, वनस्पती, सस्तन प्राणी, पक्षी, सरपटणारे प्राणी, भूजलचर, कीटक आणि इतर अपृष्ठपंथीय प्राणी यांचा विचार करून सोबतच तिथे वास्तव्य करणाऱ्या आदिवासी व वनवासी लोकांचेही हित लक्षात घेऊन व वन्यजीवांचा शास्त्रपुद्ध अभ्यास करून त्यांच्या षाष्वत जीवनासाठी प्रयत्न करण्याच्या उदात्त हेतूने 1982 मध्ये डेहराडून या ठिकाणी भारतीय वन्यजीव संस्थान उदयास आले. या संस्थानाच्या निर्देशानुसार भारताला प्रमुख 10 जैव भौगोलिक विभागात वर्गीकृत करण्यात आले आहे. यातील प्रत्येक विभागात वने, गवताळ प्रदेश, नद्या, दलदली प्रदेश, टेकड्या व डोंगर अशा विविध परिसंस्था अस्तित्वात असून त्यामध्ये प्राणी-वनस्पतीचे वैविध्य आढळून येते. जैवविविधतेच्या बाबतीत भारत हा जगातील एक महत्वाचा देश आहे. भारतातील जैवविविधतेचे वर्गीकरण 10 विभागात करण्यात आले आहे. तक्ता क्रमांक 1 मध्ये नमुद केल्याप्रमाणे जैव भौगोलिक प्रदेश व त्या प्रदेशाची वैशिष्ट्ये पहावयास मिळतात.

तक्ता 1 : भारतातील जैव भौगोलिक विभाग

क्र.	जैव भौगोलिक विभाग	स्थान व वैशिष्ट्ये
1	ट्रांस हिमालय प्रदेश	हिमालयाला समांतर, हिमालयाच्या उत्तर-पश्चिम दिशेला, यात सुमारे 80 जातींच्या वनस्पती व पांढरा चित्ता व लांडगा हे प्राणी आढळतात.
2	हिमालयीन प्रदेश	ट्रान्स हिमालयाच्या दक्षिणेला तसेच अरुणाचल प्रदेशाचा उत्तर भाग यात येतो. सदाहरित वनस्पती व रानम्हशी, गेंडा, लालपांडा, याक, लेपर्ड इ. प्राणी.
3	समुद्रकिनार्यालगतचा प्रदेश	भारताच्या पूर्व व पश्चिम समुद्रकिनारपट्टी तसेच लक्षव्दीप किनारपट्टी, येथे जलीय वनस्पती व जलीय प्राण्यांचा अंतर्भाव होतो.
4	पश्चिम घाट प्रदेश	गुजरातमधील भडोचपासून दक्षिणेस कन्याकुमारीपर्यंत भाग येतो. या ठिकाणी आंबा, ताग, साग, सुपारी, रबर इ. बीनरखी पाणमांजर, पिसोरी, वाघ, निलगिरी ताहर, लंगूर सिंहपुच्छ वानर
5	दख्खन पठारी प्रदेश	दख्खन पठाराचा हा त्रिकोणाकृती भाग उत्तरेकडील सातपुडा पर्वतापासून तर दक्षिणेकडे कन्याकुमारीपर्यंत हा पसरलेला आहे. पठारावरील उंच प्रदेश विविध प्रकारच्या जंगलांनी व्यापलेले आहे.
6	गंगेचा मैदानी प्रदेश	अरवली पर्वतरांगापासून पश्चिम बंगालपर्यंत पसरलेला आहे. येथे गहू, ऊस, भात, पानझडी वने, जगातील सर्वात मोठा सुंदरबन दलदली वनांचा पट्टा
7	पूर्वांचल प्रदेश	भारताचा उत्तर-पूर्व भाग आहे. आर्किड, फर्न, नेचे बांबू, लिंबू इ. वनस्पती व हिम बिबट्या, हुलूक, बोकड, मेंढया इ. प्राणी या क्षेत्रात आढळतात.
8	व्दीपसमूह	हा प्रदेश बंगालचा उपसागरातील अंदमान व निकोबार बेट समूहावर आढळतो. सदाहरित वनस्पती, दलदलीची जंगले वटवाघळाच्या 46 जाती, 242 प्रकारचे पक्षी या क्षेत्राचे वैशिष्ट्ये आहे.
9	वाळवंटी प्रदेश	अरवली पर्वताचा पश्चिम भागाचा यात समावेश होतो. खुरटे गवत, निवडूंग काटेरी झुडपे यासारखे वनस्पती व साप, सरडे, पाली, कोल्हा, काळवीट, हरिण, रानमांजर, जंगली गाढव इ. प्राणी दिसून येतात.
10	निम्न वाळवंटी प्रदेश	गुजरात व राजस्थानमधील वाळवंटी प्रदेशाचा भाग अंतर्भूत आहे. दाट झाडी गवताचे विविध प्रकार आहेत. साप, उंट, गाढव, कोल्हा इ. प्राणी आढळतात.

स्त्रोत - भारतीय वन्य जीव संस्थान, डेहराडून

जगातील प्राणी आणि वनस्पतींच्या विविधतेच्या दृष्टीने समृद्ध देशाच्या यादीत भारताचे स्थान पहिल्या 10 ते 15 देशात गणल्या जाते. भारतात प्राण्यांच्या 103258 पेक्षा जास्त तर वनस्पतींच्या 55048 पेक्षा अधिक प्रजाती या 10 विभागात आहेत. भारत अनादी काळापासून कृषिप्रधान देश असल्याने येथील पिकांमध्येही मोठ्या प्रमाणात विविधता दिसून येते. सपुष्प वनस्पतींच्या जवळपास 14500 प्रजाती तर जगातील 90 टक्के वनौशधी वनस्पती प्रजाती

भारतात आढळतात. यापैकी 18 टक्के प्रजाती प्रदेशनिष्ठ असून जगात इतरत्र कुठेही आढळून येत नाहीत. प्राणी प्रजातीतील भूजलचर प्राण्यात 62 टक्के भारतीय उपखंडात आढळणाऱ्या वैशिष्ट्यपूर्ण प्रजाती आहेत तर सरपटणाऱ्या प्राण्यातील सरडयांच्या 153 प्रजाती आढळून येतात. कीटक, समुद्री जीवजंतू, गोम, मेप्लाइज व गोडया पाण्यातील स्पर्जसारख्या प्रदेशनिष्ठ जाती मोठ्या प्रमाणावर आढळून येतात.

तक्ता 2 : जागतिक स्तरावर भारतातील प्रजातींचे स्थान

क्र	प्रजाती	जगात भारताचा क्रमांक	प्रजातींची संख्या
1	सस्तन प्राणी	8	350
2	पक्षी	8	120
3	सरपटणारे प्राणी	5	453
4	भूजलचर प्राणी	15	182
5	सपुष्प वनस्पती	15.20	14500

भारतीय उपखंडात अनेक षतकापासून मानवी संस्कृतीचा विकास झाल्यामुळे पारंपरिक पद्धतीच्या शेतीत केवळ तांदळाच्या 30 ते 50,000 प्रजातींचा वापर करण्यात येत असे. यात धान्य, भाज्या व फळे यांचाही समावेश होतो. पारंपरिक पद्धतीने उगवल्या जाणाऱ्या प्रजातींचे वैविध्य अधिक पर्जन्यमान असलेल्या पश्चिम घाट, पूर्व घाट प्रदेश तसेच हिमालय व पूर्वोत्तर प्रदेशात आढळून येते. या पारंपरिक प्रजातीपैकी 34000 धान्याच्या 22000 जातींच्या प्रजातींचे जनुकीय संवर्धन करण्यात आले आहे. भारतात पाळीव प्राण्यांच्या 27 प्रादेशिक प्रजाती, मेंढयांच्या 40, बक-यांच्या 22 व म्हशीच्या 8 प्रजाती आढळतात. यापैकी अनेक प्राणी प्रजाती अस्तंगत होत आहेत. कारण विदेशी वाणाच्या जर्सी तसेच होलस्टन गाईच्या प्रजातींचा वापर अधिक प्रमाणात झाल्यामुळे भारतातील बैलाच्या प्रजाती न्हास पावत आहेत. अधिक उत्पादनाच्या हव्यासापोटी पारंपरिक वाण पिके लुप्त होत आहेत. सोबतच अन्नधान्य निर्मिती करणारे नगदी पिकांचे प्रमाण वाढत आहे. अशा बदलांमुळे भारतीय उपखंडातील जैवविविधता नष्ट होत आहे.

ज्या क्षेत्रात वनस्पती, प्राणी व सूक्ष्म जीव इ. सजीवांच्या प्रजातींची संख्या अधिक असणारे क्षेत्र जैवविविधतेची अनुकूल क्षेत्रे म्हणून ओळखली जातात. जगभरात असे एकूण 18 'हॉट स्पॉट्स' पैकी भारतात दोन आहेत. भारतातील पश्चिम घाटाचा प्रदेश व लक्षव्दीप, अंदमान, निकोबार व्दीपसमूहाचा प्रदेश जैवविविधतेचे हॉट स्पॉट्स समजले जातात. या प्रदेशात समृद्ध असे प्राणी आणि वनस्पतींच्या जीवजाती आढळतात. अंदमान व निकोबार बेटांमध्ये

सुमारे 1200 फुल वनस्पतींच्या व नेचे वनस्पतींच्या 120 जाती आढळतात. भारतातील 60 टक्के सस्तन प्राणी व 1500 स्थानिक वनस्पतींच्या प्रजाती ईशान्य राज्यात आढळतात. पश्चिम घाटामध्ये सरपटणाऱ्या प्राण्यांच्या प्रजातीचे प्रमाण जास्त आहे. तसेच 1500 वनस्पतींच्या प्रजातीही या हॉट स्पॉट क्षेत्रात आढळतात.

जैवविविधता न्हासाची कारणे :

निसर्गाने मानवाला देणगी स्वरूपात मिळालेली जैवविविधता नैसर्गिक व मानवी अशा दोन्ही कारणांमुळे न्हास पावते. नैसर्गिक कारणांमुळे भूकंप, ज्वालामुखी, अवर्षण, वादळे इ. चा अंतर्भाव होतो. मात्र प्रजातींच्या न्हासास मानवी कृती सर्वात जास्त जबाबदार आहेत. मानवाने वेळोवेळी निसर्गावर आक्रमण करून जंगल तोडणे, नद्या अडवणे, डोंगर पोखरणे, मोकळी राने सिमेंटच्या जंगलात रूपांतरित करणे यासारख्या मानवी कृतीतून जैवविविधतेचे अस्तित्व धोक्यात आले आहे. या संकटाची महत्वाची कारणे पुढीलप्रमाणे आहेत.

1. जैविक अधिवाला मानवाकडून केल्या गेलेल्या विनाशामुळे तीव्र गतीने जंगलांचा नाश झाला. त्यामुळे ज्ञेय जीवांचे अधिवास धोक्यात आल्याने ज्ञात व अज्ञात प्रजातींचाही न्हास होत आहे.
2. बेकायदा वन्य जीवांची शिकार व व्यापार मोठ्या प्रमाणात केला गेल्याने बरेच वन्य प्राणी नामशेष झाले व बरेच प्राणी नामशेष होण्याच्या मार्गावर आहेत.

3. मानवाने इंधन, चारा, इमारती लाकूड इ. साठी वनांची कटाई केली त्यामुळे वनात राहणाऱ्या प्राण्यांचे अधिवास नष्ट झाल्याने ससा, हरिण, कोल्हा, वाघ वगैरेंची अन्नसाखळी खंडित होत आहे.
4. वाढत्या लोकसंख्येमुळे मानवाला निवाऱ्यासाठी भूमि कमी पडू लागल्याने जंगलावर अतिक्रमण करून तेथील जागा स्वतःसाठी वापरली. त्यामुळे वृक्षांवर राहणारी वानरे, वटवाघूळ, कावळे, चिमण्या व इतर पक्षी बेघर होऊ लागले.
5. औद्योगिक विकासासाठी आवश्यक असणारी भूमी मानवाने जंगल तोडून मिळविली. मोठमोठे कारखाने सुरु केले. यातून बाहेर पडणारे प्रदूषित वायू व पाणी जैविक संपत्तीचा नाश होण्यास कारण ठरले.
6. नद्यांवर बांधली जाणारी धरणे नद्यांचा प्रवाह खंडित करतात. या खंडित प्रवाहांचे भाग वाळवंटात रुपांतरित होतात.

जैवविविधता संवर्धनार्थ उपाययोजना :

जैवविविधतेच्या नाशामुळे भविष्यकाळात मानव जातीसमोर अनेक संकटे निर्माण होणे संभव आहे. त्यामुळे जैवविविधतेचे संरक्षण सर्वच स्तरावरून होण्याची गरज आहे. जागतिक, राष्ट्रीय व स्थानिक स्तरावर तिचे संरक्षण करण्यासाठी मूलस्थानी व परस्थानी प्रयत्न केले जात आहेत. या व्यतिरिक्त जैवविविधतेच्या संरक्षण व संवर्धनासाठी पुढील उपाययोजना प्रत्यक्ष कृतीत आणण्याची गरज आहे.

१. भारतात 1972 चा वन्य जीव संरक्षण कायदा, 1980 चा वन संवर्धन कायदा, 1986 चा पर्यावरण संरक्षण कायदा, 1987 चा मासेमारी कायदा इ. व यासारख्या जैवविविधतेचे संवर्धनार्थ कायदांची काटकोर अंमलबजावणी होणे.
२. स्थानिक लाक जिथे राहतात तेथील जैवविविधतेच्या ज्ञानाचा समृद्ध साठा त्यांच्याकडे असतो. हे ज्ञान एका पिढीकडून दुसऱ्या पिढीला हस्तांतर करण्यासाठी या ज्ञानाचे जैवविविधता नोंद दस्तावेज तयार करणे.
३. जैवविविधता संवर्धन कार्यक्रम यशस्वी करण्यासाठी स्थानिक लोकांचा सहभाग वाढविणे.
४. ज्या जीवांच्या जाती नष्ट होण्याचा धोका निर्माण झाला आहे, अशा जातींचा संग्रह करून ठेवणे.
५. वन्यप्राण्यांची आश्रयस्थाने सुरक्षित राहावीत, त्यांना निर्दोषपणे जगता यावे यासाठी जंगलतोड थांबविणे.
६. वन्यप्राण्यांच्या शिकारीवर पूर्णतः बंदी घालणे. अवैध व छुपी शिकार करणाऱ्यांना जबर दंड व शिक्षेची तरतूद करण्यात यावी.
७. वन्यप्राण्यांपासून मिळणाऱ्या सर्व प्रकारच्या वस्तुंचा व्यापार करणाऱ्यास देहदंडाची शिक्षा करणे.
८. मानवी जीवनाच्या अस्तित्वासाठी असणारे वन्य जीवांचे महत्व समाजाला पटवून देणे.
९. अभयारण्यात पर्यटकांना भटकंती व प्राणी निरीक्षणासाठी योग्य सुविधा पूर्णविणे.जेणेकरून वन्यप्राण्यांच्या दैनंदिन जीवनात अडथळे निर्माण होणार नाहीत.
१०. वन्यजीव सप्ताहासारखे कार्यक्रम गावागावात राबवून 'जगा व जगू द्या', 'वन्य प्राण्यांचे रक्षण करा' या प्रकारचा संदेश जनतेपर्यंत पोहोचवावा.

निष्कर्ष :

भारतातील जैवविविधता एक नैसर्गिक संसाधन आहे. तिचे जतन करण्यासाठी केवळ राष्ट्रीय उद्याने व अभयारण्येच सुरक्षित ठेवून चालणार नाही तर त्यासाठी संरक्षित केंद्रांचे विकेंद्रीकरण करणे आवश्यक आहे. देवराया, शेती, नद्यातील डोह, पाणवटे, इतकेच नव्हे तर शहरामधील टेकड्या, शैक्षणिक संस्थांचे परिसर यांचेही जतन होणे आवश्यक आहे. पर्यावरणीय संतुलन राखण्यासाठी वने व वन्यजीव वाढविणे, जैवविविधतेची जपणूक करणे तसेच तिचे संवर्धन करणे ही काळाची गरज आहे.

त्यामुळे त्या पाण्यात राहणारे मासे, कीटक व अनेक जलचर नाश पावतात.

7. मानवाने लोह, तांबे, कोळसा, डिझेल, पेट्रोल, गॅस यासाठी अनेक खाणी खोदण्याचे काम केले. त्यामुळे त्याठिकाणी बिळ करून राहणारे असंख्य साप, बेडूक, कोल्हे, ससे यांचे जीवन धोक्यात आले.
8. मानवाने आपल्या अन्नधान्याच्या उत्पादन वाढीसाठी कीटकनाशके व रोगनाशके पिकांवर फवारली. त्यामुळे फळे व पिके विशारी बनली. अर्थात याना खाणारे पशुपक्ष्यांचा विनाश होण्यास कारण झाले.
9. अणुचाचण्यांमुळे समुद्रातील व वाळवंटी भागातील सजीवांची अधिकांश क्षेत्रे सजीवांसह नष्ट व्हायला लागली.
10. लश्करी हेतूसाठी बऱ्याचदा जमिनीवर लश्करी तळ उभारले जातात. यामुळे सुद्धा त्या जमिनीवरील सजीवांची अधिवास क्षेत्रे नष्ट होतात.

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“आसना नदी खोऱ्यातील बदलत्या हवामानाचा भौगोलिक अभ्यास”

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सारांश :

प्रस्तुत अभ्यासाचा मुख्य विषय हा आसना नदी खोऱ्यातील हवामानाचा अभ्यास करणे असून आसना नदीच्या खोऱ्यातील मध्ये बिंदू ज्याचा विस्तार (अक्षवृत्तीय १९° ३८'४०" उत्तर ते रेखावृत्तीय ७७° ३५'३३") एवढा आहे. हा बिंदू आसना खोऱ्यातील मध्ये भागातला असून या संदर्भातील आकडेवारीही खोऱ्यातील समजून तेथील तापमान, पर्जन्यमान व आर्द्रता या तीन घटकांची मागील ४२ वर्षात हवामानातील काय बदल झाला आहे, हे अभ्यासण्यासाठी ४२ वर्षांचे दोन गटात विभागणी करून त्याची सरासरी काढून हवामानाच्या परिस्थितीचा आढावा घेण्यात आलेला आहे. त्यानुसार संपूर्ण आसना खोऱ्यातील हवामानातील परिस्थिती ग्रहीत धरून अभ्यास करण्यात आलेला आहे.

बीजसंज्ञा: आसना नदी खोऱ्यातील बदलते हवामान.

प्रस्तावना:

भारत देशातील शेती हा व्यवसाय मुलभूत मानला जातो. जगाच्या पाठीवर कोठेही शेतीचे वितरण व विकास हा समतोल असलेला दिसून येत नाही. त्याप्रमाणेच आसना नदी खोऱ्यातील शेतीची हि अशीच परिस्थिती दिसून येते. याचे कारण म्हणजे शेतीवर परिणाम करणारे विविध घटक होय. शेतीवर परिणाम करणाऱ्या घटकांमध्ये अनेक घटकांचा समावेश होतो. जसे कि, भौगोलिक, आर्थिक, सामाजिक, सांस्कृतिक, पारंपारिक व तांत्रिक इ. घटकांचा शेतीवर प्रत्यक्ष व अप्रत्यक्ष परिणाम होत असतो. या सर्व घटकांमध्ये जास्तीत जास्त प्रभाव पडणारा घटक म्हणून हवामान या घटकाकडे पहिले जाते. ज्यामुळे शेतीवर प्रतिकूल किंवा अनुकूल अशा दोन्हीही प्रकारे परिणाम होताना दिसून येतो. हवामान या घटकावर आधारित शेतीचे प्रारूप व आकृतिबंध ठरत असतो. हवामान या घटकाच्या अनुकूल व प्रतिकूलतेवर त्या प्रदेशातील उत्पादन अवलंबून असते. मानवाने विज्ञान व तंत्रज्ञानाच्या जोरावर इतर प्राकृतिक घटकांना काही प्रमाणात अनुकूल करण्याचा प्रयत्न केला आहे. परंतु विस्तारात्मक प्रमाण किंवा व्याप्ती अतिशय कमी आहे. जसे की, तीव्र उतार असलेल्या ठिकाणी लोक जमीन फोडून सपाट करून पायऱ्या-पायऱ्याची शेती केली. तर यंत्राच्या साहाय्याने जमिनीवरील उंचसखलपणा सपाट करून शेती सुरू केली. या तुलनेत हवामान या घटकावर मानवाने नियंत्रण मिळविण्यासाठी पॉलीहाऊस व ग्रीन हाउस, कृत्रिमरीत्या पाऊस पाडणे यासारखे प्रयत्न केले पण शेवटी या घटकांनाही इतर घटकांप्रमाणेच नैसर्गिक परिस्थिती अनुकूल करणे मानवाच्या हाती नसल्याकारणाने

हवामान या घटकाच्या नैसर्गिक परिस्थितीनुसारच शेतीचा विस्तार व विकास झालेला दिसून येत असतो.

