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On

Sustainable Development Goals in South Asia: Key Issues, Opportunities and Challenges

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A Study Of Solid Waste Management Regulation In Maharashtra State

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Abstract:

Maharashtra Government constituted Maharashtra Pollution Control Board for monitoring of Solid waste management which involves the activities associated with generation, storage, collection, transport, processing and disposal of solid waste, which is environmentally compatible adopting principles of economy, aesthetics, energy and conservation. It consists of planning, organization, administration, financial, legal and engineering aspects. Suitable legislation and regulations provide an effective working system for taxation and its realization. Maharashtra Pollution Control Board (MPCB) is implementing various environmental legislations in the state of Maharashtra, mainly including Water (Prevention and Control of Pollution) Act, 1974, Air (Prevention and Control of Pollution) Act, 1981, Water (Cess) Act, 1977 and some of the provisions under Environmental (Protection) Act, 1986 and the rules framed there under like, Biomedical Waste (M&H) Rules, 1998, Hazardous Waste (M&H) Rules, 2000, Municipal Solid Waste Rules, 2000 etc. MPCB is functioning under the administrative control of Environment Department of Government of Maharashtra.

The policy and legislative framework forms the backbone of any implementation system. The solid waste management in Maharashtra is covered under various regulations. It is covered through various national as well as state level regulations. Every municipal authority under Maharashtra Government comes under the municipal solid waste (Management and Handling). Local bodies in the country are governed by various laws enacted by their state legislatures. The solid waste management can improved by modernizing the solid waste management system by the urban local bodies and ensuring public participation by providing adequate legislative support. A policy framework is necessary to guide the urban local bodies in the country for managing the solid waste scientifically and cost effectively.

Keywords: Solid Waste Management, Urban Local Bodies, Performance disclosure, Liability Laws

Introduction:

Solid wastes area unit being made since the start of civilization. Over the years, there has been a continuous migration of individuals from rural and semi-urban areas to cities and cities. The proportion of population residing in urban areas has enhanced from 10.84 in 1901 to 25.70 in 1991. The uncontrolled growth urban areas has left several Indian cities deficient in infrastructural services like installation, sewerage and municipal solid waste management.

Solid Waste Management may be a part of public health and sanitation. Solid Waste Management is one in all the foremost neglected aspects of India's setting. The management activity being of a neighborhood nature, the urban native Body undertakes the task of solid waste service delivery, with its own employees, instrumentation and funds. Satisfactory performance of any utility depends on institutional infrastructure with needed hands and instrumentation, adequate monetary inputs, legislative powers and public response.

Maharashtra Pollution Control Board (MPCB) is implementing various environmental legislations in the state of Maharashtra, mainly including Water (Prevention and Control of Pollution) Act, 1974, Air (Prevention and Control of Pollution) Act, 1981, Water (Cess) Act, 1977 and some of the provisions under Environmental (Protection) Act, 1986 and the rules framed there under like, Biomedical Waste (M&H) Rules, 1998, Hazardous Waste (M&H) Rules, 2000, Municipal Solid Waste Rules, 2000 etc. MPCB is functioning under the administrative control of Environment Department of Government of Maharashtra.

Role Of Maharashtra Pollution Control Board:

1. To plan comprehensive program for the prevention, control or abatement of pollution and secure executions thereof,
2. To collect and disseminate information relating to pollution and the prevention, control or abatement thereof,
3. To inspect sewage or trade effluent treatment and disposal facilities, and air pollution control systems and to review plans, specification or any other data relating to the treatment plants, disposal systems and air pollution control systems in connection with the consent granted,
4. Supporting and encouraging the developments in the fields of pollution control, waste recycle reuse, eco-friendly practices etc.
5. To educate and guide the entrepreneurs in improving environment by suggesting appropriate pollution control technologies and techniques
6. Creation of public awareness about the clean and healthy environment and attending the public complaints regarding pollution.

Legal Aspects:

Solid Waste Management systems adopted in Indian cities area unit extremely inefficient, out-of-date and lacking public participation. Overall public apathy is determined within the matter of handling and disposal of Municipal waste. A system of throwing garbage on the streets by voters and native bodies aggregation the waste from the streets and disposing it of within the most insanitary manner is modish. These systems will be corrected by taking joint measures involving the general public at massive through their active participation within the method, and by the method, and by the native bodies activity their duties effectively. in keeping with the Indian constitution, public health and sanitation falls among the preview of the State laws. assortment and disposal of Solid Waste is of native nature and is entrusted to native civic authorities. The Municipal laws lay down elaborated list of obligatory and discretionary duties. Public health and sanitation is listed among obligatory duties and thus the civic authorities area unit needed to create adequate provision.

Local laws additionally ought to offer for penalty on the spot to those that don't adhere to the directions given for maintaining acceptable. Solid Waste Management systems within the urban areas, giving adequate power to the native authorities to penalize the offenders. Most of the Municipal byelaws agitate body aspects and therefore the process and disposal aspects area unit rarely addressed. native civic authorities in Indian States like U.P, Punjab, Bihar, Tamil-nadu, West Bengal, area unit ruled by recent Statutes passed in 1920,1922 & 1932 severally that agitate assortment and cartage away of the waste. Developments going down in alternative areas further as urban complexes don't get mirrored within the laws to satisfy trendy urban living conditions. Similar state of affairs exists in several alternative developing countries.

General Provisions Of The Law:

The law ought to specify and outline the terms used. The law ought to additionally specify the classes of wastes that ought to be collected and carted away by civic authorities and people that the producer ought to be accountable. the way in necessary for it ought to be clearly mere.Detailed provisions ought to create concerning the industries and therefore the sorts of wastes which might be accepted by civic authorities and therefore the manner of its assortment and process arranged down. The laws ought to additionally lay down charges to be levied and recovered from individual households, industries, market places, etc. The penalties to be obligatory just in case of violations of the rules and therefore the methodology of recovery of such dues ought to even be arranged down.

Economic Aspects:

Solid Waste Management may be a part of public health and sanitation and in keeping with the Indian construction falls among the reach of the state list. Since this activity is nonexclusive, unrivalled & essential the responsibility for providing the services lies among property right. The activity being of native nature is entrusted to the local government. Public attention to solid waste and usage has enhanced dramatically over the past decade.To carry out this essential activity associate annual provision for the revenant and cost is formed within the municipal budget. The municipal budget relies on the overall financial gain from Central and government. the availability of funds for solid waste management is usually determined to be created on adhoc basis and isn't associated with the necessity. Solid Waste Management receives a relatively inadequate share out of the overall

municipal budget because the municipal agencies assign low priority to the present work leading to poor services.

The solid Waste Management activities would be ruled by the norms of Public Finance particularly the Principles of most Social Advantage. in essence the burden of tax for finance Solid Waste Management ought to fall the smallest amount on the lower financial gain teams and more and more on the center and better financial gain categories. It doesn't needed a justification in terms of "positive returns on investment" or "minimum profits". associate investment but must be even on the grounds of being "the least value technologically possible option" for achieving the desired degree of potency.Economists have developed models to assist policy manufacturers select the economical mixture of policy levels to control Solid Waste & usage. Economists have extensively utilized completely different styles of knowledge to estimate the factors that contribute to the generation of Solid Waste, usage and to estimate the effectiveness of the many of the policy choices utilized. Economists have additionally calculable the connection between education and unit garbage totals. Educated households may be additional responsive to usage opportunities. it had been found that increase within the size of unit decreases the per-capita amount of garbage disposed.Having understood the large potential of amount related to usage and recycle of Solid Waste, the question arises on why most of Solid Waste area unit generated and land-filled.From the stand purpose of environmental economic science, like different environmental resources, waste treatment is usually subject to promote failures, and thus creating corrective economic instruments necessary for the mentioned reasons. First, the consumption waste treatment at acceptable levels creates positive advantages to people. Second, waste treatment is to an oversized extent a public smart due to non-exclusivity in consumption. Finally, the high infrastructure needs imply that the fixed costs is high, that discourages participation by several suppliers.

As Solid Waste become a lot of vital issue to policy manufacturers, intellectual attention from social scientist inflated. Several economic papers ar dedicated to Solid Waste Management. However the opposite possibility is dedicated to prescribing the economic policy approach. Most models support the employment of some kind of a "deposit-refund" system. The deposit or advanced disposal fee can be applied at either the purpose of production or at purchase level. The refund or grant to usage can be given to households that recycle or to companies that purchase recycled materials. Different economic models support a tax on virgin material or an immediate tax on the household's disposal selections.Advanced disposal fees exits just for some merchandise in some countries. Deposit-refund systems are enforced just for food containers. several jurisdictions have already got implicit deposit refund systems on all merchandise, to the extent that they impose a general excise tax on all purchase and use a number of the cash to procure free curbside-recycling assortment. The economic analysis of solid waste management points out that there'll be overrun of waste in an exceedingly market system if external prices from the waste isn't mirrored within the costs of the merchandise at first made and consumed within the market. The market fails to portion resources expeditiously as a result of costs fail to replicate full social price. That is, the right prices of lowland, combustion and composting aren't mirrored in end-product costs within the market place. This ends up in an extra bias against most employ and usage activities.Several differing types of economic instruments specifically designed so as to correct market failures within the management of Solid Waste. All of those instruments are often classified into 3 main categories: revenue raising, revenue providing and non-revenue instruments. These instruments are summarized below.

Table-1: Types of Economic Instruments

Revenue generating instrument	Revenue providing instrument	Non-revenue –instrument
Charges Taxes Subsidy reduction	Subsidies Grants Tax credits Development rights and property rights Host community incentives	Product and production change incentives Trade-off arrangement Procurement policies Deposit-refund systems Take –back system Product stewardship

	Funds	Performance disclosure Liability law Performance bonds

Gift Money Provision

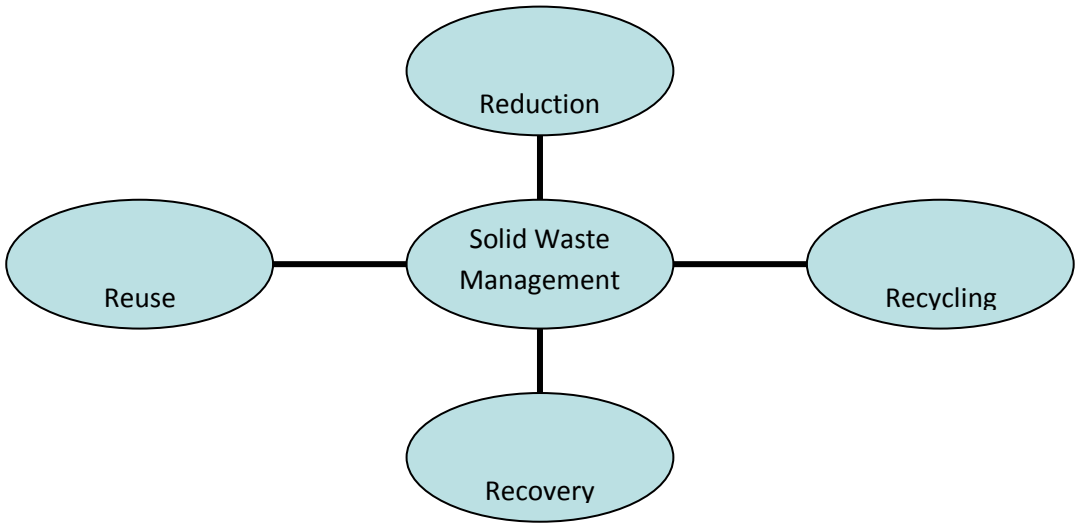
Municipal agencies got to manage varied civic services. The quantity of activities managed by these agencies increase with the dimensions of town. it's determined that smaller cities wherever the most activity is Solid Waste Management pay up to seventy of their budget on solid waste management.Metropolitan cities on different hand, thanks to wider resources base and responsibility of provision of larger variety of services pay solely around ten of their budget on Solid Waste Management. A majority of urban centers but pay 5-40 of their budget on a similar this can be just about Rs.50-250 per capita p.a.. an oversized proportion of this expenditure is incurred on salaries and solely a restricted quantity is spent on Operation & Maintenance (O&M) and development works.

Presently an oversized proportion of the entire expenditure is incurred on assortment, {a bit|a touch|a small quantity} lesser on transportation & a meager amount on disposal. In Municipal Corporation of city 70-85 of the entire expenditure on solid waste management is spent on assortment, 26.45 on transportation and solely two.7 on disposal. Once the system is correctly designed, the proportion are seventy five of the entire expenditure on assortment, 21.4 on transfer & transportation and seven.6 on disposal. In absolute terms this cost/per ton in city ar Rs. 642/ton for assortment, RS,240/ton for transportation and Rs.24.5/ton for disposal. The figures for an additional metropolitan town i.e bigger metropolis, in 1992-93 ar Rs. 632/ton,Rs.211/ton and Rs.73.2/ton for assortment, transportation and disposal severally.

Social Control Aspects:

It is determined that within the flow of materials in our society, we tend to don't consume materials, we tend to just use them and ultimately come back them typically in an altered state to the setting. The assembly of helpful merchandise for ultimate use by those individuals referred to as shoppers needs an input of materials.

These materials originate from one in every of 3 sources: raw materials, Scrap materials and materials recovered when the merchandise has been used. The ensuing processed merchandise ar oversubscribed to the users of the merchandise, who, in turn, have 3 choices when use: to lose this material, to gather the fabric for energy production or recycle it back in to the commercial sector or to employ the fabric for a similar or a distinct purpose while not remanufacture. A high rate of stuff extraction will eventually result in a haul within the depletion of natural resources. The Solid Waste social control principles for achieving reduced material use and waste generation referred to as the four R's:



1. Reduction: Waste reduction are often achieved in 3 basic ways: (1) reducing the quantity of fabric used per product while not sacrificing the utility of that product,(2) increasing the period of time of a product, and/or (3) eliminating the necessity for the merchandise.

2. Reuse: Reuse is an integral a part of society. Many of our products are reused without much thought given to ethical considerations. For example, paper bags obtained in the supermarket are often used to pack refuse for transport from the house to the trash can or to haul recyclables to the curb for pickup.

3. Recycling: the method of usage needs that the owner of the waste matter 1st filtrate the helpful fraction so it are often collected individually from the remainder of the solid waste. Several of the elements of Municipal solid waste are often recycled for producing and future use, the foremost vital being paper, steel, aluminum, plastic, glass, and yard waste. Taking into accounts transportation and process charges, it still seems that the economic science for paving usage and materials recovery facilities in metropolitan areas are quite favorable.

4. Recovery: Recovery is defined as the process in which the refuse is collected without prior separation, and the desired materials are separated at a central facility. The recovery of materials, although it seems attractive, is still a marginal option. The most difficult problem faced by engineers designing such facilities is the availability of firm markets for recovered product. Occasionally, the markets are quite volatile, and secondary material prices can fluctuate widely.

Conclusion:

Solid Waste Management may be a part of public health and sanitation. Solid Waste Management is one in all the foremost neglected aspects of India's setting. The management activity being of a neighborhood nature, the urban native Body undertakes the task of solid waste service delivery, with its own employees, instrumentation and funds. Satisfactory performance of any utility depends on institutional infrastructure with needed hands and instrumentation, adequate monetary inputs, legislative powers and public response.

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Reflection Of Feminist Ecocriticism In Terry Pratchett's Equal Rites

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Abstract

Feminist ecocriticism is basically a hybrid discipline that provides a novel integration between feminist criticism and ecocriticism.Ecofeminism pays attention towards the opposition between culture and nature wherein higher status is given to culture and as a result human domination over nonhuman nature is authorized. Ecofeminism strives to find out liberatory alternatives and promotes them. The present research aims to investigate and analyse Terry Pratchett's presentation of traditional oppressive patriarchy, the issue of gender equality and its association with environmental issuesin the novel*Equal Rites*. It is assumed that the novel*Equal Rites* claims that environmental degradation and subordination of women are interconnected. By applying the theory of feminist ecocriticism, it is found thatthe novel*Equal Rites* provides a powerful statement of cultural ecofeminismby presenting the story of the young girl Esk who challenges the traditional oppressive patriarchy by becoming the first female wizard. Pratchett subverts the Western mythsand the masculinist matrix of ideological formations within Western cultures. Pratchett attempts to question the oppression of women and nature. He highlights the kinship between humans, animals and plants. He clearly understands the way social, political and economic power is used to subordinate women. So, he firmly supports social justice and presents the need to restructure social practices. Moreover, he suggests that the world can sustain itself by moving beyond hierarchical domination.

Keywords - Feminist Ecocriticism, Ecofeminism, Ecocriticism, Gender Equality

Introduction

The term "ecofeminism" has been coined by Francoised'Eaubonnein the year 1974 to highlight the special relationship of women with nature.The interrelation between ecology and feminism was ignored in literature during 1970s and 1980s(Gaard,et. al. 1998).In the following decade critics started to examine the woman/nature analogy.Karen Warren defines this analogy as "the connections- historical, empirical, conceptual, theoretical, symbolic, and experiential- between the domination of women and the domination of nature" (as cited in Carr, 2000, p. 16).Feminist ecocriticism examines the relationship between women and nature reflected in literature, literary theory and criticism.Feminist ecocriticism takes into consideration diverse theories like chaos theory and psychoanalysis, and analyses varied genres ranging from sentimental literature to fantasy fiction.

Rationale of the study Terry Pratchett is popular British writer of humorous and satirical fantasy.Pratchett'sDiscworld series consists of around forty novels.Witches acting as protagonists is the main subseries in the Discworld novels.*Equal Rites*,the third Discworld novel, published in the year 1987 is Pratchett's first feminist witch novel in which the disorganised witches challenge the organised misogynistwizards.Pratchett presents the patriarchal view about women and promotes the liberatory alternatives.

Objective of the study The present research aims to investigate and analyse Terry Pratchett's presentation oftraditional oppressive patriarchy,the issue of gender equality and its association with environmental issues.

Hypothesis It is assumed that Terry Pratchett's novel*Equal Rites*claims that environmental degradation and subordination of women are interconnected.

Methodology

There is a need to study the interconnection between environmental degradation and subordination of women in the novel *Equal Rites*.So, the theories presented by prominent eco-critics Timothy Clark, Peter Barry, Greg Garrard and Douglas Vakoch have been studied and applied to interpret the select text. Obviously, interpretative, analytical, evaluative and comparative methods have been used for the present research.

Analysis

It is difficult to generalize feminist criticism because it accepts multiple ideologies.Ecocriticism also embraces such pluralism while examining the relationship between the physical environment and literature.The feminist literary criticism and ecocriticism both being open to multiple and even incompatible perspectives form a new field that is feminist ecocriticism. This hybrid discipline which is also known as ecofeminist literary criticism has been defined by Buell et. al. as "politically engaged discourse that analyses conceptual connections between the manipulation of women and the non-human" (as cited in Vakoch, 2012, p. 2)

Main theme presented throughout the novel*Equal Rites* is of equal rights for women.There is word play on the phrase "equal rights", as Pratchett deliberately spells it as "equal rites".Pratchett mocks at the traditional rites and supports equal rights for men, women and nature. In the opening of the novel itself Pratchett informs the readers that the novel presents a story about magicand a story about sex. The image of the Discworld carried on the backs of four giant elephants who stand on the back of gigantic turtle that moves in the universe suggests that the world is balanced by different natural elements. Though the villages located in the Ramtop mountains are full of scenic beauty of nature, they are considered inferior to urban places. The village name 'Bad Ass' itself is abusive, but the revolt against class and gender inequalities is taking place here. Pratchett describes the meeting between the wizard Drum Billet and the blacksmith as the meeting between equals. Traditionally, a wizard's social class was considered to be superior to a blacksmith; but Pratchett makes them sit together and describes the rain and the mist that both of them were watching. The natural view was equal to both of them because nature does not have class discrimination. Moreover, Pratchett introduces the fantastic character of Death who symbolises equality and natural justice.Drum Billet, the wizard knows he is going to die, so he wants to pass on his wizardness to a successor. He chooses the eighth son of the eighth son, but the baby is a girl child, and mistakenly the staff is given to the girl child. According to the tradition on the Disc, the magical men become wizards and magical women become witches, but the tradition is reversed and the world is given its first female wizard.Granny Weatherwax, the witch is a major Discworld character who is very confident and powerful old woman. She takes initiative in the making of the female wizard named Eskarina. Likewise, women should play a key role in empowering themselves.Granny enters the owl's mind and peers the mountains. The owl comes back to the village and alights on the biggest apple tree in Smith's orchard. The tree resented her and complained that Granny was bullying it, because it was a tree. The tree thought that its life was good having sun, fresh air, the bees in the spring and especially time to think. Granny and the tree have further conversation about the girl Esk. According to the tree, Esk is a promising child. The glimpses of wizard magic are seen in Esk, but Granny thinks that it is the wrong sort of magic. According to Granny, wizard magic is not for women. The tree suggests Granny to train Esk in wizard magic. As Granny is not familiar with wizard magic, the tree recommends that Esk should be sent to university. The tree here has more liberal views than human beings, it presents a revolutionary idea, "Well? Who says women can't be wizards?" (Pratchett, 1987, p. 49). Granny shockingly says, "Women have never been wizards. It's against nature. You might as well say that witches can be men"(Pratchett, 1987, p. 49).

The tree speaks like a philosopher and presents the theoretical basis of equality among sexes. The tree compares witches and women with Mother Goddesses. According to the tree, women are closer to nature. Though Granny listens to the tree's revolutionary views, she is not convinced because tradition has a deep impact on her. So, initially, Granny begins to teach witchcraft to Esk starting with the practical lessons in basic Herbalism.Though Esk is denied entry to the Unseen University, the school of magic, she enters it as a servant and takes lessons in practical magic. Women's entry to the Great Hall of the university was considered to be trespassing, but Granny and Esk enter the hall and meet Archchancellor Cutangle. Granny challenges Cutangle and has a magical duel with him. All these examples are symbolic of women's fight for liberty and equality.Pratchett presents several instances wherein the close affinity between women and nature is highlighted. Granny is able to transform herself into a fox or a bird. Moreover, Granny and Esk like borrowing birds; they would enter the bird's mind and would explore the hidden valleys, the secret lakes and the hidden places of secretive beings. When they borrow an eagle's mind, Granny cautions Esk that as the eagle had a lifetime of being an eagle, they should not upset it. Moreover, Granny warns Esk that the nature of wild creature should be understood and nothing should be suggested to it that is against its

nature.Esk was travelling in a barge with Amschat. When a market broker in the town of Zemphis offered Amschat a bag of ultramarines in exchange of fleeces, Esk with some magical power identifies that those were not ultramarines.Amschat and Esk go to the assayer's stall; after the conduct of some tests the assayer declares that the stones were false, they were not ultramarines. Symbolically, Pratchett suggests that women and nature have close bonding.

Pratchett is very much critical about the human encroachment in the natural environment. When Granny and Esk stay at the town of Ohulan, Pratchett gets an opportunity to criticise the people burdened by the pressures of urban life. On the contrary, he appreciates natural scenery of Ramtop mountains and the simplicity of village life. Moreover, Pratchett favours human life that is closer to nature. To simplify his point, he presents comparison between the animal mind and the human mind. According to him, the animal mind is simple, sharp and focused; and it understands the universe very well.Throughout the novel Pratchett presents several incidents wherein male dominance treats women as inferior. When Esk was travelling in a barge, Amschat wants to know why she was travelling. He thinks that if Esk would have been a boy, he would have asked if he was going to seek his fortune. Eskfirmly questions him if girls can not seek their fortune. He replies that girls should seek a boy with a fortune. In another incident Esk is laughed at and humiliated by Treatle, the Vice-Chancellor of Unseen University when she presents her idea of a woman becoming a wizard.Treatle says that he has highest respect for women and on the other side he underestimates women by saying that they are good for having babies and household work only. Moreover, Treatle underestimated witchcraft and discouraged Esk by telling her to be away from wizardy. Furious Esk decided to be a witch and a wizard too, the more the people tried to stop her; the more determined she became.According to the Archchancellor Cutangle the idea of a female wizard is completely laughable and against the lore.Cutangle wanted to give the magic staff to Simon, but Granny strongly protests. As there was no precedent, Cutangle hesitated to declare Esk as a wizard. Granny explains to him that we are born once, so lots of things have never happened before. Granny convinces Cutangle and finally declares that Archchancellor Cutangle has changed the lore and Esk is now a wizard. Moreover, Cutangle intends to allow a few more girls to the University. He is also in favour of co-education and offers a Chair to Granny. As Granny was good at herbs and headology, she would deliver some lectures to students. Also, Cutangle has plans of student visits to Granny's cottage for extra-mural studies.

SherryB.Ortner argues that "the universal devaluation of women could be explained by postulating that women are seen as closer to nature than men, men being seen as more unequivocally occupying the high ground of culture" (Ortner, 1974, p. 83-84).Karen J. Warren (2000) elaborates how male-focused thinking follows a logic of domination whichstimulates the oppositional pair male/female and places a greater value on males in this pair, and as a result defends inequalities between men and women.Further Warren explains how humans reshape their environment to dominate the nonhuman natural others like rocks or plants.Greta Gaard (1998)also expresses the need to liberate women, the other oppressed groups and nature.

Conclusions

The novel ends with Esk and Simon beginning to develop a new kind of magic that would comfort everyone. Granny and Esk's struggle wins them equal status in the society. Wizards and witches, men and women work in collaboration and write a new lore. Similarly, Pratchett suggests that human beings should collaborate with environment and not exploit it.Pratchett presents the relationship of women with environment with the help of female witches who are in touch with nature, herbs and headology.

Ecofeminism is not only used by female scholars but male writers also use it, and it is relevant for them also. Oppressive dichotomies of male/female and nature/culture are the basis of the contemporary environmental problems. Feminist ecocriticism specially focuses the emancipatory strategies for overcoming oppression. Pratchett promotes a sense of interrelationship with both community and the land through the novel *Equal Rites*.The novel articulates aspects of cultural ecofeminism. Granny and Esk are connected to one another and to nature in a manner unknowable to men. Pratchett attempts to challenge the oppression of women and nature. He highlights the kinship between humans, animals and plants. Pratchett clearly understands the way social, political and economic power is used to subordinate women. So, he firmly supports social justice and presents the need to restructure social practices. Moreover, he suggests that world can sustain itself by moving beyond hierarchical domination.

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Impact of Agriculture on Indian Economy 2021

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Abstract

Agriculture is an important part of India's economy and at present it is among the top two farm producers in the world. This sector provides approximately 52 percent of the total number of jobs available in India and contributes around 18.1 percent to the GDP. Agriculture is the only means of living for almost two-thirds of the employed class in India. As being stated by the economic data of financial year 2020-21, agriculture has acquired 18 percent of India's GDP. The agriculture sector of India has occupied almost 43percent of India's geographical area.India is primarily an agrarian based economy in which Agriculture is the main source of employment and livelihood. The Agricultural sector contributes about 17 percent in India's GDP and 9.9 percent share in total exports from India in 2018-19. Most employment opportunities are generated in rural areas and agriculture and allied sectors. Majority of Peoples are directly or indirectly or indirectly engaged in agricultural activities. The Agro based industries are the major contributors of exports earnings for India from agricultural sector. This sector also provides vast employment opportunities to a large number of populations' from rural and urban areas. The farmers, agricultural workers, industrial workers, wholesalers, retailers, exporters, and other persons involved in production and export related activities. The contribution of food based export products have increased considerably to make vital share in India's GDP. India has to produce quality agro based products to compete in the world trade of agro based industries. there is vast opportunities for India's agro based products in the world marked as India is having one of the cheapest source of agricultural labour in comparison of the world.

Introduction

Agriculture plays a vital role in the Indian economy. Over 70 per cent of the rural households depend on agriculture. Agriculture is an important sector of Indian economy as it contributes about 17% to the total GDP and provides employment to over 60% of the population. Indian agriculture has registered impressive growth over last few decades. The food grain production has increased from 51 million tonnes (MT) in 1950-51 to 250MT during 2011-12 highest ever since independence.

Objectives of the Study

1. To current Status.
2. To understand opportunities and process is the future of agriculture**.**
3. To provide a basis of monitoring and evaluation

Current Status

1. The Directorate of Economics and Statistics, Ministry of Agriculture (DESMOA) is responsible for the collection,.(a) weekly and daily wholesale prices, (b) retail prices of essential commodities, (c) farm harvest prices.
2. Weekly wholesale prices cover 140 agricultural commodities from 620 markets.
3. Retail prices of essential commodities are collected on a weekly basis from 83 market centres in respect of 88 commodities (49 food and 39 non-food) by the staff of the State Market Intelligence Units, State Directorates of Economics and Statistics (DESs) and State Department of Food and Civil Supplies.
4. Farm Harvest Prices are collected by the field staff of the State revenue departments for 31 commodities at the end of each crop season and published by the DESMOA

Some salient facts about Agricultural scenario

1. Agriculture is the largest provider of livelihood in rural India
2. It contributes 25 percent to India's GDP
3. It is still dependent primarily on the monsoons
4. The growth in agricultural production has been stagnant for the past several years.
5. The drought in north and western parts in FY09 created shortages in supply of food grains.

3.2 Contribution to GDP over the years

Sector	1990	2000	2010	2020
Agriculture	29.5	5.4	17.5	20.2
Industry	6.6	28.5	30.2	25.92
Service	44.3	8.6	45.4	53.89

Source: https://tradingeconomics.com/india/gdp-from-agriculture

Agriculture in India is livelihood for a majority of the population and can never be underestimated.

Although its contribution in the gross domestic product (GDP) has reduced to less than 20 per cent and contribution of other sectors increased at a faster rate, agricultural production has grown. This has made us self-sufficient and taken us from being a begging bowl for food after independence to a net exporter of agriculture and allied products. Total food grain production in the country is estimated to be a record 291.95 million tonnes, according to the second advance estimates for 2019-20. This is news to be happy about but as per the estimates of Indian Council for Agricultural Research (ICAR), demand for food grain would increase to 345 million tonnes by 2030. Increasing population, increasing average income and globalisation effects in India will increase demand for quantity, quality and nutritious food, and variety of food. Therefore, pressure on decreasing available cultivable land to produce more quantity, variety and quality of food will keep on increasing.India is blessed with large arable land with 15 agro-climatic zones as defined by ICAR, having almost all types of weather conditions, soil types and capable of growing a variety of crops. India is the top producer of milk, spices, pulses, tea, cashew and jute, and the second-largest producer of rice, wheat, oilseeds, fruits and vegetables, sugarcane and cotton. In spite of all these facts, the average productivity of many crops in India is quite low. The country's population in the next decade is expected to become the largest in the world and providing food for them will be a very prime issue. Farmers are still not able to earn respectable earnings. Even after over seven decades of planning since the independence, majority of the farmers are still facing problems of poor production and/or poor returns. Major constraints in Indian agriculture are:

1. According to 2010-11 Agriculture Census, the total number of operational holdings was 138.35 million with average size of 1.15 hectares (ha). Of the total holdings, 85 per cent are in marginal and small farm categories of less than 2 ha (GOI, 2014).
2. Farming for subsistence which makes scale of economy in question with majority of small holdings.
3. Low-access of credit and prominent role of unorganised creditors affecting decisions of farmers in purchasing of inputs and selling of outputs
4. Less use of technology, mechanisation and poor productivity for which first two points are of major concern
5. Very less value addition as compared to developed countries and negligible primary-level processing at farmers level.
6. Poor infrastructure for farming making more dependence on weather, marketing and supply chain suitable for high value crops.

Future of agriculture is a very important question for the planners and all other stakeholders. Government and other organisations are trying to address the key challenges of agriculture in India, including small holdings of farmers, primary and secondary processing, supply chain, infrastructure supporting the efficient use of resources and marketing, reducing intermediaries in the market. There is a need for work on cost-effective technologies with environmental protection and on conserving our natural resources.The reforms towards privatisation, liberalisation and globalisation affected inputs market at a faster pace. Agricultural marketing reforms after 2003 made changes in marketing of agricultural outputs by permitting private investment in developing markets, contract farming and futures trading, etc. These amendments in marketing acts have brought about some changes but the rate is less.Along with this, the information technology revolution in India, new technologies in agriculture, private investments especially on research and development, government efforts to

rejuvenate the cooperative movement to address the problems of small holdings and small produce etc. are changing face of agriculture in India. Many start-ups in agriculture by highly educated young ones show that they are able to understand the high potential of putting money and efforts in this sector. Cumulative effects of technology over the next decade will change the face of agriculture.

All the constraints in agriculture make the productivity and returns complex but still a high untapped potential is there in India's agriculture sector. Advantageous weather and soil conditions, high demand for food, untapped opportunities, various fiscal incentives given by the government for inputs, production infrastructure, availability of cheap credit facilities and for marketing and export promotion are attracting many individuals, big companies, start-ups and entrepreneurial ventures to do a lot of investments on innovations, inventions, research and development and on other aspects of business.

The efforts are being done to convert all the challenges in agriculture into opportunities and this process is the future of agriculture.

1. Changing demand due to increase in incomes, globalisation and health consciousness is affecting and going to affect more the production in future. Demand for fruits and vegetables, dairy products, fish and meat is going to increase in future.

2. Researches, technology improvements, protected cultivation of high value greens and other vegetables will be more. There will be more demand of processed and affordable quality products.

3. More competition will be there among private companies giving innovative products, better seeds, fertilisers, plant protection chemicals, customised farm machinery and feed for animals etc. in cost effective ways at competitive prices giving more returns on investment by farmers. Use of biotechnology and breeding will be very important in developing eco-friendly and disease resistant, climate resilient, more nutritious and tastier crop varieties.

4. Some technologies will be frequently and widely used in future and some will become common in a short time while some will take time to mature. For producing the same products in other way so as to use resources judiciously and using new resources also like hydroponics, use of plastics and bio-plastics in production. There will be more of vertical and urban farming and there will also be efforts in long term to find new areas for production like barren deserts and seawater.

5. Precision farming with soil testing-based decisions, automation using artificial intelligence will be focused for precise application inputs in agriculture. Sensors and drones will be used for precision, quality, environment in cost effective manner.

Small and marginal farmers will also be using these technologies with the help of private players, government or farmer producer organisations (FPO). Use of GPS technology, drones, robots etc. controlled by smart phones etc. can make life of farmers easy and exciting with good results. These advanced devices will make agriculture be more profitable, easy and environmentally friendly.

6. Use nano-technology for enhancement of food quality and safety, efficient use of inputs will be in near future. Nano-materials in agriculture will reduce the wastage in use of chemicals, minimise nutrient losses in fertilisation and will be used to increase yield through pest and nutrient management. IFFCO has already done successful tests in nano-fertilisers.

7. India has improved remarkably in its digital connectivity and market access has become very easy. The number of internet users is projected to reach 666.4 million in 2025. Farmers will be behaving more smartly with mobiles in hands and would be able to be more aware and connected with different stake holders. Government will be making wide use of digital technology for generating awareness among farmers, information sharing, government schemes using digital technology for direct transfers of money.

8. There will certainly be more work by government, village communities, agri start-ups and private players in conserving sharply depleting water resource. Use of digital technology can make revolution in this direction. There will be use of satellites, IoT, drones for better collection of data regarding soil health, crop area and yield which will make cost for insurers less with better estimations and system will be more exact and effective.

9. There will be more of niche marketers in operations, area, and crop specific small equipment's which will make operations even at small farms easier and efficient. Food wastage will be less and better use of waste materials in agriculture will be more. Number of warehouses in private sector will be more and linkages between government and private warehouses will be increasing. This will help in balancing supply with demand and stabilisation of prices of agri-outputs in the market.

10. Retailing in agriculture will largely be digitalised. A study estimates that over 90 per cent of kirana stores across the country will be digitalised by 2025 with modern traceable logistics and transparent supply chain. Many players have already taking kiranastores to the door steps of consumers like Amazon and Jio Mart.

Question arises whether farmers will be able to make use of modern technologies in a country where education, holding size, infrastructure, low level of technology adoption and many other constraints are there.

Role of agriculture in Indian economy

Share in National Income: Agriculture is still the only largest contributor to India's GDP (16%) even after a decline in the same in the agriculture share of India. Agriculture also plays a significant role in the growth of socio- economic sector in India. Agriculture employed more than 50% of the Indian work force and contributed 17–18% to country's GDP. In 2016, agriculture and allied sectors like animal husbandry, forestry and fisheries accounted for 15.4% of the GDP (gross domestic product) with about 41.49% of the workforce in 2020. Agriculture, food, and related industries contributed $1.109 trillion to the U.S. gross domestic product (GDP) in 2019, a 5.2-percent share. The output of America's farms contributed $136.1 billion of this sum—about 0.6 percent of GDP. India is a global agricultural powerhouse. It is the world's largest producer of milk, pulses, and spices, and has the world's largest cattle herd (buffaloes), as well as the largest area under wheat, rice and cotton. Agriculture, once India's main source of revenue and income, has since fallen to approximately 15.87% of the country's GDP, as of 2019. Over the past 60 years, the service industry in India has increased from a fraction of the GDP to approximately 54.4% between 2018 and 2019.

Largest Employment Providing Sector: The agricultural sector is the largest employer in the Indian economy. It employs nearly 51% of the labour force in India. However, this sector accounts for only about 17% of India's GDP. Agriculture, with its allied sectors, is the largest source of livelihoods in India, where 70 percent of the rural households still depend primarily on agriculture for their livelihood, with 82 percent of farmers being small and marginal. Jobs and career opportunities in agriculture are unorganized and informal because of the nature of this sector. Agriculture industry in India has been segregated into 17 major sectors. They are farming, agriculture equipment, fertilizers, pesticides, warehousing, cold chain, dairy market, floriculture, fisheries, poultry and more.

Contribution to Capital formation: Capital formation in agriculture is a pre-requisite for the growth of agriculture and is vital for sustained growth of the sector in order to meet the increasing demands. Capital formation in agriculture comes from public and private investment. Agriculture and Food. Agriculture can help reduce poverty, raise incomes and improve food security for 80% of the world's poor, who live in rural areas and work mainly in farming. The World Bank Group is a leading financier of agriculture. What are the major contributions of agriculture in our country? One of the central goals of every developing country is to reach high-income status. Agriculture plays a critical role in transforming economies to reach the goal, along with achieving other essential development goals like ensuring food security and improving nutrition.

Providing Raw Material to industries: Agricultural production is generally seen as a source of raw materials, not as a user of them. Large scale commercial farming requires fertilisers, pesticides, erosion control measures, and feed for livestock. Manufacturing all these uses agricultural raw materials, which Bisley supplies. Agro-based industries are the industries that obtain their raw materials from agriculture. Textiles, sugar, paper, vegetable oil is some of the examples of agro-based industries and agro-based industries are consumer based industries. Industries produce machinery and equipment for agricultural uses e.g. tractors, ploughs, cutlass, hoes, etc. 3. Agriculture can provide market for industrial products e.g. farm machinery, chemicals, fertilizers, etc. Agriculture provides raw materials for industries. Many raw materials, whether it's cotton, sugar, wood, or palm

oil, come from agriculture. These materials are essential to major industries in ways many people aren't even aware of, such as the manufacturing of pharmaceuticals, diesel fuel, plastic, and more.

Market for Industrial Products: Agricultural products means crops, livestock and livestock products, including but not limited to: field crops, forage, fruits, vegetables, horticultural specialties, cattle, sheep, hogs, goats, horses, poultry, furbearing animals, milk, eggs and furs. Agriculture is the art and science of cultivating the soil, growing crops and raising livestock. It includes the preparation of plant and animal products for people to use and their distribution to markets. Agriculture provides most of the world's food and fabrics.

Agriculture Laws

The Farmers' Produce Trade and Commerce (Promotion and Facilitation) Act, The Essential Commodities (Amendment) Act and The Farmers (Empowerment and Protection) Agreement on Price Assurance and Farm Services Act. Apart from The main problem in Agriculture Land celling and in the India under Celling Act Agriculture land problems. Second things Government interfere in the market and they are controlling the price and due to the framer not taking the proper benefits and due to framer suicide happens in the India.

Conclusion

The agricultural sector is of vital importance for the region. It is undergoing a process of transition to a market economy, with substantial changes in the social, legal, structural, productive and supply set-ups, as is the case with all other sectors of the economy. These changes have been accompanied by a decline in agricultural production for most countries, and have affected also the national seed supply sectors of the region. The region has had to face problems of food insecurity and some countries have needed food aid for IDPs and refugees.Due to the relatively low demographic pressure projected for the future, the presence of some favourable types of climates and other positive factors, including a very wide formal seed supply sector, it should be possible to overcome problems of food insecurity in the region as a whole, and even to use this region to provide food to other food-deficient regions. Opportunities must therefore be created to reach these results.In order to address the main constraints affecting the development of the national and regional seed supplies that are mentioned here, the region requires integrated efforts by all national and international stakeholders and institutions involved in seed supply and plant genetic resource management. On practical issues, lessons learned by some countries could be shared with other countries; e.g. on how to progress with the transition or how to recognize the most immediate needs of farmers. Appropriate policies should also be established, at various levels, in order to facilitate seed investment and development in the region. The Change is happening in rural India but it has still a long way to go. Agriculture has benefited from improved farming techniques but the growth is not equitable. The Land use is changing in rural areas as farmers are getting good value for their holdings. The effort should be to stop the migration to urban areas. Wholesale prices are primarily used to monitor the weekly price movements. The number of essential commodities should be reduced to an absolute minimum, especially the non-food crops. Remove ant farmer law Land Celling Act, Essential Commodities Act and Land Acquisition Act. Once the Act is abolished then market is open.

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School – Community Partnership For School Development

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Abstract

The term 'school' has originated from the Greek word 'Skhole' meaning 'Leisure'. The reason for associating 'leisure' with school is probably due to the fact that in the ancient Greece, liberal education was imparted only to a few selected members of the society. It was not available to all. It was a privilege of the elites or aristocratic people who had enough 'leisure' at their disposal. A community is a social group, living in a particular given area, sharing a common cultural heritage. Community may be understood as a 'group of social beings living a common life including all the infinite variety and complexity of relations which result from common life or constitute it. The involvement of Sarpanch, Headmaster and Parents as school-community members through enrolling children in school, contribution of money, increasing the student's attendance, participation "in real decision making at every stage," including identification of problems, the study of feasibility, planning, implementation and evaluation. Sarpanch, Headmaster and Parents as school-community members provide provision for involving in the achievement of education goals. These members help to increases effective supervision on academic activities, promoting the enrollment of school, reducing the dropout rate of school and increasing the pass rate, monitoring the teacher's regularity and curricular activities of the school. These members also help to mobilization of resources, providing infrastructural facilities, taking good decision making, organizing co-curricular activities and the development of school and community relationship. This study demands survey method of descriptive research studies. Under this method, descriptive information is obtained from the target population, namely, Sarpanch, Headmaster and Parents as school-community members. For this study, simple random sampling technique was adopted. The objectives of the study are to examine the involvement of Sarpanch, Headmaster and Parents as school-community members in academic activities and non-academic activities of the school and correlate the involvement of Sarpanch, Headmaster and Parents as school-community members in academic activities and non-academic activities of the school.

Key Words School, Community, Academic activities, Non-academic activities, involvement and partnership

Introduction

School

The term 'school' has originated from the Greek word 'Skhole' meaning 'Leisure'. The reason for associating 'leisure' with school is probably due to the fact that in the ancient Greece, liberal education was imparted only to a few selected members of the society. It was not available to all. It was a privilege of the elites or aristocratic people who had enough 'leisure' at their disposal. They had immense amenities to receive liberal education. Education was not vocational, not so much related to livelihood. It was mainly a cultural exercise, a luxurious attainment. The school, therefore, was associated with 'leisure'.According to Dewey, the School is a miniature society. It is a social institution to serve its purposes. It has to train and bring up the students in such a way that the students will be able to participate effectively, efficiently and harmoniously in the society in which they live. The school should reflect the occupations and life styles of the society. Student should be oriented to the needs and challenges of the future society.

Community - The term community is derived from the same root as "common" and "communal". It means sharing in common. People living in a community co-operate, share and associate with each other in their day-to-day affairs of life.A community is a social group, living in a particular given area, sharing a common cultural heritage. Community may be understood as a 'group of social beings living a common life including all the infinite variety and complexity of relations which result from common life or constitute it.

Co-operation between the School and the Community

Relationship between the School and the Community

Ryburn (1970) emphasizing the close relation between the school and the community has rightly said, "There must be vital connection between the life or the pupils in schools and the life of the community from which they come. There must be vital connection between the school, which is the corporate life of pupils and teachers and the community. Otherwise, the school can never succeed in its aim of enabling its pupils to go out and to face society and make necessary adjustments nor can it, as a corporate body; even have the vital influence on the community which it ought to have".

Community Resources for Schools - There are vast resources of the community which can be utilized for improvement of the school. The community, even at the stage of its under-development possesses abundant resources like firms and farms, temples and monuments, flora and fauns, fairs and festivals, rivers and hills which can be utilize for the benefit of the school, particularly, for effective learning experiences. A Community may be backward and poor in economic conditions, but, rich in natural resources. The teacher should recognize these assets for their utilization organizing both curricular and co-curricular programmes.