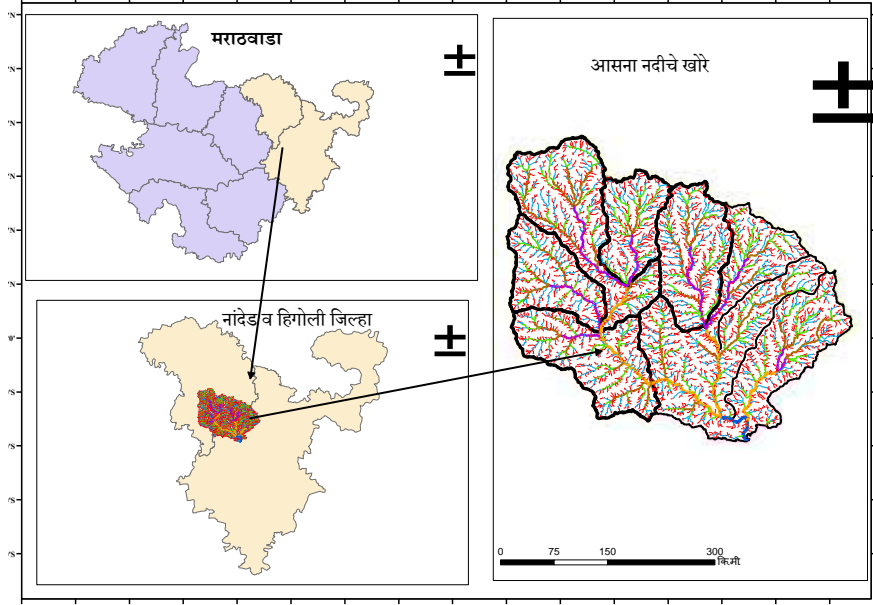
हवामान या घटकाचे व्यापक स्वरूप लक्षात घेता या घटकाचा शेतीवर होणारा परिणाम खालील उपघटकांच्या माध्यमातून आपणास स्पष्ट करता येते. जसे तापमान हा घटक शेतीसाठी अत्यंत महत्वाचा घटक असतो. कारण तापमान व पिकांचे वितरण व उत्पादन यांचा जवळचा संबंध येतो. कारण एखाद्या क्षेत्रातील तापमान तेथील पिकांची वाढ व उत्पादन वाढण्यासाठी आवश्यक असते. जर सहा अंश सेल्सिअस पेक्षा कमी असेल तर त्या प्रदेशातील पिकांची वाढ व्यवस्थित होत नाही. पिकांची वाढ झाली नसल्यामुळे त्याचा परिणाम पिक उत्पादनावर पर्यायाने शेतीवर होत असतो. तापमान हे स्थळ व कालपरत्वे बदलत जाते. यानुसार पिक वितरण व पिक प्रारूप बदलतो. अभ्यास क्षेत्रातील पिक पेरणीसाठी व वाढीसाठी कमीत कमी सहा अंश सेल्सिअस तापमानाची गरज असते. यालाच शून्यवत तापमान म्हणतात. तसेच तापमान ४५ अंश सेल्सिअस असलेल्या प्रदेशात सुद्धा पिकांची वाढ व उत्पादन व्यवस्थित होत नसते. म्हणून सर्वसाधारणतः १५ ते ३० अंश सेल्सिअस दरम्यान तापमान शेतीसाठी अनुकूल असते. याला पर्याप्त तापमान असे म्हणतात. हवामानातील दुसरा व प्रभावी घटक म्हणून पर्जन्यमान या घटकास प्राधान्य दिले जाते. पर्जन्याच्या वितरणावर जगातील देशातील व राज्यातील व आसना खोऱ्यातील पिक प्रारूप व आकृतिबंध आढळतो. प्रत्येक पिकाला पाणी आवश्यक असते. हे पाणी पर्जन्यामुळे मिळते. भारत देशात हवामान हे मान्यून प्रकारचे आहे. त्यावरून असे ठरते की, अभ्यास क्षेत्रात पर्जन्य हा साधारणतः जून

जुलै महिन्यात सुरुवात होतो. तपामानाप्रमाणेच पर्जन्याचे वितरणही स्थल व काळानुसार बदलत असल्यामुळे अभ्यास क्षेत्रातील पिकाचे वितरण व पिक वाढ व पिक प्रारूप वेगवेगळे आढळते. उदा. आसना खोऱ्यातील जास्तीत जास्त १०० मि.मि. पर्जन्य असलेल्या प्रदेशात पिक वाढ व उत्पादन जास्त येते. व काही प्रदेशात १०० मि.मि. पेक्षा कमी पर्जन्य असलेल्या ज्वारी, बाजरी व तेलविया इ. पिके घेतली जातात. सुरुवात

अभ्यास क्षेत्र:

आसना नदी ही गोदावरीची उपनदी असून या नदीचा भौगोलिक विस्तार हा महाराष्ट्रातील मराठवाडा विभागातील नांदेड व हिंगोली जिल्ह्यातील औंडा नागनाथ, कळमनुरी, बसमत व अर्धापूर हदगाव, हदगाव, मुदखेड आणि नांदेड या सात तालुक्यांच्या काही भागात पसरलेला

असून याचा अक्षवृत्तीय विस्तार हा १९° १०' ते १९° ३०' उत्तर व रेखावृत्तीय विस्तार ७७° ०५' ते ७७° ३०' पूर्व या दरम्यान असून मुख्य नदीच्या उघडी, लोणारी, मेंढला, टोर, व कुरुंदा या उपनद्या आहेत. आसना नदी खोऱ्याचे क्षेत्रफळ १३४९.६७ चौ.की. एवढे आहे. तसेच उत्तर-दक्षिण लांबी ३४.५३ की.मी. व पूर्व-पश्चिम रुंदी ४२.१५ कि.मी. आहे. तर समुद्रसपाटीपासूनची उंची ही ५४८ ते ३५० मी दरम्यान आहे. मुख्य प्रवाहाची लांबी ५९.०५ की.मी. एवढी आहे. आसना खोऱ्यामध्ये २०११ च्या जनगणनेनुसार एकूण २३५ वसाहती आहेत. तर एकूण लोकसंख्या ५७४८५० इतकी असून त्यापैकी २९६२७२ पुरुष व २७८५७८ स्त्रिया आहेत. तसेच ग्रामीण लोकसंख्येची घनता दर चौरस किलोमीटरला २८१.९४ एवढी आहे. आसना खोऱ्याचे नऊ उपखोऱ्यात विभाजन केले आहे.



उद्देश: आसना खोऱ्यातील हवामानाचा अभ्यास करणे.

संशोधन पद्धती: प्रस्तुत अभ्यासासाठी वापरण्यात आलेली आधारसामग्री ही दुय्यम स्वरूपातील असून ती ऑनलाईन पद्धतीने संकलित करण्यात आलेली आहे.

विषय विवेचन:

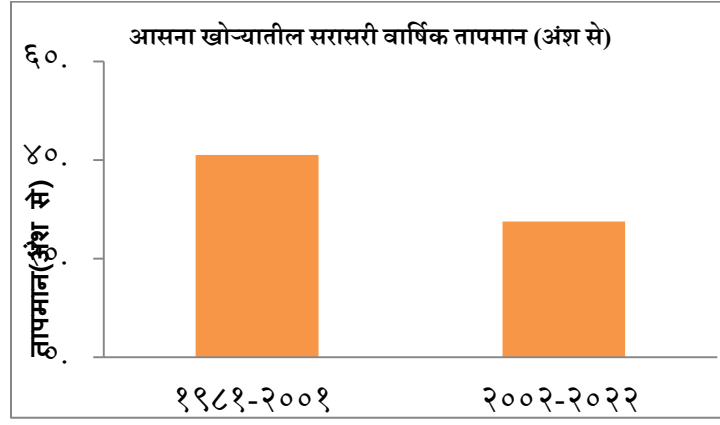
आसना खोऱ्यातील हवामानाचा अभ्यास करताना तापमान अंश सेल्सिअस, आर्द्रता ग्र/कि.ग्र व पर्जन्य मि.मी. या प्रमाणात दर्शविण्यात आलेले आहे. यासाठी सन १९८१ ते २०२२ पर्यंतच्या एकूण ४२ वर्षातील आकडेवारी ही सण १९८१-२००१ व २००२-२०२२ अशा दोन गटात

विभागून त्याच्या सरासरीचे वितरण खालीलप्रमाणे सांगण्यात आलेले आहे.

- तापमान:- सन १९८१-२००१ या २१ वर्षांच्या कालावधीतील तापमान हे ४१.१ अंश सेल्सिअस एवढे आहे, तर सन २००२-२०२२ या कालावधीतील तापमान हे २७.५७ अंश सेल्सिअस एवढे आढळते. म्हणजेच तापमानात आधीच्या कालावधीपेक्षा नंतरच्या कालावधीतील तापमानात जवळपास १३.४९ अंश सेल्सिअस ने घट झालेली दिसून येते.

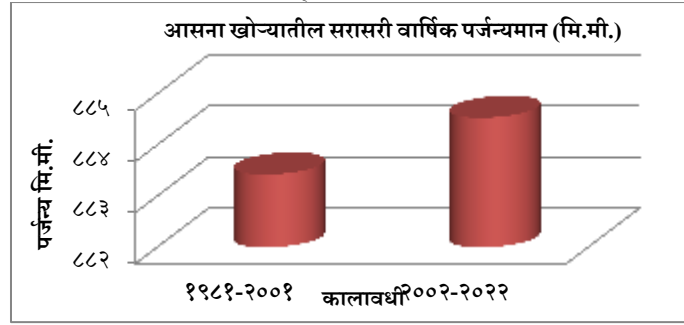
अ.क्र.	वर्षे	वार्षिक तापमान (अंश से)	वार्षिक आर्द्रता(ग्र/कि.ग्र.)	वार्षिक पर्जन्यमान (मि.मी.)
१	१९८१-२००१	४१.१	११.२२	८८३
२	२००२-२०२२	२७.५७	११.६७	८८४.६०

स्त्रोत: <https://power.larc.nasa.gov/data-access-viewer/>



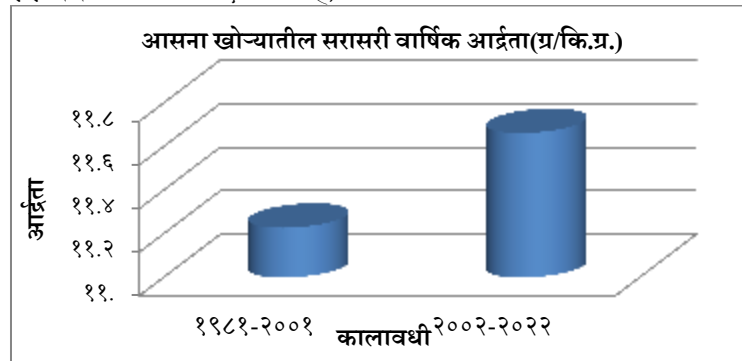
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- २) पर्जन्यमान: सन १९८१-२००१ या २१ वर्षांच्या कालावधीतील पर्जन्यमान हे ८८३ मि.मी. एवढे आहे. तर सन २००२-२०२२ या कालावधीतील पर्जन्यमान हे ८८४.६० मि.मी. एवढे आढळते. म्हणजेच आधीच्या कालावधीपेक्षा नंतरच्या कालावधीतील पर्जन्यमानात १.६० मि.मी. ने वाढ झालेली आहे.



स्त्रोत: <https://power.larc.nasa.gov/data-access-viewer/>

- ३) आर्द्रता: आसना खोऱ्यातील एक कि.ग्रम हवेत असलेल्या एक ग्रम आर्द्रता असे प्रमाण दर्शविण्यात आले आहे. यावरून आसना खोऱ्यातील आर्द्रता अभ्यासल्यास असे दिसून आले आहे की, सन १९८१-२००१ या २१ वर्षांच्या कालावधीतील आर्द्रता ही ११.२२ ग्रम/कि.ग्रम एवढी आहे, तर सन २००२-२०२२ या कालावधीतील आर्द्रता ही ११.७० ग्रम/कि.ग्रम एवढी आढळते. म्हणजेच आर्द्रतेत आधीच्या कालावधीपेक्षा नंतरच्या कालावधीतील जवळपास ०.४३ ग्राम ने घट झालेली दिसून येते.



स्त्रोत: <https://power.larc.nasa.gov/data-access-viewer/>

निष्कर्ष:

- १) प्रस्तुत अभ्यासावरून असे लक्षात येते की, आसना नदी खोऱ्याच्या तापमानाचा ४२ वर्षांचे दोन विभागात विभाजन केल्यानंतर आलेल्या आकडेवारीमध्ये तफावत जाणवते ती १९८१-२००१ या कालावधीपेक्षा २००२-२०२२ या कालखंडात १३.५ अंश सेल्सिअस

ने घटले आहे. याचा परिणाम तेथील वेगवेगळ्या पिकांवर होत असतो.

- २) त्याचप्रमाणे पर्जन्यामानातील आलेल्या आकडेवारीमध्ये सुद्धा तफावत झालेली आहे. ती १९८१-२००१ या कालावधीपेक्षा २००२-२०२२ या कालखंडात १.६० मि.मी. ने वाढले आहे. याचा परिणाम तेथील

वेगवेगळ्या पिकातील उत्पादन वाढले असावे असा अंदाज सांगता येतो.

- ३) खोऱ्याच्या आर्द्रते ४२ वर्षांच्या आलेल्या आकडेवारीमध्येही किंचितसा फरक झालेला जाणवते ती १९८१-२००१ या कालावधीपेक्षा २००२-२०२२ या कालखंडात ०.४८ ने वाढ झालेली आहे.

संदर्भ:

- १) डॉ. संजय पगार, डॉ. अशोक थोरात, डॉ. ज्योतिराम मोरे (जून २०१५): कृषी भूगोल अथर्व प्रकाशन पुणे. पृष्ठ क्र. ४२, ४३ ४४ ४५.
- २) डॉ. बालाजी आव्हाड, “आसना नदी खोऱ्यातील ग्रामीण वसाहतीचे प्रकार”. संशोधन पेपर, ISBN ९७८-९३८४३०९-०२-२.
- ३) <https://power.larc.nasa.gov/data-access-viewer/>



खनिज तेलाचे साठे आणि उत्पादन यांचे भारतीय अर्थव्यवस्थेवर होणाऱ्या परिणामांचे अध्ययन करणे.

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प्रस्तावना:

तेलाच खोत म्हंटल कि आपल्या डोळ्यासमोर आखाती देशाचे नाव समोर येते. तेलाची आयात करावी लागते म्हणून ते महाग असते असे सर्वांनी मान्य केले. जवळपास 150 वर्षांपूर्वी अमेरिकेच्या पूर्व पेन्सिलवेनिया क्षेत्रात तेलाच्या साठ्याचा शोध लागला. भारतात खनिज तेलाचा शोध 1867 मध्ये लागला. आसाममध्ये कोळशाची खाण खणत असताना कोळशाऐवजी कामगारांना तेल लागलं. त्याचा उपयोग माहीत नसल्यामुळे मालकांची निराशा झाली. नंतर भूगर्भाशास्त्रीय सर्वेक्षण मंडळाला तिकडे तेल असल्याचं आढळून आलं. भारतातील सर्वात मोठा खनिज तेलाचा साठा मुंबई हाय येथे आहे.

भारतातील पहिला तेलसाठा आसाम मधील दिग्वोई येथे आहे. भारतात गुजरात, आसाम, राजस्थान, महाराष्ट्र या राज्यातही खनिज तेल उत्पादन होते. भारतात आंध्र प्रदेशातील विशाखापट्टणमध्ये १३.३ लाख टन कच्चे तेल, कर्नाटकातील मंगलोरमध्ये १५ लाख टन आणि कर्नाटकातील पाडूरमध्ये २५ लाख टन कच्च्या तेलाचा साठा आहे. भारताकडे ३.८ कोटी बॅरल कच्च्या तेलाचा साठा पूर्व आणि पश्चिम किनार्यावर तीन ठिकाणी बांधलेल्या भूमिगत गुहांमध्ये आपत्कालीन परिस्थितीमध्ये वापरण्यासाठी साठवून ठेवला आहे. हे साठे आंध्र प्रदेशातील विशाखापट्टणम, मंगलूरु आणि कर्नाटकातील पाडूर येथे आहेत. १९९० मध्ये आखाती युद्ध सुरू झाले आणि जगावर तेल संकट आले. तेव्हा १९९८ मध्ये तत्कालीन अटल बिहारी सरकारने कच्च्या तेलाचे राखीव साठे निर्माण करण्याचा निर्णय घेतला होता. हे तेल नैसर्गिक आप्पती, युद्ध, तेल तुटवडा, किमती प्रचंड वाढल्या तर अश्या वेळी वापरता यावे हा त्यामागे उद्देश होता. २०१८ मध्ये मोदी सरकारने ओरिसाच्या चंडीखोल आणि कर्नाटकच्या पुदूर येथे जास्तीचे तेल भांडार तयार केले आहे. जमिनीखालील खडकात खोदलेल्या गुहांमध्ये ही साठवण केली जाते. भारताच्या तेलाच्या एकूण गरजेपैकी ८३ टक्के तेल आयात केले जाते आणि ही आयात प्रामुख्याने आखाती देशातून होते.

आणीबाणीच्या परिस्थितीत देशाच्या ऊर्जेची गरज भागवण्यासाठी कच्च्या तेलाचा साठा करणे म्हणजेच स्ट्रॅटॅजिक रिझर्व्ह होय. युद्ध किंवा इतर कोणत्याही कारणांमुळे कच्च्या तेलाच्या पुरवठ्यावर परिणाम होतो, तेव्हा देशाच्या ऊर्जेच्या गरजा या साठ्यातून भागवल्या जातात. आणीबाणी व्यतिरिक्त या साठ्यांचा वापर तेलाच्या किमती नियंत्रित करण्यासाठी देखील केला जातो.

खनिज तेल कसा तयार होतो?

खनिज तेल म्हणजेच कूड ऑईल तयार करण्यासाठी लाखो वर्षे लागतात. याची सुरुवात समुद्रातून होते. समुद्रातील जीव मृत्यू पावतात. त्यानंतर त्यांचे मृतदेह समुद्राच्या तळाशी जातात. तिथं ते सडतात. लाखो टन वजनाचे कव्हर तयार होते. तेथील उष्णता आणि दबाव विशिष्ट पातळीवर जाते. भूगर्भात हालचाली होत असतात. काळानुसार समुद्र दुसरीकडे सरकतो. त्याची जागा बदलते. उष्णता किंवा बाष्पीभवनामुळे हालचाल सुरू असते. जमिनीच्या आत ऑक्सिजन नसतो. ऑक्सिजन नसल्याने मोमसारखा पदार्थ तयार होतो. त्याला कॅरोजन म्हणतात. त्यालाच कूड ऑईल असं म्हटलं जातं.

संशोधनाची उद्दिष्टे

१. भारतातील तेलाच्या साठ्यावर आणि उत्पादनावर होणाऱ्या परिणामांचे अध्ययन करणे.

२.भारतीय खनिज तेल साठे आणि उत्पादन यांची सद्यस्थितीचे अध्ययन करणे.

३.भारतात असणाऱ्या राखीव खनिजतेल साठ्यांचे अध्ययन करणे.

संशोधनाची गृहीतके :

१.भारतीय खनिज तेलाच्या उत्पादनावर नकारात्मक परिणाम झालेले दिसून येतात.

२.भारतात खनिज तेलाचे साठे मर्यादित आहेत हे नष्ट झाले तर भारतीय अर्थव्यवस्थेसमोर मोठे आव्हान उभे राहील.

३.भारत खनिज तेलाच्या बाबतीत आत्मनिर्भर नाही.

संशोधन पद्धती:

सदर संशोधनासाठी द्वितीय संशोधन पद्धतीचा वापर करण्यात आला आहे यामध्ये वर्तमानपत्रे, ई-वर्तमानपत्रे, विकिपीडिया, वृत्तवाहिन्या, आर्टिकल्स, इंटरनेट, पुस्तके या माध्यमाच्या सहाय्याने माहिती संकलित करून तिचे विश्लेषण करण्यात आले आहे.

भारतातील तेल उत्पादक क्षेत्र:

भारतात स्वातंत्र्य मिळेपर्यंत खनिज तेल फक्त आसाममधून काढले जात होते, पण त्यानंतर गुजरात आणि बॉम्बे हायमध्ये खनिज तेलाचे उत्खनन सुरू झाले. तेल आणि नैसर्गिक वायू आयोगाने देशाच्या स्थलीय आणि सागरी भागांमध्ये अशा २६ खोऱ्यांची ओळख करून दिली आहे, जिथे तेल उत्पादनासाठी भरपूर क्षमता आहे. भारतातील संभाव्य तेल क्षेत्र १४.१ लाख चौरस किमी आहे. ते संपूर्ण भारतात पसरलेले आहेत, त्यापैकी ८५ टक्के जमिनीवर आणि १५ टक्के ऑफशोर भागात आहेत. भारताचे ज्ञात साठे आणि खनिज तेलाचे उत्पादन दोन्ही कमी आहे, त्यामुळे तेलाची गरज भागविण्यासाठी विदेशातून आयात केले जाते. आंतरराष्ट्रीय भूवैज्ञानिक सर्वेक्षणानुसार, भारतातील खनिज तेलाचे साठे ६२० कोटी टन आहेत. तेल आणि नैसर्गिक वायू आयोगाने भारतातील एकूण खनिज तेलाचा साठा १७५० लाख टन असल्याचा अंदाज व्यक्त केला आहे. भारतातील तीन प्रमुख क्षेत्रे आहेत जिथून खनिज तेल मिळते. यापैकी सर्वात महत्वाचे तेलक्षेत्र आसाम आणि मेघालय या ईशान्येकडील राज्यांमध्ये पसरलेले आहे, तर दुसरे महत्वाचे क्षेत्र गुजरातमधील खंभातच्या आखाताला लागून असलेले क्षेत्र आहे. मुंबई

किनार्यापासून १७६ किमी अंतरावर अरबी समुद्रात वसलेले बॉम्बे हाय नावाचे ठिकाणही तेल उत्खननाच्या दृष्टिकोनातून महत्वाचे बनले आहे. येथील तेलाचा साठा १२५० लाख टन इतका आहे.२००७-०८ या वर्षात एकूण ३४१ लाख टन कच्चे पेट्रोलियमचे उत्पादन झाले.

१.आसाम दिग्बोई -

एडविन एलड्रेक यांनी १८५९ मध्ये अमेरिकेतील पेनसिलव्हेनिया येथील टायटसव्हिल येथे जगातील पहिली तेल विहीर खोदल्यानंतर भारतामध्ये त्याचा आणखी एक शोध नोंदवला गेला आसाम रेल्वे आणि ट्रेडिंग कंपनीने १८६७ मध्ये इटालियन अभियंत्यांना आसामच्या दुर्गम ईशान्य भागात चहाच्या बागा कोळशाच्या खाणी आणि इमारती लाकूड गिरण्या विकसित करण्यासाठी नियुक्त केले. त्यांनी दिग्बोई ते मार्गेरीटा हा रेल्वे मार्ग बांधण्याचा निर्णय घेतला आणि असे करत असताना चुकून तेल सापडले दिग्बोई. दरम्यान या प्रदेशातील तेल व्यवसाय व्यवस्थापित करण्यासाठी आसाम ऑइल कंपनीची स्थापना १८९९ मध्ये करण्यात आली.११ डिसेंबर १९०१ रोजी बांधलेली आसाम मधील दिग्बोई रिफायनरी ही केवळ भारतातील नव्हे तर संपूर्ण आशियातील सर्वात जुनी तेल रिफायनरी आहे. जगातील सर्वात जुनी तेल विहीर देखील आहे याला भारतीय हायड्रोकार्बन क्षेत्राची गंगोत्री असे संबोधले जाते.

२. बॉम्बे हाय-

मुंबई हाय हे अरबी समुद्रात मुंबईपासून १७६ किलोमीटर पश्चिमेस असलेले नैसर्गिक तैलक्षेत्र आहे. १९६० ते ७० या दशकात गुजरातमधील अंक्लेश्वर व खंभायतच्या आखातात खनिज तेलांचे विस्तृत साठे सापडल्यामुळे गुजरात व महाराष्ट्र या राज्यांलगतच्या अरबी समुद्राच्या उथळ भागात खनिज तेलाचे साठे असण्याची शक्यता निर्माण झाली. भूकंपीय सर्वेक्षणाच्या अभ्यासातूनही या शक्यतेला दुजोरा मिळाला होता. त्यामुळे खनिज तेल व नैसर्गिक आयोगाच्या संशोधकांनी रशियन संशोधकांच्या सहकार्याने या भागात शोधमोहीम हाती घेतली. या शोध मोहिमेला यश मिळून मुंबईच्या वायव्येस सुमारे १६० कि.मी. अंतरावर उथळ समुद्रामध्ये विस्तृत खनिज तेल क्षेत्र सापडलं. या क्षेत्राचं 'बॉम्बे हाय' असं नामकरण करण्यात आलं. जानेवारी १९७४ मध्ये ओएनजीसीने 'सागर सम्राट'

या ड्रिलशीपद्वारे या क्षेत्रात तेलविहीर खोदण्यास सुरुवात केली.. मे १९७४ मध्ये या विहिरीत खनिज तेलाचा साठा उपलब्ध झाला. त्यानंतर अनेक विहिरी खणण्यात येऊन 'बॉम्बे हाय' या क्षेत्राचा विकास करण्यात आला. भारतातील खनिज तेलाच्या एकूण उत्पादनात या क्षेत्राचा वाटा ३८ टक्क्यांपर्यंत पोहोचला; तर देशाच्या खनिज तेलाच्या एकूण गरजेपैकी १४ टक्के गरज या क्षेत्रामुळे पूर्ण झाली.

3. गुजरात तेल क्षेत्र -

अंकलेश्वर हे गुजरातमधील भरूच जिल्ह्यात स्थित एक खनिज तेल उत्पादक क्षेत्र आहे. जुलै 1958 मध्ये येथे तेलाचा शोध लागला तर उत्पादन 1961 मध्ये सुरू झाले. गुजरात राज्यात नवगाव, कोसंबा, साणंद नदी खोरे, कडी, ओलपाड, कठाणा, ढोलका इत्यादी ठिकाणी तेलाचा विस्तार आहे.

४. बाडमेर तेल क्षेत्र

काळया सोन्याचे म्हणजेच तेलाचे उत्पादन थारच्या वाळवंटात सुरू झाले. सहा वर्षांच्या अल्प कालावधीत या तेलक्षेत्रातून दैनंदिन 2.25 लाख बॅरल कच्च्या तेलाच्या उत्पादनाने देशाची ऊर्जा सुरक्षा तर सुनिश्चित केली आहेच शिवाय राज्यात विकासाची नवी गाथा लिहिली आहे. या सहा वर्षांच्या अल्प कालावधीत या तेल क्षेत्राने राजस्थानच्या विकासात कर महसुलात 21 हजार कोटींहून अधिक योगदान दिले आहे. त्याच वेळी, केंद्र सरकारला कर महसूल याच्या जवळपास पाच पट म्हणजेच सुमारे एक लाख कोटी मिळाला आहे. तर अजूनही ही सुरुवात मानली जात आहे. तेलाचे उत्पादन वाढल्याने येत्या काही वर्षांत यात आणखी वाढ होण्याची अपेक्षा आहे. भाग्यम आणि ऐश्वर्या, मंगला सोबत, बाडमेर जिल्ह्यात असलेले देशातील सर्वात मोठे तेल साठा, आज देशाच्या देशांतर्गत तेल उत्पादनात 27 टक्के वाटा थारमधून दररोज सुमारे अडीच लाख बॅरल तेलाच्या उत्पादनासह आहे. सध्या हे तेल जगातील सर्वात लांब थर्मल पाइपलाइनद्वारे बाडमेरमधून गुजरातच्या खरेदीदार कंपन्यांपर्यंत पोहोचत आहे. या उत्पादनामुळे राजस्थानला हायड्रोकार्बन क्षेत्रात प्रगती होण्यास मदत होणार नाही तर देशासाठी तेल आयातीचा खर्चही कमी होईल. 2009 मध्ये शून्यापासून सुरुवात करून, कच्च्या तेलाच्या उत्पादनाने अवघ्या सहा वर्षांत एकूण 300

दशलक्ष बॅरल तेल उत्पादनाचा टप्पा ओलांडला आहे. सहा वर्षांपूर्वी याच दिवशी तत्कालीन पंतप्रधान मनमोहन सिंग यांनी येथून तेल उत्पादन सुरू केले होते. राजस्थानचा हा प्रदेश तेल उत्पादनात भारताच्या आघाडीवर आहे. 2004 च्या सुरुवातीला केयर्नने बाडमेरमध्ये एक मोठे तेल क्षेत्र शोधले ज्याचे नाव मंगला होते. तेव्हापासून या भागात भाग्यम, ऐश्वर्या, सरस्वती आणि रागेश्वरी क्षेत्रासह 38 तेल-वायू शोध लागले आहेत. थारमध्ये उत्पादित होणाऱ्या कच्च्या तेलाने देशाला ऊर्जा क्षेत्रात सुरक्षा तर दिलीच पण त्यातून मिळणाऱ्या महसुलाने राज्य आणि केंद्र सरकारची तिजोरीही भरली. अवघ्या सहा वर्षांत राज्य सरकारला येथून २१ हजार ६४७ कोटी रुपयांचे उत्पन्न मिळाले आहे. त्याचवेळी केंद्र सरकारला यापेक्षा पाचपट अधिक म्हणजे एक लाख कोटींचा महसूल मिळाला आहे. गेल्या वर्षी आंतरराष्ट्रीय बाजारात कच्च्या तेलाच्या किमतींमुळे राज्य आणि केंद्राच्या महसुलात काही प्रमाणात घट झाली असली, तरी पुढील अनेक वर्षे येथील तेल राज्याच्या तिजोरीत भर घालत राहणार आहे. त्यामुळे राज्यातील विकासकामांसाठी शासनाकडे निधीची कमतरता भासणार नाही.

भारतातील तेलसाठे आणि उत्पादन यांची सद्यस्थिती :

भारताची खनिज तेलाची मागणी झपाट्याने वाढत असून, चालू वर्षाच्या मध्यापर्यंत चीनला मागे टाकून भारत जगातील सर्वात मोठा तेल आयातदार देश बनेल, असे आंतरराष्ट्रीय ऊर्जा संस्थेने (आयईए) म्हटले आहे. देशातील तेलशुद्धीकरण प्रकल्पांची क्षमता वाढल्याने ही मागणी वाढत असली तरी, मध्य पूर्वेतील देशांमधील राजकीय अस्थिरतेचा तसेच तेल पुरवठ्यावर मोठा परिणाम होईल, असा इशारा संस्थेने दिला आहे. अमेरिका आणि चीननंतर भारत तेलाच्या वापरात जगातील सर्वात मोठा देश आहे. 2021 मध्ये, भारताने रशियाकडून 12 दशलक्ष बॅरल तेल आयात केले, जे त्याच्या एकूण आयातीच्या केवळ 2 टक्के होते. भारताची खनिज तेलाची मागणी 2024 पर्यंत प्रतिदिन 60 लाख बॅरलवर पोचेल. ही मागणी 2017 मध्ये प्रतिदिन 44 लाख बॅरल होती. वाढत्या मागणीला फक्त तेलाची विक्री कारणीभूत नसून, देशाची तेलशुद्धीकरण क्षमताही वाढत आहे. याचवेळी देशांतर्गत तेल उत्पादन मात्र "जैसे थे" आहे. खनिज तेलासाठी भारताला मध्य पूर्वेतील

देशांवर सर्वस्वी अवलंबून राहावे लागत आहे. तसेच, या देशांमध्ये उद्धवणारी भू-राजकीय अस्थिरता आणि खनिज तेलाच्या भावात होणारे चढउतार यांचा भारतावर मोठा परिणाम होणार आहे. सध्या देशाला लागणाऱ्या एकूण तेलापैकी तब्बल 80 टक्के तेल आयात केले जाते. त्यात मध्य पूर्वेतील देशांचा वाटा 65 टक्के आहे. सद्यःस्थितीत भारत, चीन आणि अमेरिकेनंतर खनिज तेलाचा तिसरा मोठा आयातदार देश आहे. तेलशुद्धीकरणात भारत जगातील चौथ्या क्रमांकाचा देश आहे. भारतातून शुद्ध पेट्रोल आणि डिझेलची निर्यात केली जाते. सद्यःस्थितीत भारतात प्रतिदिवशी 50 बॅरल खनिज तेलाचे शुद्धीकरण केले जाते. ते 2025 पर्यंत 80 लाख बॅरलवर पोचेल. त्यामुळे तेलशुद्धीकरणासाठी भारत एक आकर्षक बाजारपेठ होणार आहे. परिणामी, सौदी अरॅमको, ब्रिटिश पेट्रोलियम, अबूधावी नॅशनल ऑइल कंपनी सारख्या जागतिक तेल कंपन्या भारतात गुंतवणूक करण्यास उत्सुक आहेत.

भारतीय तेलाचे साठे आणि उत्पादन यावर परिणाम करणारे घटक पुढीलप्रमाणे:

१.तेलाच्या उत्पादनावर भारताचे अवलंबित्व

भारतातील पेट्रोलियम उत्पादने आणि इंधनाच्या वाढत्या मागणीमुळे कच्च्या तेलाची गरज मोठ्या प्रमाणात वाढत आहे. देशातील कच्च्या तेलासाठी आयातीवरील अवलंबित्व वाढत आहे आणि देशातील कच्च्या तेलाचे देशांतर्गत उत्पादन फारसे प्रभावी नाही, त्यामुळे यंदा त्याची आयात खूप वाढली आहे. २०२२-२३ या आर्थिक वर्षात देशाच्या कच्च्या तेलाच्या गरजेसाठी आयातीवरील अवलंबित्व ८७.३ टक्क्यांवर आले आहे. गेल्या वर्षी म्हणजेच २०२१-२२ या आर्थिक वर्षात ते ८५.५ टक्के होते. पेट्रोलियम मंत्रालयाच्या पेट्रोलियम प्लॅनिंग अँड अॅनालिसिस सेलने (PPAC) ही आकडेवारी जाहीर केली आहे. भारतातील पेट्रोलियम उत्पादने आणि इंधनाच्या वाढत्या मागणीमुळे कच्च्या तेलाची गरज मोठ्या प्रमाणात वाढत आहे. देशातील कच्च्या तेलासाठी आयातीवरील अवलंबित्व वाढत आहे आणि देशातील कच्च्या तेलाचे देशांतर्गत उत्पादन फारसे प्रभावी नाही, त्यामुळे यंदा त्याची आयात खूप वाढली आहे. २०२२-२३ या आर्थिक वर्षात देशाच्या कच्च्या तेलाच्या गरजेसाठी आयातीवरील

अवलंबित्व ८७.३ टक्क्यांवर आले आहे. गेल्या वर्षी म्हणजेच २०२१-२२ या आर्थिक वर्षात ते ८५.५ टक्के होते. पेट्रोलियम मंत्रालयाच्या पेट्रोलियम प्लॅनिंग अँड अॅनालिसिस सेलने (PPAC) ही आकडेवारी जाहीर केली आहे.

२.आर्थिक मंदी

भारत देश इंधनासाठी जागतिक बाजारपेठेवर अवलंबून असल्यामुळे खनिज तेलाच्या किमती वाढल्या की त्याचा अनिष्ट परिणाम आपल्या अर्थव्यवस्थेवर होतो. पेट्रोल व डिझेल महाग झाल्यामुळे वाहतूक महाग होते. त्यामुळे खाद्यान्न महागते. असा जीवनमानाचा खर्च वाढल्यामुळे देशात असंतोष वाढीस लागतो गतिक बाजारपेठेत खनिज तेलाचे भाव भडकण्याची प्रक्रिया सुरू होताच भारतीय अर्थव्यवस्थेला मोठा तडाखा बसण्याची शक्यता निर्माण झाली आहे. खनिज तेल महाग झाल्यामुळे आता त्याच्या आयातीसाठी आपल्याला अधिक परकीय चलन खर्च करावे लागणार आहे. त्यामुळे परकीय व्यापारातील तूट वाढणार आहे. तसेच चालू खात्यावरील तूट (current account deficit) २०१२-१३ प्रमाणे धोक्याची पातळी ओलांडण्याची म्हणजे ४.५ ते ५ टक्क्यांपर्यंत वाढण्याची शक्यता निर्माण झाली आहे. ही तूट भरून काढता आली नाही तर १९९१ प्रमाणे परकीय चलनाच्या तुटवड्याचे संकट निर्माण होऊ शकते. इंधन महाग झाल्यामुळे महागाई वाढणार आहे आणि ती नियंत्रणात ठेवण्यासाठी रिझर्व्ह बँकेला व्याजाच्या दरात वाढ करावी लागणार आहे. यामुळे उद्योजक नवीन प्रकल्पांमध्ये गुंतवणूक करण्याचे निर्णय पुढे ढकलतील असे दिसते. तसेच रोजगारात वाढ होऊन क्रयशक्ती वाढली नाही तर आधी सुरू असणारे आर्थिक मंदीचे सावट अधिकच गडद होण्याची शक्यता निर्माण झाली आहे.

३.कच्च्या तेलाच्या खर्चात वाढ

आर्थिक वर्ष 2021-22 मध्ये भारताच्या कच्च्या तेलाच्या आयातीवर त्याआधीच्या वर्षाच्या तुलनेत दुप्पट खर्च झाला आहे. कच्च्या तेलाच्या किंमतीत वाढ, देशांतर्गत इंधन मागणीत वाढ आदी कारणे आहेत. इंधन वापर आणि कच्च्या तेलाची आयात करण्यात भारत जगातील तिसऱ्या क्रमांकाचा देश आहे. पेट्रोलियम मंत्रालयाच्या PPAC च्या

आकडेवारीनुसार, एप्रिल 2021 ते मार्च 2022 पर्यंतच्या काळात भारताने तेल आयातीवर 119.2 अब्ज डॉलर खर्च केले. यामध्ये मागील वर्षाच्या तुलनेत 62.2 अब्ज डॉलर इतका खर्च कड्या तेलाच्या आयातीवर करण्यात आला होता. PPAC च्या अहवालानुसार, आर्थिक वर्ष 2021-22 मध्ये भारताने 21.221 कोटी कड्या तेलाची आयात केली होती. तर, त्याहून मागील वर्षी 19.65 कोटी टन तेलाची आयात केली होती. कोरोना महासाथीच्या आधीचे वर्ष 2019-20 च्या तुलनेत ही संख्या कमी आहे. तर, 22.7 कोटी टन कड्या तेल आयात करण्यात आले होते. त्यावेळी कड्या तेलाच्या आयातीवर 101.4 अब्ज डॉलर इतका खर्च झाला होता. भारत आपल्या मागणीच्या 85.5 टक्के कड्या तेल आयात करतो.

४. दरवाढीची अपरिहार्यता

तेल आणि त्याचा दर हा आपल्या देशाच्या अर्थव्यवस्थेमध्ये एक प्रमुख घटक आहे. भारताला आर्थिक प्रगतीच्या या पर्वात विविध ऊर्जास्रोतांची मोठी गरज भासत असते. आजही आपला देश कड्या तेलाच्या एकूण मागणीपैकी सुमारे ७५ टक्के आयात करत असल्यानं तेलाच्या दरांमधल्या चढ- उतारांचा आपल्या देशाच्या अर्थव्यवस्थेवर लक्षणीय परिणाम होतो. आपला देश रोज अंदाजे दहा लाख बॅरल्सचं उत्खनन करतो, तर आपली कड्या तेलाची रोजची गरज अंदाजे ४१ लाख बॅरल्स आहे. यावरून आपलं कड्या तेलाबाबतचं आयातीवरचं अवलंबित्व स्पष्ट होतं.

निष्कर्ष:

वरील विवेचनावरून असे लक्षात येते कि, भारताने धोरणात्मक पेट्रोलियम साठे तयार करण्यास सुरुवात करणे हा देशाच्या ऊर्जा सुरक्षेसाठी अत्यंत महत्वाचा उपाय आहे. आखाती देशांमध्ये युद्धाच्या स्थितीत हा उपाय भारतासाठी उर्जेची पिगी बँक म्हणून काम करेल. भारत तेलाच्या बाबतीत स्वयंपूर्ण नाही. आज भारताला आपल्या गरजेच्या 85% कड्या तेलाची आयात करावी लागते आणि आता भारतातील डिझेल आणि पेट्रोलच्या किमती दररोज चढ-उतार होत असतात कारण तेलाच्या किमती बाजारभावानुसार ठरतात. त्यामुळे तेलाच्या किमती स्थिर ठेवण्यासाठी आणि देशाची ऊर्जा सुरक्षा सुनिश्चित

करण्यासाठी भारताला पेट्रोलियम रिझर्व्ह बनवण्याची नितांत गरज आहे.

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प्रस्तावना :

शेती ही फार पुरातन काळापासून चालत आलेली आहे. तिचा उगम आदिमानवाच्या विचारातून आणि स्त्रियांच्या लागवड तंत्रज्ञानातून झाल्याचे दिसते. भारतात ग्रामीण भागातील जास्तीत जास्त लोक शेती करतात. भारतात पूर्वीपासून सखोल शेती केली जाते म्हणून भारताला कृषिप्रधान देश असे म्हटले जाते. कृषी व्यवसाय हा जगातील अत्यंत पुरातन व्यवसाय असून आधुनिक काळातही तो व्यापक प्रमाणात केला जातो.

जगातील जवळपास दोन-तृतीयांश लोकांचा प्रमुख व्यवसाय शेती हाच आहे. भारतासारख्या देशात तर सुमारे ७० टक्के लोक आजही शेतीवर अवलंबून असल्याचे दिसते. परिणामी राष्ट्रीय उत्पन्नात शेतीचा वाटा फार महत्वाचा आहे. भारतातील एकूण निर्यातीपैकी १७% निर्यात ही शेती क्षेत्रातून केली जाते. शेतीतून मिळणाऱ्या कच्च्या मालाच्या आधारे अनेक उद्योग चालवले आहेत. राष्ट्रीय उत्पन्नातील २४ % उत्पन्न हे शेती व्यवसायातून प्राप्त होते. इतर विकसित देशांच्या तुलनेत भारतातील वाटा हा खूप मोठा आहे. असे असले तरी शेती करण्यासाठीची आधुनिक साधने उपलब्ध नसल्यामुळे बऱ्याच ठिकाणी पारंपरिक पद्धतीनेच शेती केली जाते. तसेच शेतकऱ्यांना मिळणाऱ्या सोयी-सुविधा, नैसर्गिक संकटे यांमुळे शेतीचे होणारे नुकसान याचा विचार करता ग्रामीण शेतकऱ्यांची दयनीय अवस्था पहावयास मिळते. आज अनेक चित्रपट, कथा, कादंबरी, कविता या साहित्यातून ग्रामीण शेतकऱ्यांची अवस्था मांडण्याचा प्रयत्न झाला असला तरी शेतकऱ्यांची स्थिती सुधारण्यासाठी होणारे बदल तितक्या प्रमाणात झाले नसल्याचे दिसते.

शेतकरी :

भारतीय अर्थव्यवस्थेचा कणा म्हणून ओळखला जाणारा शेती हा व्यवसाय आज दुर्लक्षित झाला असल्याचे दिसते. याची अनेक कारणे पहावयास मिळतात. शेती धारण

करणारा व्यक्ती शेतकरी होय. मात्र शेती कसणारा खरा शेतकरी होय. ग्रामीण भागामध्ये प्रमुख व्यवसाय शेती केला जातो. शेतकरी हा ग्रामव्यवस्था आणि कृषी समाज रचनेचा कणा मानला जातो. ग्रामीण शेती आणि शेतकरी यांचे वर्णन अनेक पुस्तकांतून पाहावयास मिळते. “गावगाडा”कार श्री. ना. अत्रे गाव वसविण्याचे आणि जमीन वहिवाटीला आणण्याचे श्रेय शेतकऱ्यांनाच देतात. अत्रेच्या मते खेडणे म्हणजे जमिनीची मशागत करणे आणि खेडूत म्हणजे जमीन कसणारा. जमीन कसणारा म्हणजेच शेतकरी होय. शेतकऱ्यांची संपूर्ण उपजीविका शेतात येणाऱ्या पिकाच्या उत्पन्नावरून चालत असते. रात्रंदिवस काबाडकष्ट करून शेतकरी अन्नधान्य पिकवतो. शेतकरी शेतात राबतो म्हणूनच आपल्या अर्थव्यवस्थेची चाके चालतात कारण भारतातील अर्थव्यवस्था देखील शेती उद्योगांशी निगडित आहे. ग्रामीण भारतातील शेतकरी हा अत्यंत महत्वाचा घटक मानला जातोय.

जगाचा पोशिंदा :

शेतकऱ्याला जगाचा पोशिंदा म्हणून ओळखले जाते. शेतीतून केवळ अन्नधान्य मिळवणे हा एकच उद्देश नसतो तर जगाची अन्नधान्याची गरज भागविण्याचे काम शेतकरी राजा करत असतो. शेतकऱ्याला राजा असे म्हटले जात असले तरी आज हा राजा मोठ्या संकटात सापडल्याचे दिसते. शेतीवर उद्योगधंदे पशुधन एकंदरीत

मानवी जीवन अवलंबून आहे.शेतीची चाके थांबल्यास सर्व जनजीवन उद्ध्वस्त होईल कारण अन्नधान्य,भाजीपाला,दुग्धजन्य पदार्थ,उद्योगांसाठीचा कच्चा माल हे सर्व मिळण्याचे ठिकाण शेतीच आहे म्हणूनच शेतकऱ्याला “जगाचा पोशिंदा” असे म्हणतात.आपली समाज व्यवस्था सुरळीत चालावी यासाठी ऊन,वारा,पाऊस,वादळे अशा सर्व संकटांचा सामना करत शेतकरी बारमाही शेतात राबवत असतो.म्हणूनच तो जगाचा पोशिंदा ठरला आहे.

भारतीय अर्थव्यवस्थेत शेतीचे महत्त्व :

ग्रामीण विकासातील कृषी क्षेत्राचे योगदान अनन्यसाधारण आहे.देशाच्या आर्थिक विकासात शेती क्षेत्राला महत्त्वाचे स्थान आहे.देशातील लोकसंख्येच्या प्राथमिक गरजा पूर्ण करण्यासाठी,औद्योगिक विकासासाठी, कच्चा माल पुरवठा करणारे एक प्रमुख क्षेत्र म्हणून शेती व्यवसायाकडे पाहिले जाते. देशातील एकूण लोकसंख्येपैकी ७४ टक्के लोकसंख्या खेड्यात असून त्यांची प्रत्यक्ष अप्रत्यक्ष उपजीविका शेती आणि शेतीशी संबंधित उद्योगावर आधारलेली आहे.कृषी क्षेत्रात झालेल्या सकारात्मक बदलातून शेतीचे उत्पादन वाढविण्यास मदत झाली.पशुसंवर्धन व्यवसायात कृत्रिम रेतनामुळे श्वेता क्रांती होऊ शकली. पशुधनासाठी चाऱ्याची उपलब्धता आवश्यक आहे.ही गरज आपण शेतीच्याच आधारे पूर्ण करू शकतो.मोठ्या प्रमाणात रोजगार निर्माण करून देणारे क्षेत्र म्हणून शेतीकडे पाहिले जाते.असे असले तरी परंपरागत शेतीतून आपण आधुनिकतेकडे वाटचाल करणे आवश्यक आहे. देशाच्या विकासासाठी आवश्यक असणारे तंत्रज्ञान,वस्तू, सेवा परकीय देशातून मिळविण्यासाठी निर्यात वाढवणे आवश्यक आहे. भारतासारख्या कृषी प्रधान देशातून अन्नधान्य, चहा,साखर,तंबाखू,तेलबिया, मसाल्याचे पदार्थ,फळे इत्यादीच्या निर्याती द्वारे देशाला परकीय चलन प्राप्त होण्यास मदत होते.

सगळ्यात मोठा खाजगी उद्योग :

शेतीची मालकी ही खाजगी आहे.स्वतःच्या मालकीची शेती ही आकाराने कितीही लहान असली तरी शेतकऱ्याला आणि त्याच्या कुटुंबाला आजच्या विकासाच्या अवस्थेत आर्थिक आधार आहे. असे असले तरी भारतातील शेतीचे मोठ्या प्रमाणात तुकडीकरण झाल्याचे पहावयास मिळते.भारतात ६५ ते ६६ टक्के शेतकरी हे छोटे व सीमांत आहेत.असे शेतकरी आपल्या शेतात आधुनिक यंत्रसामग्रीचा वापर आवश्यकतेनुसार करू शकत नाहीत.परिणामी अनेक सुविधांपासून असा शेतकरी वंचित

राहतोय. अल्पभूधारक शेतकऱ्याची कर्ज घेण्याची क्षमता कमी असल्यामुळे सावकार,बँका, खाजगी संस्थानकडून जास्त व्याजदर आकारून शेतकरी कर्ज मिळवतात.कर्जाच परतफेड न झाल्यामुळे सावकार, बँका आपला नफा मिळवून शेतकऱ्यास रसातळाला पोहोचवताना दिसतात.शेती व्यवसायासाठी महत्त्वाचा घटक म्हणजे पाणी.सिंचनासाठी पाणी उपलब्ध असणे अतिशय महत्त्वाचा भाग आहे.यावरून जिरायती शेती आणि बागायती शेती असे स्वतंत्र गट निर्माण होतात.बागायती शेतकरी मुबलक प्रमाणात पाणी उपलब्ध असल्यामुळे वर्षातून दोन पेक्षा जास्त धान्य पिके,फळे,भाज्या, भाजीपाला पिकवून आपले उत्पन्न वाढविण्याचा प्रयत्न करतात.ळ.मात्र जिरायती शेतीमध्ये निसर्गाच्या लहरीपणावरती शेतीचे उत्पन्न अवलंबून असते. पंजाब,हरियाणा,पश्चिम बंगाल तसेच दक्षिणेच्या राज्यांमध्ये सिंचनासाठी भरपूर पाणी उपलब्ध आहे. महाराष्ट्रामध्ये मात्र सुमारे वीस ते पंचवीस टक्के क्षेत्रच लागवडीखालील जमिनीचे असल्याचे वास्तव समोर येते.याचा परिणाम ज्यांना सिंचन सुविधा उपलब्ध आहेत ते सामान्यपणे श्रीमंत आणि जे कोरडवाहू ते सामान्यपणे गरीब असे विभाजन ग्रामीण भागात असल्याचे दिसते. छोट्या शेतकऱ्यांना मोठ्या शेतीचे संघटनात्मक वित्तीय तांत्रिक फायदे कसे मिळवून द्यावे आणि उपलब्ध सिंचन जास्तीत जास्त जमिनीसाठी शेतकऱ्यांना कसे उपलब्ध करून द्यावे हे दोन प्रश्न भारतीय शेतीपुढे आहेत.गेल्या ४० वर्षात पाझर तलाव, नाल्यांवरील बंधारे,वेगवेगळ्या नदी खोऱ्यांसाठी ज्या पाणी योजना झाल्या याचा मोठा फायदा पश्चिम महाराष्ट्रातील दुष्काळी पट्टा व मराठवाडा या विभागास झाला परिणामी शेतीचे उत्पन्न वाढले,उद्योगांमध्ये वाढ झाली तसेच मोठ्या प्रमाणात रोजगार उपलब्ध झाला.