School Resources for the Community - A Child grows in the community as well as in the school. He learns by living as a member of the community. He is trained to grow in a desired manner in the school and to live his individual as well as community life effectively. Both the physical and human resources of the school belong to the community. The students, the teachers, and other staff members come from the community all the physical facilities are provided by the community either through government. The school should provide all kinds of experiences by sharing in the community activities. The services for participation of children in the community work are, for example, literacy drives, health campaigns, road construction, etc.

Need And Importance - Sarpanch, Headmaster, parents as school-community members provide provision for involving in the achievement of education goals. These members help in academic activities to increases effective supervision, promoting the enrollment of school, reducing the dropout rate of school and increasing the pass rate, monitoring the teacher's regularity and curricular activities of the school. These members also participate in non-academic activities for the development of school and help to mobilization of resources of school, providing infrastructural facilities, taking good decision making for the development of school, organizing co-curricular activities for school children physical and mental development and also develop the school and Community relationship.These members have a strong role to play in the development of school and the students. These partnerships result in sharing and maximizing resources, while also helping students develop healthy behaviours and promote healthy families.

Objectives

The following are the objectives of the study.

1. To examine the involvement of Sarpanch, Headmaster and Parents as school-community members in the academic activities of the school.
2. To examine the involvement of Sarpanch, Headmaster and Parents as school-community members in the non-academic activities of the school.
3. Correlate the involvement of Sarpanch, Headmaster and Parents as school-community members in academic activities and non-academic activities of the school.

Materials And Methods - According to the objectives, this study demands survey method of descriptive research studies. Under this method, descriptive information is obtained from the target population, namely, Sarpanch, Headmaster and Parents. Basic instrument of survey method is questionnaire i.e., a set of questions printed or typed in a definite order on a form or set of forms. Sarpanch, Headmaster and Parents have to answer the questions on their own. Researcher had to carefully determine exactly about the type of questions, items of questions, sequence of questions.In the present study, the normative survey method was used to obtain information about functioning of Sarpanch, Headmaster and Parents.

Normative survey method - Normative survey method is a method of research, which concerns itself with the present phenomena in terms of conditions, practices, beliefs, processes relationship or trends that are going on. It is otherwise called "Normative survey" or descriptive survey or status survey.

The researcher had taken 375 members from 25 government Primary schools i.e., 25 Headmasters of school and 325 parents of school and 25 Sarpanches from 25 villages of Shankarpally mandal, Rangareddy district, Telangana state as a sample to find out the involvement of Sarpanch, Headmaster and Parents in the academic activities and non-academic activities for the development of school.A questionnaire was prepared with 100 items of 100 minimum score, 300 maximum score including both positive statements and negative statements. It was used in survey method to assess the school-community members involvement in school development. The researcher covered the following academic activities and non-academic activities of the school.

1. Supervision
2. Promoting enrolment
3. Reducing dropout rate and increasing pass rate
4. Regularity of teachers and
5. Curricular activities.
6. Mobilization
7. Infrastructural facilities
8. Decision making
9. Co-curricular activities
10. The development of school and Community relationship

The involvement of Sarpanch, Headmaster and Parents as school-community members in the academic activities and non-academic activities for the development of school were explained in the following way.

Table-1 showing the involvement of Sarpanch, Headmaster and Parents as school-community members in academic activities.

Members	N	Mean	S.D	F	Sig.*(p)*	df
Sarpanches	25	92.72	10.72	55.92	0.00**	2,372
Headmasters	25	109.92	8.05			
Parents	325	93.04	7.42			

Note: *2,372-Level of Significance: ≥ 3.00 at p=0.05* level and ≥ 4.61 at p=0.01**level*

Table-1 shows the scores of Sarpanch, Headmaster and Parents as school-community members in the academic activities. Sarpanches, Headmasters and Parents obtained Mean scores are ranging from 92.72 to 109.92. It may be observed that the Mean scores vary among Sarpanch, Headmaster and Parents as school-community members in the academic activities. Headmasters are better than Parents and Sarpanches. The obtained 'F' value 55.92 with a df of 2,372 is statistically significant at 0.01 level of significance.Thus, it may be concluded that the involvement of Sarpanch, Headmaster and Parents as school-community members in academic activities, Headmasters were appearing to be better than Parents, who in turn are better than Sarpanches, which is significant statistically.

Table-2 showing the involvement of Sarpanch, Headmaster and Parents as school-community members in non-academic activities.

Members	N	Mean	S.D	F	Sig.*(p)*	df
Sarpanches	25	88.16	11.83	28.05	0.00**	2,372
Headmasters	25	106.56	6.91			
Parents	325	89.42	11.33			

Table-2 shows the scores of Sarpanch, Headmaster and Parents as school-community members in non-academic activities. Sarpanches, Headmasters and Parents obtained Mean scores are ranging from 88.16 to 106.56. It may be observed that the Mean scores vary among Sarpanch, Headmaster and Parents as school-community members and Headmasters are better than Parents and Sarpanches. The obtained 'F' value 28.05 with a df of 2,372 is statistically significant at 0.01 level of significance. Thus, it may be concluded that the involvement of Sarpanch, Headmaster and Parents as school-community members in non-academic activities, Headmasters were seem to be better than Parents, who in turn are better than Sarpanches, which is significant statistically.

Table-3 showing the scores of Sarpanch, Headmaster and Parents as

school-community members on the development of school and community relationship.

Members	N	Mean	S.D	F	Sig.*(p)*	df
Sarpanches	25	19.44	3.48	33.10	0.00**	2,372
H.Ms	25	22.16	3.36			
Parents	325	17.11	3.17			

Table-3 shows the scores of Sarpanch, Headmaster and Parents as school-community members on the development of school and community relationship. Sarpanches, Headmasters and Parents obtained Mean scores are ranging from 17.11 to 22.16. It may be observed that the Mean scores vary among Sarpanch, Headmaster and Parents as school-community members and Headmasters are relatively better than the Sarpanches and Parents. The obtained 'F' value 33.10 with a df of 2,372 is statistically significant at 0.01 level of significance. Thus, it may be concluded that in the developing the relationship between the school and community, Headmasters were found to be better than the Sarpanches, who in turn are better than Parents, which is highly significant statistically.

Table-4 showing correlation co-efficient among academic activities

	Supervision	Promoting enrolment	Reducing dropout rate and increasing pass rate	Regularity of teachers	Curricular activities
Supervision	1				
Promoting enrolment	0.146**	1			
Reducing dropout rate and increasing pass rate	0.088	0.293**	1		
Regularity of teachers	0.120*	-0.043	0.237**	1	
Curricular activities	-0.054	0.077	0.052	0.170**	1

*** Correlation is significant: ≥ 0.115 at the 0.01 level (2-tailed)*

** Correlation is significant: ≥ 0.088 at the 0.05 level (2-tailed)*

The above table-4 shows the correlation co-efficient among academic activities.

Supervision - It was observed that there was a significant positive relationship between supervision VS promiting enrolment and the regularity teachers.Hence, it may be concluded that Sarpanch, Headmaster and Parents as school-community members who were actively involved in supervision were also found to be working for promoting enrolment of children in the school as well as in assessing the teachers regularity, encouraging them to use new methods and in maintaining good rapport with them.

Promoting enrolment

It was found that there was a significant positive relationship between promiting enrolment VS reducing dropout rate and increasing pass rate.Therefore, it can be concluded that Sarpanch, Headmaster and Parents as school-community members who were actively involved in promoting enrolment of children in the school were also found to be working to reduce dropout rate and increasing pass rate.

Reducing dropout rate and increasing pass rate

It was inferred that there was a significant positive relationship between reducing dropout rate and increasing pass rate VS regularity of teachers. Hence, it may be concluded that Sarpanch, Headmaster and Parents as school-community members who were actively involved in reducing dropout rate and

increasing pass rate were also found to be working for assessing the teachers regularity, encouraging them to use new methods and in maintaining good rapport with them.

Regularity of teachers

It was observed that there was a significant positive relationship between regularity of teachers VS curricular activities. Therefore, it may be concluded that Sarpanch, Headmaster and Parents as school-community members who were actively involved in assessing the teachers regularity, encouraging them to use new methods and in maintaining good rapport with them were also found to be highly concerned about curricular activities i.e., encouraging teachers to attend in-service programmes, preparing and using teaching materials and teaching aids effectively.

Table-5 showing correlation co-efficient among non-academic activities

	Mobilization	Infrastructural facilities	Decision making	Co-curricular activities	Development of school and community relationship.
Mobilization	1				
Infrastructural facilities	0.328**	1			
Decision making	-0.297**	0.399**	1		
Co-curricular activities	-0.178**	0.499**	0.721**	1	
Development of school and community relationship.	0.296**	0.156**	0.027	0.022	1

The above table-5 shows the correlation co-efficient among non-academic activities.

Mobilization - It was observed that there was a significant positive relationship between mobilization VS infrastructural facilities and the development of school and community relationship and there was a significant negative relationship with decision making and co-curricular activities.Hence, it may be concluded that Sarpanch, Headmaster and Parents as school-community members who were high in mobilization of services provided in the school like first-aid- services and hygienic education, organizing health camps and utilizing community resources were also found to be good in infrastructural facilities such as school buildings, play-ground, multimedia technology access, availability of chairs and tables, good in developing relationship between the school and community, but poor in taking decision making and the administrative abilities of Headmasters and poor involvement in co-curricular activities such as conducting school assembly, games and sports, field trips and excursions and cultural activities.

Infrastructural facilities

It was found that there was a significant positive relationship between infrastructural facilities VS decision making, co-curricular activities and the development of school and community relationship.Therefore, it can be concluded that Sarpanch, Headmaster and Parents as school-community members who were good in infrastructural facilities such as school buildings, play-ground, multimedia technology access, availability of chairs and tables were also involved in taking decision making and the administrative abilities of Headmasters and also encouraging in co-curricular activities such as conducting school assembly, games and sports, field trips and excursions and cultural activities.

Decision making

It was inferred that there was a significant positive relationship between decision making VS co-curricular activities and the development of school and community relationship.

Hence, it may be concluded that Sarpanch, Headmaster and Parents as school-community members who were actively involved in taking decision making and the administrative abilities of Headmasters were also found to be encouraging the school children in co-curricular activities such as conducting school assembly, games and sports, field trips and excursions and cultural activities, and also inviting

the parents of school children to participate in school programmes for the developing good relationship between the school and community.

Observations/Results/Discussion

The involvement of Sarpanch, Headmaster and Parents as school-community members in all school academic and non-academic activities appears to be as follows:

In school activities

Headmasters were found to be better than the Parents, who in turn were better than the Sarpanches.

Academic activities

Headmasters were found to be better than the Parents, who in turn were better than the Sarpanches.

Non-academic activities

Headmasters were found to be better than the Parents, who in turn were better than the Sarpanches.

The development of School and Community relationship

Headmasters were found to be better than the Sarpanches, who in turn were better than the Parents.

Correlation among academic and non-academic activities

Supervision

Sarpanch, Headmaster and Parents as school-community members who were actively involved in supervision were also found to be working for promoting enrolment as well as assessing the teachers regularity, encouraging them to use new methods and in maintaining good rapport with them.

Promoting enrolment

Sarpanch, Headmaster and Parents as school-community members who were actively involved in promoting enrolment were also found to be working to reducing dropout rate and increasing pass rate.

Reducing dropout rate and increasing pass rate

Sarpanch, Headmaster and Parents as school-community members who were actively involved in reducing dropout rate and increasing pass rate were also found to be working for assessing the teachers regularity, encouraging them to use new methods and in maintaining good rapport with them.

Regularity of teachers

Sarpanch, Headmaster and Parents as school-community members who were actively involved in assessing the teachers regularity, encouraging them to use new methods and in maintaining good rapport with them were also found to be highly concerned about curricular activities of school, i.e., encouraging teachers to attend in-service programmes, preparing and using teaching materials and teaching aids effectively.

Mobilization

Sarpanch, Headmaster and Parents as school-community members who were high in mobilization of services provided in the school like first-aid-services and hygienic education, organising health camps and utilizing community resources were also found to be good in providing and improving infrastructural facilities such as school buildings, play ground, multimedia technology access, availability of chairs and tables, good in developing relationship between the school and community but poor in taking decision making and administrative abilities and poor involvement in co-curricular activities such as conducting school assembly, games and sports, field trips and excursions and cultural activities.

Infrastructural facilities

Sarpanch, Headmaster and Parents as school-community members who were good in providing and improving infrastructural facilities such as school buildings, play ground, multimedia technology access, availability of chairs and tables were also involved in taking decision making and administrative abilities, encouraging the school children in co-curricular activities such as conducting school assembly, games and sports, field trips and excursions and cultural activities and good in developing relationship between the school and community.

Decision making

Sarpanch, Headmaster and Parents as school-community members who were actively involved in taking decision making and administrative abilities were also found to be encouraging the school children participating in co-curricular activities such as conducting school assembly, games and sports, field trips and excursions and cultural activities and also inviting the parents of school children to participate in school programmes for the developing relationship between the school and community.

Conclusion

The involvement of Sarpanches in the school academic activities was found to be low when compared to the Headmasters. This resulted in the poor quality of educational standards. To over come this difficulty proper monitoring for Sarpanches should be given so that their regular involvement in supervision The study revealed that the parents involvement in school academic activities was found to be meagre. For the improvement of academic activities, the parents should attend the school academic meetings without fail for decision making, to strenghten their children education and teachers teaching.

The study revealed that the parents involvement in school activities was found to be meagre. For the improvement of academic and non-academic activities, the parents should attend the academic monitoring committees meetings without fail for decision making, to strenghten their children education and teachers teaching.The revealed that the two-fifths of the Sarpanches and the nine-tenths of the parents were illiterates. This resulted in low enrolment of school children, less utilization of community resources and poor contribution in providing school facilities. The study also revealed that the involvement of Sarpanches and parents were found to be low in providing and improving infrastructural facilities. In infrastructural facilitdies such as school buildings, play-ground, multimedia technology access, availability of chairs and tables Headmasters should encourage the Sarpanches and parents to improve such facilities further development of schools. The study revealed that the involvement of Headmasters was found to be better than the Sarpanches and parents in mobilization of services provided in the school. In mobilization of services like first-aid- services and hygienic education, organizing health camps and utilizing community resources, sanitation facilities, parents and sarpaches involvement were seemed to be low. To over come this problem the concerned authorities should take necessary measurements to improve such facilities in the schools.

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Clean and Cost Effective Industrial Wastewater Treatment Technology

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Abstract:

The material business produces run of the mill effluents because of its differentiated activities. Starches, Polyvinyl,alcohol, cellulose, polycyclic acids and polyesters are utilized as handling specialists that altogether contribute towards BOD and COD creation in the framework. The non-cellulose parts of cotton are taken out by cleansers during scouring process. The sewage water from enormous material private settlements likewise presents issue. At the same time, it produces 1,628 m^3/day material wastewater, 1,968m3/day clothing wastewater and 225 m3/day homegrown sewage water. The absolute BOD heap of this wastewater is 2,533 kg/day. The protected treatment of this enormous emanating has been a major issue. The ISO ties don't permit removal of this untreated wastewater in to local water bodies. The establishment of wastewater treatment plant tackled this issue. The fluid effluents are sanitized by normally happening miniature creatures developed for the reason in holders like tanks and tidal ponds and so forth Various polymers at the pace of 40 l/hr (liter/hr) as 10 % arrangement are utilized for flocculation. Sulphuric corrosive 26l/hr (98 % fluid) is utilized for pH control.Chlorine gas is utilized to kill the microbes 650 g/hr. The every day assessment of boundaries like BOD, COD, TDS, TSS and pH showed that these are changed after treatment to the norms fixed by W.H.O. The BOD of material wastewater (989 mg/l), GWP wastewater (441 mg/l) and homegrown sewage (60 mg/l)was decreased to 60 mg/l. Likewise COD was changed in accordance with the degree of 250 mg/l which was viewed initially as 3,313 and 1,784 mg/l individually in material and GWP wastewater. The TSS was diminished to 80 mg/l. The pH of various waste waters was compared inside the scope of 6-9. Henceforth, the wastewater treatment plant demonstrated compelling to eliminate every one of the poisons. Wastewater put away in settlement and cleaning lakes was utilized for water system reason as and when required.

Keywords: Industrial Wastewater, Biochemical Oxygen Demand, Chemical Oxygen Demand, Microorganisms, Gamma Radiation, Organic Pollutants.

Introduction:

Water covers 71% of the world's surface and makes up 65% of our bodies. We utilize clean water for different purposes including cooking, washing, planting and so on lastly end up as wastewater. At the point when water becomes tainted, it loses its financial and tasteful worth, just as representing a danger to our wellbeing and the susta failure of marine life that relies upon it [1]. It is assessed that out of the absolute water provided around 70% to 80% becomes wastewater. The wastewater that is produced is delivered into the normal water stream. Removal of wastewater into the surface water sources causes critical issues and damages individuals' wellbeing the main answer for this is to get the wastewater the norms [2]. The wastewater contains numerous pathogenic microbes, microorganisms, suspended solids, supplements, minerals, harmful metals and so forth For a considerable length of time the essential objective of wastewater treatment was to decrease the quantity of suspended solids, oxygen-requesting materials, unsafe microorganisms, and broke up inorganic mixtures. Notwithstanding, as of late more pressure has been set on further developing the civil treatment processes for the removal of strong waste. In conventional wastewater treatment physical, compound and natural cycles are utilized to eliminate natural matter, supplements and solids from wastewater [3]. Fundamental, essential, optional and tertiary medicines are the distinctive treatment stages. Fundamental treatment incorporates the evacuation of coarse solids and other enormous materials from wastewater. The actual cycles of sedimentation and buoyancy are utilized in essential treatment to eliminate natural and inorganic solids. Inauxiliary treatment, the profluent is blessed to receive eliminate the leftover organics and suspended solids. Tertiary treatment incorporates all tasks and cycles used to eliminate the toxin not eliminated in past stages. Despite the fact that these means can further develop the water nature of ordinary wastewater, they can't be a therapeutic choice for treating the wastewater produced by the expanding modern exercises. The wastewater that we are managing may contain more toxins that are hard to eliminate by the traditional technique. The

wastewater that will be dealt with may contain more impurities that can't be treated by conventional strategies. The strategy for treatment to be utilized is chosen by the idea of wastewater and in this manner know the wastewater attributes like COD, TS, VS and salt substance [4-5]. Contamination in its broadest sense incorporates all progressions that reduce regular utility and apply pernicious impact on life. Water contamination is any synthetic, natural, or actual change in water characteristics that harmfully affects living life form or makes water unsatisfactory for want use. It has been proposed that it is the main overall reason for death and illnesses, and that it represent the passing of in excess of 14000 individuals day by day. The emergency set off by the quickly developing populace and industrialization with the resultant corruption of the climate makes a grave danger the personal satisfaction. Corruption of water quality is the horrible modification of the physical, synthetic and organic properties of water that forestalls homegrown, business, modern, farming, sporting and other advantageous employments of water [6].

Industrialization is the primary vein of a country. A created country can't be worked without industrialization. The development of industrialization prompts the ascent of wastewater created from different ventures and the contamination load on the climate is increasing.Water is the primary part which is utilized in all sort of enterprises. Water is utilized for various cycles in ventures. It very well might be utilized for washing, weakening, arrangement and other a few purposes. For the most part, practically every one of the ventures create wastewater that needs earnest consideration. Water utilized in industry is a multiplied edged sword. On one hand, it comes down on neighborhood water assets furthermore, on the opposite side, wastewater released from the business dirties the neighborhood climate. The primary concerning impurities of modern wastewater are microbes, parasites and infections, inorganic and natural poisons. Disposing of modern wastewater to the stream or lake without appropriate treatment can cause the harm of eco-framework and human's government assistance. Close to the undesirable poisons, modern wastewater contains important constituents, for example, large scale or miniature supplements and natural matters which all are fundamental for the plant development advancement. Muck is created as result of modern wastewater treatment interaction and it is additionally turned into a decent wellspring of natural manure. The utilization of modern wastewater muck as manure or soil conditioner is the best reusing choice for farming and ecological protection perspective. In any case, its high heap of poisons become the obstacle from valuable utilize or securely arrange to the water climate. Regular wastewater treatment incorporates essential treatment (actual sedimentation), optional treatment (synthetic sedimentation) and tertiary treatment (sanitization). Chlorine is utilized with the end goal of sterilization in ordinary interaction. The majority of the contaminations in modern wastewater are artificially and organically safe; subsequently, the use of regular treatment is frequently not adequate. Other than the decrease of microorganisms in wastewater treatment plants with chlorination was seen as deficient, and it might produce the development of cancer-causing chlorinated hydrocarbons. For this reasons, one more thought should be expected to supplant customary cycles and the supplanted procedures were co-precipitation, adsorption on charcoal and gums, buoyancy, biodegradation, burning and reusing. Quite possibly the most generally utilized techniques to treat the natural compound is adsorption on actuated carbon. Notwithstanding, the cycle just exchanges the pollutant from fluid to strong stage. In this treatment the natural mixtures are not debased, and the utilized (spent) actuated carbon must be disinfected or appropriately put away. One more acquainted strategy with the modern wastewater treatment innovation was progressed oxidation process (AOPs), which has drawn in many investigates on account of the ability to mineralize natural mixtures. The most effective oxidation is the utilization of OH revolutionaries. There are different techniques for producing OH revolutionaries like the utilization of ozone, hydrogen peroxide, Fenton response, bright and the communication of ionizing radiation with water [7]. Radiation processes resemble warm or substance processes in the perspective that incite changes on materials by energy move. The limiting energies of atomic bonds are for the most part under 12 eV. Assuming any material is submitted to a warm or compound interaction, the gradual of energy move is minuscule part of 1 eV up to roughly 10 eV; ionization moves a higher energy that changes qualities and corrupts materials and furthermore causes inactivation of microorganisms. The measures of energy moved isn't sufficiently high to cause changes of the core of particles and to make the material radioactive. This innovation never left buildups and that is the reason called a spotless innovation [8].

1. Materials and experimental work:

Materials utilized in this examination work were modern wastewater tests, some substance reagents and gamma light facility.Wastewater test for this exploration was gathered from the fundamental wastewater pipe line of Mandalay Industrial Zone. There are absolutely 9 production lines disposing of wastewater into this line. These production lines are, five refineries, one sugar plant, one sweets manufacturing plant and two material industrial facilities. All out release pace of this line is 327169 gallons each day (3.786

gallons each second). The most wastewater delivered plants are refineries and material industrial facilities and they involve around 96% of all out release. A few qualities of wastewater test are as per the following;

• pH – 2 to 3
• colour – reddish brown
• smell – rotten egg (bad smell)
• total solid - ~10%
• BOD – 7093 mg/l
• COD – 32664 mg/l.

X-ray fluorescence analysis of constituent elements in this wastewater sample is shown in Table 1.

The chemicals used in this research were sulphuric acid, hydrogen peroxide, ferrous sulphate, calcium hydroxide and activated carbon.

Gamma Chamber 5000 was used as the irradiation facility for this research. Gamma source is Co-60 and activity was 1.24 kCi (1.61 kGy per hour) and the capacity of the chamber is 5 liters. The Diagram of Experimental Work Fig.1

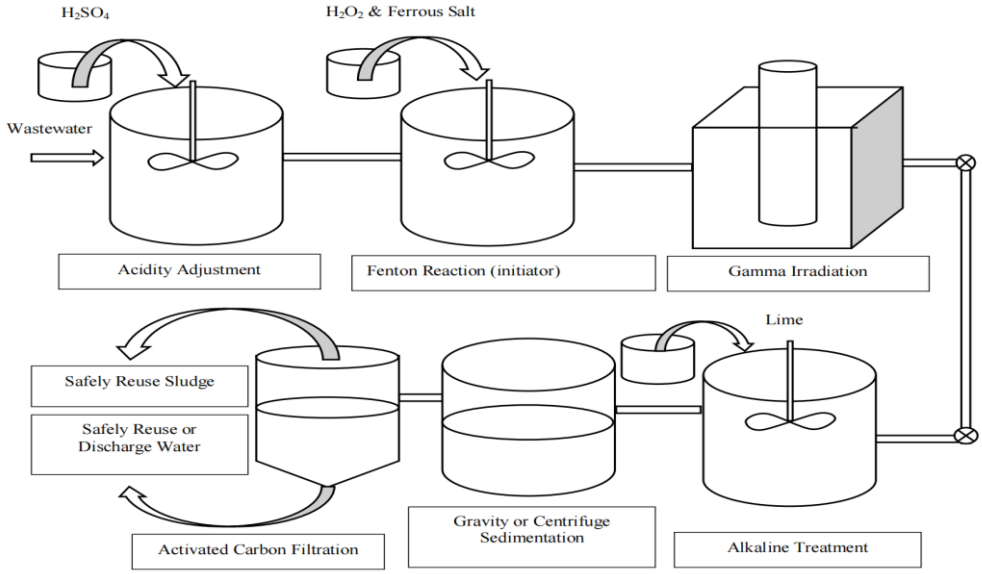

Fig. 1: Diagram of Experimental Work

Table I: Constituent Elements of Industrial Wastewater Sludge

No.	Formula	Atomic no.	Net Int (kcps)	Cal. Conc (%)
1	Na	11	0.7806	1.22
2	Mg	12	2.949	0.842
3	Al	13	0.1499	0.038
4	Si	14	2.773	0.494
5	P	15	16.12	1.97
6	S	16	52.79	4.094
7	Cl	17	12.91	1.69
8	K	19	190.4	19.08
9	Ca	20	16.37	2.28
10	Mn	25	1.46	0.0585
11	Fe	26	30.86	0.853
12	Cu	29	3.787	0.0389
13	Zn	30	1.895	0.01
14	Rb	37	8.296	0.08
15	Sr	38	2.114	0.022

2. Wastewater treatment in India:

Out of 16,662.5 MLD of wastewater generated, only 4037.2 mld (24 %) is treated before release, the rest (i.e. 12,626.30 MLD) is disposed of untreated. Twenty-seven cities have only primary treatment facilities and only forty-nine have primary and secondary treatment facilities.

3.1 Aerobic and Anaerobic Wastewater Treatment:

High-impact, as the title proposes, implies within the sight of air (oxygen); while anaerobic means without any air (oxygen). These two terms are straightforwardly identified with the sort of microbes or microorganisms that are engaged with the debasement of natural pollutants in a given wastewater and the working states of the bioreactor. In this manner, high-impact treatment processes occur within the sight of air and use those microorganisms (likewise called aerobes), which utilize sub-atomic/free oxygen to acclimatize natural debasements for example convert them in to carbon dioxide, water and biomass. The anaerobic treatment processes, on other hand happen without a trace of air (and consequently sub-atomic/free oxygen) by those microorganisms (likewise called anaerobes) which don't need air (sub-atomic/free oxygen) to acclimatize natural debasements. The end results of natural absorption in anaerobic treatment are methane and carbon dioxide gas and biomass [9] Fig.2.

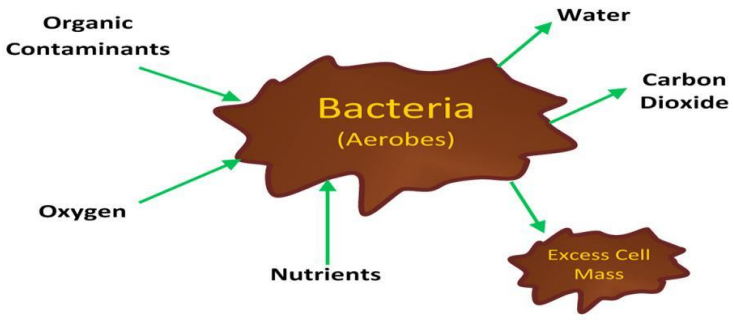

Fig.2 Aerobic Process

Aerobic treatment systems such as the conventional activated sludge (CAS) process are widely adopted for treating low strength wastewater (< 1000 mg COD/L) like municipal wastewater. CAS process is energy intensive due to the high aeration requirement and it also produces large quantity of sludge (about 0,4 g dry weight/g COD removed) that has to be treated and disposed off. As a result, the operation and maintenance cost of a CAS system is considerably high. Anaerobic processes for domestic wastewater treatment are an alternative that is potentially more cost-effective, particularly in the sub- tropical and tropical regions where the climate is warm consistently throughout the year. Anaerobic wastewater purification processes have been increasingly used in the last few decades. These processes are important because they have positive effects: removal of higher organic loading, low sludge production and high pathogen removal, methane gas production and low energy consumption [10] Fig.3.

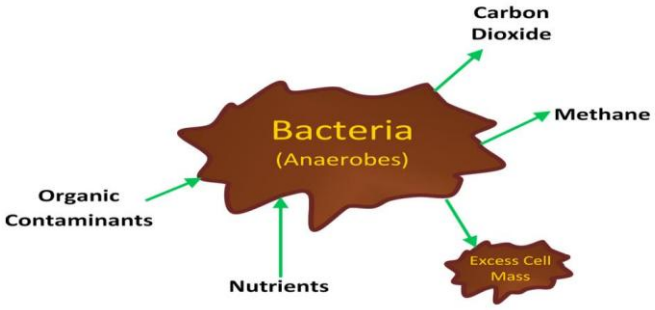

Fig.3 Anaerobic Process

3.2 Conventional Wastewater Treatment Method:

Traditional wastewater treatment uses physical, chemical, and biological methods to remove solids, organic matter and, nutrients from wastewater. The different stages include preliminary, primary, secondary and tertiary.

A. Preliminary Treatment:

The goal of primer treatment is to isolate drifting materials like dead animals, free branches, papers, bits of clothes, and furthermore substantial settleable inorganic solids. This stage additionally helps in eliminating oils, oil, and so forth, from the sewage. This treatment diminishes the BOD of wastewater by 15-30%.Screening, garbage tank, comminutors, floatation unit and skimming tanks are the different units engaged with fundamental treatment. Screening is utilized for the expulsion of drifting matter. Garbage

tank is otherwise called coarseness chamber, is utilized for evacuation of sand and coarseness. Comminutors are utilized for crushing and slashing enormous size suspended solids. Floatation units and skimming tanks are utilized to eliminate oils and lubes [11]

B. Primary Treatment:

The actual cycles of sedimentation and floatation are utilized in essential treatment to eliminate natural and inorganic solids. During essential treatment, around 5-half of the approaching biochemical oxygen interest (BOD5), 50-70% of the complete suspended solids (SS), and 65% of the oil and oil are eliminated. Despite the fact that natural nitrogen, natural phosphorus, and weighty metals related with solids are taken out during essential sedimentation, colloidal and broke down constituents are not impacted. In many industrialized nations, the base degree of pre-application treatment needed for wastewater water system is the essential treatment. This can be considered to flood crops that are not devoured by people or to inundate plantations, grape plantations, and some handled food crops [12]. Essential sedimentation tanks might be round or rectangular bowls, normally 3 to 5 m profound, with water driven maintenance time somewhere in the range of 2 and 3 hours. Settled solids (essential slime) are typically taken out from the lower part of tanks to a focal well from where it is siphoned to slop handling units. Filth is additionally taken out from the tank surface by water jets or mechanical means to slop handling units [13].

C. Secondary Treatment:

The effluent from the primary sedimentation tank contains 60 to 80% of the unstable elementary organic matter originally present in sewage. The colloidal organic matter which passes the primary clarifiers has to be removed by further treatment. The secondary or biological treatment of sewage involves modifying the character of the organic matter and thereby transforming it into stable forms through oxidation or nitrification. [14].Secondary treatment of sewage involves various methods;these methods are broadly classified into two categories called filtration and activated sludge process. Contact beds, intermittent sand filters and trickling filters are the various filters used in the secondary treatment [15].

D. Tertiary Treatment:

Tertiary treatment is performed when specific wastewater constituents which cannot be separated by secondary must be removed. The final cleaning process improves the wastewater quality before it is reused, recycled, or discharged to the environment. The treatment removes inorganic compounds and substances such as nitrogen and phosphorous [16].

3.3 Modern Wastewater Treatment Technologies:

Enactment and heavy fines for the removal of wastewater that doesn't meet as far as possible are the essential reasons that prompted the beginning of new or further developed wastewater treatment advancements. Because of this the plants and ventures have fuel-led the presentation of new or further developed treatment advancements [17]. The eco-accommodating nature and costeffectiveness of anaerobic and vigorous advancements have made them be utilized in the treatment of natural wastewater. Be that as it may, anaerobic advancements enjoy an additional benefit of low energy utilization among their friends. The initial step to pick a sufficient treatment innovation is to track down the idea of the wastewater; hence, it is pivotal to portray water to decide key wastewater qualities, for example, compound oxygen interest, absolute solids, unpredictable solids, salt substance and so on [18].

A. Nanofiltration (NF):

Film filtration cycles, for example, nanofiltration have perceived as viable method for giving a protected and dependable cause of supply water by reuse for both drinking water and non-drinking water purposes [19]. Before the film filtration process, wastewater was pre-offered by appropriate strategies eliminate the vast majority of the suspended or un-disintegrated fixings like suspended strong, inorganic and natural mixtures. this is done to shield the significant expense film from harm [20]. Lingering toxins are basically disintegrated substantial metals salts. In the treatment strategy, we attempt to build the sub-atomic size of the contaminations then, at that point, chosen the appropriate layer filtration system for toxins partition [21]. The fundamental study of the film cycles can be clarified by the arrangement of the weighty metal of cationic structures which are at first edifices by a holding specialist which will build the sub-atomic load of the fortified cations and increment the size of the particle to a size more prominent than the pores of the layer which is utilized for partition [22-23]. Film filtration has two viewpoints that separate layer filtration contrasted with other regular filtration strategies. The main viewpoint is, layers are deviated and the feed is looked by the little pore size, which diminishes the tension drop across the film and wipes out film stopping propensity. The subsequent viewpoint is, a solid get stream over the layer surface is important to work film frameworks. The crossflow kills the chance of channel cake develop [21]. The film filtration is recognized by the accompanying benefits contrasted with the other customary partition innovations: low-energy necessities, the high selectivity of division, and exceptionally quick

response energy [24]. It is normal that the adaptability of planning and the assortment of natural substances for NF arrangement will increment and spread its application in various cycles [25]. NF is recognized with the evacuation of calcium and magnesium particles bringing about water relaxing, and no option of sodium particles during filtration [26] contrasted with particle trade units.NF doesn't need extra compound treatment to decrease hardness. NF doesn't needheating or cooling of feed like distillation for example which will reduce the cost of separation effectively. In addition, no mechanical stirring is required which will maintain gentle molecular separation. NF has the important benefit of handling a high volume of feed continuously and a stable flow rate of permeate.NF has a limited application in the industry due to the pore size of the membrane, which is limited to nanopore size. Reverse osmosis and ultrafiltration are preferred since they can cover the UF range effectively without the cost limitation of NF due to high initial, operating and maintenance cost [27]. Based on the amount of total dissolved solids, membranes have to be changed before the actual life which increases the NF cost.

B. Use of Algae in Wastewater Treatment:

Over the most recent 50 years, organic wastewater treatment frameworks utilizing microalgae have filled in prominence, and it is presently generally trusted that algal wastewater treatment frameworks are similarly just about as effective as ordinary treatment frameworks. On account of their qualities, algal wastewater treatment frameworks have turned into a suitable minimal expense option in contrast to more modern and costly treatment frameworks, especially for civil wastewater. Green growth recuperated from treatment lakes are ordinarily used as a nitrogen and phosphorus supplement in horticulture, and they may likewise be aged to create energy from methane. Green growth are equipped for disposing of poisonous substances like selenium, zinc and arsenic from the sea-going climate by aggregating those substances inside them. [28]. Numerous green growth can take up and collect numerous radioactive minerals in their cells even their focus in water is more. For instance, spirogyra can amass radio-phosphorus.Thinking about this large number of capacities of green growth to filter the wastewater of many kinds, it is quite important that algal innovation in wastewater treatment frameworks is relied upon to settle the score more well known before very long. Standard culture medium has been intended for certain microalgae strains and has since been altered to create a wide scope of various microalgae strains. These are subsequently utilized as layouts to characterize wastewater attributes and to choose the microalgal strain of the microalgae consortium that would best have the option to treat a specific wastewater source. Different exploration groups [29] detailed the presence of arising toxins (EP) in wastewater and the conceivable bothersome impacts they can cause on the climate and living beings. This EP incorporates, among others, pesticides, drugs, and beauty care products; and a few advancements have been proposed for their expulsion, for example, Physico-synthetic and organic treatment methodologies. The utilization of unadulterated microalgae strains to eliminate EP has been demonstrated to be helpful. Be that as it may, microalgae-based EP expulsion innovations have not gotten a lot of consideration in the worldwide examination local area. In oceanic environments, microbes and green growth have an advantageous relationship. Green growth help high-impact bacterial oxidation of natural materials, by giving oxygen through photosynthesis and devour carbon dioxide and supplements that created through high-impact bacterial oxidation, for their turn of events. Most of nitrogen in algal cell bound to proteins which makes to 45-60% out of dry weight and phosphorous is fundamental for the amalgamation of nucleic acids, phospholipids and phosphate esters. Green growth that need nitrogen and phosphorus in their improvement can eliminate the supplements from wastewater in a brief period [30]. Oxidation lakes that advance the development of specific species might be more fruitful in eliminating supplements than customary treatment techniques. Phosphorus sedimentation, smelling salts, and hydrogen sulfur expulsion are brought about by expanding broke up oxygen fixation and pH. High pH in algal lakes additionally prompts microorganism sanitization. Additionally, the evacuation proficiency of weighty metals by green growth shows changes among species [31]. There are difficulties like the requirement for enormous land region, detachment of algal biomass from the water, decline in the productivity during cold environment and the restricted capacity of the green growth biomass to diminish micropollutant content in the wastewater. Despite the fact that green growth can adjust to sub-deadly amounts, substantial metal development in cells might deleteriously affect other food web cycles [29].

C. Biosorption:

Biosorption is a Physico-compound interaction that happens normally in specific biomass which permits it to latently think and tie toxins onto its cell structure. It tends to be characterized as the capacity of natural materials to amass weighty metals from wastewater through metabolically intervened or Physio-synthetic pathway of take-up [29]. It doesn't need energy, and the quantity of impurities a dissolvable can eliminate is reliant upon dynamic harmony and arrangement of the cell sorbent surface. Pollutants are

adsorbed onto the cell structure. Despite the fact that the term biosorption is generally new, it has been put to use in numerous applications for quite a while. It is generally known to be utilized in Activated Carbon Filter. They can channel air and water by allowing toxins to tie to their permeable and high surface region structure. It additionally has numerous modern applications and is utilized as an option in contrast to human-made particle trade pitches, which cost multiple times more than biosorbents. It is utilized to eliminate effluents containing poisonous metals. A traditional strategy like coagulation, electrocoagulation, electro-floatation, and electro-affidavit have been utilized for the expulsion of substantial metals from the wastewater. In any case, they have different burdens like inadequate metal expulsion, age of ooze, high energy prerequisites and so forth on account of these detriments, a financially savvy, proficient and eco-accommodating elective innovation called 'biosorption' can be utilized for the expulsion of substantial metals from wastewater [31-36]. This incorporates the utilization of microorganisms, plant-determined materials, horticulture or modern wastewater, biopolymer as biosorbent [30]. It is a reversible fast cycle associated with restricting of the biosorbent in watery arrangement by mean of different communications rather than oxidation through high-impact or anaerobic digestion. The benefit incorporates straightforward activity, no extra supplement prerequisite, low amount of muck, high productivity, recovery of biosorbent and no increment in COD of water. It can eliminate impurities even in weaken fixation. The principal stage in biosorption is that the biosorbent ought to be suspended in the arrangement containing the biosorbrent (metal particle). After hatching for a specific time frame stretch, balance is achieved. At this stage, the metal-improved biosorbent could be isolated. The biosorption limit of biosorbent can be characterized as the measure of biosorbate (metal particle) biosorbed per unit weight of biosorbent [37].The challenges experiencing in biosorption are like those looked by layer filtration innovation prior to accomplishing importance and prominence as today. This incorporates the expense and solidness of the biosorbent (film), the lessening in restricting destinations (fouling), and helpless agreement and general hesitance to embrace new advances and so on [37]

D. Advanced Oxidation:

Progressed oxidation processes (AOPs) are a bunch of synthetic treatment systems intended to eliminate natural and inorganic materials in wastewater by oxidation through responses with hydroxyl revolutionary (OH). In functional cases, we use ozone ($O_{3)}$, hydrogen peroxide (H_2O_2) and UV light.Their application becomes fundamental on the grounds that a large number of the natural mixtures present in modern water are impervious to traditional treatment. The AOP methodology is valuable in cleaning naturally harmful or non-degradable materials, for example, aromatics, pesticides, petrol constituents, and unpredictable natural mixtures present in wastewater [38].

Rather than gathering or moving foreign substances into another stage, they can proficiently eliminate natural mixtures in the watery stage. Because of the reactivity of OH, it responds with numerous fluid contaminations. AOPs are relevant in a circumstance where numerous natural foreign substances should be eliminated simultaneously. Some weighty metals can likewise be taken out in the types of accelerated M(OH)X. Sanitization is conceivable in some AOP plans, making these AOPs an incorporated answer for some water quality issues. This strategy doesn't deliver any perilous substance into the water, in light of the fact that the side-effect shaped by lessening OH is H_2O. [39]. AOPs are somewhat exorbitant since it requires a consistent contribution of substance reagents to keep up with the activity of this AOPs frameworks. AOPs need hydroxyl extremists and different reagents with respect to the quantity of toxins to be wiped out by their actual nature. A few procedures require pretreatment of wastewater to guarantee dependable execution, which could be costly and in fact testing. The presence of bicarbonate particles (HCO_3^-) can fundamentally bring down the convergence of OH due to rummaging processes that yield H_2O and a substantially less receptive animal groups, for example, CO_3^-[40]. Therefore, bicarbonate should be killed from the framework any other way AOPs won't be effective. Utilizing AOPs alone to deal with a lot of wastewater isn't financially savvy; all things being equal, AOPs ought to be conveyed in the last stage solely after guaranteeing that essential and auxiliary treatment has effectively eliminated an enormous extent of foreign substances. Late examinations are essentially zeroing in on lessening the expense of treatment through consolidating AOPs with natural treatment [39]. This field has seen a quick headway both in principle and in application. TiO_2/UV frameworks, H_2O_2/UV frameworks, and Fenton, Photo-Fenton, and Electro-Fenton frameworks have gotten broad examination up until this point. [41]

Conclusions:

Wastewater age is unavoidable, yet it tends to be treated in a powerful manner to limit ecological effects. Industrialization prompted the presentation of new pollutants in pesticides, drugs, beauty care products, and so forth which have complex arrangements and are perilous in nature. Despite the fact that 75% of the world's surface is covered by water the accessibility of drinking water is under 1%. Placing this

accessible water in danger will bring us significantly more danger. In the present circumstance, it is fundamental for treat the wastewater, to fulfill the drinking water norms. Numerous treatment techniques are arising for the ultra-purging of wastewater. Water treatment innovation advancement and execution have been essentially determined by three essential factors: the disclosure of new more uncommon impurities, the reception of new water quality principles, and cost. During yearly periods, compound explanation, granular media filtration, and chlorination were for all intents and purposes the main treatment processes utilized in metropolitan water treatment. Be that as it may, today we can see a sensational change in the business' way to deal with water treatment as they are truly considering elective treatment advances to the customary filtration/chlorination treatment approach. The NF strategy can be applied for treating wastewater containing little pollutants. Additionally, it can relax the water alongside purging the water. Nonetheless, it is seen that they are not solid which makes them uneconomical. The utilization of green growth for wastewater treatment is an entrancing method since it is exceptionally conservative, yet it is seen that their productivity relies upon the climatic conditions. Biosorption is another arising innovation that is proficient in eliminating harmful particles and furthermore their activity is straightforward. With regards to cost, their application isn't liked. Progressed oxidation is a synthetic treatment strategy, that is profoundly proficient in wiping out natural mixtures, yet their activity is additionally exorbitant. Despite the fact that the greater part of the arising water treatment techniques are profoundly effective in eliminating toxins, their expense of activity is costly. Utilizing green growth bacterial beneficial interaction in treating wastewater shows a lot of proficiency and is efficient simultaneously. Consolidating other treatment strategies alongside green growth bacterial advantageous interaction can make the framework more productive and efficient.

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E-Marketing- Growth and Challenges in India

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Abstract:-

E marketing created a means of doing business defying time and space. It established speed, information flow and access in buying and selling of products. Marketers have been using electronic tools for many years, but the internet and other information technologies created a flood of interesting and innovative ways to provide customer value. The more the Internet settles into mainstream business, the more it spawns innovation and more change. Electronic marketing is the youngest of the membership growth devices and has grown tremendously since mainstreaming a little more than two decades ago. E-marketing is traditional marketing using information technology but with some twists. The marketing transformation results in new business models that add customer value, build customer relationships, or increase company profitability. This in turn created a virtual market for actual products globally. This paper emphasis on the growth and the challenges in the process of e-marketing.

Keywords-: Growth and challenges, E-marketing, Membership growth devices.

Introduction:-

Before the term e-marketing evolved, the term digital marketing was used in the 1990s. It is often referred to as "online marketing", "internet marketing", or "web marketing". Technically speaking, the Internet is a global network of interconnected networks. In this context, E-marketing is the use of information technology in the process of creating, communicating, and delivering value to customers, and for managing customer relationships in ways that benefit the organization and its stakeholders. E-marketing is the application of a broad range of information technologies for

1) Transforming marketing strategies to create more customer value through more effective segmentation, targeting, differentiation and positioning strategies.
2) More efficiently planning and executing the conception, distribution, promotion, and pricing of goods, services, and ideas, and
3) Creating exchanges that satisfy individual consumer and organizational customers' objectives.

Definition:

E-Marketing (Electronic Marketing) are also known as Internet Marketing, Web Marketing, Digital Marketing, or Online Marketing. E-marketing is the process of marketing a product or service using the Internet. E-marketing not only includes marketing on the Internet, but also includes marketing done via e-mail and wireless media. It uses a range of technologies to help connect businesses to their customers.

E-marketing involves the following aspects-:

1) Enabled by website, create virtual shops
2) Create customer data bank
3) Provide for business-to- business exchange of data
4) Contact customers by e-mail or fax
5) Use business-to- business buying and selling
6) Defies all barriers of time and space

The history of E-marketing:-

1)1971 or 1972 The ARPANET is used to arrange a sale between students at the Stanford Artificial Intelligence Laboratory and the Massachusetts Institute of Technology, the earliest e.g of commerce
2) 1979: Michael Aldrich demonstrates the first online shopping system.
3) 1981: Thomson Holidays UK is first business- to business online shopping system to be installed.
4) 1996: India MART B2B market place established in India.
5) 2007: Flipkart was established in India

Need of the study

India will likely see the golden period of the Internet sector between 2013 to 2018 with incredible growth opportunities and secular growth adoption for E-Commerce, Internet Advertising, Social Media, Search, Online Content, and Services relating to E-Commerce and Internet Advertising. As we all know, India has a long way to go in the world of Digital Marketing as more and more Indians are spending time on the internet as compared to China and US.Development and scope of E-Marketing marketing has universal application. It penetrates all kinds of business namely, agricultural, industrial, medical tourism, governance, education and so on. Some of the commonly used applications of e- marketing are: Document automation, payment systems, content management, group buying ,online banking, teleconferencing, electronic tickets which have become common with large and small businesses alike.

Objectives of the e-marketing:-

a) Methods of making market more effective and fulfil the needs and requirements of the customers.
b) To conduct research as to the nature e.g demographics, preference and needs of existing and potential customers.
c) Designing processes to provide a strong communication between businessman and clients.
d) To Identify the area of quality customer service with personal attention.

Research Methodology

This studied have been carried out on E-market. Data used in this study collected basically from the secondary sources. Primary data also collected through personal interview method conducting the person who is supposed to have knowledge about the topic. Secondary data have been collected from various sources including websites, newspapers, various published and unpublished article about pre-primary education etc.

Advantages of E-Marketing

1. Much better return on investment from than that of traditional marketing as it helps increasing sales revenue.
2. E-marketing means reduced marketing campaign cost as the marketing is done through the internet
3. Fast result of the campaign as it helps to target the right customers.
4. Easy monitoring through the web tracking capabilities help make e-marketing highly efficient
5. Using e-marketing, viral content can be made, which helps in viral marketing.

Disadvantages of E-Marketing

Dependability on technology
Security, privacy issues
Maintenance costs due to a constantly evolving environment
Higher transparency of pricing and increased price competition
Worldwide competition through globalisation

Types of E-Marketing

1. Article marketing
2. Affiliate marketing
3. Video marketing
4. Email marketing
5. Blogging
6. Content marketing.

Growth factors:

Individual or business involved in e-commerce whether buyers or sellers rely on Internet-based technology in order to accomplish their transactions. E-commerce is recognized for its ability to allow business to communicate and to form transaction anytime and anyplace. Whether an individual is in India or overseas, business can be conducted through the internet. The power of e-commerce allows geophysical barriers to disappear, making all consumers and businesses on earth potential customers and suppliers several factors have contributed to the growth of e marketing in India. There is sea change in the life style of the burgeoning middle class. Internet and 3G penetration revolutionized the marketing scenario For both consumers and the marketers. Rising standard of living has not only increased the level of consumption but also the pattern and quality of consumption. Busy urban lifestyles, lack of time for shopping, desire for variety and convenience and comfortable

disposable income has changed the way Indian consumers prefer to shop today6.Some other factors helping the online retail industry seeing good growth include smart phones offering accessibility to online shopping, aspirations of tier II & III cities, women becoming more tech savvy, evolving perception around branded products, impulsive buying and logistical convenience.

Barriers to Growth:

While India's Internet adoption rate has been projected to grow rapidly significant barriers limit the growth of future Adoption and e- business. A report conducted by Nasscom and Boston Consulting group outlines the following barriers-:

1) PCs and other devices to access the Net for individuals are less than 1%.
2) Telephone line penetration is limited to less than 3% of the population.
3) Poor telecom and communication infrastructure for reliable connectivity.
4) Internet connectivity is very slow and access costs are still very high.
5) High legal and regulatory barriers.
6) Safeguards to protect privacy of personal and business data are not in place.
7) Low penetration of credit cards.

Legal Issues:

Legal issues of e-commerce in India are generally ignored by e-commerce websites. Foreign companies and e-commerce portals would be required to register in India and comply with Indian laws, as India is gearing up to regulate online business. Efforts are being made to regulate marketing websites dealing with various products online and violating laws of India. Enforcement directorate (ED) of India has already initiated legal actions against companies dealing with Bitcoins in India. Tax liability of foreign companies like Google, Face book, etc. is also under consideration in India. Myntra, Flipkart and many more e-commerce websites are under regulatory scanner of ED of India for violating Indian laws8. The case of US-based transport application provider Uber Inc .is the latest example that can be cited. Similarly, illegal online sales of prescribed drugs by illegal online pharmacies of India are also under scrutiny of regulatory authorities of India In India, the Information Technology Act 2000 governs the basic applicability of e-commerce. Further, e-commerce laws and regulations in India are also supplemented by different laws of India as applicable to the field of e-commerce. For instance, e-commerce relating to pharmaceuticals, healthcare, travelling, etc. are governed by different laws though the information technology act, 2000 prescribes some common requirements for all these fields. The competition commission of India (CCI) regulates anti competition and anti trade practices in e-commerce fields in India.

Challenges in the context of skills:

The world is used to conducting business and commerce on signed paper documents. Electronic documents and messages, without familiar signatures and marks have changed the scene of trade. Consumers want to be assured that the electronic world is safe. Therefore there is a genuine expectation that e-commerce system offers some level of reliability. This includes integrity, confidentiality and non- repudiation of origin and receipt of electronic document in case of dispute. In e-commerce, there is a concern that in the absence of proper controls, it is relatively easy to change the electronic record. The common problems are legal problems in trademarks and domain names. Another issue is copyrights. Copyright was developed in the printed world .However, the copyright law protects only the expression of an idea and not the idea itself. Internet communications know no geographical boundaries which is a major issue, whereas traditionally consumers are conditioned to territoriality. Different laws are applicable under different jurisdictions. A number of questions which are vital to the legality of commerce in cyberspace continue to exist.

Conclusion:

The paper clearly shows that E-marketing impacts in various number of ways upon businesses. When used effectively, e-marketing campaigns and strategies have the potential to reach customers in a speedy and low-cost manner and can provide promotion to a wide range of products and services. The development of e-marketing and social media advertising has led to many businesses opportunities in recent years. Despite globalization speed and the extent of information that can be gained from E-marketing will surely help the business to develop, when implemented properly. On the other hand the technology driven approach of E-marketing leaves certain businesses vulnerable and overly dependent upon technology. It also empowers dissatisfied consumers to a far

greater extent than ever before and can lead to bad reviews that have the potential to greatly destabilize certain e-marketing campaigns and operations. However, despite these problems it is reasonable to conclude that E marketing is on the whole a positive development for businesses and that despite certain dangers. Its impact upon businesses has been largely positive.

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Online shopping- a sustainable competitive advantage over offline shopping

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Abstract

Online shopping is the preferred way of shopping for the people who want to save their time and get the products and services at their doorstep. online shopping is a fundamental concern of decision making for purchasing various products by the consumers through different websites and e-commerce applications. The brick-and-mortar system is challenged by the e-commerce system. Things are easily available at low cost. So, people are interested to buy from the online channels more than the offline channels. During the pandemic it got more advantage as because of lockdown it was not possible for everyone to go out and buy the goods. Sustainable competitive advantage in B2C shopping is achieved through continuous improvement in the websites, and applications.In this paper study is done to find out the preference of people to buy online over offline and the sustainability of online shopping over offline.

Key Words Sustainability, online shopping, offline shopping, competitive advantage

Introduction

Today's retail environment is very competitive. In the retail scene multichannel retailing is the best way to sell goods. The internet has transformed and will continue to transform the retail sector.(Blázquez n.d.)Online buying, also termed as Internet buying, refers to purchasing goods or services through Internet.(Zhou et al. n.d.)Since the late 1990s, online shopping has taken off as an increasing number of consumers purchase increasingly diversified products on the Internet. Online stores are combination of traditional brick-and-mortar store, warehouse, and consumer magazine. Customer can browse and search for items just as a regular store. There is wide range of products, sizes, and colours of products, as one can find in the warehouse and most online stores contain reviews of products by people who bought it earlier. Clothing is the most commonly purchased item on internet which is followed by jewellery.(Rai n.d.) In online shopping, P2P platforms act only as intermediary which allows the sellers and buyers meet directly for transaction. A seller can use the P2P website or mobile app with a login account, take a picture of the product, post an ad, fix the price, give verified contact details and pay a nominal fee to go for a premium ad listing while a buyer can search for products available and click for adding in the cart of putting the buy now option, pay the money through online sources or cash on delivery and buy the things at their door step.(Padmavathy, Swapana, and Paul n.d.) There are many reasons consumers can buy online for example consumers can buy anything at any time, they can avoid pressure when having an interaction with the salesperson, they have cost efficiency, they have time efficiency and moreover lot of convenience.It is required that retailers should create sustainable competitive advantages that enable customers to survive against all odds as and when presented by its competitors. competitive advantage is your unique skills and inherent resources devoted/dedicated to your business that competitors cannot predict easily.(Anon 2015)Customer experience has gradually become the main source of retailers' sustainable competitive advantage through differentiation. Online retailers have started to expand their e-grocery market and offer their customers a full range of services, in addition to their traditional offerings that limit the selection to non-perishables products. In 2017, Amazon acquired Whole Foods Market grocery chain stores to complement its satellite de-bulking facilities in an effort to get groceries closer to consumers (Mkansi and Nsakanda 2021)

Online trust is built through the sustainability that a customer has

(1) a belief that the seller has not done any cheating while selling.

(2) a belief that the website is safe to purchase the products

(3) by having a typical user interface, it is easy to buy the products.

(4) Application or website is, moreover, easy to use.(Gefen, Karahanna, and Straub 2003)

Ecommerce has grown in popularity because of the sustainability in the form of convenience, eco-friendly packaging, use of biodegradable and recycled materials, renewable resources, value, and choice it offers consumers. And online selling goods will remove the middlemen and thereby goods will be available at low price. The increase in online shopping generates new economy growth and spurs innovation among sellers, getting them to pinpoint what makes their product unique and create a compelling experience that keeps customers coming back. This creates greater incentive for customers to shop online and drives growth for the economy overall. (Miva n.d.) the current ecommerce climate is driving entrepreneurship and encouraging businesses of all sizes to compete. This sustained growth and activity leads to more online experiences for all customers. sing people centred and earth centred approach in distribution is another way to maintain sustainability. Nowadays many of the online website provide job opportunities to women as delivery agents thus they generate employment in this sector also.The quality of the online customer experience in terms of web site ease of use, selection of goods offered, quality of customer service, the effectiveness of virtual community building, and site personalization are crucial to the success of online shopping. If differences in the quality of online experiences provide a long-term competitive advantage, we would expect a positive relation between quality of online experience and shareholder value.(Rajgopal, Venkatachalam, and Kotha 2000)

Methodology To examine the sustainability of the online shopping over the offline shopping, the research was conducted with the help of google forms circulated randomly to the people and the responses were collected.

Results And Interpretations A Survey was conducted from the sample of 145 respondents which consisted of 52.4% male and 47.6% female respondents. The age group was 18-30 years which were 81.80%, 31-40 years were 4.9%, 41-50 years were 3.5%, 51-60 years were 8.4% and 60 and above years were 1.4%. The research was conducted from 6 states randomly. Data was analyzed with SPSS software and excel, the following is the result of the research.

Table 1

Profile of the respondents

Profile variables	particulars	No. of Respondents	percentage
Gender	Male	75	52.40%
	Female	68	47.60%
age	18-30	117	81.80%
	31-40	8	4.90%
	41-50	5	3.50%
	51-60	12	8.40%
	60 and above	2	1.40%
Name of state	Maharashtra	134	92.41%
	Gujarat	5	3.44%
	Jharkhand	1	0.68%
	Karnataka	1	0.68%
	MadhyaPradesh	2	1.37%
	UttarPradesh	2	1.37%

Table 2

Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	77	53.1	53.1	53.1
	Female	68	46.9	46.9	100.0
	Total	145	100.0	100.0	

53.1% are male and 46.9% are female respondents.

Table 3

Age					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-30	117	80.7	80.7	80.7
	31-40	8	5.5	5.5	86.2
	41-50	5	3.4	3.4	89.7
	51-60	15	10.3	10.3	100.0
	Total	145	100.0	100.0	

Highest number of respondents are from 18-30 years and lowest number of respondents are from 41-50 years category.

Table 4

State					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Maharashtra	132	91.0	91.0	91.0
	Gujarat	6	4.1	4.1	95.2
	Jharkhand	2	1.4	1.4	96.6
	Karnataka	1	.7	.7	97.2
	Madhya Pradesh	2	1.4	1.4	98.6
	Uttar Pradesh	2	1.4	1.4	100.0
	Total	145	100.0	100.0	

Highest number of respondents are from Maharashtra i.e., 91% whereas the other states participants are very less.

Table 5

Online shopping					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	131	90.3	90.3	90.3
	No	14	9.7	9.7	100.0
	Total	145	100.0	100.0	

Table 6

Frequency					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Sometimes	81	55.9	55.9	55.9
	Most of the times	42	29.0	29.0	84.8
	when I don't get the products offline	22	15.2	15.2	100.0
	Total	145	100.0	100.0	

Large number of participants i.e., 55.9% feels to buy only sometimes through the online channels.

Table 7

Preference					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Offline	105	72.4	72.4	72.4
	Online	40	27.6	27.6	100.0
	Total	145	100.0	100.0	

People prefer more offline than online.

Table 8

Availability					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	101	69.7	69.7	69.7
	No	9	6.2	6.2	75.9
	May be	35	24.1	24.1	100.0
	Total	145	100.0	100.0	

69.7% people feel that products are easily available online.

Table 9

Uniqueness					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	109	75.2	75.2	75.2
	no	11	7.6	7.6	82.8
	may be	25	17.2	17.2	100.0
	Total	145	100.0	100.0	

More than 75% people feel that online products are unique in character.

Table 10

Packaging					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	118	81.4	81.4	81.4
	No	3	2.1	2.1	83.4
	May be	24	16.6	16.6	100.0
	Total	145	100.0	100.0	

More than 81% feel that the packaging of products is attractive and good.

Table 11

Selection					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	100	69.0	69.0	69.0
	no	20	13.8	13.8	82.8
	May be	25	17.2	17.2	100.0
	Total	145	100.0	100.0	

Highest number i.e., 69% people feel that there is possibility of good selection in online channels.

Table 12

Discounts					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	84	57.9	57.9	57.9
	no	19	13.1	13.1	71.0
	may be	42	29.0	29.0	100.0
	Total	145	100.0	100.0	

57.9% people feel that good discounts are available online.

Table 13

Damaged products					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	46	31.7	31.7	31.7
	no	44	30.3	30.3	62.1
	sometimes	52	35.9	35.9	97.9

	most of the times	3	2.1	2.1	100.0
	Total	145	100.0	100.0	

In this category people agree that they sometimes get damaged products in online shopping.

Table 14

Exchange					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	104	71.7	71.7	71.7
	No	18	12.4	12.4	84.1
	May be	23	15.9	15.9	100.0
	Total	145	100.0	100.0	

Highest number of people i.e., 71.7% feel that they get quick exchange in online shopping.

Table 15

Moneyback					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	98	67.6	67.6	67.6
	No	19	13.1	13.1	80.7
	May be	28	19.3	19.3	100.0
	Total	145	100.0	100.0	

67.6% people feel that they get money back easily in online shopping.

Table 16

Anytime Anywhere					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	102	70.3	70.3	70.3
	No	15	10.3	10.3	80.7
	May be	28	19.3	19.3	100.0
	Total	145	100.0	100.0	

More than 70% people feel that they can shop anytime and anywhere through online shopping channels.

Table 17(a)

Case Processing Summary						
	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Gender * Preference	145	100.0%	0	0.0%	145	100.0%

Table 17(b)

Gender * Preference Crosstabulation					
			Preference		
			Offline	Online	Total
Gender	Male	Count	52	25	77
		% within Gender	67.5%	32.5%	100.0%
	Female	Count	53	15	68
		% within Gender	77.9%	22.1%	100.0%
Total		Count	105	40	145
		% within Gender	72.4%	27.6%	100.0%

In gender comparison with preference male sample are preferring more offline than online whereas women and when we compare in total regarding the offline people are preferring more offline than online.

Table 18(a)

Case Processing Summary						
	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Online shopping * Frequency	145	100.0%	0	0.0%	145	100.0%

Table 18(b)

Online shopping * Frequency Crosstabulation						
			Frequency			
			Sometimes	Most of the times	when I don't get the products offline	Total
Online shopping	Yes	Count	75	41	15	131
		% WithinOnline shopping	57.3%	31.3%	11.5%	100.0 %
	No	Count	6	1	7	14
		% WithinOnline shopping	42.9%	7.1%	50.0%	100.0 %
Total		Count	81	42	22	145
		% WithinOnline shopping	55.9%	29.0%	15.2%	100.0 %

In comparison to online shopping with frequency that highest number of people prefer sometimes to buy online otherwise they are preferring offline.

Table 19(a)

Case Processing Summary						
	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Gender * Discounts	145	100.0%	0	0.0%	145	100.0%
Gender * Exchange	145	100.0%	0	0.0%	145	100.0%
Gender * Moneyback	145	100.0%	0	0.0%	145	100.0%

Table 19(b)

Gender * Discounts Crosstabulation						
			Discounts			
			yes	no	may be	Total
Gender	Male	Count	44	11	22	77
		% within Gender	57.1%	14.3%	28.6%	100.0%
	Female	Count	40	8	20	68
		% within Gender	58.8%	11.8%	29.4%	100.0%
Total		Count	84	19	42	145
		% within Gender	57.9%	13.1%	29.0%	100.0%

In comparison to the gender with discount understanding more female sample feels that they get discount in online shopping than offline

Table 19(c)

Gender * Exchange Crosstabulation				
	Exchange			
	yes	No	May be	Total

Gender	Male	Count	52	9	16	77
		% within Gender	67.5%	11.7%	20.8%	100.0%
	Female	Count	52	9	7	68
		% within Gender	76.5%	13.2%	10.3%	100.0%
Total		Count	104	18	23	145
		% within Gender	71.7%	12.4%	15.9%	100.0%

In comparison to gender with understanding of exchanging products again female feels that there is more possibility of exchange in online than the male sample.

Table 19(d)

Gender * Moneyback Crosstabulation						
			Moneyback			
			yes	No	May be	Total
Gender	Male	Count	54	8	15	77
		% within Gender	70.1%	10.4%	19.5%	100.0%
	Female	Count	44	11	13	68
		% within Gender	64.7%	16.2%	19.1%	100.0%
Total		Count	98	19	28	145
		% within Gender	67.6%	13.1%	19.3%	100.0%

In comparison to gender with money back more male agree that they get money back easily on returns with the online shopping.People are describing various websites and applications like Amazon, Ajio, Myntra, Flipkart, eBay, Nike, etc. which they feel easy for their buying.

Limitation Of The Study

Due to time limitation this study was conducted in less than a month time and the number of respondents is also limited to 145 from 6 states. There is a possibility to further research in these areas with more elaborative questions and the sample size can be increased and a large area can be covered in this regard.

Observation And Conclusion

It is not surprising that online shoppers tend to earn more money than traditional store shoppers due to sustainability provided by them through less wastage over packaging, on time and before time delivery, no touch delivery (specially in covid time), branded products etc. Online shopping is mostly done by the young and middle-aged people whereas its advantages and disadvantages are known to all aged people. The feeling of personal touch and the beauty of going outside for shopping and window shopping cannot be replaced with online shopping over offline shopping but the busy life schedule, long hours jobs, trust made by the online website for exchange and systematic returns, ease of payment through mobile wallets and other UPI payment systems and the increasing number of online shops really encourage people to go for online shopping without hesitation.

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Climate Crisis And Tribal Comouflag

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Abstract: -

Climate change has been a major problem for decades. Constant climate change is affecting the lives of the tribal people, their livelihoods, their economy and consequently their socialization. According to Article 342 of the Indian Constitution, there are about 700 different tribal castes and tribes in India. According to the 2011 census, their number was 8.6 percent. There has been a further increase in these ten years. Their economic livelihood depends mainly on forests and agriculture. But in the name of making more and more progress, the forests were destroyed. This has an effect on climatic factors such as rainfall, temperature, soil and water resources. Emissions of greenhouse gases are adding fuel to the fire. As a result, the mathematics of his life is collapsing. Tribals are mainly dependent on these natural resources. Nevertheless, they are successfully using their traditional knowledge to cope with these changes. The government needs to use their knowledge and wisdom to adapt to the changing climate

Keywords: - climate crisis, consequences, tribal, camouflage etc

Introduction: -

Today we are standing on the threshold of destruction that even if we do not try now, destruction is inevitable and certain. Because if anything is taken for granted, its end is certain. Here we are not talking about any war or any terrorism attack where we are certainly going to win and getting victory. Here we are discussing about the existence of whole mankind by protecting it from outburst of climate change. These changes are already started many decades ago. Now they are continuously moving towards apex of eruptions. Meanwhile they shows many signals to mankind to save themselves from this unrecoverable deterioration like flood, drought condition, melting ice of Antarctica, spreading acids in Ocean, rising of sea levels, dying of coral reef, burning of forest, etc. Each and every corner of our one and only globe is facing all these crises. This is happening more rapidly than we assume. Now it's time to take concrete step before we calculate the cost of disappearing of human existence.

What is climate crisis?

The main driver of climatic change is the greenhouse effect. Carbon dioxide, methane, water vapor, nitrous oxide gas from the earth's atmosphere act as barriers in the greenhouse. They trap the sun's heat in the atmosphere and prevent it from returning to space. Without these gases, the Earth's temperature would be -18 degrees Celsius. Therefore, it is essential that the amount of these gases be in right proportion. Human activities such as fossil fuels, fertilizer management, cement production, industrial power generation, tourism, etc. emit large amounts of carbon dioxide. Its atmospheric concentration is 100 ppm which is much higher than normal. Along with that deforestation is also fuel up this changes. Many species specially in human kind Tribals are mainly dependent on forest to run their bread & butter. So, climate crisis very badly affected to their overall phenomenon.

Relevance of the study: -

Extremely rapid changes in climate are affecting different organisms in the ecosystem in different ways. Climate change in glacial regions is considered to be one of the most vulnerable ecosystems. Because the biggest impact of temperature change is sitting there. As a result, the previously dense layer of ice is now thinning and melting. As a result, the water level in glaciers is rising. Also, harmful bacteria buried in ice millions of years ago are now likely to be revived. Not only that, but according to the new environment, there is no denying the possibility that they may be modified and become even more dangerous. They can spread from water to other places. From time immemorial, primitive man has inhabited the land along the river. This primitive man started his livelihood from

the forest. He also protected the forests. But deforestation had deprived them of their right to shelter. Deforestation has negatively affected their natural ecosystem, existence and cost of living.

The article includes how tribals are severely and adversely affected due to these crises and changes their lifestyle, culture, traditional food, habitat form and economy extra. But even today, these tribal peoples, found all over the world, have the traditional knowledge and methods to adapt to climate change. Their knowledge extends to tribal and non-primitive people as well.

Objectives of study

1) to search the reasons of climate crisis.
2) To assess its negative impact on overall tribal economy**.**
3) to study previous mechanism utilized by them in climate changes for survival.

Methodology

Climate crisis issues are being examined by secondary data, annual reports of various decades, related data have been assessed by in support of interviews, Focus group discussions, questionnaire, journals, extra.

Assumptions

1) Climate change is affecting the whole earth.
2) Tribal farmers subsisting on forest have been hit twice.
3) Outbreaks of pests on crops have affected their economic and social life.
4) Tribal people are trying to balance their economic and social life by adapting to these changes in the environment.

Causes of climate crisis –

Climate change can be both internal and external. For example, changes in the distribution of energy in the oceans and in the atmosphere many times during internal processes affect the climate (changes in thermohaline). Extrinsic systems can be anthropogenic (green house or dust emissions) or natural (changes in solar energy, orbit of the earth, volcanic eruptions). Climate change is largely due to human intervention. Scientifically, global warming means an increase in the earth's surface temperature. Climate change, along with global warming, requires increasing levels of greenhouse gases. Elements of the Earth's climate system include the atmosphere, hydrosphere, lithosphere, and the biosphere. If there is a change in this, it is said that there is a change in the internal climate. These changes are often found in cyclical or oscillating forms, for example, according to the **IPCC** report, no matter how much humans decide to reduce emissions, this point will reach its highest level by 2050. Also, the amount of co2 in the atmosphere is much higher than it is now two million years ago. Methane and nitrous gas agencies are having an adverse effect on climate change. In addition, the following factors have a profound effect on global warming:

Fossil fuel -

According to the International Energy Agency, such a goal must be achieved by 2050 through a sustainable path. Humans burn fossil fuels, for example coal, oil, wood, natural gas, etc., so the Earth's atmosphere emits large amounts of gases such as carbon dioxide and methane. Therefore, human beings should stop adopting these resources. Also**, Zero - Emission Target** should be sworn.

Deforestation -

Carbon dioxide emissions have increased significantly by 50 percent since 1960. Yet 56% of the CO2 emitted into the atmosphere is absorbed by forests, soils and oceans. But due to inhumane deforestation, CO2 in the atmosphere is not absorbed as much by the forest. For example, according to the **Brazilian Space Agency**, by August 2020-2021, a total of 8,172 square kilometres of forest, known as the Earth's lungs, had been decimated. This significantly reduced the amount of oxygen released into the atmosphere by CO2 absorbed by plants.

Livestock farming -

The demand for livestock is increasing tremendously for various reasons. But when cows, buffaloes and sheep digest food, a large amount of methane gas is produced. This gas is considered to be one of the most important greenhouse gases on earth. It also requires agriculture to manage their fodder. Deforestation also occurs as a result.

Fertilizers containing nitrogen -

Continuous farming destroys the fertility of the soil. Soil nutrient depletion occurs early and adversely affects crop growth. They use nitrogenous fertilizers to strengthen the growth of the crop. But these fertilizers emit nitrous oxide, which further raises the earth's temperature.

Fluorinated gases –

These harmful gases are widely used in commercial and industrial fields. ex. AC, freeze heaters etc. They are also used as foam, fire extinguisher, solvents and aerosol propellants. They generate 23,000 times more heat than gas. For example, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF6), nitrogen trifluoride (NF3) etc.From last 15 years the data produced by thousands of scientists over all the world, analysed and organized by Intergovernmental Panel on Climate Change (IPCC) has confirmed that 97% of global warming derives from anthropogenic greenhouse effect i.e. it is caused by human activity. In reality Nobel prize winner **Svante Arrhenius** and later confirmed by American scientist **David Killing** in 1960 has said that there is a connection between the level of carbon dioxide and rising of temperature was established back in the last century.

Consequences of climate change –

1) Earth's temperature has increased by 0.98 Celsius. Scientists' research suggests that in the period from 2030 to 2050, It is likely to go up to +1.50. We will have to face the worst consequences.

2) The thickness of ice on both poles of the Earth decreases by 12.85% every ten years.

3) Sea level has been rising by 3.3 millimetres every year since 1870 by storing melted ice water in the sea.

4) fire seasons which are combination of high temperature, low humidity, rainless days and high winds have become larger and more intense like Australia in year 2019.

5) On closer inspection, it has been observed that the recurrence of catastrophic natural calamities like cyclones and floods has also increased significantly since 1990.

6) Incidents like **EL Nino** could lead to more severe droughts in areas with severe potential, such as East Africa.

7) Extreme temperatures between plants and animals cause genetic changes and their transformation from one ecosystem to another. If this continues, it will be a shock to the entire Biodiversity Foundation.

8) The biggest impact of climate change is on the surface cover. The soil that has been formed according to the climatic pattern of many years ago is ready to take a different shape again due to the changing climate. Soil fertility is determined by the right amount of organic curb, essential nutrients, bacteria. However, short duration heavy rains, hailstorms, and very hard wool reduce soil fertility and lead to soil erosion. When the fertile topsoil of the soil becomes extinct, then the characteristic crops of that region also decline. Measures have to be taken according to local needs so that they are not harmed.

9) Due to freezing winds in winter and rising temperatures above 40 degrees Celsius in summer, milk production of dairy animals is negatively affected. Milk production is reduced by up to 40%.

10) At a time when rainfall is reduced due to climate change, it also has an adverse effect on honey production. Bee keeping and honey production is a supplementary business for many tribal farmers. Climate change has led to significant reductions in bee hives, bee production capacity, flowering plants and flower sap.

11) Due to the ever-changing climate, the retail production in the forest has also come down drastically. Moha flowers, gum, lacquer, resin, tendu leaves, herbs are declining in both quality and quantity.

Coping mechanism and adaptive risk –

The biggest and biggest impact of climate change is on the tribal people. Because their two main sources of livelihood were agriculture and forests. Due to the continuous play of wool and rain, the changing cycle of nature causes soil erosion and threatens the survival of crops. Also, minor forest products, which are a supplementary occupation to agriculture, are declining due to deforestation. Tribal people have a wealth of traditional knowledge to cope with these changes.

Therefore, the adverse effects of these changes on them are negligible. It also makes it easier for them to adapt to changing climates.

1) The use of organic farming to maintain and increase the fertility of the land by tribal farmers has been practiced for a long time. The use of chemical, synthetic fertilizers, antibiotics and hybrid seeds is avoided in this field. On the contrary, it uses wet waste, animal manure, crop rotation. This type reduces pollution. The amount of energy decreases. Harmful chemicals do not dissolve in soil and water through the soil. In Arunachal Pradesh, India, for example, the whole of agriculture is based on organic farming.

2) Instead of traditional food grains, tribal farmers are now eager to grow climate friendly crops like bamboo, spices, cardamom, ginger, mushrooms, pears, raisins, chestnuts, pineapples.

3**) Vacro's Busamlu Crisiko**, known as the Tea Lady, has encouraged people to abandon the cultivation of extremely delicate and climate-resistant poppy seeds and cultivate the leaf of faith. As a result, the lives of many tribal people have come to an end and they are now less affected by climate change.

4) Tribal cooperative finance corporation Ltd (TRICOR) organized trainees program with the help of the International Crops Research Institute for Semi arid Tropics (ICRISAT). In Mahabubad 46 tribal farmers have been selected for modern techniques of farming. Selected farmers would be trained for agriculture, horticulture, floriculture, vegetable, dairy and aquaculture.

5) In Benwar method no ox, plow, tractor is used for tillage and plowing of land. Therefore, women can also do this farming and make themselves and their family financially independent. This farming can be done in any climate. Climate change does not have much effect on agriculture.

6) 16 crops are regularly grown in mixed farming which is mainly found among the tribals. There are also a total of 56 species of water. All these crops are grown together. Larger crops support smaller crops. Large and strong maize crops, for example, protect delicate vines from strong winds. By burying the legumes in the soil, it provides nitrogen to the soil and other crops.

7) Forests are the habitat of food production for them. Researcher **Vishwambharnath Tripathi** has compiled a list of 26 cereals, 28 tubers, 40 types of vegetables, 25 types of fruits and 21 types of mushrooms which are known to them. This list of farms rich in biodiversity has the power to combat changing climates. Because it is made entirely of organic fertilizers.

8) In the study done by **Debal Dev** and other scholars, they came to know about 121 types of uncultivated. These foods are those eatables which grow naturally without protected and uncultured method for example **Jonnachamcheli, Adavi Pullakura,** green vegetables, flowers, animals, fish, crabs, mushrooms, tender leaves of jute, tubers etc. Tribal people depend on this super food for their livelihood whenever they face the problem of climate change. Since it is available free of cost in the forests, we have to take care of the forests to keep them afloat and the tribal farmers get the double benefit of getting food to the poor.

Conclusion –

In the name of evolving the world, the very elements that made up the world have been destroyed on a large scale. You have to suffer from unavoidable changes in the weather because of your mistakes. Yet these mistakes are still ongoing. But in the corners of the world, there is also a traditional culture that is known for its traditional knowledge and perseverance in facing these changes. Even today, tribal culture is not advanced in our eyes. But they have an invaluable store of knowledge that they can overcome in any situation. Rather than forcing the government into a stream of development that they do not want, it is much more important to formulate policies on how to use that invaluable resource of their knowledge in a reformed and intelligent society like ours.

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Dr.Pawar R.S.: The Ranganathan For Library and Information Science Scholars

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Abstract

Research in the field of library and information science started in the 20th century by Chicago University. Research area of this field is not too much wide but library Science research spread all over the world. Any subject becomes a professional when the research work is done because the phenomenon is depends upon the research for the development of knowledge and theoretical framework. The credit of doctoral research in library science program is goes to Dr.Ranganathan. Dr. Ranganathan found the Documentation Research and Training Centers for development of research work in library Science. This Article discusses about the knowledge working and guiding style of the librarian and research guide Dr.Pawar R.S. of Guru Budhi Swami College Purna in the field of Library and Information Science Research at present.

Introduction

Library and information science education is nothing but a joint concept which consists of library education and information science education. Library education is also specialized formal training for the librarians for acquisition of skills and other necessary things for library services and transfer of knowledge among the student and research scholars. Libraries are mostly known for important indicators of growth and development. They also provide and aware about social needs, scientific services and help everyone for their needs. For recognition and changing the strengthen development Librarians and library and information science programs are the base one.

Research in Library and Information Science

For the development of library science research in whole of the country we have to made some valuable aims and objectives. Depending upon the aims and objectives each field will be developed in the country. Library and information science is also one of the progressive fields of the country after the continuous hard work of the Dr.Ranganathan. Different institutes and courses related to library and information sciences were started in the country at university level by Dr. Ranganathan. For creative research in the field of library and information science necessary topics should have to be covered by each scholar, like historical studies, structure and development of knowledge, information studies, classification cataloguing and indexing, social and economic aspects of librarianship, application of techniques of library and information science to evaluate other disciplines, library and information management and system analysis. These topics also discussed in the curriculum development committee on library and information science of the university grants commission. Research scholar should declare the research work is based on new facts or new relation of facts. Research topics should be ideal, superficial and bookish. In different developing country with India there is dearth of research problems to be investigated. The most popular area for the research university libraries, Bibliometrics, collection evaluation, library use and user libraries, classification and indexing, library history, information systems, special libraries, references services and source and library science education, cataloguing, document selection and procurement, experimental designs in library management are the most related topics in library science research. Now in these days library automation and networking and information technology are mostly selected topics by the scholar and supervisors.

Dr. S.R. Ranganathan

Dr. S. R. Ranganathan was the best librarian of the Madras University. He was very hard working librarian who made the important Scientific Library and Information Science theories and principles. He also travelled United Kingdom to get knowledge in the field of Library and Information Science. He founded the colon classification system and five laws of library Science. The credit of opening of a formal institute of doctor of philosophy in the subject of library & information science is

goes toward Dr. Ranganathan. The Documentation Research and Training Centers was also founded by him in 1962 for research and development of library science. Dr.Ranganathan firmly believed that research is necessary for well-being of humanity and peaceful co-extensive of nations. He was awarded by padmashree award by Indian government in 1957.

Dr.Pawar R.S.

Dr.Pawar Rameshwar Suryabhanji one of the best librarians of Shri guru Budhi Swami College of Arts, commers and science Purna, of parbhani District, of Maharashtra state, since last three decades. He is basically from Wazur Gaon of Parbhani District. He is also very hard working and cooperative librarian. Currently he is a president of library association of the Maharashtra state. He attended number of conference and seminars in the country and out of the country also. He published number of articles related to library and information science for the development of library and information science in the country and for the knowledge of the research scholar in library science. Numbers of librarians of the country and out of country are taking ideas related to the development and working in the field of library science. Dr. Pawar R.S. is also a registered guide of Swami Ramanand Teerth Marathwada University Nanded, in the faculty of interdisciplinary studies for the subject of library and information science. Currently four research scholars are doing their research work in the subject of library science under his supervision. Dr.Pawar R.S. also got number of awards in the field of library and information science and for the development of libraries in the state. Different public libraries are run under the supervision of him. He runs one of the award winner public library in Wazur gaon of parbhani district of Maharashtra state, establish by his father who was the freedom fighter. He is also founder of library and information science institute to promote the library science education in the State.

Research Study

A research study is actually based on a philosophical stance about the nature of reality, whether or not that stance is identified by the researcher. Research is nothing but detailed study of a subject to discover the new information. Currently there are four research scholar of library and information sciences are in progress their research work under the supervision of Dr.Pawar R.S. After getting the joining letter from the guide the research scholar explain their opinion related to the supervisor that he helped the entire scholar individually for selecting the research topic. Really topic selection process is too much hard which is not successful without the help of supervisor. The research titles of doctoral students approved by the university under the supervision of Dr.Pawar R.S. are as follows.

1. Scientific Citation analysis of doctoral Dissertation in Pharmacy from Universities in Maharashtra State in the year 2011_2018."
2. Content Analysis of Desidoc Journal of Library and Information Technology 2010 2019.
3. Problems and Prospects in Libraries of Kendriya Vidyalaya in Maharashtra and Goa State.
4. Swami Ramanand Teerth Marathwada Vidhyapeeth Nanded Saulaganit Varishth Mahavidyalyatil Adhyapakanchya Lekhan Karyat Mahavidyalayin Granthalyache Yogdan.

These four research topic of doctoral degree are approved in the supervision of Dr.Pawar R.S. in April 2019. As per the rule of university all these candidate working satisfactorily. The entire related problem during the research will be solved by the help of Dr. Pawar R.S. yearly progress Reports are also completed in the presence of Guide, subject experts and committee members of the swami ramanand teerth marathwada university Nanded. Valuable suggestions are also given by the guide for minor correction related to the research. It means that it's very important for each scholar to get the good supervisor to guide him during the research period. Really Dr. Pawar R.S. is not a best librarian for the institute but a scientific scholar for their research student, for that it's no matter to say that he is the Ranganathan for the library and information science scholars.

Way of Supervision

Every scholar have best brain to do research .Research is too important on the forefront of a profession with new direction and dimensions. Research and publication improve teaching and learning. As every librarian manage the library as per the rules and regulation of the library. Dr. Pawar R.S. also follows all the rules and regulation for the development of the library and also guides the research scholars as they need the guidance. Most of the guides are only signatory guides they only signed the related documents like progress Reports, research topics and so on, of the research scholars, but Dr. Pawar R.S. is not in that list. He is a gentle guide for his research student. The

guiding methods for his doctoral student are very informative and different as compare to the other guides which are describe as follows.

1. Beware about the plagiarism
2. Make sure about the theory either it's copied or search from the books or dissertation.
3. Read the number of books related to the topics.
4. Read the number of dissertation for review.
5. Collect the data as per the choose method.
6. Check out the work in between the research.
7. Work promptly within the period of time.
8. Write the research article related to the subject and topic in between research.
9. Reach the different libraries for search the information related to the research topics.

These are the instruction of the Dr. Pawar R.S. for each scholar to do their research work successfully. Really these instruction are very informative for each research scholar not only for library science but also for every subject research scholar, they should follow these instruction if they want to complete their research work easily and within the time successfully. Each guide has their own way of guidance but guiding the scholar as per their understanding level it is too important and these level is maintain by Dr. Pawar R.S. After following the instruction of the Dr.Pawar R.S. each research scholar feels satisfaction from his guidance.

Conclusion

Research is process which never ends. Research is nothing but a systematic inquiry to discover new facts by objective methods. Researchers are always on the forefront of the profession. Library and Information Science research is improving day by day in the country with the help of supervisors and research scholars. They are creating new facts in library science for research. Dr.Ranganathan was the proudly librarian of the country who serve all effort for the development of library science and research in the country. Dr.Pawar R.S. also one of these who doing effort for the development of library science education and research by proper guiding the library and information science scholars.

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A Study of irrigational facility in Latur district

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Introduction:

In India, there are three seasons, rainy season, winter and summer. The rainy season is usually between June and October. Rainwater is carried by the river to the sea. Flowing rainwater on the surface blocked by build the dams in the rivers. Underground water stored by digging wells and bore wells. Humans are in dire need of water from waking up in the morning to sleeping at night. Water is an essential element for industry and agriculture. In Maharashtra there is some surface irrigation project for agriculture like Dam, Major irrigation project, Medium irrigation project, Kolhapur dam, Percolation Lakes etc. Underground water supply to agriculture by irrigation wells. Cereals, Cash crops, Horticulture, Floriculture, etc. require water. The water from the dam is conveyed to the farms through canals while the water from the wells is supplied to the crops by modern irrigation methods like sprinkler, drip system through electric pump.

Key Words :- Agriculture, Irrigation, Irrigated area

Objectives: - The main objective of this research paper is to study the irrigation facilities in Latur district

Methodology :- For research essay Secondary data has collected Magazines, District Social and Economic Review etc. Tables, graph, diagrams are used to analyze the information.

Study Area:-Latur district is located in the south east of the state of Maharashtra. Latur district has an axial extension of 18.5^0 north to 18.7^0 north and a linear extension of 73.25^0 east to 77.25^0 east.Rivers like Manyad, Landi, Manjra, Tavarja, Terna etc. flow in Latur district The rainy season lasts from mid-June to October, winter from November to February, and summer from March to mid-June. Generally the land in Latur district is flat and has a slight slope, this slope is towards the south. The land in the district is generally divided into two parts, one light and medium light, two heavy and black land. Balaghat is a mountain range in Latur district

Analysis of Irrigation system in Latur district:

Latur district is located in the south east of the state of Maharashtra. Latur is an important district in Marathwada region. Latur district receives rainfall from June to October Irrigation Resources for Agriculture Major Projects are not Located in the district. Medium Projects, Small Irrigation Projects, Percolation Lakes, Kolhapur Dams, Irrigation Wells are available for irrigation.

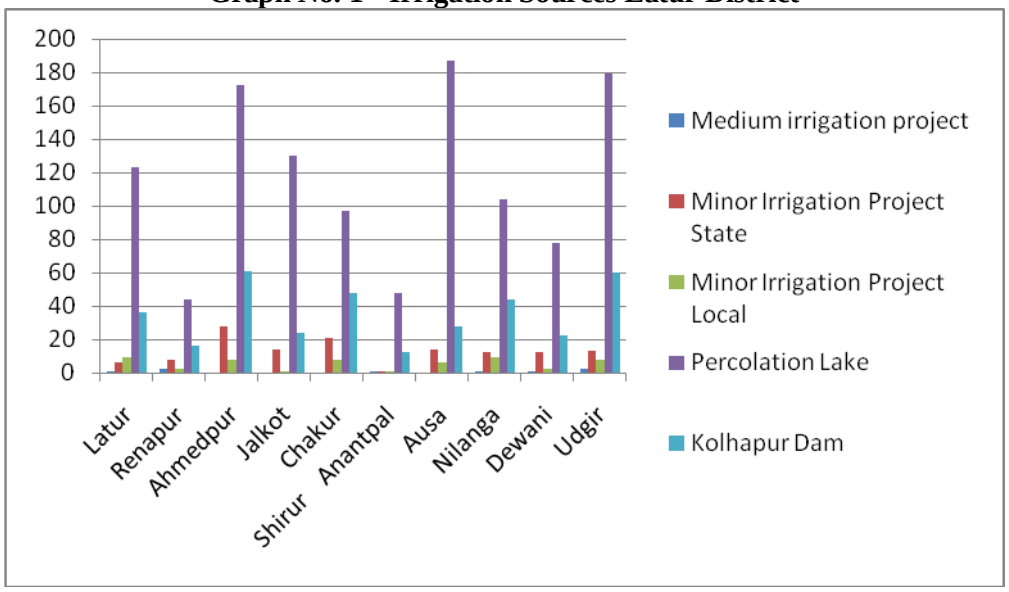
Table 1 - Latur District - Irrigation sources
Reference Year 2019-20

Sr no	Taluka	Irrigation facilities					
		Major irrigation project	Medium irrigation project	Minor Irrigation Project		Percolation Lake	Kolhapur Dam
				State	Local		
1	Latur	0	1	6	9	123	36
2	Renapur	0	2	8	2	44	16
3	Ahmedpur	0	0	28	8	172	61
4	Jalkot	0	0	14	1	130	24
5	Chakur	0	0	21	8	97	48
6	Shirur Anantpal	0	1	1	1	48	12
7	Ausa	0	0	14	6	187	28
8	Nilanga	0	1	12	9	104	44

9	Dewani	0	1	12	2	78	22
10	Udgir	0	2	13	8	179	60
Total District		**0**	**8**	**129**	**54**	**1162**	**351**

Source :- Socio Economic Review District Latur 2020

Graph No. 1 - Irrigation Sources Latur District



There is no major Irrigation project in the district. There are 8 medium irrigation projects in Latur district. Most of the medium irrigation projects are in Renapur and Udgir talukas and there are 2 medium irrigation projects each in this taluka. Latur, Shirur Anantpal, Nilanga, Dewani talukas have 1 medium project each. There are a total of 129 state level minor irrigation projects in Latur district. The highest number of minor irrigation projects is in Ahmedpur taluka which is 28. The lowest number of minor irrigation projects is in Shirur Anantpal taluka which is 1. There are a total of 54 local level minor irrigation projects in Latur district and Latur, Nilanga taluka has the highest number of local level minor irrigation project 9 It is followed by Ahmedpur, Chakur ,Udgir taluka with 8 each and Jalkot, Shirur Anantpal taluka with 1 each.Latur district has a total of 1162 percolation lakes The highest number of percolation lakes is in Ausa taluka which is 187, followed by Udgir179,Ahmedpur 172, Latur 123 and the lowest percolation lake is in Renapur taluka which is 44

. There are 351 Kolhapur dams in Latur district out of which 61 Kolhapur dams are highest in Ahmedpur taluka followed by 60 in Udgir taluka, 48 in Chakur taluka, 44 in Nilanga taluka and lowest in Renapur taluka with 16 Kolhapur dams.