ग्रामीण भागातील शेतकऱ्यांच्या समस्या :

महाराष्ट्र हे भारतातील एक औद्योगिक राज्य आहे. परंतु महाराष्ट्र राज्यात शेती हा प्रमुख व्यवसाय आहे. राज्यातील शेती ही प्रामुख्याने पावसावर अवलंबून असून राज्यातील अनेक भागात पावसाचे प्रमाण अतिशय कमी आहे.काही ठिकाणी दुष्काळ सदृश्य परिस्थिती निर्माण होते.परिणामी राज्यातील शेतकरी अर्थात शेती हा व्यवसाय धोक्यात येत आहे.भारतीय शेतकऱ्याला भांडवलाच्या अभावामुळे कृषी मालावर प्रक्रिया करून तो माल थेट बाजारपेठेत विक्री करण्यात अडचणी येत आहेत.शेतमालाच्या उत्पादन खर्चापेक्षा शेतमालाला मिळणारा बाजार भाव तसेच शासनाचे अधिप्राप्ती किंमत

आणि आधार किंमत या अतिशय कमी असल्यामुळे शेतकऱ्यांच्या उत्पादनात सातत्याने घट होताना दिसते. एकूण भूधारकांपैकी अल्पभूधारक व सीमांत भूधारकांची संख्या अधिक असून याचा परिणाम गरिबी सारख्या मोठ्या समस्येची निर्मिती करताना दिसतो. दुष्काळ, पूर, त्सुनामी, वादळे, अतिवृष्टी, ढगफुटी, हवामानातील बदल यांसारख्या सततच्या नैसर्गिक आपत्तीमुळे शेतीचे मोठ्या प्रमाणात नुकसान होऊन याचा आर्थिक फटका शेतकऱ्यास बसतो. वाढती लोकसंख्या तसेच विभक्त कुटुंब पद्धतीच्या समस्येमुळे जमिनीचे व्यापक विभाजन होऊन शेतकऱ्यांच्या उच्चाटन व उत्पन्नात घट झालेली आहे. शेतीमाल विपणनातील दोषांमुळे शेतकऱ्यांचे आर्थिक शोषण होऊन त्यांना कमी दाम मिळते. तसेच तंत्रज्ञान वापराच्या कौशल्यात्मक ज्ञानाचा अभाव, तंत्रज्ञान व कृषी यांतील परस्पर संबंधाबाबतचे अज्ञान तसेच शेतीविषयक शिक्षणाचा अभाव या संदर्भात शेतकऱ्यांच्या मोठ्या समस्या आहेत. शेतकऱ्यांकडे शेतीच्या विकासाच्या अनुषंगाने स्वतःच्या भांडवलाचा अभाव असतो. तसेच अत्याधिक जल-उपसामुळे क्षारपड जमिनीचे वाढते प्रमा, विजेची टंचाई असल्यामुळे शेतीसाठी मर्यादित विजेचा वापर, शेतीमाल साठवणुकीच्या सोयींचा अभाव परिणामी लाखो टन धान्याची होणारी नासाडी, निसर्गाचा लहरीपणा, विपणनाच्या क्षेत्रात मध्यस्थ्यांची भूमिका मजबूत असल्यामुळे शेतकरी आणि ग्राहक लाभापासून वंचित राहिल्याचे पहावयास मिळते.

शेतीची उपयुक्तता वाढविण्यासाठी चे उपाय :

स्वातंत्र्यानंतरच्या कालखंडात जमीनदारी पद्धतीचे निर्मूलन करण्यासाठी कमाल जमीनदार यांना कायदा कुळ कायदा, तुकडे बंदी कायदा, आदिवासींचा जमीन विषयक कायदा, सहकारी शेतीला चालना इत्यादी अनेक उपाययोजना करण्यात आल्या. जमीन विषयक सुधारणांमध्ये मध्यस्थीचे उच्चाटन, कुळांना संरक्षण, जमीन धरणेला कमाल मर्यादा, शेती संघटना आणि तुकड्यांचे एकत्रीकरण इत्यादी उद्देश ठेवण्यात आले. तुकडे बंदी, तुकडेजोड यांसारख्या उपायांमुळे जमिनीचे क्षेत्र किफायतशीर होण्यास मदत झाली आहे. तसेच पाणीपुरवठ्याच्या सुविधांमध्ये वाढ करणे आवश्यक आहे. यासाठी शासनाने धरणे, कालवे, पाटबंधारे, पाझर तलाव, विहिरी इत्यादी बांधण्यासाठी उत्तेजन देऊन विविध योजना करणे आवश्यक आहे. देशातील शेतकऱ्यांना खताची

उपलब्धता होण्यासाठी खताचे कारखाने उभारणे आवश्यक आहे. खत वापरासाठी शेतकऱ्यांना वित्तीय अनुदान दिले जाते. रासायनिक खतांबरोबरच सेंद्रिय खते, गांडूळ खते यांच्या निर्मितीसाठी देशात विविध प्रकल्पांना चालना दिल्याचे दिसते. मानवी श्रम आणि पारंपरिक पद्धती यांच्या ऐवजी शेतीत यंत्रांचा वापर करणे आवश्यक आहे. बहुसंख्य शेतकऱ्यांना रोग आणि किडींपासून संरक्षण करण्यासाठी औषधाविषयी ज्ञान नसते. शेतीच्या उत्पादकतेवर याचा परिणाम होतो. यासाठी रोग आणि कीड नियंत्रणासाठी औषधे शेतकऱ्यांपर्यंत पोहोचविणे, त्यांचा प्रसार करणे आवश्यक आहे. शेती उत्पादकता वाढविण्यासाठी संशोधनाची गरज आहे. पीक लागवडीच्या पद्धती भरघोस पिक देणारी खते बी बियाणे यांचे संशोधन आपल्या देशात झाले आहे. यासाठी भारतीय शेती संशोधन मंडळाची स्थापना करण्यात आलेली आहे. ग्रामीण भागात शेती विकासाला पूरक ठरू शकतील अशा विविध सहकारी संस्थांच्या निर्मितीची गरज आहे. शेतकऱ्यांच्या कर्ज विषयक गरजा पूर्ण करण्यासाठी वित्त संरक्षणाचे ग्रामीण स्तरावर कार्य महत्वाचे आहे. शेती विकासासाठी कर्ज पुरवठ्याच्या सुविधा निर्माण झाल्यास शेतकरी कर्जबाजारीच्या विळख्यात सापडणार नाही. अशा काही उपाययोजना केल्यास ग्रामीण भागातील शेतकरी उध्वस्त होण्यापासून वाचेल.

आपल्या कृषीप्रधान देशात हवामान जमीन व त्या परिसरातील उपलब्ध पाणी या साधनसामग्रीवर अनेक पिके घेतली जातात. ऊस, भात, कापूस, ज्वारी, बाजरी, मका, सोयाबीन, भाजीपाला, विविध प्रकारची फळे यासारखे अनेक पिके भारतीय शेतकरी घेतात. देशातील लोकसंख्येची अन्नधान्याची गरज भागवून देश अन्नधान्य, फळे, दुग्धजन्य पदार्थांची निर्यात करतोय. यातून देशाला परकीय चलन मिळते. देशातील आर्थिक उत्पन्नात आणि राष्ट्रीय उत्पन्नात शेतीचे खूप महत्त्व आहे. भारताची अर्थव्यवस्था शेती क्षेत्राशी निगडित आहे. स्वातंत्र्यपूर्व काळात देशातील शेतकरी पारंपारिक पद्धतीने शेती करत होता. त्यामुळे शेतकऱ्यांना भरघोस उत्पन्न मिळत नव्हते. स्वातंत्र्यानंतर शेती सिंचनाखाली आली शेतकऱ्यांनी आधुनिक तंत्रज्ञानाचा वापर करत भरघोस उत्पादन घेण्यास सुरुवात केली. अन्नधान्य उत्पादनात देश स्वयंपूर्ण झाला. शेतीवर आधारित अनेक व्यवसाय व उद्योगधंदे उभारले. ग्रामीण भागातील शेतकरी आर्थिक दृष्टीने सक्षम झाला. त्यांच्या जीवनमान उंचावले. स्वातंत्र्योत्तर काळाप्रमाणे

आपण मागणीनुसार इतर देशांतून अन्नधान्य आयात करत होतो. परंतु हरितक्रांतीनंतर आपण स्वयंपूर्ण झालो आणि आपली गरज पूर्ण होऊन उर्वरित उत्पादने इतर देशांना निर्यात करू लागलो. देशाच्या सकल राष्ट्रीय उत्पादनात आणि राष्ट्रीय उत्पन्नात कृषी क्षेत्राचा मोठा वाटा आहे. प्रगतिशील राष्ट्रांच्या तुलनेत आजही भारतीय राष्ट्रीय उत्पन्नात शेतीचा वाटा अधिक आहे. शेतीच्या एकूण उत्पादनामध्ये जगभरामध्ये भारताचा दुसरा क्रमांक लागतो. तर अर्थव्यवस्थेतही शेतीचा खूप मोठा वाटा आहे. आज देखील रोजगाराच्या सर्वात जास्त सोयी कृषी क्षेत्राशी निगडित असल्याचे पहावयास मिळते. विकसनशील देशांमध्ये कृषी नोकऱ्या बेरोजगाराचे उच्च दर कमी करणेस मदत करते. पशुपालन आणि दुग्ध व्यवसाय करून अनेक बेरोजगार तरुणांनी प्रगती केल्याचे पहावयास मिळते. शेती मुख्य तर दुग्धोत्पादन पूरक व्यवसाय समजला जातो. एकंदरीत देशाच्या कृषी क्षेत्रात आणि कृषी पूरक व्यवसायात आधुनिक तंत्रज्ञानाचा वापर केल्यामुळे ग्रामीण भागातील लोकांचे जीवनमान उंचावले आहे. ग्रामीण विकासामध्ये शेती व शेती आधारित व्यवसायाची योगदान महत्त्वपूर्ण आहे.

समारोप :

भारतातील शेती किफायतशीर करावयाची असेल तसेच ग्रामीण भागातून शहराकडे होणारे अनयोजित व अनियंत्रित स्थलांतर टाळावयाचे असेल तर ग्रामीण भागातील शेती सुधारणे आवश्यक आहे. शेतकऱ्यांचा शेती विषयीचा उत्साह वाढविणे आवश्यक आहे. शासकीय गुंतवणूक, शिक्षण-तंत्रशिक्षण यांचा विकास, ग्रामीण सिंचन व ऊर्जा विकास, ग्रामोद्योग, वनाधारित उद्योग व कृषी प्रक्रिया उद्योग, कृषी उत्पादनाची साठवण आणि विपणन व्यवस्थापन प्रक्रियांचे प्रशिक्षण, कृषी मालाचे वास्तविक किफायतशीर मूल्यनिर्धारण करणे. तसेच ते मूल्य थेट शेतकऱ्यापर्यंत पोहोचविणे यासाठी कृषी विभागाने प्रयत्न करणे आवश्यक आहे. शेतकऱ्याला शेती करण्यासाठी लागणाऱ्या गोष्टींमध्ये प्रथम “सुपीक जमीन” आणि नंतर “पाणी” लागते. शेतीला मुबलक पाणी असेल तरच शेती करणे शक्य आहे. तिसरी आवश्यक गोष्ट म्हणजे “मनुष्यबळ” हे असले की शेतकरी शेतातील पिकांची निगा राखू शकतो चौथे म्हणजे शेती करताना येणारा खर्च पूर्ण करण्यासाठी लागणारा “पैसा” (भांडवल) आणि शेवटी त्याचा उत्पादित शेतीमाल विकतो ती “बाजारपेठ” अशा बाबींची पूर्तता झाल्यास शेतकरी हा प्रगतीपथावर पोहोचण्यास वेळ

लागणार नाही हे निश्चित. शेतकऱ्यांसाठी त्याची शेतीच सर्व काही असते. त्याच्या कुटुंबाचा उदरनिर्वाह आणि जगातील अन्न उद्योग करणारे लोक हे कळत नकळत या शेतकऱ्यांवरच अवलंबून असतात. शेतकरी जगला तरच शेती प्रामुख्याने शेती आधारित उद्योग जगतील हे वास्तव.

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फाईव आईज: खुफिया एजेंसी

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सार :

फाईव आईज पाँच देशों (आस्ट्रेलिया, कनाडा, न्यूजीलैंड, यूनाइटेड किंगडम और संयुक्त राज्य अमेरिका) का एक समूह है, जो खुफिया साझेदारी बनाते हैं। फाईव आईज से इंटरपोल जैसी खुफिया एजेंसी की दक्षता में वृद्धि हुई है जिन्होंने सुरक्षा वातावरण को बढ़ाने के लिये राष्ट्रीय स्तर पर खुफिया एजेंसियों के साथ बेहतर सहयोग किया है। ये देश बहुपक्षीय (न्ना.नै.) समझौते के पक्षकार हैं जो सिग्नल इंटेलीजेंस में संयुक्त सहयोग के लिये एक संधि है। ये पाँचों देश एक दूसरे के साथ खुफिया जानकारी साझा करते हैं। इनका मकसद ही एक दूसरे देश को खुफिया जानकारी पहुँचाना है। ये पाँचों देश आपस में ही अपने सीक्रेट शेयर करते हैं।

कीवर्ड्स : फाईव आईज, खुफिया एजेंसी, इंटरपोल, इंटेलीजेंस

फाईव आईज क्या है :

द्वितीय विश्व युद्ध 1941 के दौरान इसकी शुरुआत हुई। अमेरिका और ब्रिटेन इस एजेंसी के पहले सदस्य थे। विश्व युद्ध से जुड़ी इंटेलीजेंस को ये दोनों देश एक दूसरे को साझा करते थे। इस एजेंसी में 1948 में कनाडा भी इनके साथ जुड़ गया। धीरे धीरे इस एजेंसी का विस्तार हुआ और दो देश आस्ट्रेलिया और न्यूजीलैंड भी इसके सदस्य बन गये। कनाडा सरकार की वेबसाइट के मुताबिक फाईव आईज के पाँचों देश अलग अलग समाज से आते हैं। लेकिन इन देशों पर कानून का शासन और लोकतंत्र है। मनावधिकार पर इनका रुख बिल्कुल साफ है। भाषा भी इन देशों की एक सी है। इन्हीं खुबियों की वजह से पाँचों देशों में जानकारी को सँझा करना बहुत ही आसान होता है। फाईव आईज जब दुनिया के सामने आया तो यह और बड़ा होता गया। इन्हे नाईन आईज और फोरटीन आईज गठबंधन भी कहा जाता है क्योंकि इसमें ज्यादा से ज्यादा देशों को शामिल किया गया है। नीदरलैंड, डेनमार्क, फ्रांस और नार्वे को ऊपर बताये गये पाँचों देश के साथ शामिल किया गया है जबकि बेलजियम, ईटली, जर्मनी, स्पेन और स्वीडन को भी इन्हीं देशों के साथ शामिल किया गया है। यह एक पार्टनरशिप है जो शीत युद्ध के दौरान बनी थी।

फाईव आईज का महत्व :

फाईव आईज समुद्री क्षेत्रों में शिपिंग गतिविधियों पर भी नजर रखते हैं, जिसमें समुद्र भी शामिल है। वायु सेना हवाई क्षेत्र के भीतर दो महत्वपूर्ण सैन्य (बैलिस्टिक मिजाइल परीक्षण और विदेशी उपग्रहों की स्थापना) संचालन करती हैं। हथियारों से निपटने के लिये फाईव आईज आतंकवादी समूहों पर भी नजर रखती है।

फाईव आईज का गठन क्यों किया गया :

द्वितीय विश्व युद्ध के बाद 1941 में फाईव आईज ने अटलांटिक चार्टर जारी किया। इस चार्टर ने मुख्य रूप से विश्व युद्ध के बाद के लिये यूनाइटेड किंगडम और संयुक्त राज्य के उद्देश्यों को रेखांकित किया। इस चार्टर के प्रमुख प्रावधान (लोगों की इच्छाओं के खिलाफ कोई क्षेत्रीय परिवर्तन नहीं किया जायेगा, स्वशासन से वंचित लोगों के लिये स्वशासन की बहाली, भय से मुक्ति और आक्रमक राष्ट्रों का निरस्त्रीकरण) है।

फाईव आईज कैसे काम करती है :

फाईव आईज चार्टर के अनुसार पाँचों देश अपनी अपनी खुफिया एजेंसी संचालित करती हैं। उनसे जो भी अहम जानकारी आती है जो दूसरे देश के काम आ सकती है वह जानकारी एक दूसरे को साझा करते हैं। फाईव आईज देश (आस्ट्रेलिया, कनाडा, न्यूजीलैंड, यूनाइटेड किंगडम और संयुक्त राज्य अमेरिका) एक दूसरे के कॉमन इंटररेस्ट को ध्यान में रखकर काम करते हैं। ये फाईव आईज देश हर साल एक कान्फ्रेंस करते हैं। व्यक्तिगत तौर पर

आपस में मिलकर एक दूसरे को खुफिया जानकारी साँझा करते हैं। वर्ष 2016 में फाईव आईज इनटेलीजेंस ओवरसाइट एंड रिव्यू काउंसिल बनी जिसका मुख्यालय अमेरिका में है। अमेरिका सबसे ज्यादा खुफिया खबरे शेयर करता है। इसके बाद ब्रिटेन खुफिया खबरे शेयर करता है। आस्ट्रेलिया, कनाडा, न्यूजीलैंड की खुफिया खबरे सीमित रहती हैं। इन देशों के बीच मतभेद की स्थिति भी रही है। वर्ष 2021 के दौरान जब चीन ने उइघर मुसलमान पर हिंसा की आलोचना की तो न्यूजीलैंड ने दूरी बना ली।

फाईव आईज क्यों चर्चा में आया :

कनाडा के प्रधानमंत्री ने आरोप लगाया है कि कनाडा में खालिस्तान आंदोलन के एक सिख अलगाववादी नेता हरदीप सिंह निज्जर की हत्या में भारत सरकार के संभावित संबंध हो सकते हैं। इसलिये दोनों देशों के बीच तनाव की स्थिति है। हरदीप सिंह निज्जर हत्याकांड में कनाडा सरकार ने फाईव आईज से जाँच के दौरान मदद ली थी। कनाडा सरकार को फाईव आईज से कई खुफिया जानकारी मिली हैं। इस संबंध में फाईव आईज की तरफ से कोई प्रतिक्रिया नहीं आई। नई दिल्ली में बैठे सरकारी अधिकारियों के हवाले से सूत्रों ने बताया कि सरकार इसके प्रति गंभीर है और यह भी संभावना है कि कनाडा में रह रहे भारतीय कर्मचारियों की जासूसी भी की गई है। इस मामले में फोन टेपिंग की संभवनाओं से भी इनकार नहीं किया जा सकता है। हरदीप सिंह निज्जर की हत्या के बाद भारत और कनाडा के बीच तनाव बढ़ता जा रहा है। दोनों देशों ने एक दूसरे देशों के राजनयिकों को निष्कासित कर दिया। भारत ने कनाडा के लोगों के लिये वीजा जारी करने पर रोक लगा दी है।

फाईव आईज की विशेषतायें :

ये भागीदारी देश एक दूसरे को खुफिया जानकारी का आदान प्रदान करते हैं। फाईव आईज स्थापना के बाद नाईन आईज और फोरटीन आईज गठबंधनों के रूप में विस्तार किया तथा सुरक्षा भागीदार के रूप में अनेक देशों को शामिल किया।

फाईव आईज की कार्यप्रणाली :

फाईव आईज खुफिया जानकारी जुटाने तथा सुरक्षा के मामलों में एक दूसरे से जुड़े होते हैं। फाईव आईज देश अति संवेदनशील स्टोनघोस्ट नेटवर्क के माध्यम से एक दूसरे के साथ जानकारी साझा करते हैं। आंतरिक सुरक्षा, आतंकवाद के मुद्दे इसकी प्राथमिकता में शामिल हैं। इसके अलावा मानव खुफिया, सिग्नल इंटेलीजेंस, सुरक्षा खुफिया, भू-स्थानिक खुफिया और रक्षा खुफिया जैसी जानकारी साझा करती है। चीन को बढ़त को संतुलित करने अथवा नियंत्रित करने जैसे हितों से फाईव आईज के बीच घनिष्ठता भी बढ़ी है। एक समान भाषा और दशकों के सहयोग से बने आपसी विश्वास को श्रेय दिया जाता है। वर्ष 2016 में फाईव आईज

इनटेलीजेंस ओवरसाइट एंड रिव्यू काउंसिल अस्तित्व में आई। इसमें फाईव आईज देशों की गैर राजनीतिक खुफिया निगरानी और सुरक्षा फाईव आईज द्वारा संचालित निगरानी कार्यक्रम :

PRISSM, TEMPORA, X KEYSORE, STATEROOM vkSj MUSCULAR फाईव आईज द्वारा संचालित निगरानी मिशन थे।

फाईव आईज से मिली खुफिया जानकारी का इस्तेमाल :

वियतनाम युद्ध, फॉकलैंड युद्ध, खाड़ी युद्ध, ईरान के प्रधानमंत्री मोहम्मद मोसद्दिक को गद्दी से हटाने के लिये, पैट्रिस लुंबा की हत्या, चिली के राष्ट्रपति सल्वडोर अलेंदे का तख्तापलट, आतंक के खिलाफ।

फाईव आईज के लक्ष्य पर कौन कौन हैं :

राजनेताओं, नागरिकों, बड़ी बड़ी कंपनियों की गतिविधियों पर फाईव आईज नजर रहती है। इनमें तेल कंपनियां, प्रौद्योगिक कंपनियां, एयरलाइन्स, दूरसंचार आपरेटर, वित्तीय संस्थान, शैक्षणिक संस्थान शामिल हैं।

भारत को शामिल किया जा सकता है :

आस्ट्रेलिया और जापान के स्ट्रेटजिक एक्सपर्ट्स का ये मानना है जापान के साथ भारत और दक्षिण कोरिया को भी फाईव आईज में शामिल करना चाहिये। यदि चीन को घेरना है तो भारत को भी इंडो पसिफिक क्षेत्र में अपनी शक्ति बढ़ानी होगी। आस्ट्रेलिया इसमें एक मुख्य रोल अदा कर सकता है। ये दोनों देश पहले से ही सैनिक साझेदारी को बढ़ा रहे हैं ताकि चीन की चुनौती को निपटा जा सके।

2023 बैठक :

फाईव आईज नेताओं की पहली ज्ञात बैठक अक्टूबर 2023 में स्टेनफोर्ड यूनिवर्सिटी के हूवर इंस्टीट्यूशन, कैलीफोर्निया, यूएसए में हुई। इनमें आस्ट्रेलिया के एएसआईओ महानिदेशक माइक बर्गस, कनाडा के सीएसआईएस प्रमुख डेविड विग्नॉल्ट, न्यूजीलैंड के एनजेडएसआईएस के महानिदेशक एंड्रयू हैम्पटन, यूके

संस्थायें भी शामिल हैं।

के एमआई5 के महानिदेशक केन मैक्कलम और यूएसए के एफबीआई निदेशक क्रिस्टोफर रे उपस्थित थे।

भारत कनाडा के मुद्दे में फाईव आईज की मुख्य भूमिका :

अमेरिका, ब्रिटेन और आस्ट्रेलिया जैसे देशों को भारत के साथ देखा जाता है क्योंकि इन देशों में बड़ी संख्या में भारतीय और भारतीय मूल के लोगो की आबादी है। कनाडा और गठबंधन के साथ उनकी ऐतिहासिक निकटता तथा दूसरी तरफ भारत एक वैश्विक शक्ति के रूप में उभरने के कारण भारत और कनाडा के लिये पूर्ण समर्थन की संभावना नहीं है।

निष्कर्ष :

भारत के लिये यह एजेंसी बहुत सी संभावनाये प्रदान करता है। भारत की समय समय पर खतरों को पहचानने में विफलता और खुफिया प्रदर्शन भी खराब रहता है। इन दोनों को देखते हुये फाईव आईज की सलाह भारत के लिये फायदेमंद रहेगी। भारत यदि फाईव आईज में शामिल होता है तो शिक्षा और प्रौद्योगिकी की तरफ पहुँच बहुत अधिक होगी। कश्मीर में सीमा पार से घुसपैठ जैसे मुद्दे से निपटने के लिये भारत की क्षमता में अधिक सुधार करेगा। दुश्मन के हमले की स्थिति में अमेरिकी सुरक्षा का आश्वासन मिल सकता है।

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‘ग्रामीण कवी मनातील शेतकरी जीवन’

प्रा.संजय.रावसाहेब चव्हाण

मालती वसंतदादा पाटील कन्या महाविद्यालय इस्लामपूर

मु.पो.ता.वाळवा.जि.सांगली

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प्रास्ताविक:

ग्रामीण जीवनामध्ये शेती शेतीशी निगडित पाऊस शेतीशी निगडित कालचक्र शेतीचे निगडित जनावरे आणि अशाच इतर सर्व घटकांचा कृषी संस्कृतीत समावेश होतो गाव गाड्यांमध्ये शेती हाच प्रमुख घटक आहे भारतीय शेती प्रामुख्याने निसर्गावर अवलंबून आहे आज पाऊस पडला नाही की संबंध संबंध ग्राम जीवन कोमेजून जाते पाऊस पडला की फुलून येते आणि निसर्ग हात लहरी आहे त्यातून शेतकऱ्याची होणारे वातात ग्रामीण साहित्यात वेगवेगळ्या वांगमय प्रकारातून मांडलेली दिसते. सर्व दूर पसरलेल्या ग्रामीण हृदयाची स्पंदने महात्मा ज्योतिराव फुले यांनी मांडले शेतकऱ्यांच्या जीवनातले वास्तव मराठी साहित्यात प्रथमच प्रकट झाले.