Table No. 2 - Irrigation wells in Latur District

Reference year 2019-20

Sr no	Taluka	Irrigation Wells (Numbers)	Irrigation Wells Not in use (Numbers)	Electric Pump
1	Latur	3,922	1,458	25,660
2	Renapur	3,140	1,430	11,271
3	Ahmedpur	4,463	739	7,848
4	Jalkot	1,385	315	8,788
5	Chakur	4,834	438	10,665
6	Shirur Anantpal	580	315	4,968
7	Ausa	6,664	2,130	17,811

8	Nilnaga	1,110	590	25,800
9	Dewani	1,054	52	5,076
10	Udgir	3,385	503	8,165
Toatal district		30,537	7,970	**1,26,052**

Source:- Socio Economic Review District Latur 2020

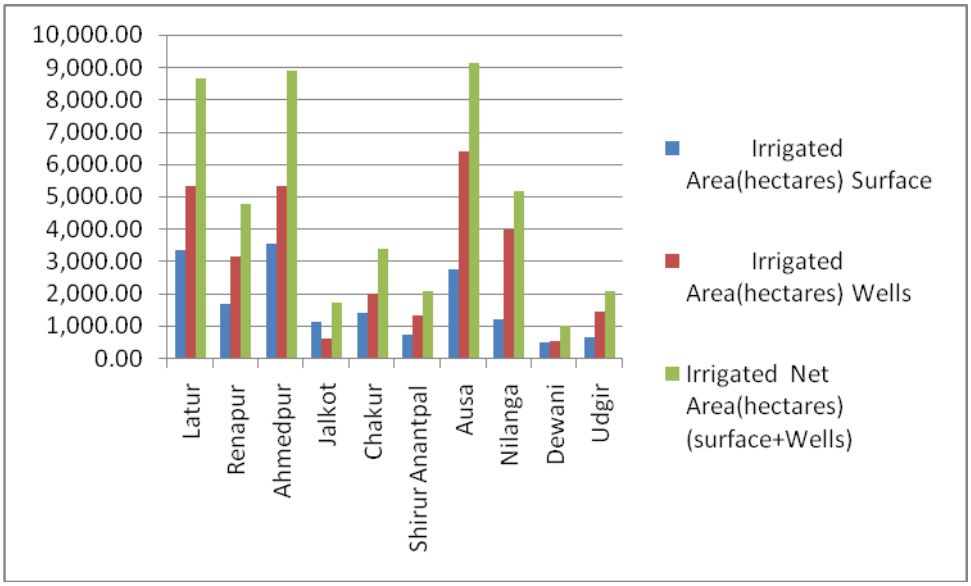
There are total 30,537 irrigation wells in Latur district Out of these, Ausa taluka has the highest number of 6,664 irrigation wells and chakur 4,834, Ahmedpur 4,463 and Shirur Anantpal taluka has the lowest number of 580 irrigation wells. 7,970 Wells are not in use in Latur district. There are total 1,26,052 electric pumps in Latur district and 25,800 electric pumps in Nilanga taluka. The lowest number of 4,968 electric pumps is in Shirur Anantpal taluka.

Table 3 - Irrigated Area in Latur district (2019-20)

Sr no	Taluka	Irrigated Area(hectares)		Irrigated Net Area(hectares) (surface+Wells)	Irrigated Gross Area(hectares)	Cultivated Gross area (hectares)
1	2	Surface	Wells			
1	Latur	3,320.00	5,332.00	8,652.00	13,456.23	1,36,092.70
2	Renapur	1,654.00	3,124.00	4,778.00	7,859.87	92,289.80
3	Ahmedpur	3,549.00	5,334.00	8,883.00	10,066.17	85,028.17
4	Jalkot	1,099.00	597.00	1,696.00	1,936.80	32,397.00
5	Chakur	1,375.00	2,000.00	3,375.00	5,194.33	86,208.60
6	Shirur Anantpal	732.00	1,317.00	2,049.00	3,143.07	45,701.00
7	Ausa	2,746.00	6,370.00	9,116.00	14,375.07	1,55,995.80
8	Nilanga	1,204.00	3,957.00	5,161.00	8,826.40	1,50,135.80
9	Dewani	459.00	524.00	983.00	1,800.40	47,877.00
10	Udgir	637.00	1,426.00	2,063.00	2,555.93	72,855.00
Total district		16,775.00	29,981.00	46,756.00	69,214.27	9,04,580.87

Source:- Socio Economic Review District Latur 2020

Graph No. 2 - Irrigated Area Latur District



Surface irrigation in Latur district It has an area of 16,775.00 hectares The area under maximum surface irrigation to maximum surface irrigation is 3549.00 hectres in Ahmedpur taluka followed by 3320.00 hectares in Latur taluka, 2740.00 hectares in Ausa taluka and the lowest surface irrigation 459.00 hectares in Dewani taluka. Total irrigated area By well of Latur District is 29,981.00 hectares The highest area irrigated is in Ausa taluka with an area of 6,370.00 hectares, followed by 5,334.00 hectares in Ahmedpur taluka and 5,332.00 hectares in Latur taluka. The lowest area irrigated by wells is 524.00 hectares in Dewani taluka.The net area under Surface irrigation and well irrigation in Latur district is about 46,756 hectares The largest area is in Ahmedpur taluka which is 8,888 hectares, Latur taluka has an area of 8,652 hectares while Dewani taluka has the lowest area of 983 hectares. The gross irrigated area in Latur district is 69,214.27 hectares The highest irrigated gross area is in Ausa taluka at 14,357.06 hectares. Lowest gross area irrigated in Dewani taluka1,800.40 hectares. The Gross area under cultivation in Latur district is 9,04,580.87 hectares. The highest Gross area under cultivation is in Ausa taluka which is 1,55,995.80 hectares The lowest gross area of under cultivation is in Jalkot taluka is 32,397.00 hectares

Conclusion :

Irrigation Sources and Irrigated area in Latur district is low.There is no any Major Irrigation Project located in Latur District. Only 8 Medium Project Located in Latur district in 6 Talukas there is no single Medium project in Ahmedpur,Jalkot,chakur, and Ausa taluka, It is need to enhance the number of Medium project in these taluka. There are a total of 129 state level minor irrigation projects in Latur district.. Latur, Renapur and shirur Anantpal these talukas are the lowest number of stae level minor irrigation project. It should be improve the number of state level minor irrigation project in these taluka There are a total of 54 local level irrigation projects (zilla Parishad etc) in Latur district Lowest number of local level irrigation projects in Jalkot, Shirur Anantpal taluka with 1 each. The Number of Local level project should be enhance in taluka's which has lowest local level project. Latur district has a total of 1162 percolation lakes The highest number of percolation lakes is in Ausa taluka which is 187 and lowes number of percolation lake is in Renapur Taluka There are 351 Kolhapur dams in Latur district out of which 61 Kolhapur dams are highest in Ahmedpur taluka and lowest 12 Kolhapur dam in shirur Anantpal taluka. There are total 30,537 irrigation wells in Latur district Out of these, Ausa taluka has the highest number of 6,664 and Lowest number of irrigation wells580 in Shirur Anantpal taluka.Surface irrigation in Latur district It has an area of 16,775.00 hectares highest surface irrigation area in Ahmedpur taluka 3,549.00 and the lowest surface irrigation area 459.00 hectares in Dewni taluka. Total irrigated area By well of Latur District is 29,981.00 hectares The highest area irrigated is in Ausa taluka with an area of 6,370.00 hectares. The lowest area irrigated by wells is 524.00 hectares in Devani taluka.The net area under Surface irrigation and well irrigation in Latur district is about 46,756.00 hectares The largest area is in Ahmedpur taluka which is 8,888.00 hectares while Dewani taluka has the lowest area of 983.00 hectares.The gross irrigated area in Latur district is 69,214.27 hectares The highest irrigated gross area is in Ausa taluka at 14,357.06 hectares. Lowest gross area irrigated in Dewani taluka1,800.40 hectares.The Gross area under cultivation in Latur district is 9,04,580.87 hectares. The highest Gross area under cultivation is in Ausa taluka which is 1,55,995.80 hectares The lowest gross area of under cultivation is in Jalkot taluka is 32,397.00 hectares. Area of Dewani , Jalkot , Shirur Anantpal taluka's. It is need to enhance the more area under irrigation of Latur District,

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Natural Resources and Tourism Development reference to A Review of Agro Tourism in India

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Introduction

India is a land of diverse climatic conditions.Tourism is the fastest growing business in the world.Agriculture is considered to be the backbone of the Indian Economy .Around 70 % of the population is directly or indirectly dependent on agriculture and almost 26% of India's GDP comes agriculture. The plate is full with offerings like dairy practices, bird watching wine trails and local handicrafts .Agricultural Tourism provides enjoyment & education for the public promotes products from the farm, and increase income for the farm.Agro tourism is specially defined by tourist has as '' travel which combines agricultural or rural settings with products of agricultural operations, all with in a tourism experience or a range of activities ,services and amenities provided by farmers . Today Agriculture Tourism already develops in many areas & we see the most popular type of tourism. Agro Tourism as a concept is not very new although its reach is limited to only some places In many areas farmers celebrated various activities. Exp. Fruit festival,bird watching trips,bullock cart riding,tractor riding farming activities. Most of the tourist wants to see how a real farm works , farm stay , floral tours , picking of fresh fruits and vegetables .

Agriculture tourism is successful because ittakes us back to culture. Today we have accept modern life style we want to visit rural areas to enjoy simple life style & farming activities , recreational experiences &visit to rural areas, many kinds of activities, events or attractions developed specially for tourist. The tourist enjoy the fresh smell of the wet soil ,the fresh air and the chirping of the birds in a majestic surrounding make tourist fall in love with the nature and attracts the urban tourists trying to get away from their regular hectic schedule .The Tourist experience milking a cow , harvesting a crop . The tourist is ready to pay any amount to book a bullock cart ride, learnpottery. The tourist also look forward to engage with the local traditions, food, and culture and festivals .The latest trend catching up is of taking a walk in the vineyards and picking up farm fresh produces.The annual flower festival of Sikkim in the northern part of India .Bullock cart ride ,learn pottery which are offered as activities at ATDC in Baramati near Pune in Maharashtra Agricultural tourists wants to eat farm fresh produce, have farm fresh foods cooked and eaten in a family environment. To keep the atmosphere pollution free an effort is being made to fully develop the place in a manner. In keeping with this view they would avoid the use of plastic and encourage the re – introduction of old world eco-friendly things. This would also give the villagers profitable occupation .Agro tourism not spread much across the states of India and is still concentrated in western belt of Maharashtra. It is slowly growing in some states. Agro tourism on a small budget can provide fun, entertainment to the tourist with some education on farm activities as well. Agriculture and its allied activities are on the brink ofa change for both the farmers as well as tourist. The farmers' needs in their farms tourism infrastructure, accommodation facilities, maintenance, transport facilities, marketing of farm produces as value based network. Promotion of Agro-tourism involves some more important stakeholders namely Ministry of Agriculture, Department of Tourism, ITDC, Tourism, Ministry State & Central Government & farmers.

Research Objectives:

To Know about Agro Tourism

To Know about the Importance of Natural Resource – Agriculture in Tourism Industry.

To know about various key factors for the development of Agro Tourism

To know about a review of Agro Tourism in India.

Research Methodology: The present research work is exploratory in nature and based on the secondary source of data collection. The researcher has collected the secondary data from the reputed

books, journals and official websites of the tourism department and department and tourism boards of different states as well as of tourism ministry of India.

Agro-tourism has great scope in the present situation ----

1) The cost of food, accommodation recreation and Travel is minimum in Agri. Tourism.
2) Curiosity about the farming activities and simple life style.
3) Recreational opportunities to all age groups- exam. Rural games, festivals,
4) rides, food and dress.
5) Health consciousness of urban population finding nature friendly means.
6) Ayurveda which is pro nature medical approach has roots in villages.
7) Organic foods are in greater demand in urban areas &foreign countries.
8) Agro-Tourism is the means for searching peaceful location.
9) Agro tourism is away from urban areas and close to nature and peace.
10) Agro-tourism provides variety of recreation to urbanites through dress languages, culture/ traditions, Lifestyle, which always adds value to the entertainment.
11) Tourist wants to see Animals, birds, farms & nature are the few things which agrotourism could after to the tourist to see and also festivals, rural games, and culture & dress create interest among in agro tourism.
12) Tourist participating agricultural operation, swimming in Rivers, Canals bullock cart riding, camel, horse, buffalo riding , cooking & playing rural games tourist can take part & enjoy.
13) Tourist also buy – dress, farm fresh products, fruits, vegetables, etc.
14) Agro-tourism is a sustainable form of tourism business.

Key Factors of Agro Tourism.

1) **Farmers** :- farmers are uneducated, less educated, and innocent, farmers, any outsider is a guest and treated whole heartedly without any commercial motive.
2) **Village** :- which is located far from the city and lack of urban facilities. But blessed natural resources. The investment is made by Nature in the farm of water bodies, forest mountains , clean air, deserts, islands , trees fields farmers treating a guest is port of their culture rather than profession.
3) **Agriculture** :-Natural Resources is Rich resources in agriculture namely land, water and plants are unique from place to place bringing diversity and creating curiosity. The way of cultivation and the products are great attraction to the urban population.

Combination of farmer, village and agriculture, create a wonderfulsituation whichprovides unlimited satisfaction to the tourist specially from urban areas.

India :- India has diverse culture and geography which provides ample & unlimited scope for growth agro- tourism India has diverse Agro climatic conditions , diverse crops, cultures ,people, deserts mountains, coastal systems and island which provides scope for promotion of all season.

There is an increasing number of tourist attract to agri-tourism. But adequate facilities and publicity are must to promote such centers.

Promotion of Agro tourism in Maharashtra –

Agro-tourism is a new concept in the tourism sector of Indian economy and it is related to the farming activities which provides better opportunities to experience rural farming life.

Since 2004, Agro-tourism came into operation first in BaramatiAgri Tourism Center under the guidance of PadurangTaware who received the National Tourism award due to this achievement. After that Agri-tourism Development Corporation affiliated and motivated more than 200 farmers to operate Agro-tourism centers in different villages of Maharashtra.

The Maharashtra Cabinet cleared an agro tourism policy aimed at reviving the tourism sector and support to the rural economy .In a Meeting held on the eve of the monsoon session of the State Legislature , the Cabinet cleared the policy whichthe government said would be added income to farmers and also an enjoyable experience to tourist .

"The Cabinet passed the agro tourism policy of Maharashtra. This will invigorate the rural sector and agricultural practitioners with a steady sources of an alternative income and an alternative employment through tourism like farm stays .Local cuisine and cultural aspects can be enjoyed by tourist,'' State's Tourism Minister Aaditya Thackeray said.He said although many countries around the world have such enabling policies to assist tourists with homestays in the farms and orchards, Maharashtra has taken the lead to in this regard in India.Thispolicy will be an enabler for those

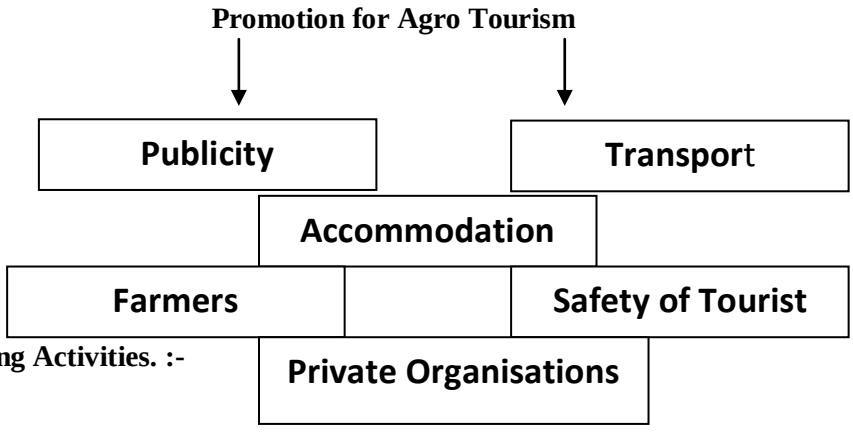
looking to travel , enjoy the rustic outdoors ,spend time on farms , and indulge in eco-friendly tourism, organic local flavours and seasonal fruit picking , he said .Rural development through agro tourism, ensuring market to agricultural produce, encouraging agriculture related business, providing employment to young women from rural areas , organizing exhibitions of folk art and traditions , and providing anexperience of pollution free and nature friendly Atmosphere .Individual Farmers, agriculture cooperative societies , agriculture research centers , agriculture universities or farmer companies can set up agro tourism centers . The Tourism Department will certify these centers after which they can be eligible for loans and other tax benefits. For loans the farmers register under the policy include owning an area of two to five acres with residential arrangements and facilities for meal supply. ForFarmers forms are available at www.maharashtratourism.gov.in or at the office of the deputy director of the Maharashtra Tourism Development Corporation.

A Maharashtra agro tourism and rural tourism development committee will also be formed to promote agro tourism.

(Source – News Paper Article Maharashtra Introduces Agro Tourism Policy, Mumbai 07 September 2020 by AlokDeshpande)

1) Alliance with airlines, tour operators, and foreign embassies. This alliance brings foreign tourists.Government can assist the Agro tourism units through promotion and co-ordination through central and state tourism department.
2) **Alliance with Hotel Industry**: -large number of domestic tourists can be attracted through alliance with hotel industry. The hotel industry can be used to promote Agri-tourism concept.
3) **Promotion by Agri-tourism Units**: - Promotion takes place through mouth to mouth &local publicity. The promotion groups approach need initial government interventions.
4) **Promotion of Agro Tourism :**

1. Incredible India.
2. Budget for promotion brand.
3. Five Year Plan budget.
4. State Government encouraging private public partnership in tourism sector.
5. Concept has to be positioned in the minds of tourists as came, pluck a fruit, smell a thower, run in the fields, lie on the soil or land.
6. Entertainment – Agro tourism involvement in agricultural operations, create joyful experience to the tourist.



Income generating Activities. :-

1) Farm Store
2) Wineries
3) Roadside stand selling fresh farm products.
4) Demonstration of Agri-activities
5) Farm Tours
6) Educational tours for school childrens, officers,
7) Moonlight activities.
8) Cooking Demos
9) Picnic grounds
10) Wool Processing
11) Herb Walks
12) Festivals.

Finishing & Hunting Food Sells,

Farm Stay :- A Farm stay is any type of accommodation on a working farm some Agro tourist centres are family focused offering children opportunities to feed animals, collect eggs & farm functions very affordable accommodation available, cottages, tents, Tent camping, huts, farmhouse guest rooms, cabin etc. India will focus on Agriculture tourism In 2010 India will focus areas of Agriculture, Food and Beverage Sectors.AFB India 2010- is the place where the sectors come together to open up markets, launch new products, establish business contacts, capture customers, create loyalty and obtain representatives , distributors , importers or suppliers.

Suppliers ,manufacturers, importers, traders, exporters, dealers, consultants, decision makes, policy makers, technology developers, buyers, academicians, professional from Central, State Government and public sectors agriculture departments, financial Institution, tribal development and management, Agro investors, NGO's etc.

Conclusion --

Needs attention for the promotion of Agri tourism are:-

1. India is a land of diverse climatic conditions. **Transport: -** Reaching the remote Agri-tourism units is greatest challenge due to lack of approach roads &poor transport facilities. Government should play important role in creating transport facilities specially where Agri-tourism units are established on priority basis.
2. **Accommodation: -**Safe and Clean Accommodation is must in Agri-tourism, Urban & Foreign tourists look for these minimum facilities. Orienting Agri tour operators. Regular clean water supply.
3. **Networking: -** Networking public & Private stakeholdes at National and State level to assist the Agri-tourism operator at remote place is necessary. This network can get policy support ,infrastructure & publicity to Agri-tourism units.
4. **Capacity building of farmers** :
5. Farmer need to be oriented on maintenance of facilities, hospitality and public relation which he is not aware.
6. **Safety of tourists**:Agri- tourism units are located in remote areas which lacks roads, medical facilities, telecommunication, support of local population emergency medical facilities & care.
7. **Private** farmers Organizations, Co-operatives,NGOs and agro business companies can take up these ventures with the help of farmers &Gov. Agencies Tour operators & Transporters & hospitality industries.

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Causes And Effects Of Ozone Depletion

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Abstract

The ozone is most important layer which is situated in atmosphere in stratosphere layer. This gas is cover whole earth so it is also called protection of earth. This paper investigates causes, mechanism and bioeffects of ozone layer depletion. It is revealed that introduction of Chlorofluorocarbons or CFCs gas in the environment is the most rated cause of ozone layer depiction. Ozone depletion is allowing the UV rays which is radiated from earth surface. The exposure to these radiations is severely affecting all life forms on earth, especially the humans. Permanent or temporary blindness, skin cancer and immunity suppression are the main effects of these radiations reported by various researchers on humans. The prospects of ozone recovery are still undiscovered. The current situation of ozone depiction demands urgent remedial measures to protect lives on this earth.

Keywords: Depletion of Ozone, Chlorofluorocarbons (CFCs), Ultra Violet (UV) Radiations.

Introduction

Many of human activities are badly affecting on the atmosphere. Ozone depletion is one of the most important examples. Life is protected from UV rays by stratospheric ozone layer which acts as a sun screen. About 90% ozone is present in stratosphere at the height of 10 to 17 kilometer and is called ozone layer while remaining 10% is present in troposphere. Medium frequency UV radiations are absorbed 97 to99% by the ozone layer. Ozone (O3) is colorless and odorless gas like oxygen (O2). It is very rare as compared to oxygen. It is estimated that out of 10 million air molecules about 2 millions are of O2 and only 3 are of ozone. The process of ozone formation is called as photolysis. When the UV radiations fromsun strike the O2 molecules, it causes splitting of O2. Oxygen molecules react with oxygen atoms in the upperatmosphere to form ozone. Stratospheric ozone is measured from the ground in units called Dobson Unit. Normal ozone concentration is between 300 - 350 Dobson unit.

Objective: The main objective of present paper is major causes and effects of ozone layer depletion are affecting human health and natural environment.

Ozone Layer

The ozone layer is basically naturally occurring gas in the region of stratosphere where ozone particles are accumulated. Ozone layer is also naturally broken down but there is a balance between its formation and natural depletion. As a result the total amount of ozone remains constant. But ozone layer thickness varies with altitude and seasonal change. Ozone concentration is highest between19 to 23 km. Most of ozone is formed at equator where there is maximum sunshine but with winds it travels at high altitude and get accumulated in stratosphere.

Ozone Hole

Ozone hole is created in the region where ozone layer has been depleted. The term "Ozone hole" is applied when the depletion level is below 200 Dobson Unit (D.U). Ozone holes are first discovered in Antarctica in1970. Few years ago ozone holes are also discovered in arctic region. Since 2000 rate of ozone depletion is increasing0.5 percent per year. Due to depletion of Ozone UV rays are penetrating in troposphere and leading to more ozone formation in troposphere which is causing injurious effects on our health as ozone is toxic for ourbody.

Causes of Ozone Depletion

Chlorofluorocarbons

Ozone depletion occurs when the natural balance between the production and destruction of stratospheric ozoneis disturbed. Although natural phenomenon can cause ozone depletion but human activities such as CFCs are now accepted as major cause of depletion of ozone gas. All ozone depleting chemicals contain chlorine and bromine.CFCs are highly volatile and noncombustible so they are very quickly evaporated and can easily reach in stratosphere where ozone is present here they

start depleting ozone molecules. These CFCs have also adverse effects on human health. According to the chemical model for ozone destruction proposed about 20 years ago,the photolysis of Cl2O2 is key to ozone depletion reaction. But now atmospheric researchers studied that the rateof this reaction is not extremely high as it was thought previously so we can no longer say that CFCs are themain cause of ozone depletion.

Launches of Rockets

Another major cause of large scale ozone depletion is Rocket launches. It has been studied that unregulated rocket launches can result in much more ozone depletion than CFCs. It is estimated that if rocket launches will be let unregulated then it would cause huge ozone loss by the year 2050 than the CFCs have done.

Global Warming

Global warming also leads to ozone layer depletion. Due to global warming and greenhouse effect most of the heat is trapped in troposphere which is the layer below the stratosphere. As we all know ozone is present in stratosphere so heat don't reaches troposphere and it remain cold as recovery of ozone layer requires maximumsunlight and heat so it leads to depletion of ozone layer.

Nitrogen Oxide

Nitrogen oxide is major gas which is also harmful to ozone layer. Nitrogenous Compounds emitted by human activities in small amount like NO, N2O and NO2 are considered to be greatly responsible for the depletion of ozone layer. This gas formed form different industries and light weighted so easily gone upper atmosphere and affects on ozone layer.

Effects of Ozone Depletion

Ozone depletion is affecting the human health and environment negatively, as it allows the penetration of UVradiations to reach the Earth. These radiations can cause severe diseases in humans such as skin cancer, eye damage and genetic mutations etc. Furthermore the ozone depletion is affecting the aquatic life, biogeochemical cycles, air quality and also contributing in Global warming but in this review paper our main focus is on the effects of ozone depletion on human health.

Effects on Eyes

The major cause of blindness in this world is cataracts. There would be 0.3% - 0.6% increase in risk of cataractif there will be 1% decrease in Ozone level. Eye lens can be damaged by oxidative agents. Oxidative oxygen produced by UV radiation can severely damage eye lens and cornea of eye is also badly damaged by UV radiation. Photo keratitis, cataract, blindness all are caused due to UV rays.

Effects on Skin

Exposure to UV radiations can cause skin cancer. UV radiations alter the structure of bimolecular and thus lead to different diseases Skin is the most often exposed part of body to UV radiations there are two types of skin cancer, Melanoma and Non-melanoma. Melanoma is most serious form of cancer and is often fatal, while non-melanoma is most common type and less fatal. Depletion of ozone layer leads to both Sun burn and skin cancer. UV radiations are also responsible for breast cancer and leukemia. Epidemiological studies of Melanoma indicate that the incidence of melanoma is increasing in those countries having high ratio of cases. As UV radiations can penetrate more easily in thin skin so there is greaternumber of incidence is found in thin skinned people. It is found that the incidence of Melanoma is more in children than adults. The chance of incidence of melanoma is correlated with UV exposure furthermore the survival chance of melanoma is less in boys as compared to girls. As the intensity of radiation increases in summer so the risk of melanoma in thin skinned people is increased in summer and it is more in females as compared to males as their skin is thinner than males.

Effects on Human Immunity

Exposure to UV radiations can also result in suppression of immune response to skin cancer, infectious diseases and other antigens. The immunosuppressant is due to changes in skin photoreceptors and antigen presenting cells that are brought by UV radiations. More increase in depletion of ozone results in more decrease in immune system.

DNA Damage and Lung Diseases

Short exposure to UV-B radiations can cause the DNA damage because UV radiations can disturb biomoleculessuch as lipids, proteins and Nucliec acids. Due to UV-B radiations there would be

cryptic transposable elements which may lead towards the mutations which is more dangerous than the immediate DNA damage. Excessive UV-B radiation exposure results in the basal and squamous cells carcinomas. These types of cancers areinduced due to transcriptional errors during DNA replication which are caused by changes in pyrimidine bases.The ultimate cause of this whole mechanism is found to be the prolonged exposure to UV radiations. It is estimated that there is increase of 2% of incidence of these cancers by 1% depletion of ozone layer. Exposure to UV radiations equally affects lungs. Bronchitis, obstruction of lungs, Emphysema, asthma all can be resulted from UV radiations exposure

Effect of Food Shortage on Human Population

Depletion of ozone layer is also causing the problem of food shortage to humans. UV radiations are disturbingdevelopmental and physiological processes which is decreasing the productivity of crops. As humans are heavily dependent on crops for food so there is a great chance if depletion of ozone layer is not checked it may cause seriously shortage of food to humans. Researches also show that UV radiations can also be used to enhance yield of crops by the use and application of phytohormones.

Conclusion and Recommendations

Ozone layer is continuously depleting which is highly alarming situation of today. Chlorofluorocarbons are majorcause of ozone depletion. These substances should be banned or we should use their alternatives so that in future we can protect ourselves from the harmful effects of UV radiation. Human eye and skin are the most exposed part of the body to these radiations. So there is high degree of incidence of blindness and skin cancer disease increasing day by day with the depletion of ozone layer so we should use sunglasses and full body clothes especially in summer when there is high intensity of sunlight so that we can protect our body from harmful UV radiations. We should also use sun block creams to our most exposed parts of body like face. We should also don't consume water from lakes as it may contain high quantity of hydrogen peroxide which is toxic to our bodies, and we should consume water for drinking from clean water sources.

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Simulating The Loss Of Agricultural Land Due To Urban Growth Using Cellular Automata Markov Chain Model – A Case Study Of Coimbatore City, Tamil Nadu

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Abstract

Urban sprawl is frequently associated with the idea of an unsuitable development, leading to the loss of agricultural land by built-up land use. With the increase in population, there is a need to increase food production and hence the increase in agricultural land. But with the depletion of existing agricultural land as a result of urban sprawl only worsens the situation. Therefore there is a requirement to monitor urban growth. CA-Markov model can be used to model and predict changes through different time slices. This paper compiles the results of a study to measure the urban sprawl in Coimbatore city, Tamil Nadu, through the cellular automata CA-Markov model. The study involves the preparation of land use/land cover (LU/LC) maps for 2001 and 2014. First, the Markov model was applied to create transition matrices and then the Cell Atom moduleto generate suitability images. Later CA-Markov model was used to predict the LU/LC for 2014 and 2030. Finally, the 2014 predicted image was used for validation. As a result, vegetation cover depleted from 647.05 sq. km (2001) to 314.39 sq. km (2014). Also, it was predicted that it will reduce further to 170.64 sq. km by the year 2030.

Keywords*:* Urban sprawl, Image classification, Transition matrix, CA-Markov model, Vegetation loss, Terrset

Introduction

Urban sprawl is a diverse concept dealing with the expansion of auto-oriented, low-density development and has a considerable impact on the surrounding ecosystem. Accurate and updated land cover change information is required to understand and assess the environmental consequences of such changes (Shikar and Akansha, 2014). In general, urban sprawl studies need to take into account several parameters, including numerous socio-demographic indicators. However, the morphological aspects of urban sprawl can be used better to monitor the rate of expansion. The rate of growth can also be predicted through urban models. Urban models are more likely to be frameworks for assembling relevant information and frameworks for formal and informal dialogues. They are essential tools in much more consensual and participatory decision support processes (Batty, 2009). The urban models are quantitative tools to assist in making urban and environmental planning decisions and capability management for assessing land suitability for development (Bhagawat, 2011; Nouri et al., 2014). Remote sensing and GIS serve as better tools for effective monitoring and modelling morphological changes in urban centres (Zubair, 2008).With the development of resource satellites and image processing techniques, modelling of urban sprawl has become readily possible. There is an abundance of research efforts made by the scientific community for land use/land cover (LU/LC) change detection using remote sensing images. The method of finding differences in the nature of an object or phenomenon by monitoring it in different times is known as change detection (Singh, 1989). Besides change detection analysis, remote sensing techniques are also widely used for simulating urban growth. Markov chain is one of the simulation models used to predict future changes of LU/LC based on the rates of changes in the past. Markov chain analysis is a convenient tool for modelling LU/LC changes when changes and processes in the landscape are difficult to describe. Markov chains model can predict future LU/LC changes based on past changes (Samereh et al., 2011). The prediction of LU/LC through Markov analysis is mainly based on transition probability, i.e. probability of transition from one land-use class to another within two discrete times Bhagawat (2011). However, spatial models of LU/LC change require information on the rate of change and

location of changes (Sudhakar Reddy et al., 2017). Markov chain model considers only the temporal dimension and does not deal effectively with the spatial dimension.

Compared to the Markov chain model, the Cellular Automata (CA) model has a spatial component. The future change is predicted by certain rules from the neighbouring cells (Sudhakar Reddy et al., 2017). CA models are based on the interaction of several components and are mostly used to build projected urban growth scenarios (Sandeep, 2010). A self-reproductive cell on the grid space will be able to assume a finite number of different cell states based on the unambiguous transition rule, which may be interactive with the states of the immediate neighbours on the same grid space (Diana et al., 2011). The changes can be predicted according to specific transition rules that govern changes in the cell state. The dynamics of various change events can be efficiently simulated employing CA models (Jamal et al., 2013). With the application of remote sensing and GIS and simple transition rules, it is easy to simulate urban dynamism Shikar and Akansha (2014). Despite the advantages, the technical framework of CA is not appropriate to support realistic urban dynamics. It is failed to consider the role of external factors which affect urban growth. Notwithstanding, combining the conventional CA model with advanced models can remove these restrictions (Mahmoud et al., 2013). That is why the idea of incorporating Markov chain analysis in CA models has evolved.CA–Markov is a hybrid model that constitutes the Cellular Automata model and the Markov model. The temporal and spatial pattern of LULC change can be simulated in the CA–Markov model (Sudhakar Reddy et al., 2017). Hence this paper aims to develop a hybrid model of Cellular Automation and Markov analysis to measure and simulate urban sprawl. Since Coimbatore has the second most highly growing urban environment, it was chosen as the case study area. Coimbatore, also known as Kovai, is the second major city in the State of Tamil Nadu and the 16th largest urban agglomeration in India. As per the 2011 census, Coimbatore city had a population of 1,050,721. With the rapid growth in diverse fields and industrial sectors in the past few decades, urban settlements are constantly sprawling outward. Due to to the limited availability of land in the city and, this calls for greater focus on planned infrastructure developers to accommodate the population increase in future. Instead of considering the present city extent, the study area was delimited by extending from the city centre up to 20 km in all four principle directions to constitute a square region of interest. The multi-temporal satellite images of the study area were used to analyse the LU/LC changes, and the future growth of Coimbatore city is predicted by applying the CA-Markov model.

Materials and Methods

Database and Software

LANDSAT 7 ETM+ was acquired on 14 January 2001, and LANDSAT 8 OLI data obtained on 11 February 2014 were downloaded from USGS Earth Explorer to prepare LU/LC. ERDAS IMAGINE 9.2 was used for preprocessing and image classification and QGIS 2.4.0 was used for converting imagine format to IDRISI raster format. The LU/LC modelling was performed in IDRISI Selva 17.0.0. Final thematic map preparation was done in ArcGIS10.3.1.

LU/LC Preparation

Bands 2, 3, 4 of LANDSAT 7 ETM+ and bands 3, 4, 5 of LANDSAT 8 OLI was used to create a false colour composite for better interpretation. In order to improve the spatial resolution, both sets of images were merged with corresponding panchromatic images. Thus the spatial resolutions of images were enhanced to 15m. The study area was delimited and used to subset the images. The linear contrast enhancement technique was applied to improve the differentiation between various LU/LC classes. In order to classify the image, signatures were collected using the signature editor tool for four classes, namely: Vegetation, Waterbody (named as Restriction), settlements and barren/ fallow land. Then maximum likelihood algorithm of supervised classification was performed to classify the image. The wrongly classified cluster of pixels was identified and recoded into correct classes. Similarly, post-classification smoothing was also done using the convolution filtering technique.

Accuracy Assessment

The misclassified pixels, though corrected to an extent, error exists. An accuracy assessment was performed to check if the error persists at an acceptable level or not. Randomly 50 samples were collected and accuracy of the LU/LC classes was examined. Error matrix was developed and other

calculations like producer accuracy, user accuracy, overall accuracy and kappa statistics were computed.

Change Detection

Change detection analysis is essential in urban sprawl modelling to ensure that sufficient sprawl has taken place, making the study valid and understanding the influencing LU/LC classes. In this study, prepared LU/LC maps were utilized to analyze the rate and extent of LU/LC changes. The principal advantage of post-classification comparison lies in the fact that the dates of images are separately classified, so the problem of systematic and non-systematic remote sensing errors will be minimized.

The annual rate of urban sprawl is calculated by comparing the area under each LU/LC class at two different times (Sudhakar Reddy et al., 2017).

$$p = \frac{1}{(t2 - t1)} \frac{a2 - a1}{a1}$$

Where p is the annual rate of change (percentage per year), a1 and a2 are the LU/LC estimates at time t1 and t2, respectively (Puyravaud, 2003).

***2.5* CA-Markov Modeling**

In the present study, Markov and CA-Markov models available in Terrset were used. The Markov model was used to develop a transition matrix, and CA-Markov was used for prediction. The Markov model considers previous states when predicting how a variable will change over time. Because of its ability to quantify the states of conversion between land-use types and the conversion rate among the LU/LC classes, the Markov model's applicability in land-use change modelling seems promising. The mathematical representation of the homogenous Markov model for predicting land-use change is (Praveen et al., 2013):

$$L_{(t+1)} = P_{ij} * L_{(t)}$$

And

$$P_{ij} = \begin{bmatrix} P_{11} & P_{12} & \cdots & P_{1m} \\ P_{21} & P_{22} & \cdots & P_{2m} \\ \vdots & \vdots & \vdots & \vdots \\ \vdots & \vdots & \vdots & \vdots \\ P_{m1} & P_{m2} & \cdots & P_{mm} \end{bmatrix}$$

L(t+1) and L(t) are the LU/LC status at periods t+1 and t.

$$0 \le P_{ij} < 1 \quad \text{and} \quad \sum_{j=1}^{m} P_{ij} = 1$$

Where, (i, j = 1,2,…,m) is the transition probability matrix in a state. A transition probability matrix is obtained by cross-tabulation of two LU/LC maps of different times. It determines the probability of a pixel in a LU/LC class changing into another class during that time. On the other hand, a transition area matrix contains the number of pixels expected to change to a LU/LC class from another class during a period. Thus the model creates transition probability and transition area matrix. Once the transition probability is computed, then CA-Markov model can be used to predict LU/LC. This model requires inputs, namely base year image for which projection is to be done, transition area file created as the output of Markov model, transition suitability image and filter. Transition suitability image was generated using CellAtom module in IDRISI, which requires two inputs: Reclass file (stating the possible transitions) and a filter. A contiguity filter was used for both the analysis as:

0 0 1 0 0
0 1 1 1 0
1 1 1 1 1
0 1 1 1 0
0 0 1 0 0

A kernel size of 5 x 5 that accounts for the neighbourhood pixels was used to create spatially explicit contiguous weighing factors. The pixels far from the existing LU/LC class have been considered lower suitability than the nearer pixels (Praveen et al., 2013).It is assumed that the LU/LC changes observed between 2001 and 2014 under the current socio-economic conditions would continue in the future. Thus, this scenario used annual transition probabilities between 2001 and 2014 to compute the transition potential matrix. Then the model was set to run from 2001 (base year) to 2014. Finally, the simulated LU/LC (2014) was compared to the actual LU/LC (2014), to validate the model's accuracy. The quantification of change in each transition can be modelled using the transition matrix (Sudhakar Reddy et al., 2017). In short, the model determines how the variables influence future change, how much difference took place between 2001 and 2014 and then calculate a relative transition to the future date, i.e., 2030. Figure 2 gives the general methodology of the study followed.

Results and Discussion

LU/LC Change Detection

The LU/LC classes of 2001 and 2014 obtained through the analysis of multi-temporal satellite images were illustrated as thematic maps in Figures 3 and 4, and data are registered in Tables 1 and 2. Accuracy assessment was done for both the LU/LC maps using their corresponding high-resolution satellite images, google earth and ground checks as reference. It was found that the overall accuracies were 92.50% and 95%, and kappa statistics were 0.9 and 0.93 for 2001 and 2014, respectively. These LU/LC maps are thus accurate enough for further analysis. Change detection was performed using a post-classification matrix (Weng, 2001). It was seen that the vegetation has mostly changed to urban and other miscellaneous classes, which includes crop and fallow land.

Rate of Urban Sprawl

Urban sprawl can be measured quantitatively by comparing LU/LC maps. Table 2 shows the percentage of change in each LU/LC class. The annual rate of change gives basic information of average speed at which the different LU/LC classes are converted, expressed in unit area per year. It is observed that vegetative cover has decreased by 332.7 sq. km in 2014 compared to 2001, with the rate of 4 percent decrease per year. On the other hand, the urban area has increased by 213.26 sq. km in 13 years (2001-2014), which depicts the annual change rate of 20.5 percent, i.e. 16.4 sq. km/year. All other LU/LC classes, including vegetation and water bodies (restricted), are constantly being converted into the built-up area. However, this temporal calculation of urban sprawl is not kind enough to understand the morphological changes.

Transition Area and Probability Matrix

As discussed, the Markov model generates two matrices, i.e. transition area and probability matrix. The time step to be predicted was given for 13 years, and results are presented in Tables 3 and 4. Based on the transition area and probability matrix, LU/LC was predicted for 2014 by inputting the LU/LC image of 2001 (Figure 5).

Model Validation

Although there is no clarity on the criteria for evaluating the effectiveness of land-use change models, validation is a critical phase in the modelling process. There are different methods available to validate the performance of models. One of the methods is to compare the simulation result to the actual LU/LC map of the same period (Yikalo and Pedro, 2010). This kind of comparison will quantify the predictive power of the model. In the present study, the predicted LU/LC for 2014 (Figure 5) was compared with classified LU/LC of the same year (Figure 4), and differences between them were tabulated. Table 5 shows no significant deviation in urban class modelling since the kappa coefficient of urban is less than 0.1. However, the vegetation class is underestimated in model prediction, but it will not influence the prognosis of urban sprawl because the trade-off is only between vegetation and other classes. Hence, the present transition matrix and LU/LC images (2001 and 2014) were used to predict urban sprawl (2030).

Prediction of Urban Sprawl

The time step to predict urban sprawl was given as 16 years (2014-2030), and accordingly, transition area and probability matrix were newly calculated as presented in tables 6 and 7.

According to the transition probability matrix, vegetation, urban, and other classes are transient categories exposed to more changes over time. Vegetative areas and others (mainly fallows and barren

land) shifted mostly to built-up areas. Based on the transition matrix and LU/LC of 2014, urban sprawl was predicted for 2030 (Table 8 and Figure 6).It is observed that all LU/LC classes are being converted into urban with differential rates. The rate of vegetation to urban conversion is comparatively high. The urban sprawl is more on northern parts of the study area, especially along the main roads to Mettupalayam, Annur, Avinashi and Tiruppur. The accessibility and existence of the relationship between Coimbatore and these towns encourage urban expansion and road networks.

Conclusion

Coimbatore city has immense potential for urban development due to its climate, industrial expansion and being an educational hub. Therefore, monitoring and modelling the city's sprawl overtime is necessary for better urban planning and land management, controlling vegetation loss. This study justifies how the CA-Markov model is used to highlight the use of remote sensing and GIS in mapping urban sprawl. The results of LU/LC change detection of the study area showed that 80.02 sq. km of the metropolitan area in 2001 increased to 293.28 sq. km in 2014 and 521.45 sq. km in 2030. This change represents a net increase of 441.43 sq. km in 30 years.Meanwhile, vegetation cover depleted from 647.05 sq. km (2001) to 314.39 sq. km (2014). Also, it was predicted that it will reduce further to 170.64 sq. km by the year 2030. The simulation was done for 16 years, and it has realized the exponential growth rate for urban areas. The predicted urban sprawl has been beneficial to understanding the morphological changes and aid in approximating the city's population growth and determining food production needs. The study results could be an instrument for policymakers to draw suitable urban management plans and resource management for sustainable living conditions. However, the model considers neighbourhood filter to predict future growth but fails to incorporate driver variables such as transport network and land unit value, which are vital in expanding urban density. If these kinds of variables are included in the modelling process, the accuracy of the prediction will be improved further. Sooner or later, if this sprawl persists without any careful management, there would be a situation that concrete structures will completely cover the river Noyyal, which is passing through the city.