ग्रामीण साहित्य व्याख्या:

ग्रामीण साहित्य बद्दल जे निवडक विचार प्रकट केले गेले त्यातून ग्रामीण साहित्य विषयक तयार झालेले विचारातून “ साहित्य हे व्यक्ती केंद्रित तर असतेच पण त्या व्यक्ती मनाच्या जडणघडणीस कृषी केंद्रित संस्कृती या संस्कृतीने निर्माण केलेले लोकमानस या संस्कृतीसाठी निर्माण झालेला गाव गाडा किंवा तत्सम कृषी उपयोगी समाज रचना इत्यादी घटक जबाबदार असल्याने त्या व्यक्तिमत्त्वाला केंद्रस्थानी ठेवून विहित असताना उपरोक्त घटक सहजपणे ध्वनीत होत जातात आणि त्यातूनच ग्रामीण साहित्य आकार घेत जाते” त्यास ग्रामीण साहित्य असे म्हणतात. ग्रामीण जीवनाचे दर्शन कथा कविता कादंबरी आत्मचरित्र इत्यादी वाङ्मय प्रकारातून अनेक अभ्यासकांनी समर्पकपणे मांडलेले दिसून येत असले तरी ग्रामीण कवितेतील शेतकरी जीवन व्यथा समस्या वेदना समर्पक स्वरूपात काव्यातून येताना दिसतात म्हणूनच ग्रामीण कवितेतील शेतकरी जीवन हा संशोधनाचा विषय घेऊन त्या पद्धतीने अभ्यासाची दृष्टी ठेवून केलेला संशोधनाचा प्रयत्न.

ग्रामीण कविता म्हणजे काय?

‘गेली शेती सुकुनी सगळी जाहली ठार देना’

आणि

‘नाही चारा मिळत पुरता खावया गुराते

आणि त्यात ते विपुल न मिळेल स्वच्छ ते प्या वयाते’

‘ज्या कवितेत ग्रामीण जन जीवनाचे चित्र ग्रामीण संवेदनशीलतेने केलेले असते तिला ग्रामीण कविता असे म्हटले जाते या कवितेमध्ये खेडे खेड्याशी संलग्न असलेले कृषी जीवन खेड्यातील जनजीवनाचे दुःख हर्ष दारिद्र्य रूढी परंपरा संस्कृती या साऱ्यांचा समावेश होतो

मराठी ग्रामीण कवितेची पहाट:

मराठी ग्रामीण कवितेची सुरुवात भा.रा.तांबे यांच्या ‘गुराख्याचे गाणे’ या कवितेपासून झाल्याचे सांगतात तर कोणी चंद्रशेखरांच्या ‘काय हो चमत्कार!’ या खंड काव्यापासून मात्र एकूणच मराठी ग्रामीण कवितेचे अवलोकन केले असता ग्रामीण कवितेची सुरुवात आमच्या एका कवी पासून किंवा कवितेपासून झाली असे निश्चितपणे ठरविता येत नाही ग्रामीण जीवन चित्रण करण्याची प्रेरणा केशवसुतांच्या काळापासून अनेक कवींच्या मनात कमी अधिक प्रमाणात झालेली दिसून येते.

माधवानुजांची कविता मात्र 857 चे भीषण दुष्काळामुळे माणसे जनावरे यांची झालेली दैन्यावस्था चित्तरण्याचा प्रयत्न त्यांनी आपले कवितेमधून केला. ‘दुष्काळ’ या कवितेत पाण्यावाचून निर्माण झालेली भीषणता त्यांना

अशा शब्दात वर्णन केले आहे दुष्काळामुळे माणसे जनावरे यांची झालेली दैन्यावस्था चित्तरण्याचा प्रयत्न त्यांनी आपल्या कविता मधून केला. इ.स.१९२० पूर्व व नंतर अशा सीमारेषेवर काही कवींनी काव्य लेखन केले त्यात ग्रामीण कवितेच्या दृष्टीने कवी चंद्रशेखर आणि भा.रा.तांबे हे दोन पत्नी जवळ करतो आहे.

‘गरिबीचा थाट, समाधान, दाट
शेळी कोरडी भाकर, पाणी, मीठ!

कोरड्यास ओठ्याच्या ग फोडी,ग.(कांचनमेघ पृ५१)

याप्रमाणे शेतकऱ्यांचे जीवन गरिबीचा असलं तरी खूप समाधानाचं असं तो सांगतो. ‘रम्य ते खेडे’हाच भाव गिरीश यांच्या ग्रामीण जीवन चित्रण करणाऱ्या कवितातून आलेला दिसतो कवीला खेड्यातील दुःख दारिद्र्य दुष्काळ इत्यादी वास्तवांचे दर्शन होते तेथे आनंद वैभव आणि गरिबी असली तरी समाधानी वृत्ती याचे दर्शन घडते. यशवंत गिरीश याप्रमाणेच रवी किरण मंडळातील एका ज्येष्ठ कवी यशवंत कवितातून शेतकऱ्यांच्या कष्टमय जीवनाचे चित्रण कवीने केले आहे.

‘किती सोसावा जुलूम हा देवा ! सुखलेश न जन्मी ठावा

या हाडाची करून निशीदिनी काडे ! पोटाचे भरती न
खाडे....(बोबडे बोल पृ.४०) शेतकऱ्याला डोक्यास मुंडासे,
अंगाला कपडा ,पोटाला अन राहायला घर ,झोपायला
अंथरून या साध्या मानवी गरजाही भागविता येत नाहीत.
कष्ट मात्र जीवापाड करावे लागतात हे सांगितले आहे.
अंगावर चिंध्याच आहेत. अशा शेतकऱ्यांची महती पुढील शब्दात येते.

ठेवलेस जरी तू औत तुझे बाजूला
घेतलीस जर तू उसंत यंदा तुला

तर ‘मोटे वरलं गाणं’ मधून मोट हाकणाऱ्या शेतकऱ्याच्या
मनमोकळ्या आणि स्वागतशील वृत्तीचे दर्शन घडते यापेक्षा
भिन्न भाव ‘पावसा’आणि‘सावकारी पाश’या कवितातून

महत्त्वाचे कवी.होत. जे कवी गिरीश यांच्या स्पोर्ट कवितेतून
खेड्यातील शेतकऱ्यांचे जीवन सुखाच्या आनंदाचे असते असा
समज गिरीश यांच्या अनेक कवितातून चित्रित झालेला
दिसतो ‘सुखी संसार’या कवितेत गरिबीतल्या सुखी संसाराचे
वर्णन पती आपल्या

आणि ग्राम जीवनावर काही कविता लिहिल्या त्यात
‘नागरकखुटी’, ‘शेतकीतील सुख’ ‘प्रेमाची दौलत’, ‘न्याहारी चे
गाणे’या कवितांचा समावेश करता येईल. यशवंतांच्या
ग्रामीण जीवनावरील कवितात कृषी जीवन जगणारे लोक
आहे त्या स्थितीत समाधान मानणारे आहेत. पा. श्री. गोरे
यांनी ‘बोबडे बोल’, ‘शेतकऱ्यांचे गाणे या

‘सुगी’चे संपादक ग.ल.ठोकळ यांचा स्वतंत्र काव्यसंग्रह
१९३८ साली प्रसिद्ध झाला बहुसंख्य कवितातून ठोकळान
शेतकरी जीवनाचा परिचय करून दिला आहे. कष्ट करणारा,
आपली स्वतंत्रता जपणारा शेतकरी शक्तीशील असला तरी
त्याला खायला कळंना,कोंडा आणि त्यांच्या

व्यक्त होतात. शेतकरी बऱ्याच दिवसापासून न आलेल्या
पावसाला येण्यासाठी विनवणी करतो

‘जर यंदा बी पूरं न पडलं पपाणी
सावकार लादील कोणी
लावून हात कर्माला
मग रोजगार करण्याला
लागल जावं ममईला

राहील इठं एकलीच घरवाली. (मीठ भाकर पृ.४५)

पाऊस आला नाही तर अशी त्याची स्थिती होणार आहे.
‘सावकारी पाश’ मध्ये पाण्याने देशोधडीला लावलेल्या
शेतकऱ्याचे व्यथित मनोगत वाचावयास मिळते. ठोकळाच्या
कवितेतील पती-पत्नी प्रेम कधी काही निमित्ताने तर कधी
एखाद्या वस्तूच्या, माध्यमाच्या आधारे संयमशील रीतीने

व्यक्त होताना दिसते. या दृष्टीने त्यांच्या ‘जात्यावरलं गाणं’,
‘घरधनी’, ‘तुझ्याविगर’, या कविता उल्लेखनीय आहेत
जात्यावरल्या गाण्यातील ‘स्त्री’आपल्या दूरदेशी गेलेल्या
धन्याला उद्देशून गाते आहे.

आवदाचं साल नाही आलं पीकपाणी

दूर देशी गेला मला एकला टाकून. (मीठ भाकर पृ.४६)

असं पावसाळा भावी कामधंदा शोधण्यासाठी त्याला पत्नीस एकटे सोडून जावं लागलं आपल्याला एकटे टाकून घरधनी गेला याचं दुःख तिला नाही “तिठं नाही त्याला जीव लावायला कोण” म्हणून काळजी लागून राहिली आहे. ‘निसर्ग’ हा ग्रामीण जीवनाचा अपरिहार्य अंग आहे. खेड्यातील पहाट, सकाळ, संध्याकाळ, निसर्ग वर्णन अप्रतिम

केले आहे. त्याबरोबरच निसर्ग शेतकऱ्यांचे चित्रण ही केल आहे. के.नारखेडे याच्या कवितेतील शेतकरी जीवन ग्रामीण काव्य प्रवाहातील बदलाच्या दृष्टीने एक लक्षणीय कविता आहे. जानपद जीवन रंगविताना

“बोचुनी काटा पायी अथवा केव्हा ठेचाळूनी

लाल हो पाऊल रक्ताळूनी”

“स्वैर उधळीता गुरे, वळवितो ओरडून सारखा !

येत असे फेस त्याच्या मुखा

भिजवून आसवा सवे सुखी भाकरी

हा बसे खावया, दृष्टी गुरावर तरी”. (शिवार पृ.५८,५९)

अशा काही ओळीतून भावविवश आणि रंजीत वर्णन दिसून येते. ‘शेतकऱ्यांचे दैवत’ या कवितेच्या पहिल्या भागात ‘पोळा’ या सणाचे महत्त्व कवीने अवघ्या ६ ओळीत वर्णन केले आहे.

‘पहा सजविले कसे देव हे परधान्या राजा

करावयाची आज त्याची सर्वांनी पूजा

राब राबिले रात्रंदिन ते आपल्या शेतात

दिवस सुखाचे त्यांच्या योग्ये आपणा मिळतात

आनंदाचा सण हा त्याचा आज असे पोळा

विश्रांतीचा त्यांना एक दिन वर्षामधला’. (शिवार पृ.५१)

वर्षातून एकदा तरी श्रमाला प्रतिष्ठा देऊन शेतकरी त्याची मनोभावे पूजा करित असतो त्याचे वर्णन कवी, शिंगाणा हिंगुळ लावणे, बेगडी चिकटविने, बाशिंग बांधणे, पायी म्हणून हेच खरे शेतकऱ्यांचे दैवत आहे बहिणाबाई चौधरी यांच्या काव्यातील कृषीजीवनः

धरित्रीला माता मानणारी बहिणाबाई ही जातिवंत कृषी कन्या आहे. शेती आणि शेती कामासंबंधीच्या तिच्या कवितातून शेतकऱ्यांच्या संपूर्ण कृषी कार्याचे वर्णन आलेले आहे. ‘शेतीची साधने’ ‘आला पाऊस’ ‘पेरणी’ ‘गारोडी’

पेंजण, गळ्यात घुंगुर घंटा, पाठीवर झोल या साऱ्या सजावटीचे वर्णन येते. बैलामुळे शेतकऱ्यांना अन्न मिळते

कापणे ‘रगडणे’ उपननी इ. कवितातून शेती आणि शेतकरी जीवनाचा सारा पटच आपल्या डोळ्यासमोर उभा राहतो.

‘पेरणी पेरणी

अवघ्या जगाच्या कारनी

ढोराच्या चारणी

कोटी पोटाची भरणी’. (बहिणाबाईची गाणी पृ.३३)

शेतकऱ्यांच्या घरात धान्य येईपर्यंत अजून काही कामे त्याला करावी लागतात. ती आहेत कापणी मळणी, उपननी या कामाचे वर्णन याच शीर्षकाच्या कवितातून येते. शेतकऱ्यांच्या शेतमाळ्यात घरात त्याला सदैव साथ

देते. त्याची पत्नी तिलाही बैलाप्रमाणेच कष्ट उपसावे लागतात. या कष्टाचे वर्णन व्यक्त करताना कवयित्री म्हणते,

उठ सासुरवाशीन बाई

सुरू झाली वटवट

कातवली वो सासू

पूस डोळयामधले आसू

अशाप्रकारे सोशिक गृहिणीचे चित्रण या कवितेत येते. तसेच निसर्ग, शेती, ग्रामीण समाज व्यवस्था प्रादेशिकता, अध्यात्म जीवन विषयक तत्त्वज्ञान, मानवी मनाचे सूक्ष्म अवलोकन आहे.

सहज आणि सर्जनशील भाषा शैली इत्यादींनी युक्त अशी बहिणाबाईची कविता म्हणजे मराठी ग्रामीण कवितेचा परिपूर्ण असा आविष्कार

साठोत्तरी ग्रामीण कवितेतील शेतकरी जीवन:

आनंद यादव या कवी व्यक्तित्वाने ग्रामीण साहित्य चळवळीच्या रूपाने ग्रामीण भागातील नवोदित तरुण लेखक कवीसाठी जे प्रबोधन प्रोत्साहनाचे कार्य केले. तेही ग्रामीण कवितेच्या दृष्टीने त्यांच्या या काव्य लेखन इतकेच महत्वाचे आहे.

शेतकरी गरीब कष्टाळू जीवन जगणारा आहे. शेतीवर राबणारा, पावसाची आतुरतेने वाट पाहणारा, आला मोठा पाऊस तरी खंत ही व्यक्त करतो. कारण शेतमजुराची काळजी आहेच तो म्हणतो,

यादवांच्या कवितेतील

‘मातीला आता शिरावी उब
दिसाच्या पोटाला लागावी कळ
ढगांनी बी आता आभाळ सोडावं

इळया खुरप्यास्त्री याव बळ (मळयाची माती पृ.६५)

गाडी’ या कवितेत शेतकरी आणि त्याचे बैल त्याचे कष्ट आणि नशीब यांचे दर्शन अल्पाक्षरात घडते. गचकत, कचकत, पांढू पाहणारी गाडी आणि हातात कचरणारं कासरं(असं

दोघांचं नशीब) ही गाडी पुढे दबवायची आणि एवढं करूनही,

ढोराच्या नशिवात कडवा
आमच्या नशिवात घराट-घोट-गाणं
चल बैला...वड बाप्पा

त्यांच्या कवितेतील शेतकरी मातीवर उत्कट प्रेम करणारा. ‘माती हे धन असतंय’ या कवितेत आमच्या रक्तात नद्या झुळझुळतात, पाण्याची तळी हृदयात हुरहुरतात, बाबळ बोरी रंगतात, कामात मन रंगतात दुभंगतात दुष्काळात

पोटाहोटातून प्रेमाचे झरे निघतात’ असं म्हणणारा हा शेतकरी आपल्या देवाचं आणि मातीचा महात्म्य पुढील शब्दात वर्णन करतो

‘डोंगरात आमचा देव असतोय
ह्या डोंगराला बी दगडाचं मन असतंय
हे मन फुलवताना आम्ही मातीत जातोय
.....पर..... मातीत गेलो तरी माती हे धन असतं.

(मळयाची माती पृ.८)

पतीची काळजी घेणारी घरधनीन अशी या कवितेत येते तशीच घरधनीची काळजी करणारा शेतकरीही येतो. एकूणच अगोदरच्या जानपद कवितेतील काल्पनिक खोट्या आणि अस्सल आहे.

अशा ग्रामीण चित्रणा ऐवजी यादवांच्या कवितेतील ग्रामीण जीवन स्वानुभूतीतून आलेले आहे. म्हणूनच सच्चे

नव कवितेच्या काळातील शेतकरी जीवन (१९४५-१९६०):

ना.धो.महानोर:

महानोर यांच्या कविताची प्रामुख्याने निसर्ग कविता आहे निसर्गही ग्राम जीवनाचा अपरिहार्य घटक म्हणून येत नाही तर निसर्ग विविध रूपाने प्रकटतो ‘रानातल्या कविता’ चे स्वरूप प्रामुख्याने रानातील झाडे, शेत पाखरे, संध्याकाळ,

सकाळ, दुपार त्यांच्याशी निगडित आहे. ‘शृंगार भावनेच्या अभिव्यक्तीसाठी निसर्गप्रतिमांचा आधार कवी घेतो.

विठ्ठल वाघ:

विठ्ठल वाघांच्या ‘काया मातीत मातीत’ या संग्रहातील वैद्यभी, साय, ही संकलने पुस्तिकांच्या रूपाने प्रसिद्ध झाले

असली तरी ‘काया मातीत मातीत’ या संग्रहातील ‘लवंग’ ‘पुनीव’ ‘पाण्या पावसाची भरम’ या कवितातून सौंदर्यानुभव

तर,' 'तिफन' 'वावर' 'ढगा मुचुक अभाय','गाव' माणूस,
मेंढरं, तरंग या कवितातून समाज वास्तव चित्रीत झालेले
दिसते. पिढ्यान पिढ्या चालत आलेल्या कृषक

किती घरातून सूर्य जातं होऊन फिरतो
किती घरातून पिठासारखा उजेड पडतो?

काळया म्हशीसारखी रात्र नेहमी आमच्या दारात जन्मत असते-केवळ अंधारच

अनेक गोष्टी ऐकल्या पण अजून (पुनीव) पाहिली नाही म्हैस
,सूर्य , पीठ या प्रतिमातून पिढ्यानपिढ्या अंधार आणि उजेड
सौख्याचा अभाव व्यक्त होतो. गाव बदललं तशी माणसं
बदलण्याची खंतही काही कवितातून व्यक्त करतो.
थोडक्यात विठ्ठल वाघांची कविता लोखानभवाला,
लोकभाषा ,लोकजीवन, लोकसंस्कृती ,लोकगीत यांच्या
अंगाने आविष्कृत करणारी लोक कविता आहे. त्याबरोबरच
राजन गवस यांनी दुःख दारिद्र्याच्या वेदना सोसणारी
कविता आपल्या सभोवतालच्या समाज जीवनाच्या
दुःखाच्या वेदनेचा वास्तव ग्रामीण जीवनाचा आणि मानवी
मनाचा विविध अंगाने प्रवास केला तसेच फ.म शहाजींदे खंड
काव्य म्हणजे शेतकऱ्यांचे प्रांजळ आत्मकथन आहे, सतीश

निष्कर्ष:

एकंदरीत मराठी ग्रामीण कवितेचा अभ्यास करताना
एक गोष्ट लक्षात येते की, आधुनिक मराठी साहित्याच्या
प्रारंभ काळापासून किंबहुना त्याच्याही काही काळ
आधीपासून मराठी काव्य ग्रामीण जीवनापासून वंचित होते.
वास्तविक या देशाचा भूभाग शेती व खेडी यांनी अधिक
व्यापलेला आहे या प्रचंड लोकसंख्येच्या देशातील बहुसंख्य
जनता खेड्यात राहते. ग्रामीण जीवनाचा खराखुरा अनुभव
मराठी कवितेतून आलेला दिसतो. अवेळी पडणारा पाऊस,
अवकाळी पाऊस, दुष्काळ, जातिव्यवस्था, मुक्या जनावरा
वरती असणारे प्रेम, घर जमिनीवर असणारे प्रेम, घर
धनींनीवर असणारे प्रेम, श्रद्धा अंधश्रद्धा बदलत्या जीवन
प्रवाहामुळे शेतीवर झालेला आधुनिक तंत्रज्ञानाचा प्रभाव
त्यामुळे शेतीशी निगडित असणारे व्यवसाय मोडीत
निघाल्याची खंत, महागाईमुळे शेती करणे परवडेनासे झाले
आहे. या सर्व गोष्टींचा परिणाम ग्रामीण शेती वरती झालेला

कास्तकरांच्या दुःखाला खापराचे दिवे या कवितेत वाट
करून दिली आहे.मातीमध्ये आम्ही जन्मलो अजून या
आयुष्याची किती माती होणार आहे

शिरसाठ'हिरवी चाहूल'संग्रहातील छोटी छोटी निसर्ग चित्रे,
दळवी ' मालवणी खाजा'ग्राहक कोकणचा निसर्ग शेतीवाडी
लोकजीवन यांचे दर्शन घडवते, इंद्रजीत भालेराव यांचा
'पीकपाणी ' हा पहिला काव्यसंग्रहातून पिक आणि
शेतकऱ्यांचे कष्ट जमीन जमिनीशी नाते सांगणाऱ्या परंपरेशी
आपले नाते सांगितले आहे. एकूणच १९६५ ते १९८०
ग्रामीण कविता विस्तारशील कविता आहे.१९७७ च्या
आसपास ग्रामीण साहित्याची चळवळ सुरू झाली.
महाराष्ट्रातील खेड्यापाड्यात झालेल्या शिक्षण प्रसार फुले
,शाहू ,आंबेडकर कर्मवीर भाऊराव पाटील, वी.रा शिंदे यांचे
विचार आणि कार्याचे पार्श्वभूमी याचा एक मोठा महत्त्वाचा
प्रवाह ठरला आहे

आहे. तरुणाईचे शहराकडील आकर्षण त्यामुळे खेडी ओस पडू
लागली. असे जरी असले तरी शेती वरती जीवापाड प्रेम
करणारा शेतकरी कवितेतून दिसून येतो.