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Table 1: LU/LC change matrix (2001 - 2014) (in %)

LU/LC Categories		**Year 2001**			
		Vegetation	**Restricted**	**Others**	**Urban**
Year 2011	**Vegetation**	39.61	0.26	6.32	0.24
	Restricted	0.09	99.14	0.03	0.01
	Others	49.23	0.49	77.50	4.89
	Urban	11.07	0.10	16.15	94.86
	Class total	100.00	100.00	100.00	100.00

Table 2: Area and rate of change (per year) of different LU/LC classes (2001- 2014)

LU/LC Classes	**2001**		**2014**		**Change in Area (2001-2014)**	**Rate of Change**
	Km^2	**%**	**Km^2**	**%**	**Km^2**	**% per year**
Vegetation	647.05	32.38	314.39	15.73	- 332.66	- 3.95
Restricted	370.52	18.54	368.25	18.43	- 2.27	- 0.05
Others	900.53	45.07	1022.2	51.16	121.67	1.04
Urban	80.02	4.00	293.28	14.68	213.26	20.50
Total	1998.12	100.00	1998.12	100.00	--	--

Table 3: Transition area matrix for 13 years

Cells in (30m)	Expected to transition to			
	Vegetation	**Restricted**	**Others**	**Urban**
Vegetation	549740	1153	695706	157183
Restricted	9560	1606467	17072	3533
Others	303842	1265	3476612	755248
Urban	4052	288	77916	1220878

Table 4: Transition probability matrix for 13 years

Given	Probability of changing to			
	Vegetation	**Restricted**	**Others**	**Urban**

Vegetation	0.3916	0.0008	0.4956	0.112
Restricted	0.0058	0.9816	0.0104	0.0022
Others	0.0670	0.0003	0.7663	0.1665
Urban	0.0031	0.0002	0.0598	0.9369

Table 5: Actual and predicted LU/LC areas of different classes for the year 2014

LU/LC Classes	**Area (sq.km)**		**Difference (sq.km)**	**Kappa Coefficient**
	Actual	**Predicted**		
Vegetation	314.39	527.74	213.35	-0.68
Restricted	368.25	364.52	-3.73	0.01
Others	1022.20	838.21	-183.99	0.18
Urban	293.28	267.65	25.63	0.09

Table 6: Transition area matrix for 16 years

Cells in: (30m)	Expected to transition to:			
	Vegetation	**Restricted**	**Others**	**Urban**
Vegetation	385092	1389	823684	193617
Restricted	10351	1603299	18936	4046
Others	357947	1550	3263482	913988
Urban	4977	344	92199	1205614

Table 7: Transition probability matrix for 16 years

Given:	Probability of changing to:			
	Vegetation	**Restricted**	**Others**	**Urban**
Vegetation	0.2743	0.0010	0.5868	0.1379
Restricted	0.0063	0.9796	0.0116	0.0025
Others	0.0789	0.0003	0.7193	0.2015
Urban	0.0038	0.0003	0.0708	0.9252

Table 8: Actual (2001 and 2014) and Predicted area of LU/LC for 2030 (sq.km)

LU/LC Class	**2001 (Actual)**	**2014 (Actual)**	**2030 (Predicted)**
Vegetation	647.05	314.39	170.64
Restricted	370.52	368.25	361.48
Others	900.53	1022.2	944.55
Urban	80.02	293.28	521.45
Total	1998.12	1998.12	1998.12

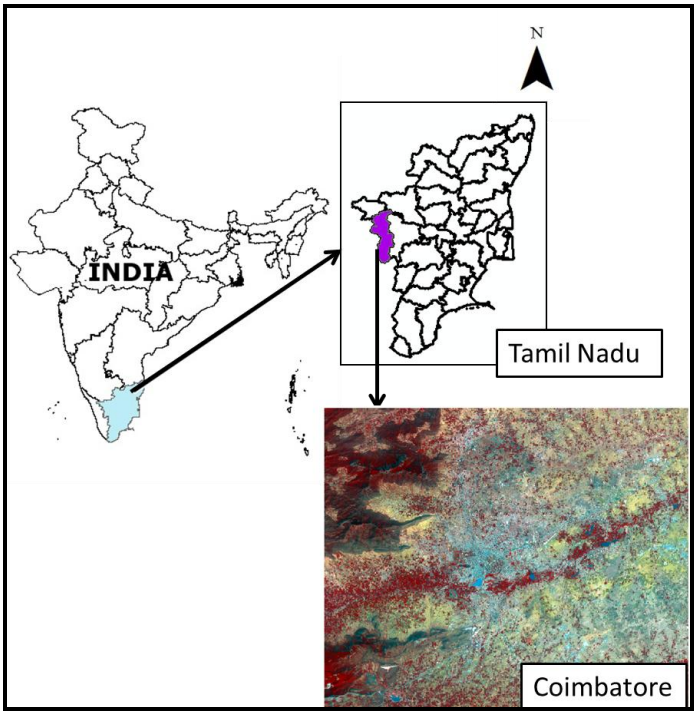

Figure 1: Location map of study area

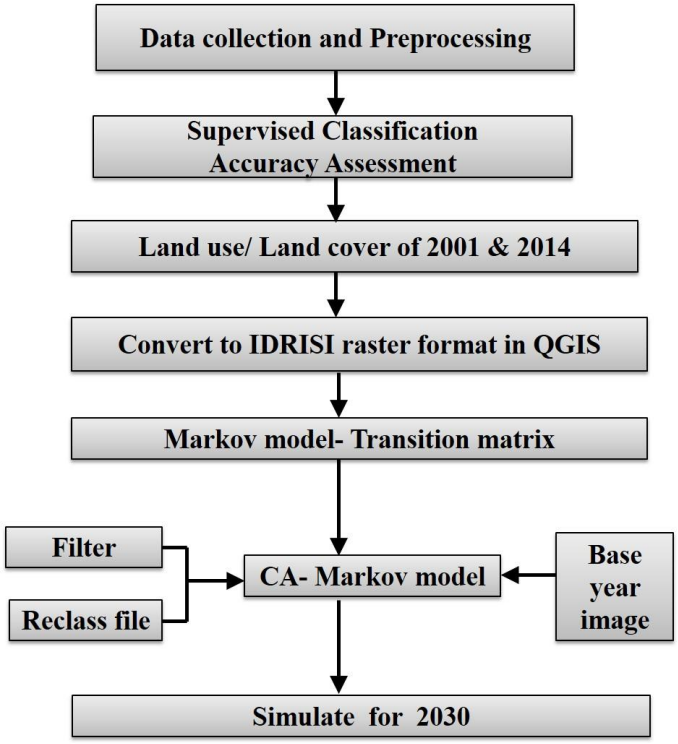

Figure 2: Flowchart of the general procedure used in CA-Markov modelling

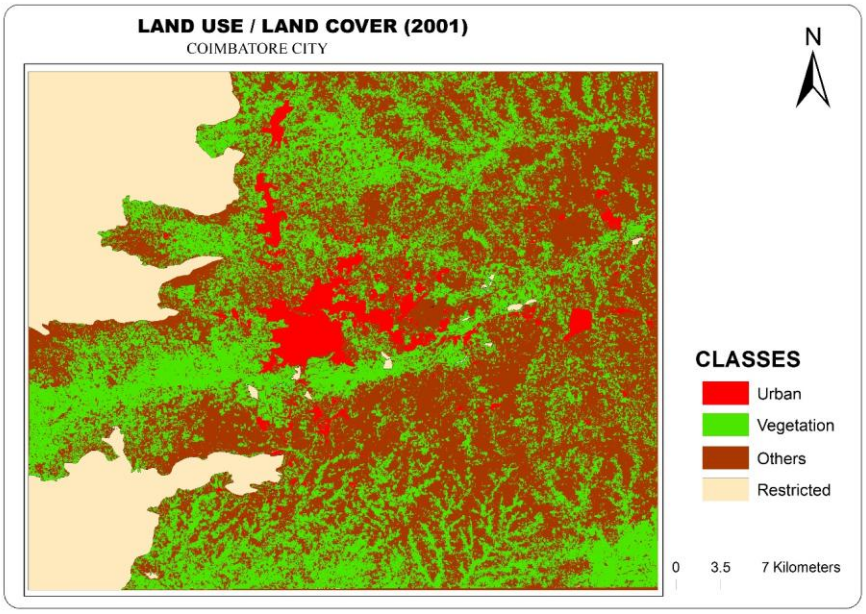

Figure 3: Land use/ land cover of 2001

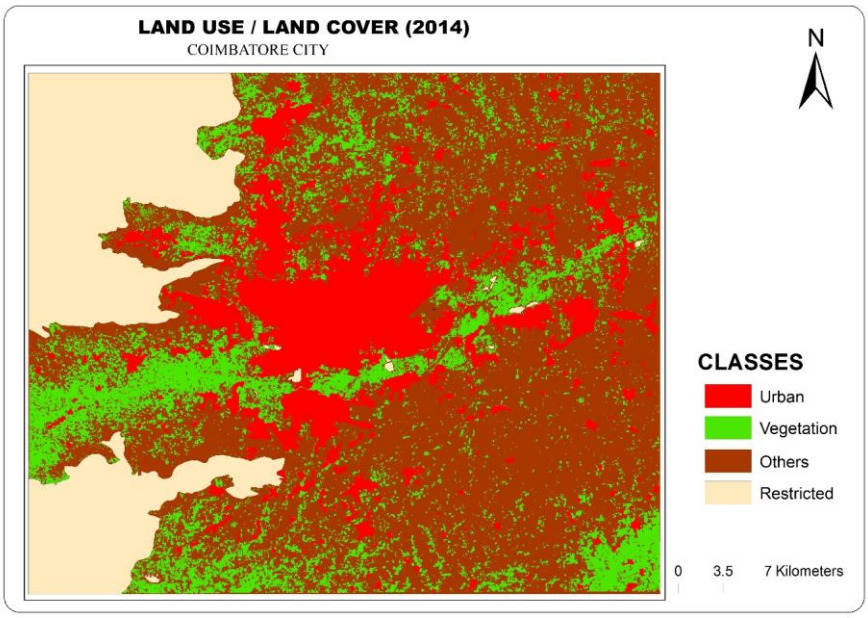

Figure 4: Land use/ land cover of 2014

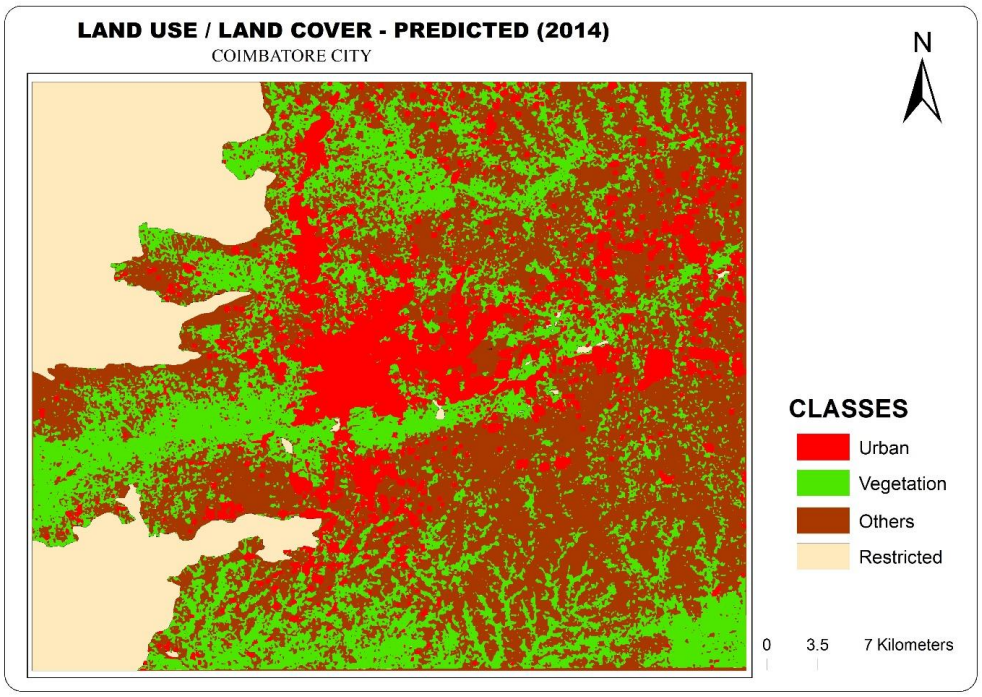

Figure 5: Predicted land use/ land cover of 2014

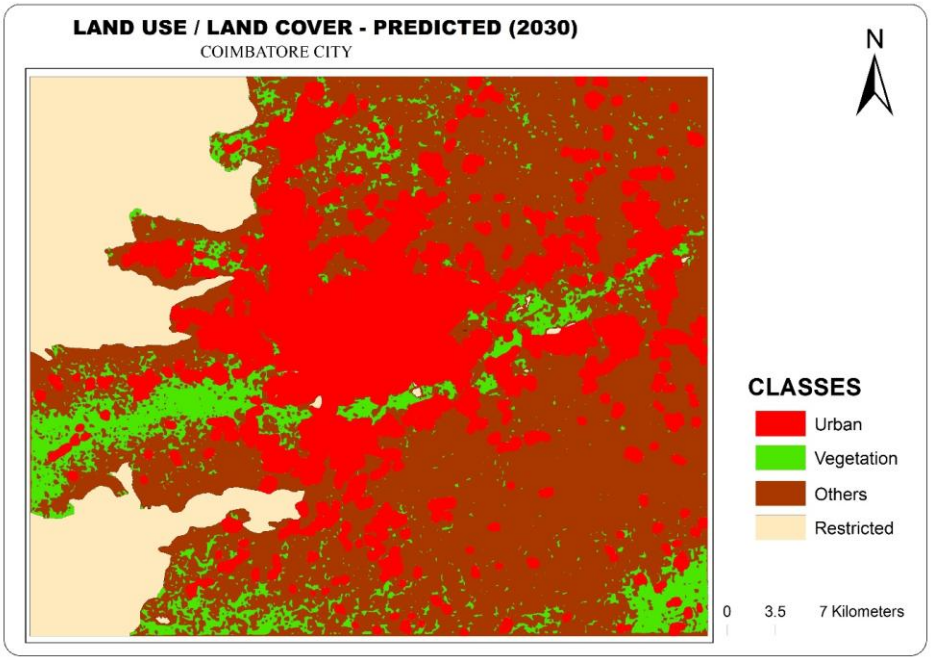

Figure 6: Predicted Land use/ land cover of 2030

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Impact Assessment Of Covid-19 On Indian Agriculture Production

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Abstract

The Covid-19 induced lockdown in India was an enormous economic distress. It started across the country on 24 March 2020 and is still continuing with restrictions in one form or other. It slowed down the economy with complete closure imposed on enterprises across all sectors. Even though agricultural activities exempted, in the initial phases of the lockdown the agriculture value chain also faced large-scale disruptions. This had a serious unfavorable effect on the rural Indian economy. The corona virus pandemic has also triggered a massive reverse migration from the urban to rural areas in large parts of the country. The government, through its various interventions specifically through the PMGKY and MNREGA has provided timely relief to migrants in these difficult times. While most of the challenges presented by the pandemic have been efficiently handled it is also important to make use of the opportunities the crises provides. A case in point is the new opportunities the crises have thrown open in the agriculture supply chain network. In many parts of the country, FPOs stepped in effectively creating supply chains in the COVID scenario. There are also numerous examples across metros in the way groups of farmers took the initiative to ensure direct delivery of produce to gated communities and societies for products ranging from striking avocados to perishables like regular fruits and vegetables. The entire logistics chain has been set in motion, but it currently lacks depth and width. The scenario of Agriculture production adversely affected in the pandemic situation.

Introduction

Agriculture, the only sector to clock a positive growth of 3.4 per cent at constant prices in 2020-21, during the first wave of the novel corona virus disease (COVID-19), could be severely impacted due to the continuing second wave. The primary reason is that COVID-19 is running riot in the country's rural surroundings, where most agricultural activity takes place, during the second wave. The second wave has an impact on the just concluded Rabi season. It could also impact on the Kharif season, depending on the trajectory of the pandemic.

Objectives of the Study

1. To understand the Impact of Covid19 on Agriculture and allied sector production.
2. To know the Impact of Covid19 on Marketing of agriculture production.

Methodology

The research is mainly on the basis of secondary information, since the first wave of the novel corona virus disease (COVID-19), as the restrictions imposed due to the lockdown are being lifted, it is an opportune moment to analyze the impact of COVID-19 on different sectors of the economy. For the study purpose numbers of reports have pointed towards the possibility of contraction on Covid19 and Agriculture and allied sector of Indian GDP in 2020-21.

India's Position in World Agriculture

As regards, India's position in world's agriculture is concerned; it is the largest producer of pulses, okra, mango, banana and lemon and the second largest producer of wheat, rice groundnut, potato, tomato, onion, cabbage, cauliflower etc (Table 1.1). India produces more than one fifth of global production of paddy and pulses. Similarly, it contributes to more than twenty per cent of global production of many of the horticulture crops such as okra, cauliflower, banana, mango and papaya. Nevertheless, the area of concern is the low level of productivity of major field and horticulture crops in the country.

Table 1.1
India's Position in World Agriculture

Item India	(Million Tonnes)	World (Million Tonnes)	India's	
			% Share	Rank
Crop production				
(A): Total Cereals	294	2849	10.3	Third
Wheat	93.5	749.5	12.5	Second
Rice (Paddy)	159	741	21.4	Second
Total Pulses	17.6	82	21.5	First
Oilseeds Groundnut (in shell)	7	44	15.6	Second
Rapeseed	6.8	69	10	Third
2. Fruits & Vegetables				
Vegetables & Melons	120	1075	11.2	Second
Potatoes	44	377	11.6	Second
Tomato	18.4	177	10.4	Second
Onion (dry)	19.4	93.2	21	Second
Banana	29.1	113.2	25.7	First
Mango and Guava	18.8	46.5	40.4	First
Lemon & Lime	3	17.3	17.2	First
Papaya	5.6	12.6	44.4	First

Source: FAOSTAT

Global Vs National Yield of Major Crops

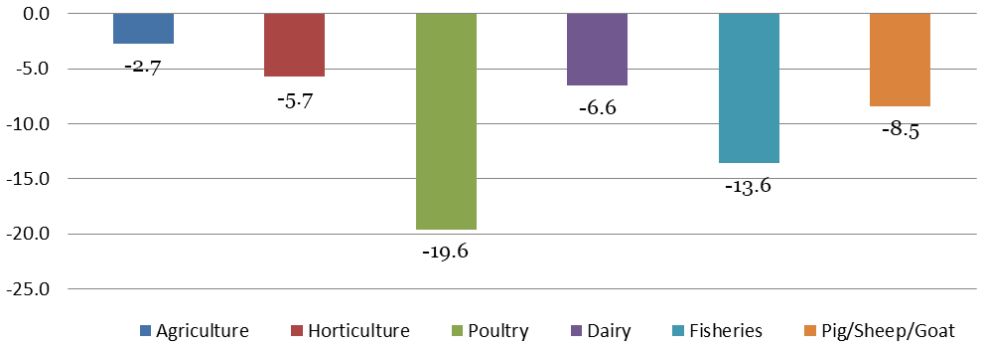
Although, India is one of the largest producers of some of the agriculture and horticulture products, yet the national yield of major crops (except ground nut) is less than the global average yield production. Further, the national yield of such crops is far less than the highest yield achieved in other parts of the world (Table 1.2). The COVID 19 pandemic has adversely impacted on the global agriculture sector and Indian agriculture sector is no exception.

Table 1.2
Global Vs National Yield of Major Crops

Item	World (kg/ha)	India (kg/ha)
Paddy	4602	3848
Wheat	3531	3219
Maize	5755	3115
Pulses	1009	664
Sugarcane	70891	69735
Groundnut	1686	1732
Tobacco	1843	1711

Impact on Agriculture Production

The impact of lockdown imposed in the entire country owing to COVID-19 on the overall production levels in the agricultural and allied sector has been significant with overall production levels in the agriculture and allied sector declining in 47% of the sample districts. However, 19% of the districts have also reported an increase in the overall level of production in the sector and 34% of the districts have shown no change in the levels of production in the agriculture and the allied sector. Some of the reasons for decline in agricultural activities include lack of availability of labour and machines, need for social distancing, and restrictions on free movement of men and Machinery.



Through the survey study of Department of Economic Analysis & Research, NABARD, August 2020, the magnitude of the impact of COVID-19 and resultant lockdown on various sub-sectors of the rural economy. In order to do so, the agriculture and allied sector was further sub-categorized as: Agriculture, Horticulture, Poultry, Dairy, Fisheries and Pig/Sheep/Goat and an attempt was made to assess the magnitude of impact on these sub-sectors. The all- India changes in magnitude of production in these sub-sectors have been depicted in Fig 1.3. All the subsectors have shown a decline in the magnitude of production with poultry showing the highest decline of 19.6% followed by fisheries with a decline in production by 13.6%. Crop production has been least impacted with a decline of 2.7%. The unfavorable impact on Crop sector was lower since harvesting of Major Rabi crops viz. wheat, mustard, gram, etc. in majority of the states was almost complete by the end of April 2020 and farmers had already moved major portion of their produce from their farms to their houses. Nevertheless, production in *allied sector* had declined significantly especially in poultry sector (-19.5%), followed by fisheries sector (-13.6%), Sheep/Goat/Pig (-8.5%), dairy (-6.6%) and horticulture (-5.7%).

Agriculture scenario for Rabi losses

Farmer harvest in Rabi crop, but sales have been impacted as COVID-19, infections have risen and mandis (wholesale markets) have remained closed since April 2021 due to lockdown and restrictions in many states. Throughout the initial wave of COVID-19, there was some supply chain issues related to transport from the primary mandis to the secondary and bigger markets. But this time around, there are numerous concerns about taking the produce even to the primary mandis due to rising COVID-19 cases in rural areas and burden of lockdowns. Preceding year, even although the lockdowns were more stringent, primary mandis at village level were largely kept out of the restrictions. This was since the infections were low or nil in rural areas. The states like Punjab and Haryana, where there is high government procurement, the majority of the wheat crop has been lifted. This is not the case in other wheat-producing states like Uttar Pradesh (UP), Madhya Pradesh (MP), and Rajasthan. Proportional data of wheat arrivals between May 1-May 21, 2021 and the same period last year shows the arrivals are dismal. For us, the month May is a busy month since a lot of harvest and commodity arrivals happen. But this time, it is a complete washout. There is an impact on farmers' livelihood also as those who want to sell their produce are unable to do so. The transaction volume will increase towards the end of May or June when mandis open.In Maharashtra, the onion Rabi crop, which is harvested between March and May, But farmers have been unable to sell as all mandis in the state, including Lasalgaon, Asia's largest onion mandi, have been closed since 12th May 2021. The Rabi crop has a longer shelf life. But unseasonal rainfall in the last few days has led to the growth of fungus in some stored stocks, Bharat Dighole, a farmer and member of the Maharashtra State Onion Growers' Association, said. Almost 40 per cent farmers are not being able to sell their onion crop in Maharashtra. Farmers use the money they get from sale of this crop to buy seeds and fertilizers and prepare for the next crop like maize, cabbage and soybean in June. But they have no

cash in hand this time. Another major concern among farmers is that once the mandis open, there will be an unexpected increase in arrivals which will result in a depression of prices for them. In Maharashtra, the mandis are supposed to open from 24th May 2021.

Agriculture scenario for Kharif

Even with the rise in cases and deaths, there is optimism about the performance of the agriculture sector, especially after the India Meteorological Department's forecast of a normal monsoon in 2021. The latest data from the Food and Agriculture Organization's (FAO) Food Price Index further boosts. It shows that worldwide food prices in May were at their highest levels since May 2014, this could be benefited Indian farmers. There is also hope that the infection situation would be much better by the time sowing for Kharif starts from mid June. But on the other hand, the possibility of farmer families getting infected is also real and may impact sowing operations. Siraj Hussain, former union agriculture secretary and now senior visiting fellow, Indian Council for Research on International Economic Relations, said: The situation in rural areas is not completely known. We still don't know the extent of the pandemic. If the pandemic is not brought under control, the Kharif sowing operations will impacted. Everything depends on movement of the disease. "For example, in rural areas of UP, there is very less awareness on what do if somebody has symptoms or even when infection is confirmed. Moreover, people are still going about having weddings and functions. The return of migrant labourers to their villages has posed a different problem for farmers. This is especially states like Punjab and Haryana that are highly dependent on agricultural labourers from UP and Bihar for the sowing of paddy.

Conclusions

National level the impact of COVID-19 and the resultant lockdown had been quite harsh on agriculture and allied sector in greater part of districts. Among various subsectors, rabi crops were least affected as its harvesting was on the verge of completion but allied sectors such as poultry, fisheries and pig/goat/sheep sector witnessed a drastic fall in demand due to misplaced rumors leading to declining production as well as declining farm gate prices. However, prices of agriculture inputs were estimated to be rising mainly due to disruption in supply chain and closure of shops and markets. Although banking activities were exempted from lockdown, the basic banking services viz, loans, deposit and recovery were severely hampered in majority districts in the country. In order to assess the impact of COVID-19 on marketing the multiple dimensions of the marketing agricultural produce. The study shows significant adverse impact on different aspects of marketing of agricultural produce, as shown in given data. For instance, at all-India level, among all captured variables relating to marketing of agri-produce, conduct of weekly markets had been affected adversely in nearly 87% of districts whereas procurement by Govt. agencies had been adversely affected in 44% of the districts. This was mainly because of complete ban on operation of such rural market by the administration to stop the gathering of people so as to check the spread of the corona virus. Notably, the degree of impact on marketing of agricultural produce had witnessed some variations across different states in respect of each of the marketing aspects.

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Role of Urban Planning in Effective Sustainable Development

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Abstract :

Urbanisation is becoming the essential ingredient in the development of cities and the nation. The result of speedy urbanisation impacts on the environment at large. There exist many problems due to urbanisation. So, the urban planning came into existence. The urban planning helps in maintaining effective and sustainable cities. This paper focuses on the urban planning and its effect on sustainable development.

Keywords : urban planning, sustainable development, urbanisation.

Introduction :

Urban areas in cities are living organism that evolves in parallel to social transformation processes; it shapes the material substrate which expresses identity and collective memory. In the twenty-first century, population growth is exponential; globalization and the information society have resulted in many of these socio-economic processes accelerating, with consequences that we are not yet able to discriminate in their entirety. In this context, cities need to adapt to the general dynamics of urban development by incorporating the environmental, economic and social aspects of the "sustainability paradigm".

There is a concerns over climate change across the world; clean air and water, renewable energy and land use continue to draw attention to sustainability, particularly sustainable urban planning -- the developmental policies and practices that ensure livable, self-sustaining communities over the long term. According to a 1987 United Nations report, sustainability is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."Sustainable urban planning includes many disciplines, including architecture, engineering, biology, environmental science, materials science, law, transportation, technology, economic development, accounting and finance, and government, among others. This kind of planning also develops innovative and practical approaches to land use and its impact on natural resources.New sustainable solutions for urban planning problems can include green buildings and housing, mixed-use developments, walkability, greenways and open spaces, alternative energy sources such as solar and wind, and transportation options. Good sustainable land use planning helps improve the welfare of people and their communities, shaping their urban areas and neighbourhoods into healthier, more efficient spaces.

Objectives :

1. To study the urban planning.
2. To study the details about sustainable development.
3. To analyse the role of urban planning in sustainable development

Hypothesis :

There is a significant impact of urban planning on sustainable development.

Urban Planning

Urban planning is the art and science of giving shape, design, and structure to cities and towns. It involves various processes like arrangement and designing of buildings, transport systems, public spaces as well as good amenities. Nowadays, it has become a much-needed discipline because cities are getting overpopulated day by day and resources are getting scarce.

That’s why urban planning has become significant as it helps in finding the solutions to use the land and infrastructure in the best possible way.

Urban planning is a new discipline whose need has been arisen due to the rising health issues because of overpopulation, poor sanitation, and pollution. The way the cities were designed earlier, it had become tough for citizens to reside, walk or use public transport. For the first time in the year 2010, over 50% of the world’s population was living in cities. At that time, the United Nations predicted that by 2015, there will be 358 cities in the world having more than 1 million population and

27 megacities with more than 10 million people. Much of this will be seen in developing countries. That's why the need for urban planning came into the picture. With this, let's understand why urban planning has become crucial in today's world.It was started in ancient Rome when the city had a population of less than 1 million. The government has recognized urban planning as the perfect measure to eradicate the problems occurring in various cities. But the question is, "Why urban planning?" "What does exactly it do and why has it become so important? Urban planning encompasses the preparation of plans for and the regulation and management of towns, cities, and metropolitan regions. It attempts to organize sociospatial relations across different scales of government and governance. Urban planning is concerned with the social, economic, and environmental consequences of delineating spatial boundaries and influencing spatial distributions of resources. The purposes and means of achieving such distributions have varied significantly historically and geographically, often in response to challenges to prevailing approaches that reveal the political nature of planning interventions and the limitations of technical knowledge claims.

Helps the Cities to Grow

Due to more work opportunity, better education facility, and many other reasons, the population in the cities of developing countries is increasing more and more. In order to accommodate a large population, there have to be some early plans. That's why authorities should always make proper planning. This will be made by keeping certain factors in mind, such as the needs of citizens, appropriate expansion of infrastructure, and efficient measures during emergency situations.Utilizing the resources through urban planning, the city would have a strategy to develop its economy as well as livability conditions. Not only the expansion of residential areas, but urban planning also ensures good transportation, health care, and judicial system. Thus, the city will grow rapidly without having negative impacts on its economy and citizens.

Improves Quality of Life

Quality of life is the major concern of every human being when they move to a city. The other two issues are employment and accommodation. Though the cost of living is higher, the opportunities are also great. To make it easier, the city manager must have rules and regulations for the proper distribution of land, public spaces, and the infrastructures. Due to increasing density in nearby cities, city management is creating several attractive points of interest in the city. The authorities are also regularly updating the traffic regulations due to constantly increase in the number of vehicles. All these measures are ultimately improving the quality of life of the people.

Predict Disasters

Global warming has created some major issues for our planet and the inhabitants. Having an early idea of natural calamities has become very important for those who do city management. They are trying to have the prediction of all such calamities to make long-term strategies and later achieve them by making short-term actions. They keep the citizens as well as the visitors safe from all possible disasters that the world is facing today. Minimizing the risks for the betterment of everyone has only become possible because of urban planning.

Positive Impact on Economy

We all know that as the cities grow, economic requirements increase too. The financial measure is one of the most important aspects of urban planning and if not taken properly, there would be a severe impact on the economy of the city. It takes care of more and more job openings as well as reducing the cost of living. The major problem cities are facing nowadays is the migration of inhabitants due to the reduced number of work opportunities and expensive living conditions. Urban planning also does the expansion of neighboring rural areas. It takes all the required measures for further development and utilization of the rural areas to bring economic growth to the city.

Safe and Healthy Lifestyle for Everyone

By constantly following the advice provided by the World Health Organization, urban planners ensure that the citizens live a safe and healthy life. They suggest the inhabitants pay attention to their lifestyle. Authorities create a better environment and provide sufficient areas in the public park for senior citizens to exercise and have leisure time. They keep machines to collect garbage and unwanted materials to keep the city clean and healthy for the citizens.

Develop the Nation

According to the reports of the UN, the world will be likely to have more 3 billion population moving to cities by 2050. This report suggests that this continuous growth in urban population could cause severe harm to biodiversity. Each country is putting efforts to minimize the impact of increasing urbanization on the environment. The management is planting more and more trees. They are raising awareness among the citizens to use more and more public transport and decrease the rate of fuel consumption per person. With the growing population, cities will always need urban planning. That's why it must be implemented all around the world, especially in developing countries. They will always come across challenging conditions and things will become even worse without urban planning. Not only the official and the management should be responsible, but every citizen should act sensibly towards the betterment of the society, city, and the country.

Sustainable Development

The sustainable development can be interpreted in many different ways, but at its core is an approach to development that looks to balance different, and often competing, needs against an awareness of the environmental, social and economic limitations we face as a society.

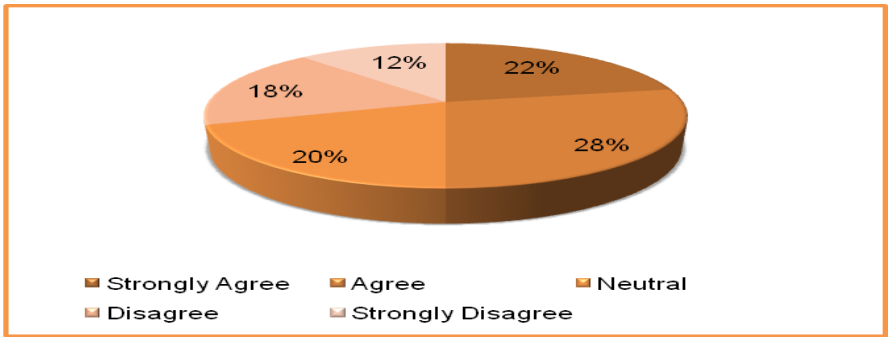
All too often, development is driven by one particular need, without fully considering the wider or future impacts. We are already seeing the damage this kind of approach can cause, from large-scale financial crises caused by irresponsible banking, to changes in global climate resulting from our dependence on fossil fuel-based energy sources. The longer we pursue unsustainable development, the more frequent and severe its consequences are likely to become, which is why we need to take action now. Living within our environmental limits is one of the central principles of sustainable development. One implication of not doing so is climate change.But the focus of sustainable development is far broader than just the environment. It's also about ensuring a strong, healthy and just society. This means meeting the diverse needs of all people in existing and future communities, promoting personal wellbeing, social cohesion and inclusion, and creating equal opportunity.The way we approach development affects everyone. The impacts of our decisions as a society have very real consequences for people's lives. Poor planning of communities, for example, reduces the quality of life for the people who live in them. (Relying on imports rather than growing food locally puts the UK at risk of food shortages.) Sustainable development provides an approach to making better decisions on the issues that affect all of our lives. By incorporating health plans into the planning of new communities, for instance, we can ensure that residents have easy access to healthcare and leisure facilities. (By encouraging more sustainable food supply chains, we can ensure the UK has enough food for the long-term future.)

Table : Impact of urban planning on sustainable development.

No. of respondents : 50

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
11	14	10	9	6

Graph : Impact of urban planning on sustainable development.



The above graph shows the impact of urban planning on the sustainable development. From the above graph it is found that out of 50 respondents, 22% respondents are strongly agree on the statement 'There is a significant impact of urban planning on sustainable development', while 28%

are agree with the statement, 20% are neutral with the statement, 18% are disagree with the statement and 12% are strongly disagree with the statement.

Thus, majority of respondents feels that 'There is a significant impact of urban planning on sustainable development'.

Role of Urban Planning in Sustainable Development

Creating sustainable society -- including the physical, economic, political, social and environmental aspects -- involves many challenges. According to the U.S. Bureau of Labor Statistics (BLS), "The environmental aspect of sustainability focuses on the goals of protecting the environment and the preservation of natural resources for current and future generations." To accomplish these goals, sustainability professionals, in particular urban and regional planners, create solutions and implement policies to help businesses and communities manage their resources, lower their consumption of natural resources and reduce their overall impact on the environment.

Urban and regional planners are important in making a region more livable for its residents and more attractive to new businesses. As cities, suburban areas and municipalities change demographically and environmentally, urban planning professionals must create revitalization projects and address population growth, environmental degradation, and resource scarcity (BLS). Planners are also necessary in new and existing communities, which require extensive development and improved infrastructure, including housing, roads and highways, water and sewer systems, schools, health care facilities, and parks.

Resilience in the face of climate change and other ecological threats implies the ability to survive and bounce back after a crisis. At the scale of the city, it is about the ability to cope with challenge and adapt without sacrificing the population's health.

Improving Air Quality

We focus on poor air quality as the most significant environmental health risk in rich countries and cities in intermediate countries such as China and India. It is caused by urban activity – particularly industry, transport and energy used by buildings – and mitigated by green environments.

Traffic is now the main cause of poor air quality in many cities. The unhealthy impacts of air pollution are greater in urban areas with high traffic levels, high built densities and lower air dispersal characteristics. There is a complicated balance of conflicting parameters: more compact urban areas reduce the amount of per capita travel but at the same time tend to increase the density of traffic and the level of congestion which in turn increases pollution. The concentration of foul air tends to be worst in heavily trafficked 'canyon streets', where the solid phalanx of buildings on either side does not allow rapid dispersal of vehicle exhaust. In new developments, canyon traffic streets can be avoided by effective urban design. Reducing local air pollution from traffic goes hand in hand with strategies for promoting active travel and reducing carbon emissions.

Where cities have successfully created urban environments that encourage people to travel by low energy means, then traffic levels are moderated, and the frequency of congestion reduced. Traffic flowing smoothly at a moderate speed is less polluting than constant start/stop. The move towards electric vehicles could also cut local pollution and should be promoted, with implications for the location of charging points. But of course, the effect on carbon emissions depends on the source of the electricity.Green infrastructure has a key role in mitigating air pollution. There are natural processes that purify the air, given the chance. Urban vegetation acts to reduce ozone pollution, absorb sulphur dioxide and remove dust, including heavy-metal particles, from the atmosphere. Soil micro-organisms reduce the amount of carbon monoxide. While plant and tree species vary in their tolerance of pollution, there are very valid reasons for reforestation of the urban environment. The whole shape and character of the city affect the ability of nature to work effectively. A green urban environment brings other benefits to which earlier chapters have alluded: moderating temperature extremes, improving the sense of well-being. We observe heat islands in cities where the ambient air temperature is several degrees higher than in the surrounding countryside. Increasing the percentage of urban areas covered by vegetation and water permits excess heat and pollution domes to be ameliorated. Cities need to breathe. Linear parkways, green lungs and water bodies that break up the continuity of hard urban development promote climatic moderation and purer air. In addition, tree

planting and living green surfaces throughout the urban area, creating a fine green mesh, assist the dispersal of pollutants and heat.

Water Sensitive Planning

Water problems are likely to be exacerbated by climate change, with some areas suffering water shortage, others subject to more violent storms and increased flood threat. Water management is not simply an engineering issue, but a matter for planners, urban designers, landscape architects – and the users. Urban surface water drainage illustrates this point. In the natural water cycle, rain is absorbed by vegetation, percolates into the ground to recharge the underground aquifers, or runs down streams and rivers at a rate moderated by vegetated banks and flood plains. In the standard urban situation, vegetation and earth have been replaced by the impermeable surfaces of roofs, roads and car parks. The speed of run-off is far faster. Surface water is piped away to streams and rivers, which are then much more liable to flood at times of storm – a problem further exacerbated if the water courses themselves have been canalized, speeding the water downstream. At the same time the local ground water supplies are contaminated by vehicle oils, pesticides, fertilizers and urban detritus, and may not be fully replenished, threatening the longevity of wells. This is foolish planning, increasing risks and distorting a natural process on which we all depend. Water-sensitive planning within settlements needs to address all stages of the water cycle.

Protect our Wildlife

Our innate affinity with nature runs deep, we need nature for mental well-being. Plants are the basis of all life on Earth – producing oxygen, sequestrating carbon, through photosynthesis providing the food and habitat that all animals depend on. Plants, especially trees, help regulate the flows of water in streams and rivers, purify the air of pollutants, and moderate local climatic extremes. Humans and all creatures live in symbiotic relationship with the plant world. Yet our actions too often belie our interdependence and our affinity. Nature conservation is often a very popular cause where mature trees, furry animals or raptors are concerned. But nature is all too easily marginalized in practice when development pressures are on. It is vital not to see wildlife policies as fixed in aspic, or just for specific sites. Nature reaches into unexpected places and is forever evolving and will do so more in the future as climate changes. Local wildlife opportunities include:

- Street trees create habitats while also providing shade and supporting human well-being. In lower density areas, street trees may combine with front gardens to offer rich habitats – so long as those front gardens are not concreted over for car parking.
- Back gardens, especially when planted with trees and linked by hedgerows, provide green threads on a finer scale than corridors, creating permeability for wildlife.
- New developments can make good use of remnant countryside hedgerows, and mature trees, to give natural interest and sense of place, as well as wildlife havens.

Buildings can be designed with green roofs (with urban cooling and water retention as well as habitat benefits), and nesting opportunities as part of the building structure. This Dezeen article showcases 10 plant-covered buildings that point to a green future. Open spaces and roadside verges can be managed so as to upgrade habitat quality, with maintenance regimes designed to encourage wild flowers, and planting of native shrubs and trees.

Locally Sourced Food

The traditional pattern of food grown around settlements and thence direct to households has been replaced in richer countries by industrialized agriculture, international trade, and pre-packaged meals. People are estranged from the earthy reality of food production. In reaction, there has been an explosion of interest in independent and community food ventures. Local food systems not only give easy access to fresh food and encourage recycling of organic waste, they give participants physical exercise, contact with growing things and, in many situations, convivial human contacts.

The implications for spatial planning are significant and radical. Past practice has tended to see provision of allotments (for example) on land left over after planning – awkward sites, slopes, fringe locations. In Odense, Denmark, allotments provide an attractive area adjacent to blocks of flats, offering an important outdoor social focus for residents; in Vancouver, housing co-operatives have been surrounded by gardens and horticulture with great effect. Key to such initiatives is community control and responsibility.It is essential to treat climate, air, water, land and biodiversity as

environmental assets which need to be treasured, safeguarded and replenished if depleted. We must do this not simply out of love of nature, but for our own long-term health and well-being. This article only scratches the surface on the potential of urban planning in the race to become sustainable. For more information, check out Hugh Barton's City of Well-being.

Conclusion :

Majority of respondents feels that 'There is a significant impact of urban planning on sustainable development'. The planned cities are environmentally sustainable. The urban planning are most important for making development sustainable. The sustainability helps citizen in providing facilities by maintaining environmentally conscious. The societies and planners should plan cities by following environment standards so that citizen and generations will be benefitted.

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Impact of Light Pollution on environment

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Abstract:

Ecological light pollution includes direct glare, chronic increased lighting, and temporary and unexpected fluctuations in lighting. Sources of ecological light pollution are very diverse and are found in almost all ecosystems in the form of sky glow, lighted buildings and towers, street lights, fishing boats, safety lights, vehicle lights, rockets on offshore oil rigs and even fires underwater research vessels. In this article, we discuss the different types of light pollution and the impacts of light pollution. Avoidable light pollution refers to the luminous flux emitted at night by artificial light sources which are not adequate for the intensity, direction and / or spectral range, not necessary to fulfill the function for which they are intended, or when the Artificial lighting is used in particular sites, such as observatories, natural spaces or sensitive landscapes. Of all the causes that negatively affect the quality of the night sky, light pollution presents the most immediate risks but, at the same time, it can be reduced with viable solutions.

Keywords: pollution, over-illumination, Light trespass, Glare, Sky glow

Introduction

With the expansion of human dwellings nearby and in natural habitats, fragile ecosystems are increasingly exposed to artificial night lighting. Natural light in the night sky comes from starlight, zodiac light (the sunlight that spreads from dust in our solar system), and glow from the air in roughly equal amounts. Even a small amount of artificial light interferes with this delicate balance, changing the color of the sky, and overwhelming starlight. Light pollution has become a global problem as it gradually decreases the ability to observe stars. This new type of waste has cultural, environmental and even energy impacts, with unforeseeable consequences. Light pollution is generally divided into two main categories: bothersome light and excessive light. Light pollution can also be divided into indoor and outdoor light pollution. The official definition of light pollution comes from the International DarkSky Association and states that light pollution is .any adverse effect of artificial light including sky glow, glare, light trespass, light clutter, decreased visibility at night, and energy waste." Light pollution typically occurs in large urban areas and has been shown to reduce the visibility of stars. Light pollution also disrupts ecosystems and can even have negative effects on health. Some scientists even argue that ever-increasing light pollution could disrupt food webs and affect entire ecosystems. This is because light pollution causes the celestial compass to be scouted for many nocturnal animals such as cockroaches, moths, crickets and spiders, which can completely disrupt their ability to navigate. Light pollution can be reduced with more efficient use of lightning. More efficient use of lightning would require changing the habits of much of our society. The brightness of the skies over large cities is a major concern for many astronomers around the world as it obscures the stars even on perfectly clear nights. Scientists have calculated that the brightness of the sky in large parts of urban areas is at least 2 to 4 times higher than normal. in Europe and North America Light pollution can have negative health effects such as frequent headaches, fatigue, increased stress, decreased libido and increased anxiety. There have also been several studies claiming that there is a link between light pollution and breast cancer due to the suppression of normal nighttime melatonin production. It is believed that light pollution also contributes to smog. According to the American Geophysical Union study, light pollution destroys nitrate radicals, preventing the normal nighttime decline in atmospheric smog. Measuring the total amount of light pollution in a given area is a very difficult and time-consuming process because the natural atmosphere is not entirely dark.Light pollution can be defined as the introduction by humans, directly or indirectly, of artificial light into the environment. Avoidable light pollution refers to the luminous flux emitted at night by artificial light sources unsuitable in intensity, direction and / or spectral range, unnecessary to fulfill the function for which they are intended, or when artificial lighting is used in particular sites. ,

such as observatories, natural spaces or sensitive landscapes. Of all the causes that negatively affect the quality of the night sky, light pollution poses the greatest immediate risk, but it can be reduced at the same time through practical solutions. Irresponsible lighting involves over-lighting, which makes unnecessary and excessive use of artificial light. as well as poorly designed lights that cause glare or glare from the sky. The Starlight Saving Time takes into account the moment when artificial lighting is absolutely necessary; Dark Time saves energy, protects our heritage and promotes quality of life as well as cultural and scientific research; the common factor in these phenomena is the loss of capacity. Stargazing, along with unnecessary impacts on people's quality of life, waste of energy, habitat degradation and negative effects on wildlife.