संदर्भ:

- १) नवीन समाज जीवन व साहित्य (डॉ.गणेश देशमुख)
स्वरूप प्रकाशन औरंगाबाद.
- २) मराठी ग्रामीण कादंबरी (डॉ. रवींद्र ठाकूर) स्नेहवर्धन
प्रकाशन पुणे
- ३) ग्रामीण साहित्य: स्वरूप आणि शोध (डॉ. नागनाथ
कोत्तापल्ले) स्वरूप प्रकाशन औरंगाबाद.
- ४) मराठी ग्रामीण कवितेचा इतिहास (कैलास सार्वेकर)
मेहता पब्लिशिंग हाऊस पुणे



ग्रामीण जीवनातील शेतीचे महत्त्व

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गोष्टवारा:

आंतरराष्ट्रीय पातळीवर पूर्वीपासूनच भारताची ओळख ही एक कृषिप्रधान देश म्हणून आहे. भारताचा मुख्य व्यवसाय हा शेती आहे. ह्याच मुख्य कारणामुळे एकूण सामाजिक जीवन आणि जीवनशैली यावर कृषि क्षेत्राचा मोठ्या प्रमाणात प्रभाव पडलेला दिसून येतो. कृषि व्यवसायापासूनच मानवी जीवनात मोठे बदल घडून आल्याचे दिसून येतात. भारतामध्ये शेती ही श्रमप्रधान तंत्राद्वारे केली जाते. ह्याच कारणामुळे शेती क्षेत्रात शेतमजुरांना मोठ्या प्रमाणात मागणी असते. शेतमजूर वर्ग हा कृषि क्षेत्रात महत्त्वाची भूमिका पार पाडत असतो. दुसऱ्या बाजूला भारतात मोठ्या प्रमाणात लोकसंख्या असल्यामुळे मनुष्यबळ हे प्रचंड प्रमाणात उपलब्ध आहे. आणि या मनुष्यबळाला रोजगाराची आवश्यकता असल्यामुळे ही गरज कृषि क्षेत्रामार्फत मार्फत भागविले जात असल्याचे दिसून येते. म्हणून प्रस्तुत शोधनिबंधामध्ये ग्रामीण जीवनात शेती क्षेत्राचे काय महत्त्व आहे? आणि कृषि क्षेत्र आपले योगदान कसे देते? याचा शोध घेण्याचा प्रयत्न केलेला आहे?

प्रास्ताविक:

भारतामध्ये ग्रामीण जीवन व शेती क्षेत्र याचा परस्पर संबंध आहे. जगातील सर्वात जुना व परंपरागत व्यवसाय म्हणून शेतीकडे पाहिले जाते. विकसनशील देशांमध्ये शेती क्षेत्राला नेहमी अनन्य साधारण महत्त्व दिले गेले आहे. भारत हा विकसनशील देश असल्यामुळे भारतामध्ये सुद्धा शेतीला सगळ्यात जास्त महत्त्व दिले गेले आहे. आजही भारताच्या एकूण लोकसंख्येपैकी ६९ टक्के लोक हे भारतातील ग्रामीण भागात वास्तव्य करतात. ह्या ग्रामीण भागातील लोकांचा मुख्य व्यवसाय शेती आहे. तसेच शेतीवर आधारित व्यवसाय जसे की, पशुपालन, दुग्ध व्यवसाय, कुकुटपालन इ. शेतीला जोड व्यवसाय म्हणून महत्त्वाचे आहे. तसेच ग्रामीण भागातील भूमिहीन लोकांसाठी शेतमजुरी हे देखील रोजगाराचे मुख्य साधन आहे. महात्मा गांधी यांनी स्वातंत्र्य प्राप्तीनंतर “खेड्याकडे चला” असे म्हटले होते. कारण त्यांनी शेती व शेतीवर आधारित व्यवसाय आणि लघुउद्योग ह्यांचे महत्त्व जाणले होते.

शेती हा भारतामधील ग्रामीण जीवनाचा आधार मानला जातो. शेती क्षेत्राचा विकास झाला तरच ग्रामीण भागाचा विकास होईल आणि हा विकास कृषि अर्थशास्त्राच्या सहाय्याने करणे शक्य आहे. त्यातून ग्रामीण जीवनाचाही सामाजिक विकास आणि आर्थिक विकास साध्य

करता येईल. म्हणून या शोधनिबंधामध्ये ग्रामीण जीवनातील शेतीचे महत्त्व अभ्यासण्याचा प्रयत्न केलेला आहे.

संशोधनाची उद्दिष्टे:

- १) ग्रामीण जीवनातील शेती क्षेत्राचे महत्त्व अभ्यासणे.
- २) शेतमजूर आणि शेती यांचा परस्पर सहसंबंध अभ्यासणे.
- ३) ग्रामीण विकास, शेती विकास व आर्थिक विकास यांच्यातील संबंधाचा अभ्यास करणे.

संशोधन पद्धती: हा संशोधन पेपर संदर्भ ग्रंथ व पुस्तके यासारख्या दुय्यम साधन सामग्री वर आधारित आहे.

ग्रामीण भागातील अन्नधान्याची गरज व पुरवठा

भारताच्या एकूण लोकसंख्येपैकी फक्त ३१ टक्के लोकसंख्या शहरात राहते उरलेली ६९ टक्के लोकसंख्या ही ग्रामीण भागात वास्तव्य करते. भारतासारख्या प्रचंड लोकसंख्या असणाऱ्या देशाची अन्नधान्याची गरज शेती क्षेत्रातून पूर्ण होते. ग्रामीण भागामधील कुटुंबे ही शेती क्षेत्रावर आपला उदरनिर्वाह करतात. तसेच अनेक लोक हे फक्त शेती क्षेत्रात काम करून म्हणजेच शेतमजुरी करून आपल्या कुटुंबाचा उदरनिर्वाह करतात. यामध्ये महिला शेतमजुरांचे प्रमाण हे पुरुष शेतमजुरांपेक्षा अधिक आढळून येते.

ग्रामीण भागातील रोजगार निर्मिती

आजही भारतीय अर्थव्यवस्थेमध्ये शेतीला महत्वाचे स्थान असण्याचे कारण म्हणजे फार मोठ्या प्रमाणात या क्षेत्रात रोजगार निर्मिती होते. २०११ च्या जनगणनेनुसार १२१.०२ कोटी असून, त्यापैकी ग्रामीण भागात ९.५९ कोटी इतका शेतकरी वर्ग आढळून आला. यामध्ये ७.३९ कोटी पुरुष शेतकरी २.२८ कोटी महिला शेतकरी आहे. देशात एकूण ८.६१ कोटी श्रमिक शेती क्षेत्रात काम करतात. यामध्ये ५.५२ कोटी पुरुष शेतमजूर असून ३.०९ कोटी महिला शेतमजूर म्हणून शेती क्षेत्रात काम करतात. ८०.९५ लाख लोक हे पशुसंवर्धन, मत्स्यपालन, फळबागा यासारख्या व्यवसायांशी संबंधित आहे. यामध्ये २५ लाख महिलांचा समावेश असल्याचे आढळून येते. २००१ ते २०११ या कालावधीत २ कोटी २७ लाख इतकी शेतमजुरांच्या संख्येमध्ये मोठ्या प्रमाणात वाढ झाल्याचे दिसून येते. या सर्वाना रोजगार हा शेती क्षेत्रातून उपलब्ध होतो.

जोड व्यवसाय:

शेती क्षेत्राच्या आधारावर शेतकरी व शेतमजूर म्हणजेच एकूण ग्रामीण भागातील कुटुंबांना पूरक किंवा जोड व्यवसाय करता येतात. लहान शेतकरी तसेच आर्थिक दृष्ट्या दुर्बल कुटुंबांना हे पूरक व्यवसाय महत्वाचे असतात. कुक्कुटपालन, दुग्ध व्यवसाय, भाजीपाला, फुले, फळे यांची लागवड करून त्यांची विक्री करून या व्यवसायातून ग्रामीण लोकांना चांगले उत्पन्न मिळते. विशेष म्हणजे या उत्पादनासाठी विशेष खर्च करावा लागत नाही. कारण शेतात काम करून मिळणाऱ्या चाऱ्यावर पशुपालनाचा व्यवसाय होतो. तसेच इतर झाडांची लागवड करण्याऐवजी फळझाडांची फुलांची लागवड केली तर त्यापासून मोठ्या प्रमाणात उत्पन्न मिळते. तसेच शेतीवर आधारित जोड व्यवसाय केले तर त्यातून मोठ्या प्रमाणात उत्पन्न ग्रामीण भागातील लोकांना मिळते.

ग्रामीण भागातील दुर्बल घटकांच्या विकासासाठी मदत:

नवीन भागातील लोकांचे जीवनमान हे पूर्णपणे शेतीवर अवलंबून असते. म्हणून शेती क्षेत्राचा विकास झाला तरच दुर्बल घटकांचा विकास होईल. ग्रामीण दुर्बल घटकांमध्ये अल्पभूधारक शेतकरी, भूमिहीन शेतमजूर कुटुंब ग्रामीण विधवा व निराधार महिला इत्यादी घटकांचा समावेश होतो. ग्रामीण भागातील शेतमजूर हे शेळ्या तसेच गायी पाळतात. कामाच्या ठिकाणाहून त्यांना शेतातील गवत हे चाऱ्याच्या स्वरूपात उपलब्ध होते. आणि त्यातून त्यांना उत्पन्नाचा मार्ग तयार होतो. व कुटुंबांच्या उदरनिर्वाहाला हातभार यातून लागतो.

ग्रामीण भागातील दारिद्र्य निर्मूलनातील शेतीची भूमिका:

ग्रामीण भागातील लोकांचे दारिद्र्य दूर करण्यात शेतीक्षेत्र महत्वाची भूमिका पार पाडते. शेती क्षेत्र एकमेव असे क्षेत्र आहे की, त्यातून कुणालाही रोजगार उपलब्ध होईल. ह्यामध्ये कुशल कामगारांची आवश्यकता नसते. शिवाय कोणत्याही वयोगटातील लोक शेती क्षेत्रात आपल्या वयानुसार कामे करू शकतात. तसेच शेती क्षेत्रातील काम

करण्यासाठी विशेष शिक्षण किंवा प्रशिक्षणाची गरज नसते. त्यामुळे शेती क्षेत्रातून पूर्ण कुटुंबाला रोजगार उपलब्ध होऊ शकतो. शेतीतून मिळणारे लाकूड पिकांचे अवशेष यातून शेतमजुरी करणाऱ्या कुटुंबांचा इंधन खर्च भागतो. तसेच भाजीपाला अन्नधान्य इत्यादी वरील खर्चाची बचत होते. अशाप्रकारे ग्रामीण भागातील दारिद्र्य कमी होण्यास शेती क्षेत्र महत्वाचे आहे.

ग्रामीण उद्योग व कुटीर उद्योगांचा विकास:

ग्रामीण भागातील लघु व कुटीर उद्योगांचे महत्त्व विशद करताना महात्मा गांधी म्हणतात की " भारताचा आर्थिक विकास हा लघु व कुटीर उद्योगांच्या विकासावर अवलंबून आहे." शेती क्षेत्रांतर ग्रामीण जनतेला रोजगार मिळवून देणारे हे क्षेत्र आहे. या उद्योगांना शेती क्षेत्रातूनच कच्चा माल प्राप्त होतो. उदा. गुळ उद्योग, तेल घाणे, फळ प्रक्रिया उद्योग इ. म्हणून ग्रामीण भागातील लघु व कुटीर उद्योगांचा विकास झाला तरच ग्रामीण भागाचा विकास होईल व त्यांच्या जीवनमानात सुधारणा होईल.

ग्रामीण भागातील विषमता कमी करणे:

ग्रामीण भागातील विषमतेची दरी कमी करण्यात शेती क्षेत्राचा मोलाचा वाटा आहे. शेती क्षेत्रातून उद्योगांना कच्चा माल उपलब्ध होतो. त्यामुळे हे उद्योग खेड्यांच्या जवळपास सुरू केले जातात. त्यामुळे ग्रामीण जनतेला रोजगाराच्या संधी निर्माण होतात. परिणामी त्यांच्या उत्पन्नात वाढ होते. व आर्थिक विषमता कमी होण्यास मदत होते.

पायाभूत सोयी सुविधांचा विकास:

उद्योग हे ग्रामीण भागाच्या जवळपास सुरू झाल्यामुळे शेती क्षेत्राच्या विकासासाठी पायाभूत सोयी सुविधा उपलब्ध होतात. प्रा. हर्षमन यांच्या मते प्राथमिक, द्वितीय व तृतीय क्षेत्रातील उत्पादन कार्य ज्यांच्या शिवाय पूर्ण होऊ शकत नाही. त्या सुविधांना पायाभूत सुविधा म्हणतात. उद्योगांना कच्चा माल हा ग्रामीण भागातून म्हणजेच शेती क्षेत्रातून पुरविला जातो. त्याच्या वाहतुकीसाठी देशांतर्गत रस्त्यांचे जाळे तयार करावे लागते. वाहतुकीच्या सुविधा उपलब्ध कराव्या लागतात. परिणामी ग्रामीण भागाचा विकास होण्यास मदत होते. मग ग्रामीण भागातील लोकांना या पायाभूत सुविधांचा लाभ मिळतो.

सारांश:

नियोजनाच्या आरंभापासून ते आज पर्यंत भारतात शेती क्षेत्र महत्वाचे होते आणि आहे हे एक स्वयंसिद्ध तथ्य (Axiomatic Fact) आहे. खरे तर भारत म्हणजे कृषी जीवनाचे आगळे वेगळे दर्शन होय. शेती केवळ व्यवसाय नाही तर ती जीवन जगण्याचा मार्ग आहे. लोक शेतीवर केवळ उपजीविका करत नाही तर ते तिच्यावर प्रेम करतात. मी त्यांच्या सुखदुःखाचा आधार असते. आजच्या विज्ञान युगातही तिचे पूजन करणारे अनेक लोक आपल्याला ग्रामीण भागात दिसून येतात. शेती क्षेत्रातूनच अर्थव्यवस्थेतील इतर क्षेत्रांचा विकास होतो. आणि त्यातून एकूण आर्थिक

विकासाचा दर वाढतो. आज जगात जी विकसित राष्ट्रे आहेत त्यांनी आपला विकास शेतीतूनच साधला आहे. आजचा ग्रामीण भागातील प्रत्येक व्यक्ती हा प्रगत विचारसरणीचा आहे. शेतीतून निघणारे उत्पादन तो विकसित राष्ट्रांना निर्यात करून त्यातून मोठ्या प्रमाणात उत्पन्न मिळवत आहे. म्हणूनच ग्रामीण जीवनात शेती क्षेत्राला अनन्य साधारण महत्व प्राप्त झालेले दिसून येते.

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- ५) भारतीय जनगणना अहवाल २०११



सार्वजनिक परिवहन की सुविधाओं का विस्तृत मूल्यांकन— जनपद देवरिया का अध्ययन

हेमन्त सिंह¹, डॉ. अखिलेश चन्द्र सेठ²

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बयालसी पी.जी. कॉलेज, जलालपुर, जौनपुर

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सारांश:

देवरिया जनपद में विभिन्न विकासखंडों में परिवहन की सुविधा का विवरण प्राप्त करने के लिए यहां जानकारी उपलब्ध है। गौरी बाजार में रेलवे स्टेशन नहीं है, लेकिन 6 बस स्टॉप्स हैं। बैतालपुर में एक रेलवे स्टेशन और 8 बस स्टॉप्स हैं। देसई देवरिया, पथरदेवा, और रामपुर कारखाना में रेलवे स्टेशन नहीं हैं, लेकिन 11, 8, और 8 बस स्टॉप्स हैं। देवरिया सदर में एक रेलवे स्टेशन है जिसके साथ 15 बस स्टॉप्स हैं। रुद्रपुर, भलुअनी, और बनकटा में कोई रेलवे स्टेशन नहीं है, लेकिन 8, 12, और 8 बस स्टॉप्स हैं। सलेमपुर, भागलपुर, और लार में 11, 10, और 10 बस स्टॉप्स हैं, लेकिन वहां रेलवे स्टेशन नहीं है। योग नगरीय में 6 रेलवे स्टेशन और 10 बस स्टॉप्स हैं। योग विकासखंड में 19 रेलवे स्टेशन और 149 बस स्टॉप्स हैं। इस जानकारी से स्पष्ट होता है कि विभिन्न स्थानों पर वाहन सुविधाएं उपलब्ध हैं, जैसे रेलवे स्टेशन और बस स्टॉप्स, जो जनता को सार्वजनिक परिवहन के लिए सहायता प्रदान करते हैं।

मुख्यशब्द— रेलवे स्टेशन, बस स्टॉप, पक्की सड़कें।

प्रस्तावना—

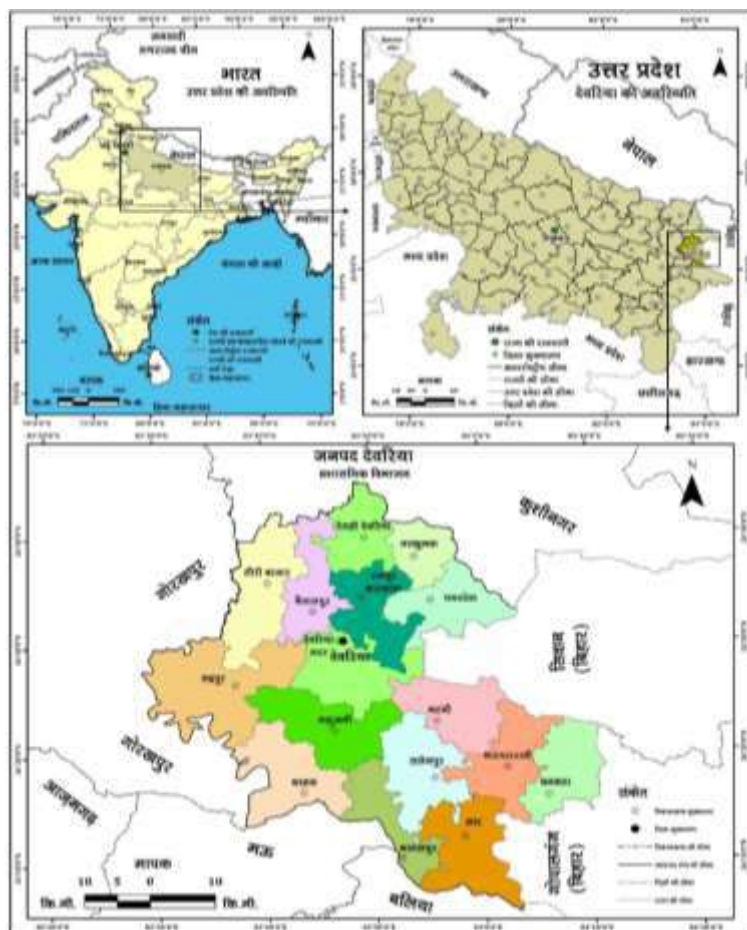
जनपद देवरिया के विभिन्न विकासखंडों में किया गया है, उसमें सार्वजनिक परिवहन सेवाओं का मूल्यांकन करने के लिए रेलवे स्टेशन, बस स्टॉप्स, और सड़कों की महत्ता का अध्ययन किया गया है। इस शोध में, शोधार्थी ने राज्य, केंद्र सरकार, और अन्य स्रोतों से सूचना और सांख्यिकीय आंकड़ों का उपयोग करके इस परिवहन अध्ययन को समृद्ध किया है। वे विभिन्न मानचित्रिक और सांख्यिकीय तकनीकों का उपयोग कर रहे हैं जैसे कि डाटा माइनिंग और विश्लेषण करने के लिए डॉटा मैपिंग। इस अध्ययन से स्पष्ट होता है कि विभिन्न स्थानों पर सार्वजनिक परिवहन सुविधाएं उपलब्ध हैं, जैसे कि रेलवे स्टेशन और बस स्टॉप्स, जो जनता को सार्वजनिक परिवहन के लिए सहायक होते हैं। साथ ही, पक्की सड़कों की लंबाई और उनके विभिन्न पैरामीटर्स का अध्ययन करने से जनता के सार्वजनिक परिवहन में सुधार की संभावनाएं सामने आती हैं।

अध्ययन क्षेत्र की अवस्थिति:

“किसी भी स्थान की अवस्थिति को सर्वाधिक संक्षिप्त और सारगर्भीत रूप से अक्षांश और देशान्तर के द्वारा, किसी अन्य स्थापित महत्वपूर्ण बिन्दुओं को उस दूरी दिशा के रूप में अंकित किया जा सकता है। (उपसमे 1953)” जनपद देवरिया 26°6' से 26° 45' उत्तर अक्षांश तथा 83° 29' से 84 11' पूर्व देशान्तर के मध्य उत्तर प्रदेश राज्य के उत्तरी-पूर्वी भाग में स्थित है। अध्ययन क्षेत्र की समुद्र तल से ऊँचाई 75 से 80 मीटर है। अध्ययन क्षेत्र के पूर्व में गोपालगंज, एवं सिवान जनपद (बिहार), पश्चिम में गोरखपुर,

उत्तर में कुशीनगर, तथा दक्षिण में बलिया, मऊनाथ भंजन जनपद स्थित है। जनपद की उत्तर से दक्षिण की लम्बाई 75 किमी. तथा पूर्व से पश्चिम 70 किमी है। जनपद के दक्षिणी-पश्चिमी भाग में घाघरा नदी प्रवाहित होती है। इसकी प्राकृतिक सीमा उत्तर में मौन नाला, एवं खनुआ नाला, दक्षिण में घाघरा नदी, पश्चिम में राप्ती एवं मझना, तथा पूर्व में सोण्ड नाला और झरही नाला बनाते हैं। जनपद के लगभग मध्य भाग से छोटी गण्डक नदी प्रवाहित होती है। जनपद देवरिया 16 मार्च 1946 ई0 को गोरखपुर जनपद से अलग होकर वर्तमान स्वरूप को प्राप्त किया। 2011 के जनगणना के अनुसार अध्ययन क्षेत्र का कुल क्षेत्रफल 2,538 वर्ग किमी है, जो उत्तर प्रदेश के कुलक्षेत्रफल का 1.05 प्रतिशत भाग है। प्रशासनिक दृष्टि से अध्ययन क्षेत्र को 5 तहसीलों (देवरिया सदर, भाटपार रानी, रुद्रपुर सलेमपुर तथा बरहज) 16 विकासखण्ड (देवरिया सदर, गौरी बाजार, भाटपार रानी, पथरदेवा, रामपुर कारखाना देसाई देवरिया, रुद्रपुर, भटनी बाजार, भकुअनी, बरहज, बैतालपुर, बनकटा, सलेमपुर, भागलपुर, लार तथा तरकुलवा) है। अध्ययन क्षेत्र में 2 नगरपालिका (देवरिया एवं गौरा बरहज) एवं 8 नगरपंचायत (गौरी बाजार, रामपुर कारखाना, रुद्रपुर, भटनी बाजार, भाटपार रानी, सलेमपुर, मझौलीराज तथा लार) न्याय पंचायत, 1016 ग्राम पंचायत एवं 2008 गाँव हैं।

मानचित्र क्रमांक-1 अध्ययन क्षेत्र की अवस्थिति



शोध अध्ययन के उद्देश्य:

प्रत्येक शोध कार्य का एक विशिष्ट उद्देश्य होता है। शोधकर्ता ने अपने शोध कार्य के उद्देश्यों का उल्लेख किया है, जो निम्नलिखित हैं—

1. विकासखंडवार परिवहन सुविधाओं का मूल्यांकन करना।
2. सार्वजनिक परिवहन के लिए पक्की सड़कों की लंबाई और उनकी संख्या का अध्ययन।
3. रेलवे स्टेशन और बस स्टॉप की संख्या का अध्ययन।

विधितंत्र:

वर्तमान अध्ययन का मुख्य उद्देश्य परिवहन सुविधाओं का अध्ययन करना है। इसके लिए जनपद में राज्य एवं केन्द्र सरकार के प्रकाशित एवं अप्रकाशित सूचनाओं तथा सांख्यिकीय आंकड़ों का प्रयोग किया गया है। इन आंकड़ों का विश्लेषण शोधकर्ता ने ड्रैफ्ट माबमस एप्लीकेशन पर किया है। जिनका विश्लेषण पुनः सारणी एवं आरेख के माध्यम से किया है। शोध पत्र में अध्ययन क्षेत्र का मानचित्र फ्लैट एप्लीकेशन पर तैयार किया गया है।

रेलवे/बस स्टेशन/स्टाप/हाल्ट:

जनपद देवरिया में विभिन्न विकासखंडों में रेलवे स्टेशन और बस स्टॉप की संख्या का विवरण देखने के लिए, यहाँ उपलब्ध जानकारी है। गौरी बाजार में कोई रेलवे स्टेशन नहीं है, लेकिन 6 बस स्टॉप हैं। बैतालपुर में एक रेलवे स्टेशन है और 8 बस स्टॉप हैं। देसई देवरिया, पथरदेवा और रामपुर कारखाना में रेलवे स्टेशन नहीं हैं, लेकिन 11, 8 और 8 बस स्टॉप हैं, उनके पास यातायात के लिए। देवरिया सदर में एक रेलवे स्टेशन है जिसके साथ 15 बस स्टॉप हैं। रुद्रपुर, भलुअनी, और बनकटा में कोई रेलवे स्टेशन नहीं है, लेकिन 8, 12 और 8 बस स्टॉप हैं, उनके पास यातायात के लिए। सलेमपुर, भागलपुर और लार में 11, 10 और 10 बस स्टॉप हैं, लेकिन वहाँ रेलवे स्टेशन नहीं है। योग नगरीय में 6 रेलवे स्टेशन और 10 बस स्टॉप हैं। योग विकासखंड में 19 रेलवे स्टेशन और 149 बस स्टॉप हैं। इस जानकारी से यह स्पष्ट होता है कि विभिन्न स्थानों पर वाहन सुविधाएं उपलब्ध हैं, जैसे रेलवे स्टेशन और बस स्टॉप, जो जनता को सार्वजनिक परिवहन के लिए सहायता प्रदान करते हैं।

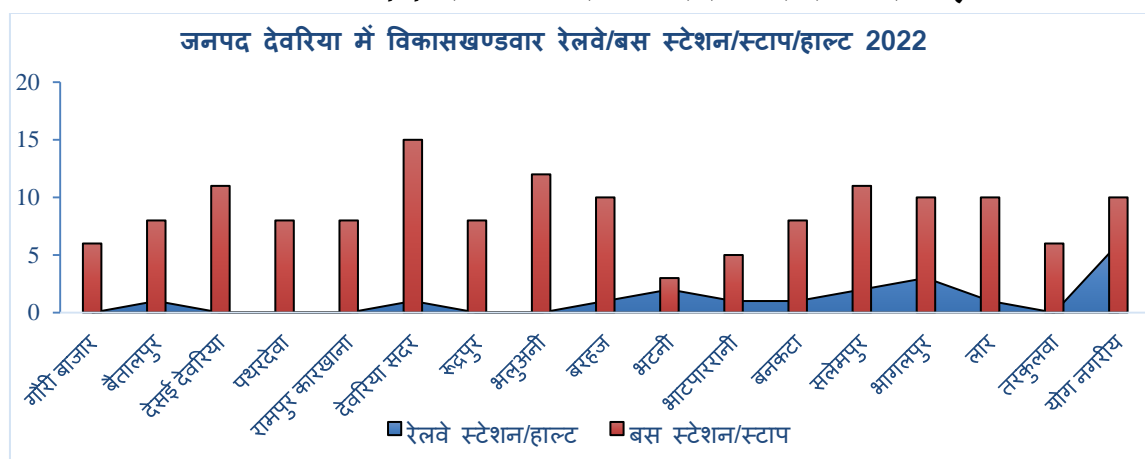
सारणी क्रमांक-1 जनपद देवरिया में विकासखंडवार रेलवे/बस स्टेशन/स्टाप/हाल्ट

जनपद देवरिया में विकासखंडवार रेलवे/बस स्टेशन/स्टाप/हाल्ट 2022		
विकासखंड	रेलवे स्टेशन/हाल्ट	बस स्टेशन/स्टाप
गौरी बाजार	0	6
बैतालपुर	1	8
देसई देवरिया	0	11
पथरदेवा	0	8

रामपुर कारखाना	0	8
देवरिया सदर	1	15
रूद्रपुर	0	8
भलुअनी	0	12
बरहज	1	10
भटनी	2	3
भाटपाररानी	1	5
बनकटा	1	8
सलेमपुर	2	11
भागलपुर	3	10
लार	1	10
तरकुलवा	0	6
योग नगरीय	6	10
योग	19	149

स्रोत-जिला सांख्यिकीय पत्रिका 2022

आरेख क्रमांक-1 जनपद देवरिया में विकासखण्डवार रेलवे/बस स्टेशन/स्टाप/हाल्ट



विकासखण्डवार पक्की सड़कों की लम्बाई:

जनपद देवरिया में विकासखण्डवार पक्की सड़कों की लंबाई और उन सड़कों से जुड़े ग्रामों की संख्या का विवरण निम्नलिखित है, गौरी बाजार में पक्की सड़कों की कुल लंबाई 463 किलोमीटर है और इसमें 1000 से कम वाले ग्रामों की संख्या 34, 1000 से 1499 वाले ग्रामों की संख्या 22, और 1500 से अधिक वाले ग्रामों की संख्या 59 है। बैतालपुर में पक्की सड़कों की लंबाई 320 किलोमीटर है, जिसमें 1000 से कम वाले ग्राम 46, 1000 से 1499

वाले ग्राम 26, और 1500 से अधिक वाले ग्राम 51 हैं। देसई देवरिया, पथरदेवा, रामपुर कारखाना, रूद्रपुर, बरहज, भटनी, भाटपाररानी, बनकटा, सलेमपुर, भागलपुर, लार, तरकुलवा, और योग नगरीय विकासखंडों में भी पक्की सड़कों की लंबाई और ग्रामों की संख्या विवरण उपलब्ध है। इस जानकारी से स्पष्ट होता है कि विभिन्न विकासखंडों में पक्की सड़कों की लंबाई और ग्रामों की संख्या में विशेषता है, जो कि जनता के लिए सार्वजनिक परिवहन में सहायक होती हैं।

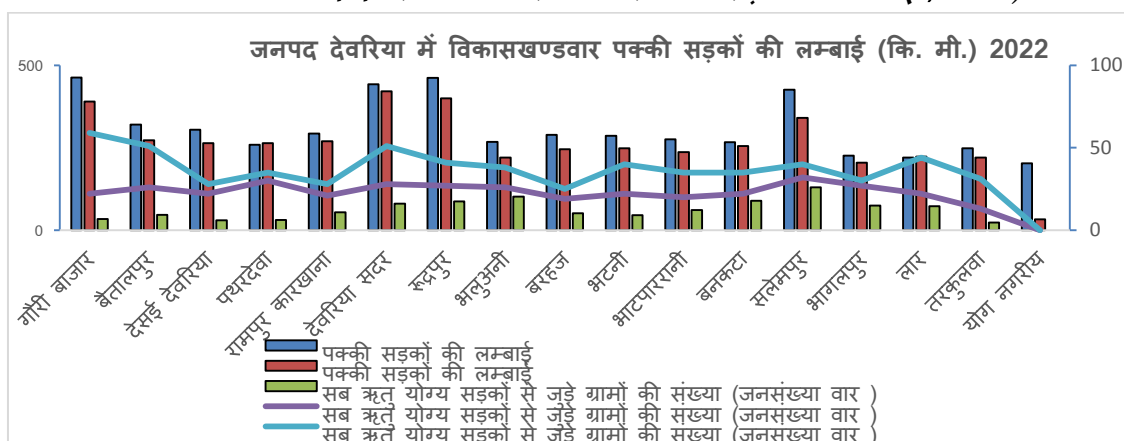
सारणी क्रमांक-2 जनपद देवरिया में विकासखण्डवार पक्की सड़कों की लम्बाई ;कि. मी.)

जनपद देवरिया में विकासखण्डवार पक्की सड़कों की लम्बाई; कि. मी. 2022					
पक्की सड़कों की लम्बाई			सब ऋतु योग्य सड़कों से जुड़े ग्रामों की संख्या		
विकासखण्ड	कुल	लोक नि. वि.	1000 से कम वाले ग्राम	1000 से 1499 वाले ग्राम	1500 से अधिक वाले ग्राम
गौरी बाजार	463	390	34	22	59
बैतालपुर	320	273	46	26	51
देसई देवरिया	305	264	30	22	28

पथरदेवा	259	264	31	30	35
रामपुर कारखाना	293	270	54	21	28
देवरिया सदर	442	421	80	28	51
रूद्रपुर	462	400	87	27	41
भलुअनी	268	220	102	26	38
बरहज	289	245	51	19	25
भटनी	286	248	45	22	40
भाटपाररानी	275	237	61	20	35
बनकटा	267	255	89	22	35
सलेमपुर	426	340	130	32	40
भागलपुर	226	205	75	27	30
लार	220	223	73	22	44
तरकुलवा	248	220	23	13	31
योग नगरीय	203	33	0	0	0
योग	5252	4508	1011	379	611

स्त्रोत-जिला सांख्यिकीय पत्रिका 2022

आरेख कमांक-2 जनपद देवरिया में विकासखण्डवार पक्की सड़कों की लम्बाई (कि. मी.)



निष्कर्ष:

उपरोक्त आंकड़ों से निम्नलिखित निष्कर्षों को संक्षेप में प्रस्तुत किया जा सकता है। शोध के अंतिम भाग में प्राप्त जानकारी और विश्लेषण के आधार पर एक निष्कर्ष निकालना आवश्यक है। जनपद देवरिया में सार्वजनिक परिवहन की महत्ता और सुविधाओं का मूल्यांकन करने के लिए अनेक प्रमुख तत्वों की जांच की गई है। पहले उद्देश्य में, रेलवे स्टेशनों और बस स्टॉप्स की संख्या और उनके विकासखंडों के संबंध में विवरण प्रदान किया गया है। यह जानकारी स्पष्ट रूप से दर्शाती है कि किस प्रकार से विभिन्न क्षेत्रों में सार्वजनिक परिवहन सुविधाएं उपलब्ध हैं। दूसरे उद्देश्य में, पक्की सड़कों की लंबाई और उनकी विविध प्रकार की संख्या के विवरण दिया गया है। यह जानकारी बताती है कि सार्वजनिक परिवहन में सुधार के लिए किस प्रकार के विकल्प उपलब्ध हैं और इनका कितना उपयोग किया जा सकता है। इस शोध का मुख्य उद्देश्य परिवहन सुविधाओं का मूल्यांकन करना था। यह अध्ययन स्पष्ट करता है कि सार्वजनिक परिवहन की महत्ता को समझने के लिए संबंधित जानकारी एवं आंकड़े कितने महत्वपूर्ण होते हैं। शोधार्थी ने उपलब्ध डेटा और सांख्यिकीय आंकड़ों का प्रयोग कर विविध विधियों से जानकारी को संकलित किया है। इसे विशेषज्ञता से विश्लेषण किया गया है, जिससे सार्वजनिक परिवहन में सुधार के लिए संभावनाएं और योजनाएं स्पष्ट हो सकें। अंत में, यह शोध

सार्वजनिक परिवहन सुविधाओं के मूल्यांकन और संभावित सुधार की दिशा में महत्वपूर्ण जानकारी प्रदान करता है। इससे सामाजिक और आर्थिक दृष्टिकोण से सार्वजनिक परिवहन के सुधारों के लिए योजनाएं तैयार करने में मदद मिल सकती है। शोध का परिणाम उत्तम सार्वजनिक परिवहन सुविधाओं की बेहतर समझ और विकास में महत्वपूर्ण सहायता प्रदान कर सकता है।

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जनपद जौनपुर (उत्तर प्रदेश) के ग्रामीण विकास में अवस्थापनात्मक तत्वों की भूमिका

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सारांश:

अवस्थापनात्मक तत्व ग्रामीण विकास के विविध पक्षों को दिशा प्रदान करती है। अतः हम ग्रामीण विकास से अवस्थापनात्मक तत्व को पृथक् नहीं कर सकते हैं। ग्रामीण विकास सतत दीर्घकालीन प्रक्रिया का गुणात्मक परिणाम होती है। प्रस्तुत शोध पत्र में जनपद जौनपुर की आर्थिक ग्रामीण विकास में विभिन्न अवस्थापनात्मक तत्वों की भूमिका का विवेचना करने का प्रयास शोधार्थी द्वारा किया गया है। किसी भी स्थान की आर्थिक प्रणाली का मुख्य आधार वहाँ के प्राकृतिक संसाधनों द्वारा निर्धारित होती है। अध्ययन क्षेत्र प्रमुखतः समतल मैदानी भूभाग होने के कारण खनिज संसाधनों की उपस्थिति नगण्य है, केवल कुछ मात्रा में रेह एवं कंकड़ प्राप्त होते हैं। अध्ययन क्षेत्र जनपद जौनपुर के ग्रामीण क्षेत्रों में आधारभूत संसाधनों के अन्तर्गत विस्तृत समतल मैदान के अतिरिक्त उपजाऊ मृदा, सतत वाहिनी नदी, जलाशय, भूमिगत जल उल्लेखनीय है। प्राचीन काल से जनपद जौनपुर की ग्रामीण विकास इन्हीं संसाधनों के आधार पर विकसित हुई है। अध्ययन क्षेत्र का ग्रामीण आर्थिक क्रियाकलाप कृषि एवं उस पर आधारित उद्योगों पर निर्भर है, जिसमें अवस्थापनात्मक तत्वों की भूमिका अति महत्वपूर्ण है।

मुख्य शब्द – अवस्थापनात्मक तत्व, ग्रामीण विकास, बस स्टेशन, पक्की सड़कें।

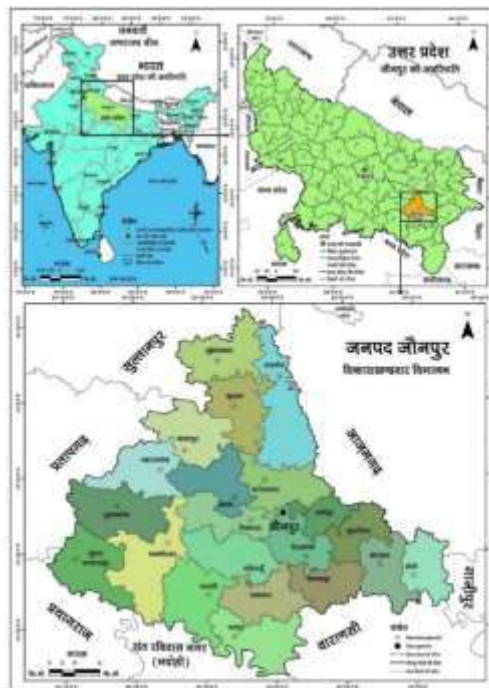
प्रस्तावना:

ग्रामीण विकास में अवस्थापनात्मक तत्वों की भूमिका बहुत महत्वपूर्ण है, क्योंकि ये तत्व ग्रामीण विकास के विविध पक्षों—सामाजिक, आर्थिक, प्रशासनिक संरचना में परिवर्तन लाने में मदद करते हैं। अवस्थापनात्मक तत्व ग्रामीण विकास में एक महत्वपूर्ण भूमिका निभाते हैं। सामाजिक अवस्थापन में शिक्षा, स्वास्थ्य, पंचायती राज, और सामाजिक संगठनों का महत्वपूर्ण योगदान है वही आर्थिक अवस्थापन में विपणन केन्द्र बैंकिंग, लघु एवं कुटिर उद्योग, कृषि मण्डियों व परिवहन का योगदान महत्वपूर्ण है। इन सेवाओं की पहुँच, उनकी गुणवत्ता, और प्रभावी प्रबंधन के माध्यम से सामाजिक विकास होता है।

अध्ययन क्षेत्र:

मनचित्र क्रमांक 1

जनपद जौनपुर का अक्षांशीय विस्तार 25°24' और 26°12' उत्तरी अक्षांश के मध्य, एवं देशांतरीय विस्तार 82°7' और 83°5' पूर्वी देशांतर के मध्य है। अध्ययन क्षेत्र जौनपुर के पश्चिम में प्रतापगढ़ एवं दक्षिण-पश्चिम में प्रयागराज जनपद स्थित है, दक्षिण में संत कबीर नगर पूर्व में गाजीपुर आजमगढ़ और उत्तर में सुलतानपुर जिला अध्ययन क्षेत्र की सीमाओं का निर्धारण करते हैं। अध्ययन क्षेत्र की अधिकांश सीमा कृत्रिम है, कुछ स्थानों पर यह नदियों द्वारा चिह्नित है। जिले की लंबाई उत्तर से दक्षिण 85 किलोमीटर एवं पूर्व से पश्चिम 90 किलोमीटर की चौड़ाई में विस्तृत है। अध्ययन क्षेत्र जौनपुर जिले का कुल भौगोलिक क्षेत्रफल 4038 वर्ग किलोमीटर है।



विधि तंत्र:

प्रस्तुत शोध पत्र में शोध विधि के अंतर्गत शोधार्थी द्वारा द्वितीयक आंकड़ों का प्रयोग किया गया है। आंकड़ों का विश्लेषण शोधार्थी ने डै माबमस से किया है। जिन्हे सारणी एवं आरेख के माध्यम से शोधार्थी ने प्रस्तुत किया है। शोध पत्र में अध्ययन क्षेत्र का मानचित्र तब व्ही एप्लीकेशन द्वारा निर्मित है।

शोध अध्ययन के उद्देश्य:

शोध का प्राथमिक उद्देश्य उन परिणामों को प्राप्त करना है जो अभी तक खोजे नहीं गए हैं। प्रत्येक शोध कार्य का एक विशिष्ट उद्देश्य होता है। शोधकर्ता ने अपने शोध कार्य के उद्देश्यों का उल्लेख किया है। जो निम्नानुसार—

1. ग्रामीण विकास में अवस्थापनात्मक तत्वों की भूमिका अध्ययन करना।
2. अवस्थापनात्मक तत्वों के प्रमुख आयामों का अध्ययन करना।

पोस्ट आफिस/बचत बैंक

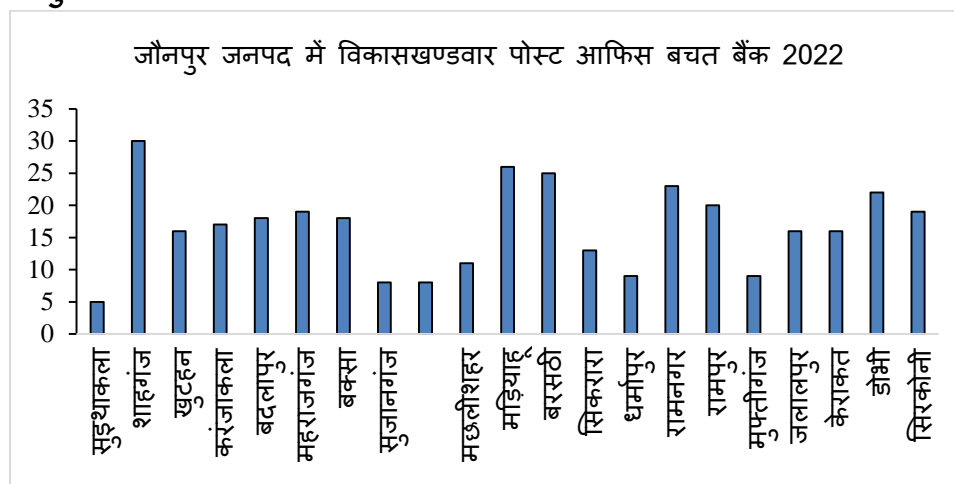
जौनपुर जनपद में विकासखण्डवार पोस्ट आफिस एवं बचत बैंकों की संख्या 2022 में सारणी व आरेख क्रमांक 1 से स्पष्ट है। विकासखण्ड सुइथाकला में 5 पोस्ट आफिस बचत बैंक हैं, जो इस क्षेत्र के लोगों के लिए सेवाएं प्रदान करते हैं। शाहगंज जहां पर 30 पोस्ट आफिस बचत बैंक हैं, यहां का पोस्ट आफिस विभिन्न वित्तीय योजनाओं के लिए लोगों को एक स्थान पर जोड़ता है।

खुटहन विकासखण्ड में 16 पोस्ट आफिस बचत बैंक हैं, जो स्थानीय लोगों के लिए वित्तीय सेवाएं प्रदान करते हैं। करंजाकला में 17 पोस्ट आफिस बचत बैंक हैं, जो इस विकासखण्ड के विभिन्न हिस्सों के बीच एकाग्रता बनाते हैं। बदलापुर, महाराजगंज और बक्सा में भी बड़ी संख्या में पोस्ट आफिस बचत बैंक हैं, जो इन विकासखण्डों के विभिन्न क्षेत्रों में सर्वांगीण सेवाएं प्रदान करते हैं। सुजानगंज, मुंगराबादशाहपुर और मछलीशहर में भी पोस्ट आफिस बचत बैंकों की संख्या है, जो विभिन्न समुदायों के लिए आर्थिक संरक्षण और विकास में महत्वपूर्ण भूमिका निभाते हैं। मड़ियाहू, बरसठी, सिकरारा और धर्मापुर में भी पोस्ट आफिस बचत बैंक हैं, जो विभिन्न विकासखण्डों में वित्तीय सेवाओं की पहुंचता बढ़ाते हैं। रामनगर, रामपुर और मुफ्तीगंज में भी पोस्ट आफिस बचत बैंक हैं। जलालपुर, केराकत, और डोभी में भी पोस्ट आफिस बचत बैंक हैं, जो इस जनपद की आर्थिक विकास में महत्वपूर्ण भूमिका निभाते हैं। सिरकोनी में भी बहुत संख्या में पोस्ट आफिस बचत बैंक हैं, जो विभिन्न विकासखण्डों के लोगों के लिए वित्तीय संरक्षण और निवेश के लिए एक साधारण स्थान के रूप में कार्य करते हैं। जनपद जौनपुर में पोस्ट आफिस व बचत बैंक हैं, जो इस क्षेत्र के विभिन्न हिस्सों में लोगों की आर्थिक रूप से सुरक्षित और विकसित बनाने में मदद करते हैं।

सारणी क्रमांक 1 जौनपुर जनपद में विकासखण्डवार पोस्ट आफिस बचत बैंक

जौनपुर जनपद में विकासखण्डवार पोस्ट आफिस बचत बैंक 2022	
विकासखण्ड	पोस्ट आफिस बचत बैंक
सुइथाकला	5
शाहगंज	30
खुटहन	16
करंजाकला	17
बदलापुर	18
महाराजगंज	19
बक्सा	18
सुजानगंज	8
मुंगराबादशाहपुर	8
मछलीशहर	11
मड़ियाहू	26
बरसठी	25
सिकरारा	13
धर्मापुर	9
रामनगर	23
रामपुर	20
मुफ्तीगंज	9
जलालपुर	16
केराकत	16
डोभी	22
सिरकोनी	19
योग	348

Source-District Statistical Magazine, Jaunpur District 2022.