Research Methodology

The researcher will be collecting information on the basis of Secondary data ,through blogs, articles, journal, research paper etc.

Types of Light Pollution

Light pollution is a broad term that refers to multiple problems, all caused by inefficient, unpleasant or unnecessary use of artificial light. Specific categories of light pollution include light trespass, over lighting, glare, light clutter, and sky glare. The only offending light source often falls into more than one of these categories.

Light Trespass

Light trespass occurs when unwanted light enters one's property, for instance, by shining over a neighbor's fence. A common light trespass problem occurs when a strong light enters the window of one's home from outside, causing problems such as sleep deprivation or the blocking of an evening view.Ordinances have also been written to limit the amount of light on property lines and beyond, but they can be unrealistic or vague. There is a need to provide realistic limits and clarity in measurement. To state "zero fires on the property line" is too vague. Absolute zero means that even if a lamp is a mile away and the light source is visible, it is in violation and would require the placement of caps on each lamp. What is realistic may vary depending on whether an area is residential or industrial, urban, suburban or rural. Credit offered by LEED provides limits at the property line and 10-15 feet beyond. At a distance of 10-15 feet, LEED limits light to 0.01 fc. (For comparison, a full moon gives 03 fc and a moonless night gives 0.004 cf). This is a very difficult limit to meet in providing uniform illumination over a parking lot and driveway. Horizontal measurements are common for indoor and outdoor lighting calculations. Measurements can be made approximately at eye level of the vertical light level facing the site, or directed towards the brightest light source. Exceptions may be allowed when vehicles enter the street. This would allow the streetlights at the entrance to the driveway to make cars. more visible when entering traffic. Limiting the height of posts is another common ordinance tactic to reduce light intrusion. This becomes counterproductive when the ordinance also provides for max: min ratios for safety reasons. Reducing the height of the posts will increase the dark spots on a site.The increase in the number of poles is only possible to a certain extent due to the width of the corridors and parking lots. Otherwise, poles should be placed in parking lots and hallways to maintain uniform lighting

Over-Illumination

Over-Illumination is the excessive use of light. In the United States in particular, over lighting is responsible for about two million barrels of oil per day in wasted energy. This is based on the consumption of U. of oil equivalent. It is also noted in the same U.S. Department of Energy source that over 30 percent of all energy is consumed by the commercial, industrial and residential sectors. Energy audits of existing buildings show that the lighting component of residential, commercial and industrial uses consumes about 20 to 40 percent of those land uses, which varies by region and land use. Thus, the energy for lighting represents approximately four to five million barrels of oil (equivalent) per day. Again, energy audit data shows that around 30-60% of the energy consumed for lighting is either unnecessary or free.

An alternative calculation assumes that lighting in commercial buildings consumes more than 81.68 terawatts (1999 data) of electricity. Therefore, commercial lighting alone consumes four to five million barrels per day (equivalent) of oil, following the alternative logic above to estimate the energy consumption of U.S. lighting

Over-illumination stems from several factors:

1. Not using timers, occupancy sensors or other controls to extinguish lighting when not needed
2. Improper design, especially of workplace spaces, by specifying higher levels of light than needed for a given task
3. Incorrect choice of fixtures or light bulbs, which do not direct light into areas as needed
4. Improper selection of hardware to utilize more energythan needed to accomplish the lighting task
5. Incomplete training of building managers and occupantsto use lighting systems efficiently
6. Inadequate lighting maintenance resulting in increased stray light and energy costs
7. "Daylight lighting" can be required by citizens to reduce crime or by shop owners to attract customers, so over- illumination can be a design choice, not a fault. In both cases target achievement is questionable.

Substitution of old mercury lamps with more efficient sodium or metal halide lamps using the same electrical power

Indirect lighting techniques, such as lighting a verticalwall to bouce photons on the ground.

Most of these problems can be easily corrected with available and inexpensive technology; however, there is considerable inertia in lighting design and landlord / tenant practices creating barriers to quickly correcting these issues. Importantly, public awareness should improve for industrialized countries to realize the big gain from reducing excessive lighting.

Glare

Glare is often the result of excessive contrast between light and dark areas in the field of view. For example, glare can be associated with the direct visualization of the filament of unprotected or poorly shielded light. Light hitting the eyes of pedestrians and drivers can obscure night vision for up to an hour after exposure.Due to the high contrast between light and dark areas, glare can also make it difficult for the human eye to s 'adapt to differences in brightness. a problem for road safety, as bright and / or poorly shielded lights around roads can partially blind drivers or pedestrians unexpectedly and contribute to accidents.

Glare can also cause a reduction in contrast, due to scattering of light in the eye due to excessive brightness, or reflection of light from dark areas of the field of view, with similar luminance. to the background luminance. This type of glare is a special example of a disability glow, called a veiling glare.

Glare can be categorized into different types which are

1. Blinding Glare describes effects such as that caused by staring into the Sun. It is completely blinding and leavestemporary or permanent vision deficiencies.
2. Disability Glare describes effects such as being blinded by an oncoming cars lights, or light scattering in fog or in the eye reduces contrast, as well as reflections from print and other dark areas that render them bright, with significant reduction in sight capabilities.
3. Discomfort Glare does not typically cause a dangerous situation in itself, and is annoying and irritating at best. It can potentially cause fatigue if experienced over extendedperiods.

Clutter

Clutter refers to excessive groupings of lights. Groups of lights can be confusing, distracting attention from obstacles (including those that may be intended to illuminate) and potentially cause accidents. Clutter is particularly noticeable on streets where lampposts are poorly designed or where illuminated advertisements surround the streets. Depending on the reasons of the person or organization that installed the lights, their location and design can also be intended to distract drivers and can contribute to accidents. Clutter can also be a hazard in the aviation environment if aviation security lighting has to compete for the attention of the pilot with irrelevant lighting. For example, runway lighting can be mistaken for a series of commuter commercial lights, and aircraft collision lights can be mistaken for ground lights.

Sky Glow

Sky glow refers to the "glow" effect that can be seen on populated areas. It is the combination of all the reflected light from what it illuminated fleeing into the sky and all the misdirected light in that area which also escapes into the sky, being scattered (reoriented) from the atmosphere to ground. This scattering is closely related to the wavelength of light when the air is very clear. Rayleigh's scattering dominates in such a clear air, making the sky appear blue in the daytime. When there is a large aerosol, the scattered light depends less on the wavelength, which makes the daytime sky whiter. Due

to this Rayleigh effect and the increased sensitivity of the eye to white or blue-rich light sources when adapted to a very low light level, white or blue-rich light contributes much more to the glow. from the sky than an equal amount of light yellow. Sky glow is particularly irritating to astronomers, as it reduces the contrast in the night sky to the point that it might even become impossible to see stars other than the brightest stars.The light is particularly problematic for amateur astronomers, whose ability to observe the night sky from their property is likely to be hampered by nearby scattered light. Most of the large optical astronomical observatories are surrounded by zones with severe restrictions on light emission. "Direct" glare from the sky can be reduced by choosing lighting fixtures that limit the amount of light to more than 90 degrees above the low point. "Indirect" glare from reflections from vertical and horizontal surfaces is more difficult to handle; the only effective way to prevent this is to minimize overexposure

Impact of Light pollution

With research into light pollution still in its infancy, the implications of this problem are not yet fully understood. While the brightening of the night sky is the best known of the many effects of light pollution (it is the most obvious and astronomers recognized it many years ago), many other alarming aspects remain unexplored: for example, the fact that light pollution is a tremendous waste of energy in lighting is responsible for a quarter of all energy consumption worldwide, and case studies have shown that various forms of over-lighting are wasted energy, including upward lighting that does not benefit from night lighting. Worldwide, around 19% of total electricity consumption produces light at night . As a by-product of the electric lighting created by burning fossil fuels, greenhouse gases are created, which are responsible for global warming and the depletion of non-renewable resources.

Light pollution produces many other impacts on the environment. Harmful effects involve the animal kingdom, the vegetable kingdom and mankind. While light pollution is eminently detrimental to nocturnal and migratory animals and to animals in flight, it also produces harmful effects on plants.

Impacts on Plants

Plants use the darkness in a variety of ways. Their metabolism management, development, and life programs are all affected. Plants measure and react to the length of the night, i.e. the length of darkness. Because of this, short day plants need long nights. lights up briefly for a long night, reacts and interprets as if it had experienced two short nights instead of one long night with a break, which may completely disrupt their flowering and developmental patterns - short-day plants are that typically bloom in the fall, if the length of the day is shortened. They use the long nights to initiate flowering; and later, as the nights get longer, the lethargy begins that enables them to survive the harsh winter.Studies suggest that light pollution around lakes prevents zooplankton like daphnia from eating surface algae, which helps cause algal blooms that can kill sea plants and affect water quality. Light pollution can also affect ecosystems in other ways. Entomologists have documented that night light can interfere with the navigation of moths and other nocturnal insects. Artificial light This can lead to a decline in plant species that cannot reproduce and change the long-term ecology of an area.

Trees provide entire ecosystems to numerous animal species. They are harmfully affected by light pollution. Trees have toadjust to seasonal alterations, and artificial light hinders them from doing so: various trees are kept from losing their leaves by light pollution. This has a consequence on the animals that depend on trees as their habitat. For instance, birds are prevented from nesting in trees as a result of the surrounding light pollution

Effects on Animals

Life arose with natural patterns of light and dark, so changing these patterns affects many aspects of animal behavior. Light pollution can confuse animal navigation, alter competing interactions, alter relationships between predators and prey, and affect animal physiology.

Threats to birds

The impact of mild within side the shape of hearthplace or lamps attracting migratory and non-migratory birds at night time, particularly while foggy or cloudy, has been regarded for the reason that nineteenth century and became and nevertheless is used as a shape of hunting. The motives for disorientation of birds thru synthetic night time lights aren't nicely regarded. Experts recommend that the navigation of birds the usage of the horizon as orientation for the course is disrupted via way of means of lights and sky glow

Lighthouses

The attraction of lighthouses and ships for birds was first recorded since the first operation in the mid 19th century and was the basis of the first detailed records of bird migration. The fatalities at light-houses depend on the type of signal used. Fixed white lights attract more individuals than flashing or coloured lights.

Light beams / Ceilometers

The attraction of light rays has been observed since the 1940s, when meteorologists installed light rays for miles to measure cloud heights, especially at airports. In 1999 Bruderer et al. studied the behavior of birds exposed to a light beam and XBand radar. The light beam caused a change of flight direction of up to 15º and a decrease in speed of up to 3 m / sec. About 50,000 migratory birds (the largest ever recorded kill on a ceiling) died on October 68, 1954 at Warner Robins Air Force Base in Georgia when a cold front moved southeast . By filtering out the longer wavelength of the lamps used and changing the units from a fixed beam to a rotating beam, drastically reduced the number of victims.

Offshore oil / Gas platforms / Light induced fisheries

Because the oceans have fewer sources of artificial light than terrestrial environments, the effect and range of a single artificial lighting is much greater. As a result of these circumstances, seabirds are strongly attracted to these sources. Birds are attracted to the glow from platforms and can be directly injured or killed by heat, collisions and oil; but also indirectly by the light trapping effect which causes the birds to circle around the light source reducing their energy reserves and making them unable to reach the next shore or decreasing their ability to survive the winter or to reproduce. Light-induced fishing uses their light to attract fish and squid but also to have an effect on birds. Hooks can hurt these birds

Towers

The growing number and height of telecommunication and broadcasting towers cause a growing number of fatal collisions with migratory birds. These structures sever migration routes, mostly of songbirds.

Two reasons are given for collisions with towers. The first is when birds flying in low visibility conditions do not see the structure early enough to avoid it (blind collision). The second mechanism of mortality occurs when there is a low cloud ceiling or foggy conditions, and the lights on a tower refract from the water particles in the air creating a network of light around the tower. Birds lose their stellar landmarks for night time navigation in these weather conditions. They also lose any broad orientation perspective they might have on the landscape as they fly under a fairly low cloud ceiling.As they pass through the lighted area, the increased visibility around the tower may become the strongest signal birds have for navigation and, therefore, they tend to stay in the lighted space near the tower. tower. Mortality occurs when they fly through the structure and its tie rods, or even collide with other birds as more and more passing birds invade the rather small and lighted space.

Newer studies show that using rotating or blinking red lights and white strobe lights can reduce the effect of trapping birds at illuminated towers, but there is still work to do to improve the understanding of the whole effect on the migration process

Threats to sea turtlesEffect on adult females

Artificial light has several effects on female turtles that seek nests and on young ones that find the sea. Female turtles avoid illuminated beaches for their nests with the effect that the nests are concentrated in the less lighted and shaded areas. This can lead to suboptimal selection of nesting habitat or a special concentration of nests, with effects on the number and sex ratio of offspring and higher infant mortality [910]. The nesting behavior itself can be influenced by many factors. The overall nesting success of marine turtles in Florida is between 50% and 80%.The process can be abandoned when turtles encounter excavation obstacles, large structures, inadequate thermal signals, or human disturbance. At the end of the nesting process, the turtles return to the sea. This process can be influenced by artificial light. In some cases, parking lot lights, street lighting and residential neighborhoods attract turtles.

Effect on hatchling sea turtle orientation

Young animals are also affected by glare from the sky and direct lighting. The way newborn sea turtles find the sea is based on the fact that the night horizon is brighter over the sea than over the land [9,11]. Light from street lamps, houses, or the bright skies of cities, especially on nights with little or

no moon, can disorient or disorient young animals on their way to the sea. Because of these orientation problems, the kittens crawl in the wrong direction to where they are. threatened by dehydration, predators and high temperatures after sunrise.

Threats to fish

The response (attraction and avoidance) of fish to artificial light depends on the species but affects their natural behavior in both directions. There are several studies on the use of artificial light in fish farms and deep-sea fish. Most studies show that fish avoid sources of white light. However, there are species that are attracted to light and the light is used to catch them by sport fishermen or industrial fishing.

Light attraction method to catch Mukene

The light attraction is often used by fishermen to fish in the dark. The FAO reports that floating lamp fishing is used in Lake Victoria to catch mukene with shovel nets and nets from the shore (beach nets) and from canoes (lamp nets). This method can endanger areas that breed for immature mukenas, Nile perch, and tilapia because it is used in shallow waters near the coast.

Salmon farms

Submerged light increases the swimming depth and decreases the density of Atlantic salmon fish in production cages. These artificial photoperiods are used to postpone sexual maturation and increase growth. Studies in these farms suggest that salmon position themselves relative to the artificial light gradient to maintain swarming behavior.

Deep-sea fish

A study of lighting techniques when observing deep-sea fish found that white light changed the natural behavior of deep-sea fish. Observations showed that "the average number of fish appearances in the chamber was significantly higher under red light than under white light" [18]. the adaptation of deep sea fish eyes to the dark environment and possible eye damage from bright light.

Effects on Human Health and Psychology

Medical research on the effects of excessive light on the human body suggests that a variety of negative health effects can be caused by light pollution or excessive light exposure, and some lighting design textbooks use human health as an explicit criterion for adequate indoor lighting. Excessive lighting or inadequate light spectral composition can include: increased headache incidence, worker fatigue, medically defined stress, decreased sexual function, and increased anxiety. The usual fluorescent tube lighting in offices is enough to raise blood pressure by about eight points. There is some evidence that prolonged daily exposure to moderately strong lighting results in decreased sexual performance. Several published studies also suggest a link between nighttime light exposure and breast cancer risk due to the suppression of normal nighttime melatonin production. In 1978, Cohen et al. suggested that reduced production of the hormone melatonin could increase breast cancer risk, citing "ambient lighting" as a possible causative factor. Researchers from the National Cancer Institute (NCI) and the National Institute of Environmental Health Sciences have completed a study suggesting artificial light at night may be a factor in breast cancer. In 2007, "Circadian Change Shiftwork" was classified as a likely carcinogen by the World Health Organization's International Agency for Research on Cancer (IARC press release). No. 180) Several studies have documented an association between night shift work and an increased incidence of breast cancer.

A good review of current knowledge of the health consequences of exposure to artificial light at night and an explanation of the causal mechanisms has been published in the Journal of Pineal Research in 2007.

Effect on Astronomy

The brightness of the sky reduces the contrast between the stars and galaxies in the sky and the sky itself, making it difficult to see faint objects. This is a factor that has led to newer telescopes being built in increasingly remote areas. Some astronomers use narrow band nebula filters "which allow only certain wavelengths of light commonly seen in nebulae, or broadband" light pollution filters "which are designed to reduce (but not eliminate) the effects of light pollution by filtering out the spectral lines, those commonly used by sodium and mercury vapor lamps, which improves contrast and improves the view of faint objects such as galaxies and nebulas. Unfortunately, this affects color perception. These filters cannot be used to visually estimate the different brightness of stars, and no filter can Effectiveness of a dark sky for visual or photographic purposes Due to the low surface

brightness, the visibility of diffuse celestial objects such as nebulae and galaxies is more influenced by light pollution than by stars ht the Milky Way.The passage of light can interfere with the observation if stray light enters the telescope tube from the outer axis and is reflected by surfaces other than the telescope mirrors (if any), eventually reaching the eyepiece and causing a glow. The usual measures to reduce this glare, if direct reduction of the light (e.g. change of location or switching off the light) is not possible, flock the telescope tube and accessories to reduce reflection and put a light protection (which can also be used as a fog protection) on the telescope Reduce the incidence of light from angles other than those near the lens. In an Italian national lighting system, this scattered light effect is referred to as "optical pollution" because there is a direct path from the light source to the "optical" eye of the observer or the telescope.

Reduction of Light Pollution

Reducing light pollution implies many things, such as reducing sky glow, reducing glare, reducing light trespass, and reducing clutter. The method for best reducing light pollution, therefore, depends on exactly what the problem isin any given instance. Possible solutions include:

1. Utilizing light sources of minimum intensity necessary toaccomplish the light's purpose.
2. Turning lights off using a timer or occupancy sensor ormanually when not needed.
3. Improving lighting fixtures, so that they direct their light more accurately towards where it is needed, and with lessside effects.
4. Adjusting the *type* of lights used, so that the light waves emitted are those that are less likely to cause severe lightpollution problems.
5. Evaluating existing lighting plans, and re-designing someor all of the plans depending on whether existing light is actually needed

Conclusion

The variety of environmental conditions is important because it contributes to the partition of resources and greater biodiversity. Various natural processes can only happen during the night in darkness. Examples are resting, repairing, celestial navigation, predating or charging of systems. For this reason, darkness has the equal and amendatory functional importance as daylight. It is indispensable for the healthy functioning of organisms and whole ecosystems. Public and government awareness shall be intensified in view of the value of protection, avoidance and decrease of light pollution. Public opinion would need to be shifted regarding light trespass and "second hand" light, the wastefulness of excessive nightlighting and the importance of using the right lighting for the right situation

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Dote Or Detest- Psychological Impact Of Lockdown On Married People

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Abstract:
Covid- 19 lockdowns worldwide has become a great catastrophe for the whole population and the economy. Where adjustments , compromise and togetherness are seen as the key to a marriage life, this tragedy of lockdown had a greater impact on relationships as well as mental health which naturally questions the above key factors. It is said that there is a 20% rise in divorce cases according to a survey on lawyered.com since the lockdown. This article is about the factors of a couple and the mental health quality during lockdown. This throws on the lights on the challenging everyday factors which lead to reconsider the couple's compatibility. The psychological, financial, sexual and work life of the couple and overall quality of marriage life has been studied during lockdown days. This article concludes on discussing the psychological management and therapeutic coping strategies which can be inculcated in the marital relationship to mould the relationship into a healthier one

Keywords: COVID 19, lockdown, marriage, couple , counselling , therapy, psychological impacts, divorce , treatment, domestic violence, pressure, stress, anxiety, social media, financial insecurities, quarantine, family issues, mental health.

Introduction:

The COVID-19 lockdown has put on tremendous mental instability, burden, and uncertainty and grief to human lives. The immediate pressure the population faced is reduced social interaction and communication. The term social distancing came into play and every single individual are forced to stay at home for disease control and prevention. Perspectives differ for different people.. People at the old age started seeing this situation dreadfully and at the same time they felt good while they are surrounded by family due to this. Teenage population saw this lockdown as an enjoyable time as schools. colleges and tuition centers are closed and everything went into the online medium. People who are much into socializing suffered as they could not go out for entertainment purposes. Couple saw this period differently , though they don't want to travel daily for work as before they find it easy and comfortable to work from home. But there are practical difficulties in every stage and for every age group of people. The focus of this article is the married people population , their psychological strains due to locked up situations at home. We further narrow it down to the couple alone rather than including other family types and family issues.what happened when couple are locked up in a same place for a very long duration of months , their arguments, their difficulties on handling each other, balancing work, their sexual life and mental health state and the quality of the relationship are the inclusions of this article. And it suggests therapeutic interventions and relationship management strategies to prioritize green flags rather than red flags to reduce the divorce and abuse rates and convert it into a harmonious relationship.

Psychological Impact Of Lockdown :

COVID-19 is entirely new for this generation where we have read about the similar conditions of Spanish flu in the history. When people are ordered to be at home all the time except for the essentials with permission it affects a huge population's mental health. Taking married people into account, initially the couple started panicking about the contraction of the virus and felt relaxed to be at home rather than spreading mornings in a hurry burying for office and doing household chores. After a few weeks of being locked up under the same roof all the time couples started talking about everyday things and talking turns into arguments and it leads to conflicts and finally to the greater extent of violence. Couples shared their experiences of not having "me time" and personal space and found it suffocating. Sleep cycle has affected a lot of people and the daily routine collapsed. Lifestyle was looked like a disaster.couples who are already facing marital issues are affected to a greater

extent as there are very restricted resources to help them. Though in some families the gender related work concepts have changed during the lockdown but in somes couples the work got piled up over their head. People with existing psychological and psychiatric complications find it very difficult to cope with the happenings in the world. And the problem arises when the couple exceeds their threshold of tolerance. They start to find it very difficult as a separate individual because their own mental state is not stable and it has lead to many couple issues. The sexual life of the partners are reported to increase as they find it as the method of busting stress level rather they mess with the concept of making love. Finance was majorly affected for many couples as they find themselves in the survival mode of life. People who have children find it difficult to handle their education, their screen and media time. The situation can be viewed as a bottle filled with full water and constantly putting external pressure so that it bursts and water goes out wasted. To handle that pressure, the couple developed unhealthy coping patterns which put the marriage life on fire. Other problematic areas are lack of entertainment, disproportionate work sharing, blurred priorities, lack of boundaries,nil socialization , reduced communication, over use of social media , news about covid and statistics of cases , family and work . couple found it difficult to balance these areas as to cope with the explained stressors they start arguing internally , thus marital conflicts arise which eventually questions couples togetherness and compatibility leads to breaking of the bond and seek divorce, separation or revenge.

Management:

As we come into the post lockdown period , the conflicts and the bitterness we underwent during the lockdown remains unsettled and itches on a daily basis which gives a lot of psychological complications. To treat that we must start seeing the signs and symptoms we get daily. Start setting a routine , and look for the signs where we cannot function as planned and the next step is analysing why we can't function as scheduled. There might be “thought bugs” in our mental system which irritates us most of the time and we can't function sufficiently. Next step is to start analysing the relationship pattern , sitting together and evaluating issues will give couples clarity. Rather trying to change the relationship red flags one must look into the new toxic traits we have developed due to the prior locked up scenario. Knowing the individual’s unhealthy pattern of living and coping can help a lot into relationships. Seek professional support where there are scientifically qualified and trained professionals who offer observations on yourselves and pose therapeutic questions which are the part of the therapy which helps us to see the relationship in a new different perspective rather than ending it out. Couple therapy, family counselling and support groups are available to handle such issues and to prevent from suicide, harmful tendencies, domestic violence, separation and divorce. When we find ourselves difficult to cope or manage ourselves the role of a psychologist or a therapist is to assess , diagnose and treat you to improvise the individual as a person and enhance the couple wellbing.

Conclusion:

Life has definitely changed after covid 19 pandemic and lockdown for all which includes couples. It is said that a lawyer- search platform called Lawrato.com reported that about 6 to 10 calls they receive in a day for divorce. There is an 20% rise in family and couple counselling sessions being conducted by Sukoon Health , says its director Kanishk gupta. We cant entirely blame the lockdown and the pandemic for the relationships conflicts and divorce rates. But we can conclude by looking into the factors which leads to conflicts when two people are together for a long time. Based on the knowledge of these conflicts we can give a push on mouldable factors and treat the negative traits so we can return to normalcy from raising divorce rate apart from the nasty and dangerous relationships. This article concludes that there is nothing wrong in seeking therapy for couple conflicts , there is still a taboo revolving around in peoples minds that ending a marriage is fine but seeking support is a sin. Everything is possible in love, war and therapy.

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Household Waste Generation And Its Management—A Study From The Perspective Of Gedu Community Households

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Abstract

The waste is considered an unwanted good that is no longer useful or desirable. In common parlance, waste is "a portable object that has been abandoned by the owner." The growing amount of household waste is a serious problem in front of the Gedu Community of Bhutan. The study intended to examine the factors, which influence household waste management and the awareness level regarding household waste management. Linear regression is built up with the factors that influence household waste management. The results reveal that the education level of the family influences household waste management. Further, the household waste is effectively managed by the Gedu community households. In addition, Gedu Community households are aware of the negative impact on the environment because of the improper disposal of waste.

Keywords*:* Awareness level, Environment, Gedu Community, Households, Waste

Introduction

Any kind of human activity generates waste. Economic development and rising living standards in Bhutan have led to increases in the quantity and complexity of generated waste. Human beings produce an unnaturally high concentration of wastes causing damage to the earth's ecosystem. The earth's ecosystem has a limited capacity to recycle waste. The growth of industrialization and lifestyle changes are generating a lot of waste. The present culture of consumerism has aggravated the waste problem. Additionally, the culture of disposables is adding large numbers of goods in the society which are being manufactured for only one-time use and to be discarded after use. The proliferation of disposals in human society has initiated the problem of solid waste. The household solid waste example includes disposable writing pens, safety razors, cups and, plates, etc which have become common in modern society leading to huge discard of material after one-time use, which eventually ends up as waste. Packing has become a part of our modern lifestyle. Rapid population growth accompanied by the proliferation of the culture of consumerism, industrialization, and urbanization gives birth to a large amount of household solid waste. Indirectly human beings also generate toxic and hazardous waste every day by using items like detergents, solvents, etc.HWM is one of the challenging tasks for every household and the local bodies. Most households in the Gedu region are plagued by acute problems related to solid waste. Due to the lack of serious efforts by town authorities, garbage, and its management has become a tenacious problem. Barring a few progressive households in Gedu, most households, and local bodies suffer due to the non-availability of adequate expertise and experience in handling household solid waste. The improper handling of household waste leads to environmental pollution and health hazards.

The study entitled "Household waste generation and its management—A study from the perspective of Gedu Community households" therefore primarily focuses on the evaluation and analysis of the household waste generation and management in the Gedu community.

Problem Statement

Waste is generated because of human activities. Waste is defined as anything, which its producer or possessor no longer requires and is unusable whatsoever without further processing. The waste is normally categorized into two types: Solid waste and liquid waste.

The per capita solid waste generation in Bhutan is estimated as 0.23Kg (National waste inventory survey [NWIS] Bhutan, 2019). The quantity of waste generation increased by more than 50%, while the nominal GDP grew by almost 12% between 2014-17. The Bhutan economy is becoming waste intensive (Environmental Accounts statistics [EAS] Bhutan, 2018). The solid waste generated in Gedu is 0.58 tons per day (Source: Environmental Accounts Statistics 2018). The growing amount of waste is a concern of the GCBS locality. Each village and urban household generates 0.5 Kg and 0.7 of solid waste a day (Source: National waste inventory survey 2019, Bhutan). The 'throw-away culture of the Gedu community is compounding the household waste management issues. The desire to acquire the latest models of goods and discard the old as waste is a serious waste management problem. The waste disposal methods followed in Gedu are unsystematic and unscientific and involve dumping in low-lying areas. The organic solid waste decomposes and befouls the surrounding environment of Gedu. Unattended waste attracts flies, rats, and other agents that spread and transfer contagious diseases.The growing amount of household waste in the Gedu locality and its management needs immediate attention for keeping the surrounding environment clean and healthy. Therefore, to design better waste handling and to inculcate effective waste management practice among the Gedu Community, household waste needs to be investigated for the local needs. The focus of the study is to identify the influencing factors responsible for household waste generation and its management. The researchers also intend to investigate the effectiveness of the household waste management practice by the Gedu community households and the awareness level of the Gedu community concerning the impact on the environment because of the improper disposal of household waste.

1.2 Research Questions:

With this background in view, the following research questions will be studied under this project:

i. What are the most influencing factors responsible for the generation of household waste?

Research Sub-questions:

i. Is the household waste is effectively managed by the Gedu community households?
ii. What is the awareness level of the Gedu community households concerning the impact on the environment because of the improper disposal of household waste?

2.0 Literature Review

Environmental Awareness

The majority of the studies confirmed that environmental value and awareness have a significant role in the generation and management of household waste. Environmental awareness levels are the critical factors impacting household waste management practices (Barr 2007; Lee and Paik 2011; Trang et al. 2017). Zangmo (2017) conducted a study on the solid waste management of Paro Dzongkhag. The findings of the study revealed that it is necessary to raise attention among the people of Bhutan about environmental values and awareness.

Household Size

Some researchers found that family size and waste generation have a positive correlation, whereas, some researchers advocated that family size and waste generation are negatively related. Suthar and Singh (2015) studied 144 households of Dehradun city of India. The study revealed that household waste generation shows a positive correlation with family size. Similarly, Kumar and Samadder (2017) acknowledged that household size has the maximum influence in waste generation and management whereas, some studies revealed that household whereas, the study conducted by Qu et al., (2009); Thanh et al.,(2010);

Ramachandra et al., (2018) has shown waste generation is negatively correlated with household size.

Recycling

The study of Lee and Paik (2011) found that people's behavior in household waste management depends on the recycling market of the waste. Likewise, Nguyen et al. (2015) asserted that knowledge of recycling of the waste helps in better management of the household disposable waste. Babaei et al. (2015) found that sensitizing citizens' awareness about Solid Waste separation and recycling holds great promise for developing effective public campaigns and behavior-changing interventions in waste management. Similarly, the study of Xu et al. (2017) suggested that convenient location of waste separation and collection facilities, promoting community campaign and education, encouraging recycling programs helps the resident in doing proper waste management and protecting the environment.

Education

The role of education is significant in household waste management. Many studies have taken place to understand the relationship between the education level and household waste generation. The majority of the studies revealed that education level does impact household waste generation (Gu et al. 2015; Khan et al. 2016). Likewise, Kumar and Samadder, (2017) concluded in their study that the education variable has an inverse relation with waste generation rate. A strong positive correlation was observed between household per capita waste generation and income and education levels of the respondents (Ramachandra et al., 2018).

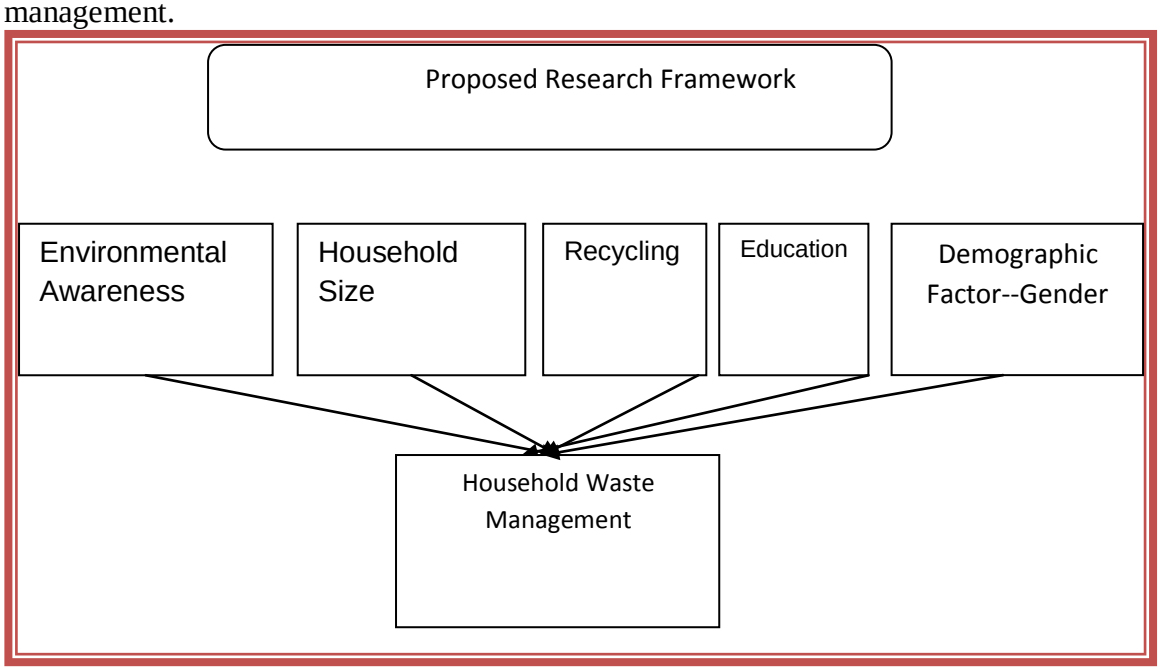
Gender:

The role of gender cannot be undermined in household waste management practices. Several studies are there to understand the role of gender in household waste management practices. Most of the studies pointed out that gender plays a significant role in household waste management policies. Tiwari (2001) acknowledged that a clear understanding of the perceptions of both men and women is required in managing sustainable environmental household waste management. Talalaj and Walery (2015) confirmed through their study that gender influences waste generation and management. Likewise, Chikowore, (2020) asserted that a strong significant association between gender and willingness to pay for fortnight waste collection exists.

Household Waste Management

Household waste management is a matter of concern globally. Many studies at present are going on how to dispose of and effectively manage household waste. The well-informed citizens of the nation participate wholeheartedly in sustainable household waste management (Xiao et al, 2017). The structural factor that includes the presence of organized garbage disposal sites encourages proper waste management behavior (Wang et al, 2018). Matin et al.(2006); Kumar et al, (2017) acknowledged that recycling is one way to manage and dispose of household waste. They further, asserted that waste segregation at source and the use of specialized waste processing facilities to separate recyclable materials has a key role. Similarly, Kumar et al, (2017) found in their study that good waste management systems retain useful resources within the economy. To the knowledge of the researchers, no study is being done on the Gedu households from the perspective of household waste generation and its management. This creates a knowledge gap and provides fertile ground for the researchers for researching the generation and management of household disposable waste. The literature shows that there is a wide range of variables that influence household waste generation and management. However, the present study would focus on the following five key indicators (i)

environmental awareness, (ii) household size, (iii) recycling, and (iv) education (v) Demographic factor--Gender to understand the most influencing variables responsible for the waste generation in Gedu. Household waste generation influences household waste management.



The proposed research framework developed after reviewing the literature is given below:
Source: Authors
(The above relationship between various parameters seems appropriate based on the studies reviewed and would be studied and assessed in the course of this research project.)

Significance of the study

The outcome of the study would help the policymakers, town planners, and the public to design better waste handling and waste management policies.

Significance to Policy Makers:

The study results would provide significant information to the town planners, policymakers, and waste handling agencies in the town to design a better waste handling and waste management practice.

Significance to knowledge:

The study will add new information on household waste generation and its management. The study intends to throw light on some of the issues related to household waste management which were not fully resolved by earlier studies. The study would also suggest plans and solutions to deal with the problem of household waste. The study findings would enrich the environmental geography of Gedu and would provide fertile ground for further research on environmental studies.

Significance to practice:

The policies designed based on the outcome of the study would improve the waste management practice among the Gedu community households. This would further improve the environment of Gedu and its nearby surrounding. However, because of some exceptional situations certain modifications and fortification are expected in the policy.

3.0 Research methodology

3.1 Research purpose and approach

The purpose of the present research is to explore the effectiveness of household waste generation and its management in the Gedu community. The researcher is assuming that household waste management is not effective. Thus, the research is exploratory. The researchers opted for the quantitative research design with a descriptive approach for the study. The information is gathered using a survey questionnaire. The questionnaire was distributed among the residents of Gedu and its nearby area for data collection purposes.

3.2 Research Design

The present study aims to understand the effectiveness of household waste generation and management through exploratory and quantitative research techniques The data are analyzed using software tools and presented through charts, graphs, and tables.

3.3 Study area

The study was restricted to the household of the Gedu area for the reason of time and financial resource constraints on the part of the researcher.

3.4 Sample element

The respondents selected for the study are from different households in Gedu and its adjoining area.

3.5 Sample study

Altogether, 132 households were identified; of these, 120 households returned the filled questionnaire. Out of 120-filled questionnaires, only 110 questionnaires were found suitable for analysis purposes.

3.6 Sample Size

In the research proposal, it is proposed to collect data from 132 households in the Gedu area. However, data were collected from 120 households only. This is because few households did not return the survey questionnaire. The research team visited the different households and distributed the survey questionnaire. The next day the team again visited the households to collect the filled questionnaire.

3.7 Sample Adequacy

The KMO value of 0.734 indicates that the sampling size is adequate for the study. KMO value above 0.6 flag fair adequacy of the sample size.

3.8 Sample Frame

The sample frame for the study is the list of households in the Gedu area.

3.9 Data Collection

In our research, primary data is collected using a structured survey questionnaire tool. This ensures the consistency and accuracy of the information gathered.

3.10 Development of Questionnaire

While developing the questionnaire due attention was given to keep it simple and easy to understand. The questionnaire is developed after doing a review of the literature. In total, 12 Likert scale questions are related to judging the effectiveness of household waste management. 6 questions are related to the demographic profile of the respondents. All questions are closed-ended survey questions.

Table 1 Questionnaires Distribution Summary

Items	No.	Percentage
No of the questionnaires distributed	132	-
No of the questionnaires received	120	91%
No of the questionnaires accepted	109	83%

Data Collection Mode

The research team visited the target households and distributed the survey questionnaire. The next day the team again visited the households to collect the filled questionnaire.

3.11Source of Information

The sources of the information for the study are the households of the Gedu area. The data was collected through the survey are coded and analyzed using statistical tools.

3.12 Data Analysis Technique

Both descriptive and inferential statistical tools were used for analyzing the data. The inferential statistical tools include a t-test. For descriptive statistics mean, mode, percentage, and frequency were used for the data analysis purposes.

3.13 Details of Hypothesis/ Model/Theory/ Experiments Used:

The present study is based on various hypotheses, which we have formed at the time of initiating the study. These hypotheses have given a direction to work on them and get them tested. Some of them are as follows:

Table 2 Research Hypotheses

SL No	Researchers Hypotheses (Alternative hypotheses)
1	**The education** of the household head is negatively associated with better waste management.
2	**Household size** is positively associated with household waste generation.
3	Knowledge of the head of the household on **recycling** is likely to have a positive effect on waste management.
4	**Gender** is likely to have an impact on household waste management.
5	The households with a higher level of **environmental awareness** are likely to have better management of household waste.
6	The Dependent variable is predicted well by the Independent variables (Regression Model Significance Value)
7	Gedu Community households are aware of the negative impact on the environment because of the improper disposal of waste.

The key limitations of the study are as follows:

Limitations are obvious in research. No study can be foolproof. Similarly, the present study also suffers from some limitations. The limitations of the study were due to its mode of operation. The following are the major limitations of the study:

1. The first, limitation is that data were collected through the survey methods and hence it is subjected to bias.
2. Second, the respondents from the households were not able to give accurate information so there are chances of biased information.
3. Third, the study result accuracy depends upon the information provided by the respondent. Sometimes, the respondents could not provide the exact information due to various reasons like his/her mood, privacy, or security.
4. Fourth, the purposive sampling method was not a very suitable method for doing the sampling. The results may vary if a simple random sampling method is adopted.
5. Fifth, the sample size was another limitation. When the sample size is large then the study would give a better result.

4.0 Analysis of the Demographic Characteristics

Table 3 Respondents Age Distribution

Age of the respondents	23	21	22	24	40	36	27	35	42	63	45	20	25	26	37	54
No. of the respondents	19	1	6	9	11	8	4	1	10	1	1	2	5	4	6	0

Table 4 Demographic Characteristics

	Gender	
	Count	
Count of Male	50	46%
Count of Female	59	54%
Total	**109**	**100%**
	Count	**Educational status**
Non Formal Education	12	11%
Junior Formal Education	17	15%
Collegiate Education	59	54%
Primary Education	12	11%
Sr. Secondary Education	7	6%
Others	3	3%
Total	**110**	**100%**
	Count	**Duration of stay in Gedu.**
less than 1 year	29	27%
Less than 5 year	48	44%
Less than 10 years	16	15%
More than 10 years	15	14%
Total	**108**	**100%**
	Count	**Monthly Income**
Less than or equal to 10K	39	39%
Less than or equal to 20 K	7	7%
Less than or equal to 30K	23	23%
Less than or equal to 40K	19	19%
More than 50K	13	13%
Total	**101**	**100%**
Number of families	**Number of Members**	**Family Size (Percentage)**
1	11	11%
2	7	7%
3	19	19%
4	14	14%
5	26	25%
6	16	16%
7	4	4%
8	2	2%
10	3	3%

Total	102	100%

Table 4 Reliability Analysis

Factor	Cronbach Alpha	No of items
Environmental Awareness	0.816	5
Recycling	0.807	4
Education	0.606	4
Household Waste Management	0.802	4
Overall Cronbach	0.847	14

The above table reflects the Cronbach Alpha value for each of the factors. The Cronbach alpha value for environmental awareness is 0.866, recycling 0.807, education 0.606 Household waste management is 0.802 respectively. The overall Cronbach Alpha value for all the 14 items of the questionnaire is 0.847. The Cronbach value above 0.7 is considered good for judging the reliability of the questionnaire.

Table 5 Multiple Regression Result

Variables	Coefficient	P-Value	Status
Environment Awareness	-0.032	0.790	Not Significant
Recycling	0.003	0.983	Not Significant
Education	0.661	0.000	Significant
Household Size	0.017	0.813	Not Significant
Gender	0.014	0.915	Not Significant
Intercept	1.347		
Observation	109		
R squared	0.182		

The model R-squared implies that 18.2% of the variation in household waste management is explained by the independent variables. The result indicates that only education is statistically significant at a 5% level. The negative coefficient of environmental awareness indicates that lower environmental awareness leads to poor management of household waste. A non-significant relationship was found between environmental awareness, recycling, education, household size, and gender with household waste management. The positive coefficient of the gender indicates that gender influences household waste management.

Table 6 ANOVA Test

ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	11.307	5	2.261	4.618	0.001
Residual	50.925	104	0.49		
Total	62.232	109			

The ANOVA table indicates that the regression model predicts the dependent variable significantly well. The test result F (4.618) and. P-value=0.001 indicates that, overall, the regression model is a good fit for the data.

Table 7(Hypotheses Result)

SL No	Researchers Hypotheses	Status	P-Value	Conclusion
1	**The education** of the household head is negatively associated		0.000	Accepted

	with better waste management.	Significant		
2	**Household size** is positively associated with household waste generation.	Not Significant	0.813	Not Accepted
3	Knowledge of the head of the household on **recycling** is likely to have a positive effect on waste management.	Not Significant	0.983	Not Accepted
4	**Gender** influences household waste management.	Not Significant	0.915	Not Accepted
5	The households with a higher level of **environmental awareness** are likely to have better management of household waste.	Not Significant	0.790	Not Accepted
6	The Dependent variable is predicted well by the Independent variables (Regression Model Significance Value)	Significant	0.001	Accepted

The final regression equation is

Y=1.347 -0.032X1 + 0.003X2 +0.661X3 + 0.017 X4 + 0.014X5 +€

Where, Y = Effectiveness of Household Waste Management

X1 = Environmental Awareness; X2 = Recycling; X3= Education; X4= Household size; X5= Gender

€ = Error Terms/ Noise

It is customary to show only the significant variables in the final regression equation. Therefore, the final regression can be restated as follows: Y=1.347 +0.661X3 +€

Table 8

Effectiveness of Household waste Management

SL No	Items	Total Score	Maximum Score
Sl 15	I play an important role in household solid waste management.	401	550
Sl 16	Regular collection of garbage is the only solution to the garbage problem	435	550
Sl 17	Picking up garbage around my community is my responsibility.	475	550
Sl 18	Public education about proper garbage management is one way to fix the garbage crisis.	490	550
	Grand Total	**1801**	**2200**

Effectiveness Index value= 1801/2200*100 = 82%

The high effectiveness score of 82% indicates that household waste management is good in Gedu and its surrounding area.

To judge the awareness level of the Gedu community households concerning the impact on the environment because of the improper disposal of household waste

H0: Gedu Community households are not aware of the negative impact on the environment because of the improper disposal of waste.

H1: Gedu Community households are aware of the negative impact on the environment because of the improper disposal of waste.

Table 9

Hypothesis Result

Factors	DF	Mean Difference	t- statistics	Sig.t	Conclusion
Environmental Awareness	109	1.22	19.315	0.000	Significant

The test value is 3

Significance at 5% level

DF= Degree of Freedom

Conclusion: The t-test results (109)=19.315, p=0.000 indicates that Gedu Community households are aware of the negative impact on the environment because of the improper disposal of waste. The

finding is supported by the descriptive analysis. The grand mean of five items under the factor environmental awareness is 4.22, which shows that the Gedu Community people are aware of the negative impact on the environment because of the improper disposal of waste.

Summary of the findings

1. The majority of the households in the Gedu Community participate in household waste management.
2. The regression result reveals that education has a positive influence on household waste management.
3. The result indicates that the majority of the respondents are aware of concerning the impact on the environment because of the improper disposal of waste.
4. The high effectiveness score of 82% indicates that household waste management is good in Gedu and its surrounding area.
5. The Gedu Community people are aware of the negative impact on the environment because of the improper disposal of waste.

Conclusion:

With the increase in consumerism and disposable income, huge waste is being generated day by day. There is wide use of plastics and other materialistic things. This resulted in different characteristics of waste that became a complicated problem for the management of household waste. This is such a burning problem that needed to be carefully researched. Quite often, it is observed that in Gedu streets waste is lying uncollected. The local bins are scattered around with waste that leads to bad smells and hazards to human health.The result indicates that people of Gedu are aware of the waste problem and they are managing it effectively but still there are many scopes to improve waste management. Waste management is not a one-time activity rather it is a process that is required to be continued with the scope of improvement. Waste management at the source point is the need of the hour. For an integrated solution to the household waste management problem, local authorities must join hands with the residents of Gedu to find out ways and means to address the problem of household waste management.

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A Comparative Study On Production Of Bio-Ethanol From Aquatic Weed

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Abstract

The world may not be able to sustain society's recent activities indefinitely. We need innovative energy sources, low CO_2 emissions, and the most ecological lifestyles possible. To repair it in a different way, the world will need to double its present energy supply while reducing CO_2 emissions to a larger extent. To meet maximum energy demand while emitting the least amount of CO_2, we must sustainably maintain as well as diversity our energy sources. Biofuels will as well as should play a significant role in the future energy mix. While corn and sugarcane are used to make bioethanol in most parts of the world, they compete with food sources. In a developing country like India, the food and energy crises are inextricably linked. We can't deal with food security while corn and sugarcane crops produce ethanol. As a result, we must explore for alternative raw materials other than corn and sugarcane for the production of biofuels.Bioethanol is one of these biofuel that can provide enough energy when burned to be used as a transportation fuel. Bioethanol production must be boosted by exploiting low-cost and environmentally favourable raw sources like aquatic weeds.

Keywords: Biofuel, Bioethanol, Fermentation, Duckweed

Introduction

Energy utilization has raise gradually up the previous century as the world community have increase as well as further nations have turn into industrialized (Hug and Rojas, 2008). Universal reduction of strength stock by reason of the endurable utilization along with associated natural fossil fuel issues consumption has motivated study on different energy origins (Bentley, 2002) as well as an expending interest in order to preservation of oil provide has been illustrated through raising oil rates (Hahn-Hag rdal et al., 2006). Such modern origins of substitute energy are getting involved solar, Air, geothermal, nuclear, biomass and more scheme of sustainable resources (Alexander, 2009). Biofuel is sustainable source as well as it is manufactured through applying assorted organic creatures that are familiar for clearup universal warming obstacle through reducing CO_2 grade in environment (Kendry, 2009). One of contemporary path is management of fuel ethanol with biomass is getting treated as a possible fluid fuel, it's specific utmost auspicious restoration to fossils combustion considering it's sustainable as well as give off approx 84.5% lesser industrial gases (during manufacture process) correlated to gasoline (Mete et.al., 2002). Newly, better study has concentrated at working inedible fuel as organic matter along with celluloses, marine algae as well as lignocelluloses comparatively to early descent biomass similarly sugar biomass as well as starch (Lewandowski et al., 2003). Biomass transformation into bio-fuel could be obtained by biochemical, thermal as well as chemical techniques. It could be transformed into accessible energy mode such as methane gas either transport gases related ethanol prepared 2.8 -3% of world transportation ignite (Turcotte and Schubert, 2002).
Considering 1900 fossil fuels, example crude oil as well as natural gas is presently the main energy sources. Yet, crude oil as well as natural gas is reserved resources that will be reduced from the time to time in coming years. Whereas, available controversy around the specific period of vertex oil origination, it's commonly considered it would exist ahead 2025, subsequently that whichever recession into universal unrefined oil origination will start (Campbell, 2013). Campbell and Laherrere (1998) further concluded that yearly worldwide oil origination would drop to the present 24 billion barrels to almost 4 billion barrels in 2050. An expending requirement regarding energy as well as necessary reduction of fossil ignitions have accelerated study to different energy sources. Organic sustainable resource is single main resource substitutes by decrease universe dependent onto popular fossil situated ignites. Dissimilar fossil ignites, bio-ethanol is a sustainable energy resources originated by sugar's fermentation, as well as it have been identified as a possible different sustainable energy resource for petroleum obtained transport. The expending requirement to

bioethanol have derived for the enormous utilization of food substance as well as cultivable ground for origination. This have concluded into food cost increases moreover have reduced rise of the bio-ethanol industry. Modern tendency consideration the assimilation of slightly three keys fermentation, hydrolysis as well as pre-treatment for both upgrade bioethanol yield as well as productivity along with to submerge amount as well as running costs (Girio et al., 2011). Beyond temporal herbs, marine herbs are more auspicious sustainable resources, they have countless influence as they breed in water bodies beyond competing along cultivable ground for grains as well as herbs as well as no any data at bioethanol manufacture taken away amphibious weeds are assessable besides for *Eichhornia crassipes* (Kumar et al., 2009). They are further utilized for water distillation to select nutrients as well as massive metals. These researches express that the water hyacinth is an auspicious weed for ethanol origination. The aspiration of current task is for examination origination of ethanol by water hyacinth, utilized like substrate, applying isolation microbiological stress. The cellulose enzyme generation microbiological strains were separated as well as the dominant cellulose originator stress is utilized for condensation water hyacinth biofuel, being the origination of the ethanol. The important target is for cut down origination amount of ethanol from utilization water hyacinth like an organic matter as well as analyzes its usefulness for economic scale employment. The water hyacinth (*Eichhornia crassiper*) weeds are free - floating aquatic weed have dispersion for higher than approx 49 countries on five continents.Aquatic biomass, category microalgae and macro algae, are rapidly spreading photosynthetic breed that consist of light or lignin content, and have need no cultivable ground and less supplements for their horticulture. They are examined as third generation of bioethanol food stock (Jambo and Abdulla, 2016). In the last ten years, there have become a rising in study target onto bio-ethanol origination by aquatic biomass. Except aquatic biomass, aquatic-nascent organisms have are inheritance, like large osmotic endurance, specific usage of sugars as well as origination of particular enzymes (Zaky and Tucker, 2014). These characters give additional profits for bioethanol origination, specifically during applying marine biomass. Ocean is a sufficient, below predicted resources. The value of ocean like a replacement for freshwater in bioethanol origination was recommended to decline the water impression of bioethanol production. This article analyzes the modern achievement in bioethanol origination by the use of aquatic biomass, aquatic microorganisms and seawater. It as well as explains future tendency in aquatic resources placed bioethanol origination. This article analyses the modern achievement in bioethanol origination by the use of aquatic biomass, aquatic microorganism and seawater. It as well as explains future tendency in aquatic resources placed bioethanol production.

A Light upon Weeds

A common processes of waste water analysis technique. The plant depends on nitrogen as well as phosphate biological pollutants, as well as in turn separates wastes from water. The global "greenest" feedstock. Rapidly, rich in protein as well as nutritive minerals, as well as regularly grown, the plant is grown as a meal supplement for funk (chicken), livestock, as well as farmed fish, especially in growing countries. Cheap, universes friendly rises of the bio fuel ethanol. Dissimilar corn, duckweed has need minimal artificial energy to rise as well as it doesn't reduce the world's food supply. A disinfectant fuels. While weeds like duckweed-generated ethanol, relate alternative plant-depend fuels, discharge some carbon dioxide (CO2) into the environment, the plant further consume carbon dioxide as it develops. Duckweed (lemnaceae, water lentils) family is the shortest flowering plants. They hurried developing plants that have capacity of increasing its weight in 24 hours. Duckweed develops well in still water, with a supply of nutritive nutrients like nitrogen as well as phosphorous solution or natural nutrient like compost tea, or the fish effluent from aquaponics. Duckweed is simple to grow than algae or more aquatic plants. Duckweed used as a to food material for fish, cattle and poultry. Duckweed serves food forest animal especially, waterfowl as to rich protein materials. Also produces much more protein per square meter as compare to soybeans. This protein has greater amount of the necessary amino acids, methionine as well as lysine. Weeds are those plants which are unwanted and uncultivated but that grows with crops and they compete with crops for same resources and these are the noxious for crops. On earth surface there are many types of weeds are present. Some weeds are directly used as food for animals such as grass for cows, buffaloes, and other animals which are relatable with the same category. Grass names as Bermuda

grass and pampas grass. These weeds are found in the wrong place means these plants are growing on that place where they are not required and these unwanted plants are known as weed. Human controlled settings such as farm fields, lawns, parks and gardens are some of the example of the example these kind of wrong places where weeds grow. Weeds or unwanted plants compete with main agricultural crops for same resources, basically water, nutrients, light and CO_2. And other weeds which are found on the waste water surface. Waste water is the polluted from the human activities and water generated from rainwater runoff. It is also called sewage. And also include the domestic sewage and industrial sewage.For production of bioethanol which weeds was used that are collected from the waste water surface/body. And these weed names as duckweed, Water Hyacinth and algae.

Production Of Bioethanol

Biotechnological leading in the origination of bio-ethanol by aquatic weeds, along with accurate target about water hyacinth, have become indicate over current years. Along with alternative cellulose ethanol feedstock, being grassy grasses as well as harvest leftovers, the common technique to ethanol origination through water plant have need an acidic hydrolysis pre-treatment of dehydrated biomass, pursued from immunization of hydrolyzed substantial as well as prelavant fermentation creature (Isaran Kura-Na-Ayudhya, 2007). As prominent ahead, a upcoming life cycle evaluation advise that minimum a single aquatic plant, the movable *Eichhornia crassiper*, could be reaped as well as worked in a sequence that will be generate this worth competitor along with switch grass as well as other cellulosic ethanol feedstock (Hronich and martin, 2008). Ethanol output worth to aquatic weeds displays changeability in research, however are commonly like for those gained by another cellulose feedstock. At the short end, bioethanol amount of almost 0.05g/g dehydrate *Eichhornia crassiper* biomass was expressed using *Pichia stipitis* as the fermentation creature (Nigam, 2002). A greater amount of 0.17g/g dehydrated Eichhorniacrassiper was expressed by the utilization of *Saccharomyces cerevisiae* (Mishima and Tateda, 2006), while an even greater amount of 0.19g/g dehydrate Water Hyacinth was gained with Candida Shehatae (Isarankura-Na-Ayudhya, 2007). It has become expressed that the sugars fulfilled into the hydrolyses of water Lettuce leafage are almost 1-8 times greater than that of Water Hyacinth, advising that water Lettuce could be an even further interesting ethanol feedstock than water hyacinth (Mishima and Tateda, 2006).Bioethanol is a pattern of auspicious substitute modern energy that has lately secure high consideration as well as it is mostly composed from starch of corn, sugarbeed and sugarcane. There possibility based on meteorological as well as topographical circumstances. The practice of this form of biomass has become progressively considered because of its register over food contribution along with for natural causes (Govumani et al., 2013). Bioenergy formed from biomass not only slow down the CO2 discharge but as well construct that energy influences (UNO 2008). The organic matter rich in carbohydrate.

Current demand for ethanol

The requirement for ethanol will continue to develop because of the fact that oil cost continues to raise as well as the energy areas of today economy continue to struggle that is the thought being shared by ethanol factory experts in current article published over on organic energy world.

Table 1:Production of ethanol

Global Ethanol Production By Country or Region

Alcoholic years	USA	Brazil	European Union	China	Canada	Rest of World
2007	6.345	5.0282	0.56039	0.586	0.2117	0.4162
2008	9.405	6.5733	0.6447	0.5229	0.2335	0.3949
2009	10.839	6.468	1.06	0.562	0.298	0.924
2010	13.298	6.9214	1.20858	0.54155	0.35663	0.98461
2011	13.948	5.5734	1.16764	0.55476	0.4623	0.69815
2012	13.3	5.576	1.189	0.555	0.459	0.773
2013	13.3	6.256	1.381	0.686	0.533	1.353
2014	14.313	6.18	1.455	0.625	0.53	1.68
2015	14.807	7.083	1.397	0.823	0.446	1.177
2016	15.329	7.285	1.387	0.855	0.456	1.303
2017	15.8	7.04	1.425	0.885	0.44	1.48
2018	16.091	8.03	1.53	1.06	0.45	1.377
2019	15.776	8.67	1.54	0.9	0.6	1.88
2020	13.926	7.97	1.35	0.88	0.438	1.649

(Renewable Fuels Association 2007 – 2020)

Universal origination of bio-ethanol is commonly by food-correlated yields like sugarcane, rice, corn, sweet potatoes, as well as cassava. Anyhow, these feed stocks are straightly dominated from humans along with animal feed. Regular utilize of that yields to bio-ethanol development can insert force on useful agricultural grounds as well as find in greater food costs. It involves agricultural as well as forestry waste, grasses, as well as another plants which are not use as food. That kind of biomass is a precious origin of bio polymers, sugars, as well as chemicals. Recent search on bioethanol development is commonly concentrate on evaluating the possible of non-food yields as feed stock as well as raising the capacity of their transformation. This weedy cellulose substrate don't require excess rate as they develop on agricultural offended ground as well as water bodies.

Types Of Biofuels - Three key biofuels are bioethanol, biodiesel, as well as biogas. Since it was a regular extension of brewing methodology, bioethanol has been developed as a common transportation fuel for more than 30 years. The burning rate of bioethanol was investigated using the gasoline gallon equivalency (GGE) value, which states that the same amount of energy is produced from 1.5 gallons of bioethanol as produced from one gallon of gasoline. Trans-esterification of plant oils produces biodiesel (Sims et al., 2008). Biodiesel emits the least amount of harmful dust compared to regular diesel. When organic wastes such as sewage as well as animal manure are digested anaerobically in absence of oxygen, produces biogas (Methane). In India and China, this sophisticated methodology is being studied on a modest domestic scale (Sims et al., 2008) and this also has also been methodically developed for industrial purpose in Germany, Denmark and more recently in the United Kingdom (Sims et al., 2008).

Bioethanol - Bioethanol is an ethanol produced from biomass-derived waste materials or sustainable sources. It can be employed in a variety of sectors as a fuel, chemical feedstock, as well as solvent. It offers a few advantages over petroleum alternatives, such as the ability to create alcohol from a variety of sustainable resources, the fact that alcohol as a fuel ignites cleaner than petroleum, and the fact that it is more environmentally friendly. It is biodegradable, which helps to reduce pollution and very less hazardous than the fossil fuels (Dominguez - Bocanegra et al., 2014). The fermentation process, as depicted by the standard equation, is extremely complicated. However ethanol, also known as ethyl alcohol (C_2H_5OH), is an important organic molecule with unique characteristics that can be employed for a variety of purposes.Under normal circumstances, ethanol is a flammable, volatile, orderly, clear and colourless liquid that is miscible in both types of solvents, polar as well as non-polar. It has a sweet flavour in dilute aqueous solutions, but a burning taste in more fixed solutions. Ethanol, CH_3CH_2OH, is an alcohol, a group of chemical substances with a hydroxyl group (- OH) attached to a atom of carbon in their molecules. Alcohol is a word that comes from the Arabic word al-kuhul, thatrefers to a fine antimony powder included in certain types of eye cosmetics. In ancient times, the word alcohol was originally used for any type fine powder but later on, mediaeval alchemists started using it to the pure distillation results, which led to the current usage (Wondal, 2012).Ethanol has been produced by fermenting sugars since ancient times. The process is still used to make all consumable ethanol as well as more than half of industrial ethanol. Natural sugars are the ingredients in question. Zymase is a yeast enzyme that converts simple carbohydrates into ethanol as well as carbon dioxide (CO_2). The fermentation process, as depicted by the standard equation, is extremely complex, with contaminated yeast colonies producing varied proportions of other components, such as glycerine as well as various organic acids.

$C_6H_{12}O_6 \rightarrow 2CH_3\ CH_2OH + 2CO_2$

The flavor is provided by contaminations in the production processes of beverages like brandy, whiskey. Starches from wheat, potatoes, corn, and certain other plants, in addition to normal sugars, can be utilized for the fermentation of bioethanol. However, firstly the starch moleculesshould be broken down into the simpler sugars. Starches are converted to sugars by diastase, an enzyme released by source barley. As a result, malting, or the preparation of barley, is the very prior step in the brewing process of beer from starch containing plants like wheat and corn (Shakhashiri, 2009).

Uses of Bioethanol

Ethanol's primary use is either as a fuel supplement or as a fuel for motor vehicles. Ethanol, as well as other varieties of alcohols may also be utilized for powering up automobiles in place of

gasoline. In most of the situation, gasoline is mixed with the ethanol. Ethanol production is a valuable approach for converting biomass into fuel since it is a cost-effective and ecologically friendly fuel. Ethanol offers the benefits of being environmentally friendly, antimicrobial, and emitting zerogreenhouse gases (Altintas et al., 2002).A large quantity of market parts are accessible in the ethanol industry, which has a wide range of applications in the industrial, pharmaceutical, beverage, household, medical as well as transportation sectors. Bioethanol market potential is thus not restricted to transportation fuel or energy construction, but it also has the probability to serve the chemical industry as a test as well as household applications. Furthermore, the most common usage of bioethanol in Ethiopia is in transportation fuel flicker ignition engine vehicles, as well as the recent volume of ethanol fuel combined with gasoline 10, and the government is functioning to rise the share. The government is also busy in starting export in two years as well as to replace the domestic cooking fuel in the future (Yacob, 2013).Ethanol is used for more than one purpose in alcoholic drinks. The ethanol content of alcoholic beverages, as well as the foodstuffs from which they are made, change dramatically. Typically, alcohol-based drinks are classified as fermented drinks, which are made by yeast reacting with sweet foods, or purified drinks, which are made by concentrating the ethanol in fermented drinks through a purification process. The foodstuff from which fermented drinks are made can be investigated in depth.

World fuel ethanol production

The United States as well as Brazil are the top leading countries in the manufacturing of ethanol from starch present in maize as well as sugarcane since years, with the quantity of ethanol produced by these countries accounting for 84 percent of global production.

Table 2:- production of ethanol fuel by different country or region

World Fuel Ethanol Production by Country or Region (Million Gallons)									
Country	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Europe	556	712	914	1020	1160	1140	1300	1440	1290
USA	5521	8309	11938	13598	11948	13600	12300	12300	13806
China	586	702	742	442	655	755	896	935	913
Brazil	3019	4472	5578	6722	5473	4577	5267	5190	6093
Canada	311	438	391	557	662	749	823	910	536
Rest of World	415	589	814	785	898	952	1372	1690	1247
World	10408	15222	20377	23124	20796	21773	21958	22465	23885

(F.O. Licht, Organic Fuels Association, Ethanol Industry Outlook 2008-2014 reports)

Feedstock for production of bioethanol

Ethanol can be generated by the fermentation of several types of sugars by microbes or synthetically from petroleum products. Sugar, starch, and lignocelluloses are the three major categories of organic compounds used in the fermentation of ethanol (Lin and Tanaka, 2006).Sugar is made from of organic materials such as fruits, sugarcane, sweet sorghumandsugar beets. There is abenefit of these sugar contained natural compounds is that they could be transformed directly into the ethanol with no need of hydrolysis. There also lies a drawbackthat several natural compounds are being investigated as a food resources for human beings and thus are prohibitively exclusive to use in the production of ethanol (Badger, 2002).Potatoes, corn, cassava, and several other cereal grains are starch based compounds that are commonly used in the production of ethanol. Starch is both a photopolymer and a biopolymer that contains only one type of monomer, that is, D – glucose. When generating bioethanol from starch, it's crucial to interrupt the bonding of carbohydrate's groups in order to get glucose syrup,

which yeast can turn into bioethanol. This is the most common feedstock for production of bioethanol in Europe and North America. A process known as hydrolysis can be used to convert starch into fermentable sugar (Sanchez et al., 2007).Agricultural wastes, wood wastes and spent sulfite spirits from paper and pulp industries can all be considered as lignocellulosic feedstock for ethanol production. The benefit of using lignocelluloses as natural ingredients for production of ethanol is that they are abundant and comparatively inexpensive (Wheals et al., 1999).In comparison to sugar-based yields, lignocelluloses acts as a substrate for the production of ethanol is challenging or practically impossible to hydrolyze (Gray et al., 2006). This is the opposite degeneration in terms of its intricate structure. All lignocellulosic biomass has the same structure: hemicelluloses $(C_5H_8O_4)$m, cellulose $(C_6H_{10}O_5)$xand lignin $[C_9H_{10}O_3.(OCH_3)$ 0.9-1.7] n. If waste substances are used, costs related to energy for fertilization,planting, and reaping can be eluded, and there will be no race for the availability of inadequateland available for agriculture, which may prove crucial for production of food (Sun and Cheng, 2002).

Production process

Biomass - Biomass is a biological material that is used to generate electricity, such as leaves, wood, bark, and stems. Biomass is produced synthetically by all plants and can be converted into useful energy. Biomass is a useful resource as a fuel because it is made from renewable resources.

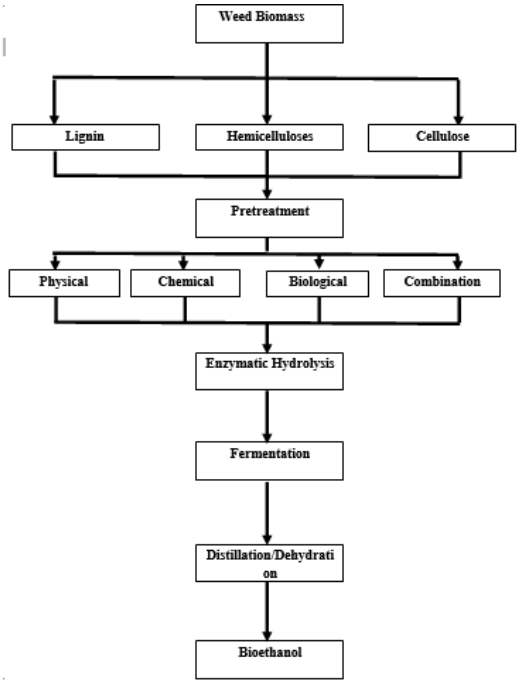
Biomass energy can be obtained by combining it with other sources of energy or by fermenting it into a liquid fuel. Ethanol is the fermented product of corn or sugarcane.

Biomass Weed - Lignocellulosic biomass from weedy plants could be a viable alternative fuel for bioethanol synthesis. A large number of weedy plant breeds are evolving throughout the universe. Features such as high dehydrated matter crops, low water and fertilizer requirements for cultivation, and cellulose material synthesis make weedy plants more appealing as a bioethanol feedstock.

Lignin - Lignin is a group of polymers that gives woody trees their texture, energy, and hardness. In terms of chemistry, lignins are investigated as cross-linked phenolics polymers. Woody plants would simply flop over if lignin polymers were absent, as they lack the cellular structure that makes wood stiff.Lignin is one of the most common organic polymers on the planet, accounting for 30% of non-fossil organic carbon. As a biological polymer, only cellulose is widely used.

Cellulose - Cellulose is a chemical found in almost every plant's cellular texture. It's composed of oxygen, carbon, and hydrogen, and therefore it's thought to be the very big organic or carbon based molecule that gives a plant's cell wall strength and structure, as well as being a source of dietary fiber. In terms of chemistry, cellulose is a complex carbohydrate molecule that delivers energy to living beings. Cellulose is being utilized in the manufacture of paper and paperboard products, other thancellophane,rayon, and other related items. When you read dietary fiber on the ingredients list of meals and drinks, it's very likely that they also include cellulose, which is one of two regularly used preservatives.

Production process Chart



Pretreatments

A dominant pretreatment is categorized by different criteria like, it should ignore the need to reduce the dimensions of biomass molecules, protect hemicelluloses, reduce the formation of stoppage that obstruct the production of fermentative microorganisms, and use the least amount of energy and money possible (Mosier et al., 2005). The efficiency of various pretreatments in future enzymatic saccharification is being investigated. The content assessed by effective single or combined pretreatment is relevant, sensitive to enzyme catalyzed saccharification, and produces high fermentable sugars for future fermentation. Furthermore, pretreatment can be used to transition from one chemical to another. As a result, a proper pretreatment is an essential condition of enzymatic fermentation and saccharification. As they can alternate with opinion to pH, temperature, conception time, and content kind, alkaline, acid, thermal, and a combination of techniques can be implemented.

Physical pretreatment

Physical pretreatments use pyrolysis and mechanical partitioning, as well as dry, wet, and vibrating ball mills, to reduce cellulose crystallinity and boost biomass absorbality by transferring the physical character of substances (Millet et al., 1976).Mechanical distribution is anarrangementof methods that includes chipping, grating, and milling to reduce the dimensions of the substance to 0 to 2mm (Sun and Cheng, 2002). When it comes to starch-to-ethanol conversion, both dehydrated and hydrated will procedures are cost-effective. Pyrolysis is a thermal-physical pretreatment related to the maximal temperature, pressure, as well as polysaccharide decay, and it leads in more than 80% alternation to decreasing sugars (Millet et al., 1976). (Sun and Cheng, 2002). The size of molecule size is essentially reduced to less than 0.5 mm in any way to get a specified growth of enzymatic saccharification for lignocellulosic substances. Pure physical pretreatments are not economic for lignocellulosic constituents due to their high energy requirements; as a result, their usage is prohibited or should combined with other thermal or chemical pretreatments (Waldson, 2010).

Chemical Pretreatment

Chemical pretreatments aid in the separation of unwanted substances such as lignin and hemicelluloses (Waldson, 2010), and their application varies depending on the biomass's characteristics. 60 percent of the time, Ozonolysis can totally separate. Lignin (for example, in wheat straw) is ignored, as is the production of hazardous compounds at ambient temperature. Dilute and hydrolysis (using H_2SO_4, HCl) have been extensively developed to produce a large sugar crop while avoiding the poisonous, incisive effects of fixed acid hydrolysis. Under some conditions, acid hydrolysis can also be employed to entirely convert xylan to xylose. Saponification, which is a source of biomass, can further isolate lignin from alkaline hydrolysis. Inflammation, as well as a rise in the

interior level domain and a decrease in the polymerization limit and crystallinity of celluloseAlthough, for downstream enzymatic saccharification and fermentation, the neutralization of chemical hydrolytic products is important. While chemical hydrolysis may improve molecular digestibility, it does so at a faster rate than alternative pretreatments (Sun and Cheng, 2002).

Physiochemical pretreatment

Physiochemical pretreatment is a completed operation that maintains the benefits of both specific physical and chemical pretreatments, resulting in good prepped substantial for subsequent procedures while drastically reducing the rate and energy needs. Vapor eruption, a thermal by hydrolytic process, is a widely used physical-chemical pretreatment for the production of ethanol and the genesis of lignocellulosic biomass (Glasses and Wright, 1997). The process causes biomass to explode due to unexpected decompression while seeking maximum pressure and temperature conditions. Current researches have tended to use a minimum temperature combined with a longer assumption duration. Vaporized cellulose is very handywhen compared to cellulose (Schwald et al., 1989). The benefits of vapor eruption include the extraordinary synthesis of xylose and glucose due to the significant lignin alteration and hemicellulose reduction. However, losses are viewed as a more energy call as a result of more temperature and pressure necessities, as well as the occurrence of fermentation stoppages. Combinations of H_2SO_4 or CO_2 in vapour eruption could boost hemicellulose reduction and enzyme catalyzed hydrolysis while lowering the creation of hazardous chemicals (Sun and cheng, 2002). Another common physical-chemical preparation is ammonia fiber explosion (AFEX). It features a presentation of lignocellulosic biomass vaporizing with liquid Ammonia added. Ammonia Fiber Explosion (AFEX) does not totally disintegrate lignin in the same way as hemicelluloses do, but it does cause minor stoppages (Waldron, 2010).

Biological pretreatments

Microorganisms have been examined and found to be effective in the degradation of plant cell walls. Because of the numerous saccharifying enzymes that fungi produce, they are utilized in the degradation of lignocellulosic materials. Various types of fungi have been utilized to target various Compounds, including brown, white, and soft-rot fungi. Brown rot fungus, for example, frequently degrades cellulose, whereas white and soft rot fungi can diminish both lignin and cellulose. Because of the lack of stomach bacteria, (Schwald et al., 1989) suppressed that these crustaceans may hold all of the enzymes for lignocellulose absorption. While biological pretreatment needs less energy limited circumstances, the range of decomposition is fewer (Sun and cheng, 2002).

Acid Hydrolysis

Acid, alkaline, and biological pretreatments, as well as hydrated oxidation, ozonolysis,organosolv, ultrasound pretreatment, and pretreatment of hydrogen peroxide (H_2O_2) with metal salts, are all options. In terms of response conditions, procedure capacity, and insolubility, these procedures are noticeably different from one another (Ramadoss and Muthukumar, 2015).Acids are often castoff to accelerate the hydrolysis process of starch in starch cookers at a specific range of temperature from 50 to 150 degrees Celsius, a practice known as acid hydrolysis (Wondale, 2012). The mass generation of fermentable sugar from starch is the goal of acid hydrolysis. TheConcentrated Acid Hydrolysis Process (CAHP), and Dilute Acid Hydrolysis Process (DAHP), both of which are key manufacturing and marketed acid hydrolysis techniques for starch, have been established. CAHP is produced under conditions of low temperature (lower than 70°C) and high acid concentration (higher than 1M HCl) and, which requires a long response time. In CAPH, the specific problems are acid neutralization and acid partition.DAPH, as well as dilute acid, is conveyed in a fraction of a second or minute at high temperatures (between 150°C and 200°C) (below 3 wt percent). Although it offers limited advantages in terms of hydrolysis rate and neutralization palliation, DAHP includes unwelcome byproducts from degradation, reversion, and retrogradation. For analytical purposes, starch hydrolysis was carried out at an average temperature of 90°C to 120°C. In the case of 0.7 M HCl, the reaction takes roughly 3 hours to complete (Hong and Bae, 1994).

Dilute Acid Hydrolysis

Dilute acid hydrolysis is undoubtedly the most oftenly used method than the chemical hydrolysis process. It is a pretreatmentmethod that can be used before enzymatic hydrolysis or as the actual method for hydrolyzing starch to sugars. Scholler techniques were possibly the first dilute –

acid hydrolysis procedures to be used. This was a batch operation in which the compounds were processed between thirty minutes as well as four hours at a temperature range of 50°C to 150°C. In the meantime, acid hydrolysis was examined using the (0.2–1.0)M stability of H2SO4 acid and a pH rate of 4.5–5.2. (Taherzadeh and Karimi, 2007).Batch reactors have been the extensively used reactors for kinetic studies of hydrolysis as well as laboratory and pilot-scale research for production of ethanol. The breakdown of sugars in hydrolysis processes, as well as the formation of unwanted byproducts, is a prevalent flaw in dilute – acid hydrolysis operations. This not only slows the formation of sugars, but it also slows the formation of numerous byproducts, inhibiting the generation of ethanol throughout the fermentation process. Furfural (an organic substance that is a colorless liquid), 5-hydroxylmethylfurfural (HMF), acetic acid, Levulinic acid, Uronic acid, formic acid, as well as Vanillic acid, Hydroxybenzoic acid, Vanillin acid, Formaldehyde,Cinnamaldehyde, and others, are all potential preventors.The sugar recovery capacity of the most dilute acid treatments is lowered to about 60% to 70%. The most significant benefit of dilute acid techniques is their quick reaction time, which simplifies routine tasks. The reduction in sugar production is the most significant loss. Feed – stocks should be reduced in size even further for quick regular procedures, in order to allow sufficient acid penetration, so that the high molecule width is in the radius of a few millimeters (Wondale, 2012).

Concentrated Acid Hydrolysis

A frequent old approach is hydrolysis with strong hydrochloric or sulphuric acids. In comparison to dilute acid procedures, concentrated acid methods are known to provide more sugar development. For example, 90 percent of intransigent glucose development, and hence increased ethanol development. Furthermore, the concentrated acid process may be used at lower temperatures (for example, 40°C), which is an obvious advantageous over dilute acid procedures. However, in this process, the acid concentration is much higher, e.g. 30-70 percent, as well as heating and dilution of the concentrated acid, while the hydrolysis procedure prepares it to be very caustic. In addition, the method necessitates the use of costly alloys or specially in non-metallic construction,sfor examplein ceramics and carbon-brick lining. The process of acid improvement necessitates a lot of energy. When sulfuric acid is utilized, the neutralization process generates anenormousquantity of gypsum. Furthermore, environmental factors have a significant impact on the use of hydrochloric acid. The exorbitant cost of this surgery, as well as the high cost of alimony, has greatly reduced the potential occupational profit (Taherzadeh and karimi, 2007). The concentrated acid technique practises significantly lower temperature conditions, and the pressure involved are usually those pressures which are only created by forcing chemicals from one container to another. The prior benefit of the concentrated technique is its high sugar improvement ability, which can be as high as 90%. Unfortunately, this is a somewhat sluggish (simple) operation, and the amount of impact acid improvement technique has proven difficult to improve/grow. To counterbalance the properties of acid in the sugar solution without acid improvement, a large amount of lime must be used (Wondale, 2012).

Fermentation

For thousands of years, fermentation of ethanol has been utilized in the production of alcohol. The process of ermentationinvolves microbes to digest sugar in lower concentrations of oxygen to produce high energy molecules (reduced nicotinamide adenine dinucleotide (NADH) andadenosine triphosphate (ATP), as well as ethanol acid and carbon dioxide (CO_2) as waste byproducts (Edward, 1922). In ethanol fermentation, various sugars (fructose, glucose, sucrose,xylose, galactoseand maltose) are digested by different yeasts. Furthermore, varied sugar supplies may have necessitated yeast pressure growth. *Saccharomyces cerevisiae*, for example, is the most important producer of glucose. *Pichiastipitis* dominates the development of ethanol from *Cerevisiae* and xylose. Duckweed biomass can be transformed to ethanol via the fermentation process. The workability of these processes is frequently determined by the quantity of starch available in the plant biomass. Starch is a glucose polymer that contains two structural components recognized as amylopectin and amylose. Amylose is a linear polymer with X-1,4 and *-1,6 links connecting glucose debris. Starch Using enzymes, it can be further hydrolyzed to fermentable monomeric glucose sugars (Cheng and Stomp, 2009).

Methodologies for fermentation of ethanol

From thousands of years, fermentation of ethanol has been employed in brewing factories, but new fermentation techniques are now being industrialized. Isolated enzyme catalysed hydrolysis and fermentation is a process where enzymatic hydrolysis and fermentation drift out on their own to keep the best circumstances for both procedures (Erdei et al 2012). The substantial loss of SHIF is that the collection of sugar products (cellobiose, xylose, and glucose) in the enzymatic saccharification technique prevents cellulose dissipation and, as a result, reduces ethanol production. Continuously Fermentation as well as saccharification Simultaneous saccharification and fermentation (SS) in a Conjunction of saccharification and fermentation may result in lower sugar collection prohibition as well as higher ethanol des production (Tomás -Pejó et al, 2008). Semi-simultaneous saccharification and fermentation (SSSF), simultaneous saccharification and extractive fermentation (SSEF) and simultaneous saccharification and co-fermentation (SSCF), are all examples of SSF (SSEF). SSEF is a process that incorporates a prehydrolysis step prior to SSF in order to provide favorable environments for both enzymes and yeast in SSF. By using two microorganisms, SSCF can convert both hexode and pentose to ethanol. The goal of SSEF is to lower down the impact of alcohol drift on yeast by hypothetically eliminating ethanol from the response compartment and preventing yeast from living in a mostly active state (Moritz and Duff, 1996). In any case, all of these methods are limited by the prohibition issue at Concentrations, which limits the activity of more substrate yeast. At high substrate concentrations (65.5 percent w/v), fed-batch fermentation can reduce prohibition while also producing a lot of ethanol. Lynd et al., developed direct microbial conversion (DMC), which is also known as "consolidated bio processing" (CBP, 2005). DMC/CAP refers to a combined technique in which polysaccharide enzymatic hydrolysis and hexodes/pentase fermentation are employed in a single bioreactor utilizing bacteria that secrete cellulose enzymes.Although the rate of this fermentation process is substantially lower for industrial expansion with appropriate benefit-advantage margins, DMC ethanol production is often less than SHF (Lynd et al., 2005).

Detoxification

Because of the ability for prohibition resulting from enzymatic hydrolysis and pretreatmentof lignocellulosic biomass, detoxification (decline in concentration of inhibitor) must be taken into account. According to Taherzadeh and Kasimi (2007), there are four ways to reduce the presence of inhibitors: minimizing prohibitory yield in pretreatments, eliminating or decaying prohibitory, changing prohibitory to compounds that yeast can tolerate, and generating secreted unusual yeast strains to increase prohibitoryendurability. A variety of detoxification treatments have been urbanised and documented, including physical, biological and chemical methods.The use of detoxification of several admitting to the nature of prohibits, but sugar disadvantage should also be taken into account.

Co-products

During the ethanol fermentation process, new and intriguing by-products are created. Methane and carbon dioxide are produced in anaerobic environments by the degradation of organic acids (acetic and formic acids). Fermentation of carbon dioxide can be distilled and used as an industrial source for dehydrated ice, carbonating drinks, and other applications. As a result, remaining biomass contains a variety of nutrients like minerals, protein, and vitamins, which can be used in distilled animal feedstuff.

Conclusion

Biofuel production frombiomass is one of the way of reducing crude oil expenditures as well as environmental pollution. Bioethanol is acceptable as a miscellaneous fuel in gasoline engines with a high octane number, as well as in diesel engines with a high octane number and a high vaporization stop self-ignition. Thus, by utilizing diesel-bioethanol-mixed fuel, burning regenerator, glow-plug, surface burning, and pilot-injection are employed to promote self-ignition. The impact of temperature, acid concentration, as well as time on the various production processes discussed. Typically, ethanol produced from various types of weeds, and other biomasses can be used to refresh the fuel supply.

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Recent Advances In Radar Technology For EnvironmentalProtection – A Historical Analyses

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Abstract

Radar technology proved invaluable role in monitoring rainfall. Radar signals reflect anyrain, hail, or snow within range, and the intensity of the reflection shows how heavy rain is falling. The Precipitation Radar was the first space-borne instrument designed to provide three- dimensional maps of storm structure. These measurements yield invaluable information on the intensity and distribution of the rain, on the rain type, on the storm depth and on the height at whichthe snow melts into rain. The estimates of the heat released into the atmosphere at different heightsbased on these measurements can be used to improve models of the global atmospheric circulation.

Key Words: Environment, Radar, Rainfall, spaceborne, Technology, TRMM, intensity,precipitation, challenges, cyclone, snow, orbit.

Introduction

Radar is an acronym for radio direction and ranging as well as radio detection and ranging.[1]It's a remote-sensing technology that detects and interprets radio signals, usually in the microwave range. Radio signals are transmitted at an object or structure in active radar systems to catch and understand the reflected waves.[2]The radar signals used in most monitoring systems are technologically generated and invisible to humans, but they can be sent and detected with special devices and transformed into more easily understood visual or audio information. For remote sensing applications, radar is a tremendously effective instrument.Radar is widely used in surveillance operations, such as military target, monitoring, and surveillance, as well as civilian surveillance of moving ships, hazards, risks, ecological factors, and weather events. The adaptability of radar makes it attractive.[3]

The Origin And Evolution Of Radar Technology

During World War II, Britain and the United States brought this technology to light. This is likely because British military strategists understood the importance of radar during World Wartime and developed and deployed it extensively, impacting the war's result. Radar, on the other hand, did not develop in the United Kingdom or during a war.[4] It was invented in Germany aroundthe turn of the century, more than thirty years before, for the goal of reducing marine disasters. By the mid-1930s, radar had turned into an important maritime and airborne navigation system.WhenWorld War II broke out, radar became the most important technology required to defeat the German forces, which is ironic given that the German military leadership first ignored German scientists' radar advances.[5]Johann Christian Doppler (1803-1853), who examined how speed may compress sound waves and so modify the frequency of sound relative to the observer's perspective, produced one of the most important scientific discoveries that have been applied to contemporary radar in 1842. Later, it was discovered that this principle also applied to other nonlinear phenomena, such as light. Doppler's observations would later be utilized to make radar devices that could use the Doppler effect to measure speed since radio energy has nonlinear qualities.Radar is essentially thetransmission and monitoring of reflected electromagnetic radiation. Pioneers like Heinrich R.Hertz (1857-1894), a German physicist at the University of Karlsruhe, made the early observationsthat led to the invention of radar in the nineteenth century. In 1886, Hertz demonstrated that otherelectric inductors can reflect electromagnetic radiation.

Radar Technology For Measuring Weather

Beginning of the 19th century, radar technology to help to prevent collisions with other vessels and to illuminate dangerous objects and floating debris. Range and weather were major stumbling

blocks for this system. Christian Hulsmeyer (1881-1957) was interested in using radio waves to better navigation, and on April 30th, 1904, he filed for a *Telemobiloskop* (far-moving scope), a radio device to assist marine ships in avoiding collisions. The employment of radio waves as a remote-sensing technique by Hulsmeyer was a big step forward.In adverse weather, his devicehad a larger range and utility than searchlight systems. On May 18th, 1904, a German engineer demonstrated his invention, which was the first to fully incorporate the fundamental principles ofradar.Between 1906 and 1920, amateur radio broadcasting blossomed, but many amateurs were keen to learn about the properties of radio broadcasts and experiment with potential implementation. They used radio waves to bounce off various surfaces to examine phenomena including reflections, refract, and absorption.Military people became interested in using radar technology for navigation and remote sensing in the 1920s.[6]

During world war I, stationary radar warning stations was useful during the conflict, military planners believed that radar-equipped aircraft early warning systems were required.The Naval Research Laboratory and the Radiation Laboratory of the US Navy created such a programme in 1944.[7] Astronomers devised an airborne radar system that could send radar video data to sea or ground platforms after experimenting with a mix of radio range and radio communications technologies. As an example, aircraft carriers could launch a reconnaissance aircraft, which would then transfer the data to the ship's combat information centre (CIC). The idea was excellent, but the technology wasn't up to par. The video data link's range was simply insufficient at the time to give the needed warning system capacity.[8]Scientists explored new methods to use radar technology after World War II ended Radio waves were reflected off of the Moon and back in 1946, indicating that the energy could not only pierce the stratosphere but also that Armstrong's FM modulating technology had great potential as a measuring and telecommunication tool. The use of satellites as observation posts was proposed by a group of engineers from Douglas Aircraft the same year, however, it wasnot implemented until several decades back.During the summer and fall of 1948, the Spinax, a US submarine, was outfitted with radar and communications technology similar to that found on naval destroyers. As a result, it was renamed SSR 489. It was the first radar picket submarine. Radar or comparable electronic radiation was detected using Spinax Electronic Counter-Measures (ECM) equipment. The submarine-spotting radar was located on the port side of the periscope wells.The technique of placing geostationary satellites in orbit around the Earth was foreseen and explainedin detail by Arthur C. Clarke. His forecasts were not only spot-on, but they also contributed to the development of satellite communications.