आरेख क्रमांक 1 जौनपुर जनपद में विकासखण्डवार पोस्ट आफिस बचत बैंक**चिकित्सालय/सामुदायिक स्वास्थ्य केन्द्र:**

जौनपुर जनपद में 2022 में विकासखण्डवार ऐलोपैथिक चिकित्सालय, औषधालय, सामुदायिक स्वास्थ्य केन्द्र और प्राथमिक स्वास्थ्य केन्द्रों संख्या और उनके बारे में सारणी व आरेख क्रमांक 2 में जानकारी दी गई है। विकासखण्ड सुइथाकला में 4 ऐलोपैथिक चिकित्सालय और स्वास्थ्य संबंधी केंद्र हैं, जो इस क्षेत्र के लोगों के लिए स्वास्थ्य सेवाएं प्रदान करते हैं। इसके बाद आता है शाहगंज जहां पर 10 स्वास्थ्य केन्द्र हैं, यहां के स्वास्थ्य केंद्र स्थानीय लोगों के लिए महत्वपूर्ण हैं और उनके स्वास्थ्य सुधारने में मदद करते हैं। खुटहन विकासखण्ड में 4 स्वास्थ्य केंद्र हैं, जो स्थानीय लोगों के लिए स्वास्थ्य सेवाओं की पहुंचता बढ़ाते हैं। करंजाकला में 5 स्वास्थ्य केंद्र हैं, जो इस विकासखण्ड के विभिन्न हिस्सों के बीच

स्वास्थ्य सेवाएं प्रदान करते हैं। बदलापुर, महाराजगंज, और बक्सा में भी 6 स्वास्थ्य केंद्र हैं, जो इन विकासखण्डों के विभिन्न क्षेत्रों में स्वास्थ्य सेवाओं की पहुंचता बढ़ाते हैं। सुजानगंज मुंगराबादशाहपुर और मछलीशहर में भी 8 स्वास्थ्य केंद्र हैं, जो विभिन्न समुदायों के लिए स्वास्थ्य सेवाओं की प्राप्ति में महत्वपूर्ण भूमिका निभाते हैं। मड़ियाहू, बरसठी, सिकरारा, और धर्मापुर में भी स्वास्थ्य संबंधी केंद्र हैं, जो विभिन्न विकासखण्डों में स्थानीय लोगों के स्वास्थ्य की देखभाल में महत्वपूर्ण भूमिका निभाते हैं। रामनगर, रामपुर और मुपतीगंज में भी स्वास्थ्य संबंधी केंद्र हैं, जो विभिन्न इलाकों के लोगों के स्वास्थ्य में सुधार के लिए महत्वपूर्ण हैं। जलालपुर, केराकत और डोभी में भी स्वास्थ्य संबंधी केंद्र हैं, जो इस जनपद की स्वास्थ्य सेवाओं में महत्वपूर्ण भूमिका निभाते हैं।

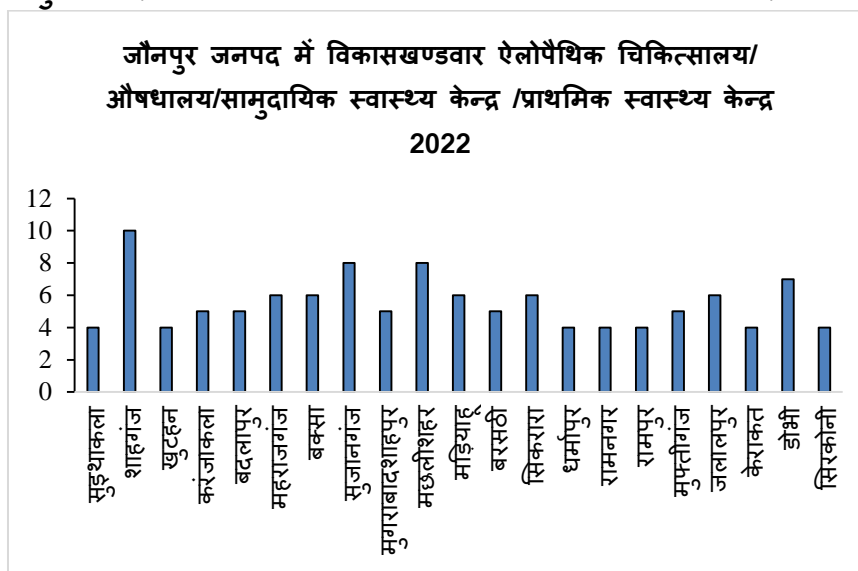
सारणी क्रमांक 2 जौनपुर जनपद में विकासखण्डवार चिकित्सालय/औषधालय/स्वास्थ्य केन्द्र

जौनपुर जनपद में विकासखण्डवार ऐलोपैथिक चिकित्सालय/ औषधालय/सामुदायिक स्वास्थ्य केन्द्र/प्राथमिक स्वास्थ्य केन्द्र 2022	
विकासखण्ड	केन्द्र
सुइथाकला	4
शाहगंज	10
खुटहन	4
करंजाकला	5
बदलापुर	5
महाराजगंज	6
बक्सा	6
सुजानगंज	8
मुंगराबादशाहपुर	5
मछलीशहर	8
मड़ियाहू	6
बरसठी	5
सिकरारा	6
धर्मापुर	4
रामनगर	4

रामपुर	4
मुफ्तीगंज	5
जलालपुर	6
केराकत	4
डोभी	7
सिरकोनी	4
योग	116

Source-District Statistical Magazine, Jaunpur District 2022.

आरेख क्रमांक 2 जौनपुर जनपद में विकासखण्डवार चिकित्सालय/ औषधालय/ स्वास्थ्य केन्द्र



कृषि सेवा केन्द्र

जौनपुर जनपद में 2022 में विकासखण्डवार कृषि सेवा केन्द्रों की संख्या और उनकी भूमिका के बारे में सारणी व आरेख क्रमांक 3 जानकारी दी गई है। शाहगंज, करंजाकला, बदलापुर, मछलीशहर, मडियाहू, बरसठी, सिकरारा, धर्मापुर, डोभी और सिरकोनी विकासखण्डों में कृषि सेवा केन्द्रों की संख्या है। इन केंद्रों का मुख्य उद्देश्य किसानों को कृषि से संबंधित विभिन्न सेवाएं प्रदान करना है, जो उनके कृषि उत्पादन को बेहतर बनाने में मदद करती हैं। सुजानगंज में 4 कृषि सेवा केन्द्र हैं, जो इस विकासखण्ड के कृषकों के लिए महत्वपूर्ण सेवाएं प्रदान करते हैं और उन्हें विभिन्न कृषि

षि तकनीकों और योजनाओं के बारे में जानकारी प्रदान करते हैं। विकासखण्ड कुल में 16 कृषि सेवा केन्द्र हैं, जो इस क्षेत्र के कृषकों के लिए महत्वपूर्ण सेवाएं प्रदान करते हैं और उन्हें कृषि विकास और प्रौद्योगिकी में समर्थन प्रदान करते हैं। जौनपुर जनपद में 2022 में विकासखण्डवार कृषि सेवा केन्द्रों की संख्या के संबंध में दी गई जानकारी से हम देख सकते हैं कि ये कृषि सेवा केन्द्र कितने महत्वपूर्ण हैं, जो इस क्षेत्र के कृषकों के लिए विभिन्न सेवाओं और समर्थन की प्राप्ति में महत्वपूर्ण भूमिका निभाते हैं और उनके कृषि उत्पादन को बेहतर बनाने में मदद करते हैं।

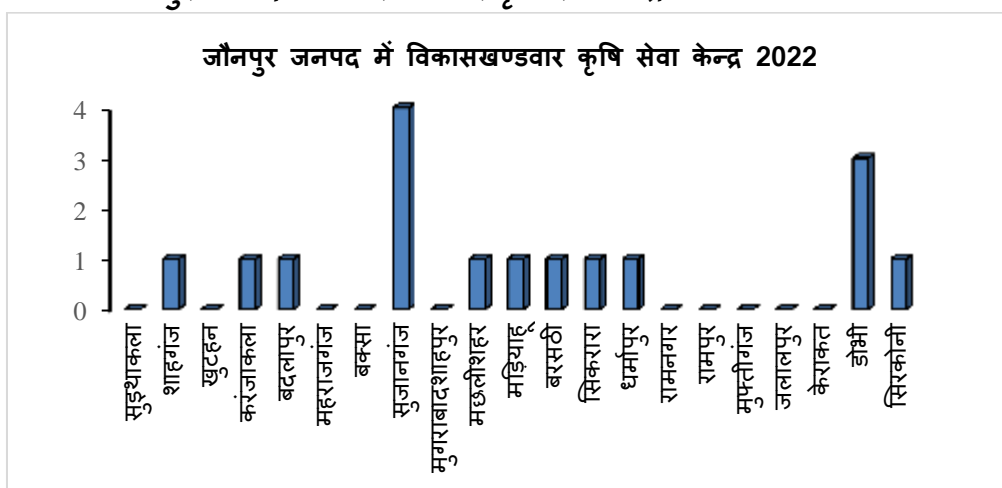
सारणी क्रमांक 3 जौनपुर जनपद में विकासखण्डवार कृषि सेवा केन्द्र 2022

जौनपुर जनपद में विकासखण्डवार कृषि सेवा केन्द्र 2022	
विकासखण्ड	कृषि सेवा केन्द्र
सुइथाकला	0
शाहगंज	1
खुटहन	0
करंजाकला	1
बदलापुर	1
महाराजगंज	0
बक्सा	0
सुजानगंज	4
मुगराबादशाहपुर	0

मछलीशहर	1
मड़ियाहू	1
बरसठी	1
सिकरारा	1
धर्मापुर	1
रामनगर	0
रामपुर	0
मुफ्तीगंज	0
जलालपुर	0
केराकत	0
डोभी	3
सिरकोनी	1
योग	16

Source-District Statistical Magazine, Jaunpur District 2022

आरेख क्रमांक 3 जौनपुर जनपद में विकासखण्डवार कृषि सेवा केन्द्र 2022



पक्की सड़कें

जौनपुर जनपद में 2022 में विकासखण्डवार पक्की सड़कों की लंबाई के बारे में सारणी व आरेख क्रमांक 4 में जानकारी दी गई है। विकासखण्ड सुइथाकला में 120 किलोमीटर पक्की सड़कें हैं, जो इस क्षेत्र के लोगों के लिए महत्वपूर्ण परिवहन के साधन हैं। शाहगंज, जहां पर 127 किलोमीटर पक्की सड़कें हैं, यहां की सड़कें स्थानीय लोगों के लिए महत्वपूर्ण हैं और विकास में भूमिका निभाती हैं। खुटहन विकासखण्ड में 142 किलोमीटर पक्की सड़कें हैं, जो स्थानीय लोगों के लिए वित्तीय सेवाओं की पहुंचता बढ़ाती हैं। करंजाकला में 150 किलोमीटर पक्की सड़कें हैं, जो इस विकासखण्ड के विभिन्न हिस्सों के बीच एकाग्रता बनाती हैं। बदलापुर, महाराजगंज और बक्सा में भी बड़ी संख्या में पक्की सड़कें

हैं, जो इन विकासखण्डों के विभिन्न क्षेत्रों में सर्वांगीण संवाहन की प्राप्ति के लिए महत्वपूर्ण हैं। सुजानगंज, मुगराबादशाहपुर, और मछलीशहर में भी पक्की सड़कें हैं, जो विभिन्न समुदायों के लिए आर्थिक विकास में महत्वपूर्ण भूमिका निभाती हैं। मड़ियाहू, बरसठी, सिकरारा, और धर्मापुर में भी पक्की सड़कें हैं, जो विभिन्न विकासखण्डों में सर्वांगीण संवाहन की प्राप्ति के लिए आवश्यक हैं। रामनगर, रामपुर और मुफ्तीगंज में भी पक्की सड़कें हैं, जो विभिन्न इलाकों के लोगों के लिए आर्थिक विकास और वित्तीय स्वायत्ता में महत्वपूर्ण भूमिका निभाती हैं। जलालपुर, केराकत और डोभी में भी पक्की सड़कें हैं, जो इस जनपद की आर्थिक विकास में महत्वपूर्ण भूमिका निभाती हैं।

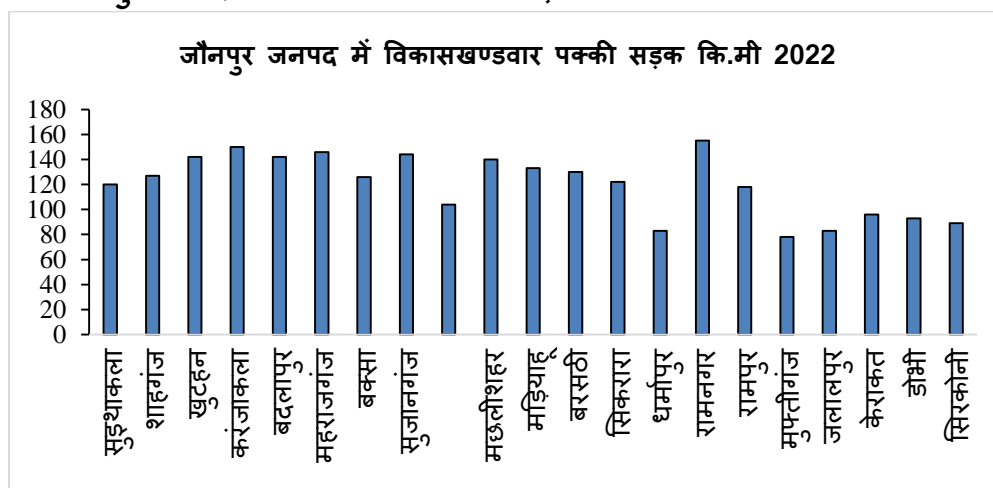
सारणी क्रमांक 4 जौनपुर जनपद में विकासखण्डवार पक्की सड़क कि.मी 2022

जौनपुर जनपद में विकासखण्डवार पक्की सड़क कि.मी 2022	
विकासखण्ड	पक्की सड़कें
सुइथाकला	120
शाहगंज	127
खुटहन	142
करंजाकला	150

बदलापुर	142
महराजगंज	146
बक्सा	126
सुजानगंज	144
मुगराबादशाहपुर	104
मछलीशहर	140
मड़ियाहू	133
बरसठी	130
सिकरारा	122
धर्मापुर	83
रामनगर	155
रामपुर	118
मुफ्तीगंज	78
जलालपुर	83
केराकत	96
डोभी	93
सिरकोनी	89
योग	2521

Source-District Statistical Magazine, Jaunpur District 2022

आरेख क्रमांक 4 जौनपुर जनपद में विकासखण्डवार पक्की सड़क कि.मी 2022



बस स्टेशन और स्टॉप

जौनपुर जनपद का विकास बस स्टेशन और स्टॉपों की संख्या और विविधता सारणी व आरेख क्रमांक 5 में देखने को मिलती है। सुइथाकला में 4 बस स्टॉप हैं। शाहगंज, जिसमें 21 बस स्टॉप हैं, यहां बस स्टेशन वास्तविक गति और ऊर्जा से भरा हुआ है। खुटहन विकासखण्ड में 8 बस स्टॉप हैं, जो स्थानीय लोगों के लिए सर्वांगीण सेवाएं प्रदान करते हैं। करंजाकला में 10 बस स्टॉप हैं, जो इस विकासखण्ड के विभिन्न हिस्सों के बीच एकाग्रता बनाते हैं। बदलापुर में 9 बस स्टॉप हैं, जो इस क्षेत्र की जनता के लिए महत्वपूर्ण हैं। महराजगंज और बक्सा में भी बस स्टॉप हैं, जो इस संवाद के माध्यम से लोगों को अलग-अलग इलाकों से जोड़ते हैं।

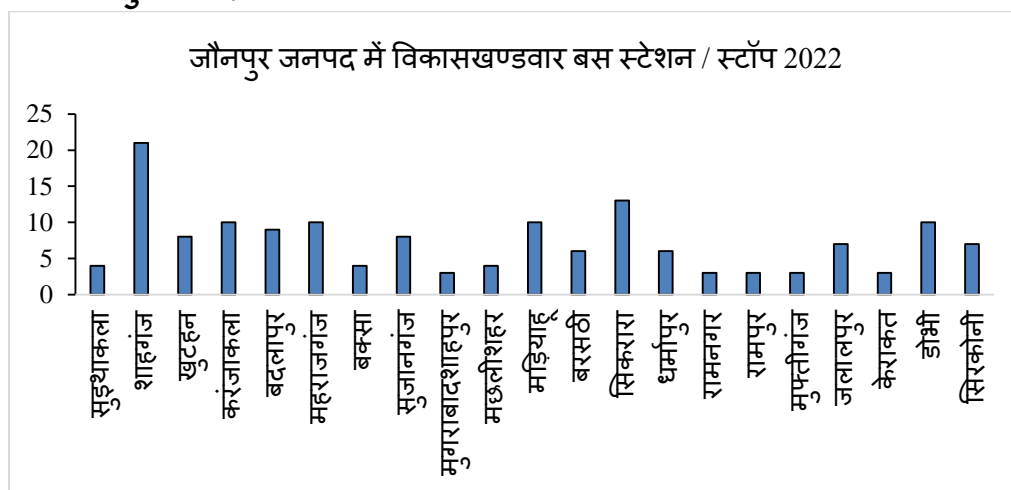
सुजानगंज में 8 बस स्टॉप, मुगराबादशाहपुर में 3 बस स्टॉप, और मछलीशहर में 4 बस स्टॉप देखने को मिलते हैं, जो इस जनपद के विकास में महत्वपूर्ण भूमिका निभाते हैं। मड़ियाहू, बरसठी, और सिकरारा में भी बस स्टॉप हैं, जो स्थानीय परिवहन के लिए जरूरी हैं। धर्मापुर, रामनगर, रामपुर, और मुफ्तीगंज में भी बस स्टॉप हैं, जो इस क्षेत्र के लोगों को इन इलाकों से जोड़ते हैं। जलालपुर, केराकत, और डोभी में भी बस स्टॉप हैं, जो इस जनपद की सामाजिक और आर्थिक गतिविधियों के लिए महत्वपूर्ण हैं। सिरकोनी और योग में भी बहुत संख्या में बस स्टॉप हैं, जो विभिन्न विकासखण्डों के लोगों के बीच यातायात को सरल बनाते हैं।

सारणी क्रमांक 5 जौनपुर जनपद में विकासखण्डवार बस स्टेशन / स्टॉप 2022

जौनपुर जनपद में विकासखण्डवार बस स्टेशन / स्टॉप 2022	
विकासखण्ड	बस स्टेशन / स्टॉप
सुइथाकला	4
शाहगंज	21
खुटहन	8
करंजाकला	10
बदलापुर	9
महराजगंज	10
बक्सा	4
सुजानगंज	8
मुगराबादशाहपुर	3
मछलीशहर	4
मड़ियाहू	10
बरसठी	6
सिकरारा	13
धर्मापुर	6
रामनगर	3
रामपुर	3
मुफ्तीगंज	3
जलालपुर	7
केराकत	3
डोभी	10
सिरकोनी	7
योग	152

Source-District Statistical Magazine, Jaunpur District 2022

आरेख क्रमांक 5 जौनपुर जनपद में विकासखण्डवार बस स्टेशन / स्टॉप 2022



रेलवे स्टेशन और हाल्ट

जौनपुर जनपद में 2022 में विकासखण्डवार रेलवे स्टेशन और हाल्टों की संख्या सारणी व आरेख क्रमांक 6 उनके महत्व के बारे में जानकारी दी गई है। शाहगंज, बदलापुर, सुजानगंज, बक्स, मछलीशहर, मड़ियाहू, बरसठी, सिकरारा, धर्मापुर, जलालपुर, केराकत, डोभी और सिरकोनी विकासखण्डों में रेलवे स्टेशन और

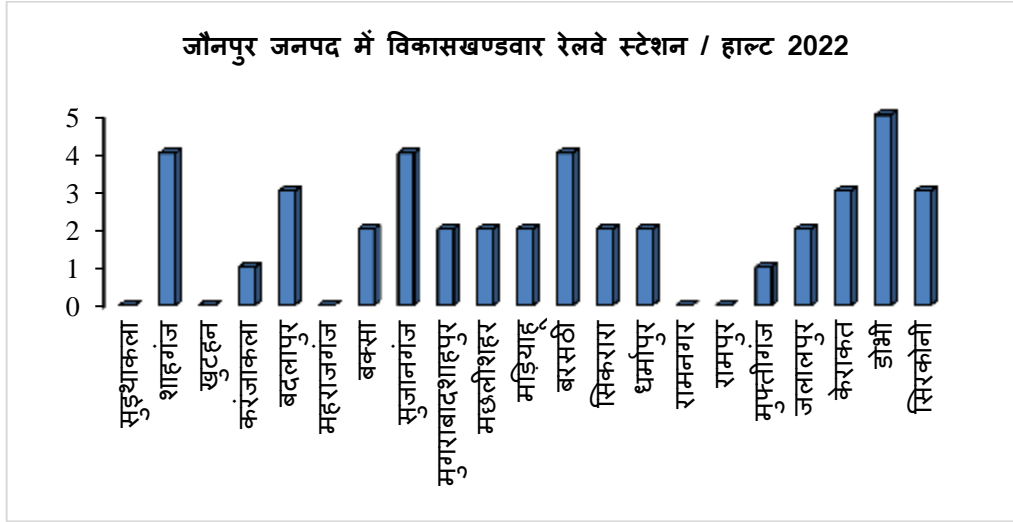
हाल्टों की संख्या है। ये स्टेशन और हाल्टें लोगों के लिए संचार का महत्वपूर्ण साधन हैं, जो उन्हें विभिन्न स्थानों के लिए पहुंचने में मदद करते हैं। अध्ययन क्षेत्र में 42 रेलवे स्टेशन और हाल्टें हैं, जो इस क्षेत्र के लोगों के लिए महत्वपूर्ण संचार का स्रोत हैं। ये स्टेशन और हाल्टें उन्हें अलग-अलग जगहों जाने के लिए एक सुविधाजनक विकल्प प्रदान करते हैं और उनके संचार को सरल बनाते हैं।

सारणी क्रमांक 6 जौनपुर जनपद में विकासखण्डवार रेलवे स्टेशन / हाल्ट 2022

जौनपुर जनपद में विकासखण्डवार रेलवे स्टेशन / हाल्ट 2022	
विकासखण्ड	रेलवे स्टेशन/ हाल्ट
सुइथाकला	0
शाहगंज	4
खुटहन	0
करंजाकला	1
बदलापुर	3
महराजगंज	0
बक्स	2
सुजानगंज	4
मुगराबादशाहपुर	2
मछलीशहर	2
मड़ियाहू	2
बरसठी	4
सिकरारा	2
धर्मापुर	2
रामनगर	0
रामपुर	0
मुफ्तीगंज	1
जलालपुर	2
केराकत	3
डोभी	5
सिरकोनी	3
योग	42

Source-District Statistical Magazine, Jaunpur District 2022

आरेख क्रमांक 6 जौनपुर जनपद में विकासखण्डवार रेलवे स्टेशन / हाल्ट 2022



निष्कर्ष:

ग्रामीण अवस्थापन में बाजार, कृषि, बैंकिंग, और परिवहन समेत विभिन्न क्षेत्रों का विकास शामिल है। तकनीकी उन्नति, इंफ्रास्ट्रक्चर, और संचार के माध्यम से ग्रामीण क्षेत्रों में तकनीकी रूप से समृद्धि और विकास लाने के लिए प्रयास किया जाना चाहिए। जनपद जौनपुर में ग्रामीण विकास के लिए अनेक अवस्थापनात्मक तत्वों की महत्वपूर्ण भूमिका है। इन अवस्थापनात्मक तत्वों का सम्मिश्र उपयोग किया जाता है ताकि जनपद जौनपुर में ग्रामीण क्षेत्रों में विकास और सामाजिक उन्नति हो सके। शिक्षा और प्रशिक्षण सामाजिक और आर्थिक विकास के लिए महत्वपूर्ण हैं। यहां प्रशिक्षण केंद्रों की स्थापना, साक्षरता कार्यक्रमों, और व्यावसायिक प्रशिक्षण के माध्यम से लोगों के लिए रोजगार के अवसरों की योजना बनाना और उन्हें आर्थिक रूप से स्वावलंबी बनाना ग्रामीण विकास के लिए महत्वपूर्ण है। स्वास्थ्य सेवाओं के पहुंचने में सुधार करना और पर्यावरण संरक्षण के प्रति लोगों की जागरूकता बढ़ाना भी ग्रामीण विकास के लिए महत्वपूर्ण है। जनपद जौनपुर में कृषि विकास के लिए अधिक प्रयास करना चाहिए। यह सही तरीके से प्रबंधित कृषि, बाजार और तकनीकी समर्थन के माध्यम से किसानों की आर्थिक स्थिति में सुधार किया जा सके।

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