Radar Measurement On Rainfall

In reality, the majority of rainfall records in the archives of weather watchers around the world were gathered with what could be described as glorified buckets.[9]In the tipping bucket gauge, the water collected is fed by a funnel to a narrow opening through which the water falls into one of two small buckets at the end of a rocking arm. The bucket holds an amount of water equivalent to 0.01 inches of rain. The mounting is such that whenthe bucket is filled, it suddenly tips over and empties the water. When this occurs, the rainwater begins to fill the second bucket. When the second is filled, it suddenly tips and empties, and the first one returns to its original position ready to be filled again. The times when the tip of the smallbucketare noted on a recorder. Since the quantity of water needed to fill the bucket is unknown, the rate of rainfall is obtained by counting the number of times the bucket has tipped over during any interval of time, for example, one hour.[10]

As the name implies, the weighing gauge employs a scale to weigh the rain. The precipitation falling through the upper opening of the gauge falls into a pail sitting on a scale. Themovement of the scale is recorded on a moving strip of paper. As water or snow accumulates in the pail, the pen arm moves progressively up the recorder chart, which is turned by a clock mechanism. Since the weight per unit volume of water is known, the weight of the total quantity of collected water can be interpreted in terms of depth of rainfall. By nothing the rate at which thetrace on the chart rises with time, one can calculate the precipitation rate.[11]If one is concerned with the total rainfall at a particular point, any of these three schemes will give satisfactory measurements, but it must be recognized that they give information applyingstrictly to only a very small area. To be specific, it applies only to the area of the opening of the gauge. In winter storms[12] the variations over small distances sometimes are small, and measurement at a single point may be representative of the rainfall within some miles of the gauge.But during periods of summer showers and thunderstorms the variations of rainfall over small distances can be very great. The diameters of showers may be as small as 2 or 3 miles, with sharp

boundaries between areas of rain and those of no rain. It is not unusual to have heavy rain on oneside of town and none on the other. In this circumstance, a single rain gauge in the centre of townwould represent a very small area. Since it is not practical to have a rain gauge every mile or twoall over the country, we have been forced to be satisfied with unrepresentative rainfall records. With the introduction of the radar, however, it has become possible to make a drastic change in this situation. In various parts of the world, measurements have been made of the diameters of raindrops and the rainfall rate.[13]The rainfall rates at a region are not the primary focus of hydrologists and meteorologists who deal with river flows. Rather, they choose to know how oftenrain has dropped over a basin in the last hour or so. They can calculate the rate at which the rainwater will flow into the channels and rivers, and then into the tributaries, using this knowledge. As a result, they can evaluate flood levels and predict water levels in different waterways.Understanding what further rain fell how and where water engineers may indeed be able to prevent floodwaters by releasing water from reservoirs to capture and release incoming water coming downstream in measured proportions.[14] Horace R. Byers proposed in 1948 that if a radar set was properly calibrated for this purpose, it might be used to determine total precipitation over a small area. His plan entailed taking 5-minute measurements of the echo area, calculating the average, and multiplying by the storm's duration. The resulting amount was graphically compared to the actual average rain that occurred on a test region using rainfall data spaced at one-mile intervals.A "calibration curve" connecting reverberation area to total rainfall could be drawn. After obtaining such a curve, measurements ofthe echo area might be used to determine total rainfall. This plan was nearly entirely based on statistics. The intensity of the echoes was not taken into account.[15]Numerous technological methods for measuring rainfall over a large area have been developed. Dr Austin has already noted that the technique given for point measurements has been enhanced. It entails using a pulse integrator to calculate the average power from precipitation across an area of around 20 square miles. To convert the power readings to average rainfall rates, an equation was used. It is possible to get enough information from repeated observations to calculate total rainfall.[16]The advantages of using an electronic system to measure total precipitation are that, in theory, little manual work is required to gather the crucial information of how much rain fell. However, the operation is difficult, not fully reliable at this moment, and, of course, costly. The long-exposure film process looks to be easy and reliable. It should be noted that all of the procedures outlined necessitate the proximity of the antenna beam to the ground. This condition makes it extremely difficult to use radar to estimate rainfall in mountainous areas all at once. The processes are suitable on dry or rolling terrain.The implementation of radar techniques for measuring rainfall has trailed behind the device's development. Radar data has been used to aid inthe creation of horizontal air maps in some circumstances, although the more advanced techniques have been underdeveloped. However, there is a tremendous push right now to make better use of the radar, and it appears that in the not-too-distant future, the radar will become a significant toolfor monitoring rainfall over watersheds.[17]

Technological Advantages

Radar is a technology that has been around for a long time. It has a wide range of uses andcan be used in a variety of sectors. The weather is one such application. A weather radar is primarily used to collect data about the weather and its specific parts.The Precipitation Radar was the first space-based equipment to provide three-dimensional cyclone structure images. Such measures provide vital information about the rain's strength and dispersal, as well as the type of rain, storm intensity, and the height at which snow melts into rain. These findings can be used to strengthen models of global atmospheric circulation by estimating the amount of heat released into the atmosphere at elevated distances.[18] Precipitation Radar (PR) & Tropical Rainfall Measuring Mission (TRMM)

Precipitation Radar has a horizontal resolution of 3.1 miles (five kilometres) at the ground level and a coverage width of 154 miles (247 kilometres). Its capacity to give point measurements of rain and snow from the surface up to a height of around 12 miles is one of its most essential qualities (20 kilometres). It is capable of detecting rain rates as low as.027 inches (0.7 millimetres) per hour. New research analysis methods have been developed to help adjust for absorption effects at high rain rates when attenuate effects can be significant.[19]When viewing straight down, the Precipitation Radar can discriminate rain reflections for vertical sample sizes of roughly 820 feet (250 meters high). All of these measurements are performed using only 224 watts of electricity, which is less than the power of a few houses LED lighting.Japan's National Space Development Agency

(JAXA) created the Rainfall Radar as part of its contribution to the joint US/Japan Tropical Rainfall Measuring Mission (TRMM).[20] People have been monitoring and tracking rainfall for a long time since water is so important in almost every aspect of human activity.However, if one wants to know how much rain falls at a specific location, this information is easy. An average bucket can be used as a rain gauge if it is placed away from trees and buildings and the taper of the bucket's sides is taken into account.The Precipitation Radar is the most innovative of TRMM'sthree core sensors. Other devices in space, such as the TRMM Microwave Imager (TMI) and the Visible and Infrared Scanner (VIS) VIRS, have previously worked, but there has yet to be any radar in space to measure rainfall.While weather radar systems have been used on the ground to estimate rainfall since World War II, numerous technical obstacles had to be overcome before suchan instrument could be utilized from space.[21]

The TRMM Combined Instrument (TCI) calibration data set for the TRMM Multi-satellite Precipitation Analysis (TMPA), whose monthly precipitation averages, daily and sub-daily (3hr) averages are perhaps the most relevant TRMM-related products for climate research, is created using these.Although TMPA timeseries are constructed using estimations from continuously updating sources of data, inhomogeneities in the spatial record is frequent. The best estimate of precipitation in each grid point at the observation time should be regarded as each precipitation field.The TRMM mission came to an end after 17 years (1997-2015). The successor mission is theGlobal Precipitation Mission (GPM). The Integrated multi-satellite Retrievals for GPM (IMERG)method is being used to create new products to replace the TMPA datasets under the Global Precipitation Measurement (GPM) umbrella. TRMM-era data has been reprocessed for 2000- present using the IMERG method, resulting in a long-term continuous record.[22]

1. Since 1998, it has been the only source of high spatial and temporal resolution precipitation estimates over a long period.
2. It may be used to look at the climatic variable rainfall distribution, as well as its duration and severity.
3. Effective for coastal rainfall assessment in climate models, as long as the information is placed on similar fields using cautious regrinding and cumulative (instead of immediate) precipitation is used.

Technological Challenges

1. When viewed from TRMM's orbital height of 250 miles (402 kilometres) above the Earth, ensuring that the spaceborne radar has enough strength to detect the feeble return echo from the raindrops is a critical need.[23]
2. An additional challenge is collecting high-resolution three-dimensional rain maps as the spacecraft is passing over cyclones.
3. To achieve such requirements, Japan's Communications Research Laboratory chose a radar frequency that is roughly three times that of a normal ground-based radar. Despite the difficulty of radiation efficiency in orbit, using a frequency allows for better high- resolution photos of cyclones.
4. An active-phased reflector and advanced sound wave techniques are utilized to electronically and swiftly scan the antenna beam while guaranteeing that the sent and received radar signals are synced. Solid-state power amplifiers (128) are utilized to save energy while also providing reliable technology.[24]
5. Another challenge for the satellite's radar was to create a narrow reflecting beam that would allow the target area to be small enough already to show out other features of interest on the ground, i.e., good ground resolution.
6. A further issue was making the beam sweep out a swath on the earth that was extensive sufficient to provide adequate protection as the spacecraft moved across its orbits.[25]

All of these design concepts were addressed by the Communications Research Laboratory of Japan. The design of a "phased array" antenna, which incorporates electronic beam steering, achieves both the small beam size and the capacity to guide the radiation.[26]

Conclusion

The environmental perspective of radar technology is used to find precipitation, measure its speed, and determine its type, among other things (rain, snow, hail etc.). In recent years, radarshave been able to detect the motion of rain droplets as well as the intensity of the rainfall. The formation of

cyclones and their power to make severe weather can be determined to use both types of information.Climate was revealed to be creating echoes on radar screens during World War II, concealing potentially hostile sites. Analysis methods were established, but scientists began to understand the phenomenon. Surplus radars were used to detect precipitation shortly after the war. Weather radar has progressed on its own since then and is currently employed by national meteorological agencies, university research organizations, and television network forecast departments. Image data are frequently used, and specialized software can use radar data to createbrief predictions of rainfall, snowfall, hailstorm, and other meteorological events' placements andintensity. The technology is necessary of preserve and protect our environment and Earth system.

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The Challenges Faced by Persons with Disabilities in Employment at Workplaces in India

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Abstract

The present study explores about the challenges faced by persons with disabilities (PwDs) in employment at workplaces in India. PwDs. PwDs in India face many obstacles in their quest to learn marketable job skills and find a job that provides a living wage. For centuries, PwDs have been marginalized and humiliated in nearly every culture. Their population is one of the most neglected and underappreciated. PwDs fall into the lowest socio-economic supports, making them social outcasts. More than half of those polled said that their biggest challenges were gaining practical access to the workplaces, communicating with coworkers, and getting information. Concerns was also raised regarding how others treated PwDs in the workplace, as they feared this would result in discrimination and low self-esteem among PwDs. PwDs were worried about sick leave and maintenance fees when they were hired, which contrasted significantly with what PwDs thought of themself. Every one of the unplanned efforts must be replaced with ones that are more planned and integrated to enhance PwDs at workplaces in India. The study comes to a conclusion with a look at possible issues and possibilities, as well as the need for more focused and ongoing attempts to improve PwDs at workplaces in India.

Keywords: Challenges, PwDs, Workplace, Employment, and India.

Introduction

The majority of PwDs indicated that their families would prefer to retain and care for their handicapped loved ones rather than enable them to work full-time outside of the house in this survey. Obtaining an academy degree may help people get out of poverty. Families and relations of PwDs have used disparaging language towards them, which has led to conflict. PwDs are some of the most economically and culturally underprivileged groups. With an ageing population, this number is only going to rise. PwDs often felt that being different made them unwanted in the open job market. Everyone, even their own families, opposed those who wished to work and become self-sufficient. For the most part, those with disabilities said that their families would prefer to keep and care for their handicapped loved ones rather than allow them to work full-time outside the home. This inquiry uncovers a slew of grave problems. Following our investigation, it became clear to us that workplaces do not respect or respect diversity in any way. We found that PwDs, particularly those working in the official and informal business sectors, face access and special planning difficulties. Investors and others in the public sector have almost no access issues. In general, PwDs face greater discrimination than others. There are also concerns about job and financial security. PwDs often believed that since they were different, they were not welcomed in the general workforce. Workers who wanted to become self-sufficient faced opposition from everyone, even their own families. Unemployment may be lessened by obtaining a college degree. People with higher education levels are more likely to work in the public sector, have a higher quality of living, and be more aware of disability rights. People with less education are more likely to find employment in the informal economic doing tailoring, embroidery, and bag manufacture, according to the study. In India, PwDs are often blamed on destiny. Disabled people have had their basic human rights violated because of the widespread idea that bad karma from a previous life is to blame for their present state (Jagadish Chander, 2013). PwDs can perform the amount of jobs if they are in the right environment. Several studies performed in developed and developing nations show that PwDs in working age had lower employment rates and greater unemployment than the general public. Lack of employment is one of the main ways that disabilities may contribute to poverty (Scott K, Mete C, 2011). Many employers do not consider

PwDs when looking for new employees. Because of perception, fear, and myth, workplaces across the globe continue to be hostile to PwDs. PwDs misconceptions abound, such as the notion that they seem unable to work or that making adjustments for them at work is expensive. Despite common perception, many companies have found that PwDs are more than capable. These examples demonstrate both the drawbacks of not employing PwDs and the benefits of doing at workplaces in India.

Persons with Disabilities

About one billion PwDs live in developing nations, where they are heavily represented among society's lowest strata (about 15 percent of the world's population). PwDs are often subjected to harassment and marginalization in everyday life. In other words, people are systematically barred from participation in development programs and financial resources in all sectors of society (including work, education, and healthcare). Nearly everybody will experience some kind of disability at some point in their lives, whether this is temporary or permanent. Globally, disability affects 600 million individuals, according to the International Labor Organization (Thibodeaux, 2011). Country to country has a different way of identifying as well as treating impairments. While referring to the people, most people have heard terms like "severely handicapped individuals," "people with disabilities," "disabled folks," and so on. For a more accurate description, we should say "disabled people," because the word refers to a problem that has developed as a result of person and their surroundings, rather than "people with disabilities" (WHO 2001). It was the UN that coined the phrase "persons with disabilities" for its Convention on the Rights of Persons with Disabilities (UNPwDs) in 2006. A person's disabilities condition increases the chances of their taking on temporary, part-time, or self-employed positions that results in a shorter tenure, fewer advancement opportunities, and lower pay (Schur, 2002). In order to assist these individuals find and keep jobs that pay a fair salary, governments all around the globe are doing all they can. Countries all around the globe are doing all they can to make it as easy as possible for these individuals to find and keep jobs that pay enough to live on. PwDs' lives are in danger because of the many challenges they encounter on a daily basis. Having defeated these issues is something we owe to coming generations as well as ourselves. Most importantly, removing these impediments will open doors for millions of individuals who have great things to offer the world. Only PwDs and the institutions that support them have the experience and knowledge to know how to successfully integrate them into the society they are living in today disadvantaged persons as well as the organizations that advocate on their behalf. Institution need to communicate and cooperate with PwDs to receive technical assistance, capacity development, and data access in order to foster integration and achieve the broader idea of "leaving no one behind." This would not only benefit us, but it would also demonstrate to the rest of the globe how much potential there is for improving the lives of everyone in employment at workplaces in India.

Employment and PwDs in India

In spite of the fact that labor is critical for PwDs, their options are severely restricted. There is some evidence to suggest that individuals with disabilities have a hard time finding work primarily because employers are ignorant of disabilities and so do not want to hire them. PwDs who want to be self-sufficient must be able to go to school and work. When looking at the economic participation of PwDs, a variety of criteria are taken into account, including the type of disability, gender, where they live, and what they do for a living. Having the ability to work gives people with disabilities a way to earn a living, build social networks, and move up the socioeconomic and cultural ladder. Many PwDs have the ability and desire to work and to help their community and society as a whole (Waterhouse, Kimberley, Jonas & Glover, 2010). Employment has a significant impact on people lives, including PwDs (Norasmah, 2014; Zinaida, 2006). PwDs are also more likely than non-disabled people to work component and in customer service employments, and to hold high - skilled locations (Houtenville et al., 2016). Whenever it comes to dealing with disabled employees and their accommodation requirements, businesses worry about someone being left with a worker who cannot be reprimanded or dismissed for fear of a lawsuits. The capacity of a candidate to perform job tasks must also be assessed, because there aren't enough handicapped employees to fill all of the available jobs. Lack of competent handicapped employment candidates is yet another problem (Stephen, Lita & Erica, 2011). Contrary to popular belief, employers who use PwDs are generally pleased with the results (Snyder et al., 2010). Occupational accidents, turnover rates, and achievement are all low among employees, regardless of whether they have disabilities or not (Lengnick-Hall, Gaunt, & Kulkarni, 2008; Stone &

Colella, 1996). There is indeed a greater likelihood for PwDs to engage in lower-paying employments than for people who aren't afflicted (Maroto & Pettinicchio, 2014). To discover out what issues workers with disabilities encounter, researchers conducted a study. To help people with disabilities find better jobs, the author is now undertaking study on employments in India.

Discrimination against PwDs in Workplace

Discrimination against PwDs in the workplace is really nothing new. To make people aware and acknowledgement of the role, achievements, and future of PwDs in society, a paradigm change from a 'charity' approach to a 'human right' strategy is required (ILO, 2006). Employers must respect disabled employees' rights to reasonable and favorable working circumstances, such as equal opportunity and fair pay for equal labor, as well as safe and healthy working conditions and protections against discrimination and redress for grievances. Adverse chances may lead to prejudice, despite the fact that PwDs are no less competent than the overall population. Discrimination against PwDs has changed substantially from a legal standpoint to a societal one (Oliver M, 1990). The disability model identifies between impairments by highlighting that social limits reflect the degree of disability without taking variations into account. The CRPD's preface to the medical model of disability uses bio-psychosocial concepts (ILO, 2004). The official language, despite conceptual shifts, nevertheless views disability as a medical illness, depicting the individual as cut off socially and physically from the larger setting (Jefferey R, 2008). Many employed PwDs believe they are discriminated against in the workforce, make when it relates to compensation, other employment terms and circumstances, and mandated by law reasonable adjustments for their disability (Snyder, Carmichael, Blackwell, Cleveland, & Thornton, 2010; Neath, Roessler, & McMahon, 2007; Balser, 2000). When discrimination was used to carry out, PwDs are unfairly treated or hurt as a result of their participation in a marginalized group. (Corrigan et al. 2001, Stone and Colella 1996). PwDs than among the general population. PwDs, particularly in the workplace, are mocked and their complaints go unresolved. Whenever we inquired about the assessment system, we were told that an employee's treatment of SC/ST teammates has a classification. As a result, there are no safeguards in place to ensure that disabled personnel are treated with dignity. PwDs are frequently subjected to discrimination. Their unemployment rate is high, they've been labelled as "low performers," and they've been effectively locked out of the employment markets in India.

Challenges faced by PwDs in Workplaces

PwDs confront numerous challenges while striving to enter the employment. Lack of formal education and/or training, as well as financial restrictions, may make it very difficult for them to obtain work. Consider the employer's perspective on disabled employees and the workplace's characteristics when making hiring decisions. Practical evidence suggests that social security teams can encourage people with disabilities to quit their jobs and apply for disability benefits (Maureen Gilbert, 2010). When it comes to discovery work, enrolling, and working in a factory, most PwDs face an array of challenges. Assess the challenges experienced by PwDs employed in public agencies, as well as their long-term impacts. PwDs confront numerous obstacles when it comes to finding work. The government has developed a number of programs to assist citizens in establishing their own corporations and to aid micro, small, and medium-sized enterprises in getting off the ground. The Disability Act of 1995 places a 3% cap on poverty-reduction initiatives. At the moment, though, it isn't being put into practice very successfully at all. The underrepresentation of PwDs in these programs stems from a range of factors, including a lack of accessibility. Obstacles and challenges the existence of PwDs in the workplace has a significant effect on the career options of underprivileged persons. This should not, therefore, stop them from adopting aggressive measures to resolve their problems. Entrepreneur with disabilities may have a better chance of finding work in the labor market if they pursue entrepreneurship. Finally, disabled entrepreneurs and people will benefit greatly from the entrepreneurial concept and execution. These are among the most significant challenges that PwDs experience in employment at workplace In India:

1. A few individuals are just focused with the disabilities.
2. It isn't always easy to locate the required accommodation.
3. Accommodations could need to be made to accommodate a specific situation, but teammates and employers are often unaware of this distinction.
4. There is indeed a great variety in the disability populace which is sometimes overlooked.

5. Employers may make derogatory or disrespectful comments about appropriate workplace accommodation, even if they are offered.
6. When an employee discloses a disability, employees can be dismissive.
7. Disabilities that are not really visible can create a unique plethora of challenges.
8. Especially people with long-standing, strong workplace relationships can be precious by the unfavorable perception of a disability.
9. Several PwDs told Insider that their bosses and peers routinely misunderstand them.
10. Even the most well-intentioned employees can make a PwDs feel uneasy.
11. For some PwDs, employments that require travel might pose unique challenges.
12. Some people truly understood that in order to establish their worth as an employer, they got to focus harder than others.

Conclusion

Depending on their disability type, reading level, gender, and geographic area, PwDs have an extensive range of employment experiences. A failure to recognize these differences may restrict the benefits of India's current efforts to develop poverty reduction methods that focus on the poor with disabilities. The survives of PwDs will not improve if national policies do not take local peculiarities into account. The distinctions across disability kinds in various Indian regions are required to better understand the employment challenges experienced by PwDs. As a result of this data, policymakers would have the evidence they need to craft better local regulations. Organizations must enhance public awareness about disability rules and improve relations between employees and people with disabilities if they are to counteract this prejudice. In this study, employees' understanding of workplace disability increased, while employers' perceptions and evaluations of potentially impaired employees did not. According to the study's findings, the overall diversity video led to better perceptions and higher ratings. The much more effective way to reduce disability prejudice in the workplace is to provide disability-specific information alongside information on a diverse variety of other subjects. This latest results show significant differences between urban and rural settings, different types of disabilities, and gender. As a result, PwDs are still marginalized. As we get closer to 2030, we must ensure that no one, especially PwDs is left behind. PwDs must be recognized as a human resource capable of producing and engaging if a strong nation is to be built in employment at workplaces in India.

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Waste Minimization

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Abstract:

Solid waste generation is increasing problem at global and local level. Improper disposal of waste pollutes all the components of environment. There has been a significant increase in waste generation due to rapid population growth and economic development. There are mainly four functional elements of waste management that is storage and collection, transportation, treatment and disposal of waste. In order to minimize the waste these elements should be optimized. This paper includes a brief discussion on waste management situation of different parts of the world and drawbacks of waste management. Based on the studies it was found that in most of the places mixed waste is generated which is difficult to handle. Geographical information system can be used as an effective tool for proper allocation of waste bins and also separated bins needs to be provided for biodegradable, recyclable, non-biodegradable waste. In place of conventional system for collection, door to door collection system should be implemented as primary method. Transportation system should be improved and some transfer station needs to be established considering standard parameter to save fuel and man power requirement. Processing and treatment of waste is the most neglected area of waste minimization process. We found that physical and chemical characteristics of waste plays an important role to suggest the suitable treatment option for waste minimization and waste can be used as a potential source of biogas and power generation This paper tells that unscientific disposal of waste is affecting soil and ground water quality. Most of the work published in this field is reviewed and concluded that a potential landfill site can be selected on the basis of certain environmental and economic parameter using sensitivity site index method. Therefore the present review aims to help environmental managers and decision-makers to find possible solutions for disposal and processing of waste.

Keywords: Municipal Solid Waste (MSW), Heavy Metals, Literature review, Waste management, Delphi technique, Bio gas, Power generation, and geographical information system (GIS)

Introduction

The activities of human produces waste and the ways in that waste is handled, stored, collected, and disposed of can create problems to the environment and to public health. Solid waste management (SWM) includes all activities that reduce health, environmental, and aesthetic impacts of solid waste. In the urban areas of most of the developing cities solid waste management has become a very serious problem. Municipal authorities understand the importance of solid waste management but due to rapid growth of population there sources became scarce. According to a survey conducted by United Nations Development Program on 151 mayors of cities, the most serious problem after unemployment that people are facing is improper solid waste management. Only 40% of total waste is collected rest of the 60% waste is dumped directly in streets and drains which results in chocking of drains, growth of flies and rodents, flooding and spreading disease. The waste that is collected is directly disposed to unscientific open dump site. The leachate produced from these sites pollutes ground water quality. Greenhouse gases mainly methane and carbon di oxide also emitted from these landfill sites which causes global warming. Visvanathan et.al. Carried out a study in 2001 shows that disposal of waste is a serious problem in Asia due to unorganized and uncontrolled urban growth. Also there is lack of money and trained men power for SWM system. According to them, the waste generated per capita in Asia is around 0.2kg/day to 1.7kg/day, Solid waste is being disposed in open dumping sites in most of the Indian cities which poses a risk for environment (Mufeed, 2006). .Like other Bangladesh is another country which is facing the problems in managing solid waste. The collection efficiency is less than 50%. There is lack of waste bins and also bins are not allocated properly on roadsides. So waste is scattered here and there, results in flooding, dirty streets, blocking of drains.Implementing Waste Minimization Solutions Prepare for Implementation The selected

solutions could be taken for implementation. Apart from simple housekeeping measures several others would require a systematic plan of implementation. The Waste Minimization team should be well prepared to take up the job of implementation. The preparation would include arranging finances, establishing linkages in case of multidepartment solutions, technical preparations, etc. Implement Solutions The task comprises layout and drawing preparation equipment fabrication / procurement, transportation to site, installation and commissioning. Whenever required, simultaneous training of manpower should be taken up as many excellent measures have failed miserably because of non-availability of adequately trained people. Monitor and Evaluate Results The WM solutions should be monitored for performance. The results obtained should be matched with those estimated / worked out during technical evaluation to establish causes for deviation, if any. The implementation job is considered to be over, only after successful commissioning and sustained stable performance over a reasonable length of time

Quantitative & Qualitative Analysis Of Municipal Solid Waste Msw can be categorized as food waste, yards waste, rubbish, institutional waste, street sweeping waste, commercial waste industrial waste, construction and demolition waste, and sanitation waste. MSW contains recyclables waste (paper, plastic, glass, metals, etc.), hazardous substances (paints, pesticides, used batteries, medicines), organic matter that can be composted (fruit and vegetable peels, food waste) and soiled waste (blood stained cotton, sanitary napkins, syringes) (Jha et al., 2003; Reddy and Galab, 1998 ;). The range of per person waste generation in Indian cities is between 0.2 kg and 0.6 kg per day .The total amount of waste is 1.15 lakh per day and 42 million annually. Also, as the cities are expanding, average per capita waste generation is increasing.

Shortcomings In Present Solid Waste Management Services

Waste is not segregated and stored at the source The waste is not separated at the point of generation that is why mixed waste is there, which is difficult to handle. Citizens have not been taught to keep the separate bins for different type of waste such as domestic, recyclable and inert waste, so they are throwing mixed waste on streets only.No System for door-to-door collection as primary method In most of the cities, communal bin and street weeping are the primary method for collection and door to door collection system is implemented. Street Sweeping is not regular it is not being done on Sundays or public holidays. The number of sweepers allotted to a particular area of a city is also irregular. In some wards of a city there is excess of sweepers whereas in other areas of city there is shortage of sweepers. Even sweepers are not performing their duties. Generally commercial road, main markets, important streets are prioritized and rest of the streets are swept occasionally or not swept at all. The tools used for street sweeping are generally inefficient and outdated. Conventional handcarts, wheel barrow, tricycles are used for collection of waste, which do not harmonize with the secondary storage systems. Waste disposed on the ground required multiple handling. Work is not distributed properly among sanitation workers, some have very less work to do while others are overburdened. The places where communal bin are used, the bins are not sufficient in numbers and they are not allocated properly. In order to improve the collection system proper allocation of waste bins is required by considering population density, area and convenient distance from user. (Syed, 2006), R. Nithya, A. Velumani et.al suggested proper number and location of waste bins in one of the ward of Coimbatore by using GIS. His model was based on public preferable walking distance for deposing of waste into collection bin Lacking of transfer stations for waste storage Conventional handcarts, wheel barrow, tricycles can collect only a small quantity of waste at a time so it is required to build transfer stations in scientific manner for temporary storage of waste before disposal so that number of trip required for transportation of waste to the distant disposal site can be reduced. But in practice, most of the cities are using open sites or round cement concrete bins for temporary storage of waste that requires multiple handling of waste. Waste spills over which is not hygienic as well as unsightly too.Transportation of Waste is transported from transfer station to the landfill site by different type of vehicles such as Dumper placer, tractors, bullock carts etc. Most of the vehicles are aged and not covered so spreading of waste pollute environment. In most of the places loading is done manually. A very few cities are using modern hydraulic vehicles as well. The conventional transportation system does not harmonized with the primary collection system and facilities of secondary waste storage which results in multiple manual handling of waste.

Maximising Cullet Recovery Reduces Batch Costs At a Lead Crystal Glass Works, glass was produced by melting a charge of blended raw materials together with process cullet. However, only about 30% of the cullet produced at the glassworks was of a size appropriate for remelting. Concern about the significant amounts of valuable raw materials lost in this cullet and being sent for waste disposal, led to the installation of a crushing unit to reduce the cullet to an optimum size for recovery. Operation of the crushing unit was subsequently enhanced by the addition of a vibrating screen and cullet washing system. The ideal size for cullet pieces, to produce a high quality melt of uniform composition and avoid faults in the blown glass, is 12 – 20 mm. Most of the heavy cullet at the company was present in large pieces that cannot be easily broken up manually to the optimum size. Lighter pieces such as those from wine glasses, were also difficult to recycle because they have to be broken up manually to obtain a satisfactory charge weight. This generates a lot of fine material, which was unsuitable because it tends to result in air bubbles being trapped in the glass gathered from the furnace pot by the glass blower. Before waste minimization programme, about 560 tonnes of cullet were disposed for waste disposal each year, costing the company considerably in terms of lost raw materials. The company therefore decided to install a crushing plant capable of producing a consistent output of a size suitable for remelting and with minimum generation of fine material. Such a plant would allow more cullet to be recycled, leading to a reduction in the cost of both primary raw materials and cullet disposal. Following discussions with suppliers of crushing plant, the company installed a rotary hammer mill. This resulted in recycling of 74% of process cullet as against 30% previously. Also alternative uses avoiding waste disposal have been found for the crusher fines and other forms of waste glass. Crushing has also increased the bulk density of the cullet by a factor of three and improved its size distribution. The benefits of maximising inhouse cullet recovery include: • Cost savings • Reduction of 37% in the purchase of primary raw materials • Improved yield of first quality glass • Payback period of three weeks Associated Waste Minimization Measures In addition to installing the cullet crusher, the company had initiated a number of other associated waste minimization measures such as segregation by source of inhouse cullet, segregating stones from cullet, lead recovery from reject cullet, crusher fines and waste glass prior to disposal.

Conclusion

The problem of waste management is becoming more and more complex day by day. There has been a significant increase in MSW (municipal solid waste) generation in the last few decades due to rapid population growth and economic development in the country. There are certain loopholes in solid waste management system due to lack of public participation, ignorance of this sector by municipal authorities and lack of funds. In order to increase the efficiency of solid Waste management, all the functional elements should be optimized. Waste should be separated at the source of generation itself which can be done by providing separate bins for each type of waste and by implementing door to door collection as primary method. A physical and chemical characteristic of waste helps in deciding the possible treatment options to be given to a particular Solid waste. Materials such as glass, metal and plastic can be recycled. Biodegradable waste with high moisture content is suitable for composting. Waste with high calorific value can be used as a effective source for biogas and power generation. By implementing these options we can reduce the amount of waste to be disposed in landfill sites.

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Isolation of Rhizosphere and fungal endophytes from *Carissa carandas* and its anti-bacterial effect.

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Abstract

The fungal rhizosphere and endophytic fungi plays a major role in influencing the growth of plants. They produce metabolites which include antibacterial compounds and bioactive substances. In the study of the medicinal plants Carissa carandas , the fungi Gliocladium roseum, Verticillium sp. Fusarium oxysporum and Trichoderma lignorum were isolated from rhizosphere while three fungi Cladorrhinium sp. Gliocladium roseum and Alternaria humicola sp. were isolated as endophytes from Carissa carandas. Three types of rhizosphere fungi, Verticillium sp.,Fusarium oxysporum and Trichoderma lignorum were found to be 50% of the population of total fungi isolated while two isolates of endophytes Alternaria humicola sp. and Cladorrhinium sp. were 37.5%. The only fungi common both as rhizospheric and endophytic include one isolate Gliocladium roseum which was 12.5% of the total population of isolates. the rhizosphere fungal isolate Fusarium sp. inhibited only K.pneumoniae whereas the fungus Halospoangium sp. showed the inhibition of S.aureus. Gliocladiumroseum, a predominant fungi isolated from the plant Carissa carandas, showed inhibition of only the gram positive bacteria S.aureus. Both the endophytes Cladorrhinium sp. and Alternaria humicola also inhibited S.aureus but these fungi did not show any inhibition against gram negative bacteria E.coli and K.pneumoniae.

Key words: Carissa carandas, Rhizosphric fungi,Endophytic fungi,antibacterial , metabolites

Introduction

The word endophyte is derived from Greek, ‘endo’ meaning within and ‘phyte’ meaning plant (Caroll, 1988). Fungal Endophytes are ubiquitous in the plant kingdom, with an estimate of at least few million species. According to Dreg Fuss and Chapela (1994) there are may be one million species of endophytic fungi in various medicinal plants. However, the study of endophytes in the tropics has received greater attention in recent years (Rodrigues and Petrini, 1997) because of increasing fungal knowledge by local mycologists and due to higher number of diverse plant species compared to temperate regions. According to Dreg Fuss and Chapela (1994) there are may be one million species of endophytic fungi in various medicinal plants. They form inconspicuous infections within tissues of healthy plants for all or nearly all their life cycle (Limsuwan et. al, 2009) The plant Carissa carandas an ancient Indian flowering shrub like in the family Apocynaceae. It is drought resistant plant and produces berry sized fruits used in Ayurveda, Siddha and Unani system of medicines. It is used to treat acidity, indigestion, wounds, skin diseases,urinary disorders and diabetic ulcer. It is anti bacterial with wide range of phytochemicals being produced. Based on their potential medicinal property the study was basically to understand the fungi in the rhizosphere and as an endophyte to exhibit such anti-bacterial property.

Rational of the study: The isolation and study rhizosphere and endophytic fungi having the similar property antibacterial property.like that of the plant Carissa carandas

Objectives:

1. To isolate and screen for the rhizospheric and endophytic fungi from roots of medicinal plant Carissa carandas
2. To investigate the anti-bacterial effect of endophytic fungi on medical pathogens E.coli , Klebsiella sp. and Stapylococcus aureus.

Materials and Methods:

Sampling site: The rhizosphere soil and the roots of medicinal plants of Carissa carandas from Dhanvantri Vana is located at Jnana Bharathi,Department of forestry, Government of Karnataka, Bengaluru, Karnataka, India.

Locality	Latitude	Longitude	Habitat/ Forest type
Dhanvantri Vana, Bengaluru	77.498159° W	12.942061° S	Cultivated

Isolation of the Rhizosphere and endophytic fungi: The collected soil and root samples from Carissa carandas**.** The soil sample was serially diluted and subjected to Pour plate technique to isolate Rhizosphere fungi**.** The root was washed and cut into small bits and subjected to surface sterilization. It was disinfected with 75% alcohol for 1 minute followed by immersion in 5% of sodium hypochlorite for 8 minutes. The sterilized root bits were again immersed in 75% alcohol for 30 seconds and then rinsed in sterile distilled water to remove the traces of sterilants on root bits. Finally the root bits were blot dried on sterile blotting paper a modified method. (**Guo et al., 2008; Wang et al., 2008; Samaga et al., 2014)**

The processed root bits were placed on sterilized Potato Dextrose Agar (PDA) medium containing streptomycin and incubated at 28°C for 21 days and observed for the growth of fungus.

Identification of fungal isolates : The isolated fungal colonies were sub cultured in Potato Dextrose Agar slants and identified for their colony characters and the morphological characters using lactophenol cotton blue.

Study of endophytic fungi for anti bacterial activity.

(a) Turbidity method: The bacterial strains gram positive Staphylococcus aureus (NCIM 5345) **and gram negative** Escherichia coli (NCIM 2068)were cultured in nutrient broth for 48 hours. The 1ml of sterile nutrient broth was taken and added with the 1ml of crude fungal broth with 100 µl of bacterial culture. The tubes were then incubated at 37ºC for 48 hrs. The tubes were observed for the presence or absence of turbidity. The absence of turbidity indicates that the fungal broth is effective in inhibiting growth of bacteria.

(b) Agar-Plate technique:A plate of nutrient agar medium was inoculated with the test organism by spread plate technique for uniform growth of bacterial lawn. Circular sterile
paper discs soaked in fungal extract is placed on the agar medium. The fungal broth extracted with ethyl acetate and dissolved in DMSO was used for the study of antibacterial property. The plates were then incubated at 37ºC for 36-48 hours and observed for the zone of inhibition. The control used was an antibiotic Ciprofloxacin was used to compare the zone of inhibition of test results. The diameter of the inhibition zone around the discs is measured in millimeter (mm). Agar disc diffusion method was followed by the method given by (Kirby- Baurer 1996)

Results and Data analysis

Study of Rhizospheric and endophytic fungi isolated from Carissa carandas

In total four fungi Gliocladium roseum, Verticillium sp. Fusarium oxysporum and Trichoderma lignorum were isolated from rhizosphere while three fungi Cladorrhinium sp. Gliocladium roseum and Alternaria humicola sp. were isolated as endophytes from Carissa carandas Three types of rhizosphere fungi, Verticillium sp.,Fusarium oxysporum and Trichoderma lignorum were found to be 50% of the population of total fungi isolated while two isolates of endophytes Alternaria humicola sp. and Cladorrhiniumsp. were 37.5%. The only fungi common both as rhizospheric and endophytic include one isolate Gliocladium roseum which was 12.5% of the total population of isolates. The results are presented in Table 2.1 and Figure 2.1

Table 2.1: Rhizospheric and endophytic fungi isolated fromCarissa carandas

Sl No	Fungal isolates	Rhizosphere fungi	Endophytic fungi
1	Cladorrhinium sp.	-	+
2	Gliocladium roseum	+	+

3	Verticillium sp.	+	-
4	Fusarium oxysporum	+	-
5	Alternaria humicola	-	+
6	Trichoderma lignorum	+	-

(+) Present (-) Absent

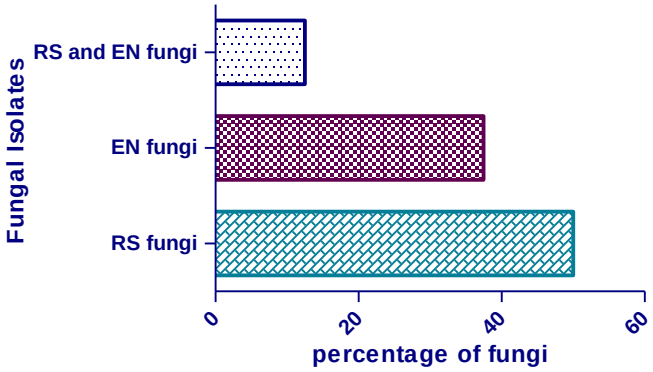
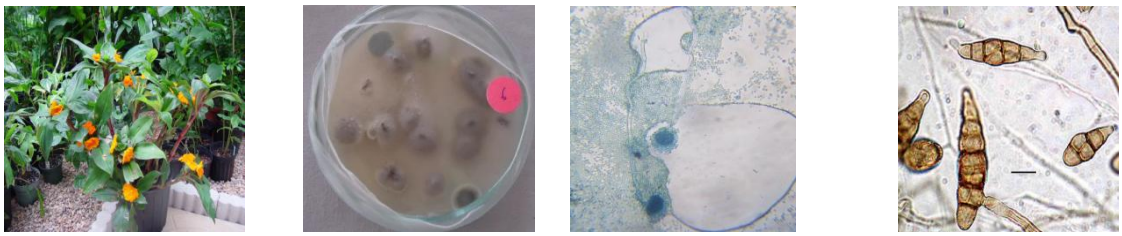
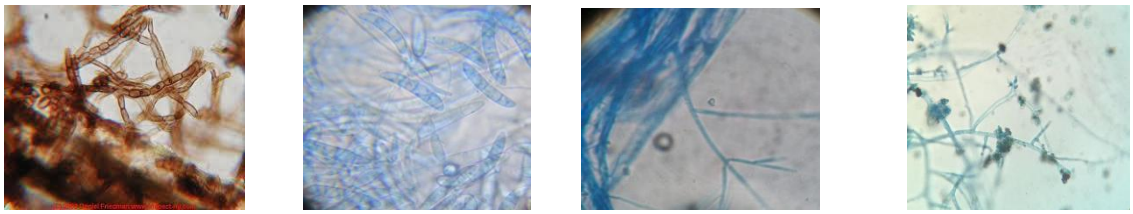


Figure 2.1:Percentage of rhizospheric (RS), endophytic (EN) fungi and total fungal isolates from *Carissa carandas.*



Carissa carandas. *Fungal isolates* *Gliocladium roseum* *Alternaria sp.*



Cladorrhinum sp. *Fusarium sp.* *Verticillium sp.* *Trichoderma sp.*

Figure 2.1 (a) : Percentage of rhizospheric (RS), endophytic (EN) fungi and total fungal isolates from *Carissa carandas*

Study of Endophytic fungi for Antibacterial activity:

In the plant, *Carissa carandas* the endophytic fungal isolate *Gliocladiumroseum*, a predominant fungi isolated from the plant *Carissa carandas*, showed inhibition of only the gram positive bacteria *S.aureus.* Both the endophytes *Cladorrhinium* sp. and *Alternaria humicola* also inhibited *S.aureus* but these fungi did not show any inhibition against gram negative bacteria *E.coli* and *K.pneumoniae.*

Study of Rhizospheric fungi for Antibacterial activity:

In the plant, *Carissa carandas*, the rhizosphere fungal isolate *Fusarium* sp. inhibited only *K.pneumoniae* whereas the fungus *Halospoangium* sp. showed the inhibition of *S.aureus.*

Table: 2.3 Study of rhizospheric and endophtic fungal extract as an anti-bacterial property.

Sl No	Name of the Plant	Name of the Fungi	Zone of inhibition (mm)		
	Carissa carandas		*E.coli*	*Staph.aureus*	*K.pneumoniae*
1		*Halospoangium* sp.	0.00	0.00	2.00
2		*Fusarium* sp.	0.00	4.00	0.00
3		*Gliocladium roseum*	0.00	5.00	0.00
4		*Cladorrhinium* sp.	0.00	3.00	0.00
5		*Alternaria humicola*	0.00	4.00	0.00
6	Ciproflaxacin 5µl (1mg/ml)	Standard	20.00	21.00	13.00

Conclusions:

In this context endophytes of medicinal plants have gained adequate importance and it's a field of exploration for the microbial diversity. The study done by M.Jacob, DJ Bhat *et al*., (2000) isolated two new anamorph genus *Kumbhamaya* sp. and new species *Gonatobotryum* sp. Rajesh *et al*, In the present study a similar isolate of *Fusarium oxysporum* and *Alternaria* sp. were isolated from *Carissa carandas*. The other fungi included *Cladorrhinium* sp., *Alternaria humicola* and *Gliocladium roseum* which showed inhibition of *S.aureus*.

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Solar Energy and Sustainable Development- A Welcome Performance of SBI

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Abstract:
The world today facing many environmental problems like global warming and climate change which has adversely affected the human life.Therefore, the issues of environmental conservationand sustainable development have received attention worldwide. Naturally at international and national level many policy measures, initiatives to reduce the carbon emission, maintain environmental balance and achieve sustainable development are being taken. The financial institutions all over world have been taking various initiatives towards sustainable development by controllingthere environmental and social impacts. During the last decade Indian banking sector has initiated measures for environment conservation and sustainable development. The largest public sector bank in India- SBI has started incorporating environmental management practices into its business operations. This paper deals with performance of the SBI regarding solar energy and sustainable development. The bank has taken an approach to manage economic environmental and social performance in an integrated manner. The study reveals that the SBI is the front-runner in respect of installing solar pannels and windmills for its captive energy utilization and promotes solar energy projects extensively with the help of raising funds through the green bonds. The SBI has set its goal to achieve carbon neutrality by 2030.

Keyword: Solar Energy,EnvironmentalManagement, Sustainable Development, Renewable Resources.

Introduction:

The ecological imbalance has adversely affected the human life. The world today facing many environmental problems like global warming and climate change. Industrialization has become symbol of prosperity and development of an economy. But it has resulted into over exploitation of the natural resources. The present nature of industrialization, excessive dependence on fossil fuels and coal for energy has resulted into high level of carbon emission and industrial waste. This has led to environmental degradation. Therefore, the issues of environmental degradation and environmental sustainability are debated around the world. Naturally sustainable development has received attention worldwide.At international and national level many policy measures, initiatives to maintain environmental balance, to reduce the carbon emission and achieve sustainable development are being undertaken. The financial sector worldwide is contributing to maintain ecological balance through green banking initiatives. The Reserve Bank of India has published a booklet containing the guidelines for the Indian banks regarding implementation of green banking initiatives. Green banking refers to the use of physical infrastructure and information technology effectively and efficiently without any side effect on environment. The banks are important source of capital for industries and business. Industries like steel, paper, chemicals, power, fertilizers, cement, textiles etc. are huge source of carbon emission. So, the banks can balance between economic development and environment protection with eco-friendly and socially responsible investment. The banks can provide and promote the use of alternative sources of energy like solar and wind power etc. The banks can also develop such projects for their own energy consumption. In short the essence of green banking is reduce, reuse and recycle the various resources.

The banking sector can contribute towards achieving sustainable development through the implementation of green banking initiatives. The Indian public and private as well as co-operative banks have started implementing these initiatives during the last decade. The largest public sector bank- State Bank of India is the front runner in respect of green banking initiatives. Therefore, the SBI is selected for this study. This study is an attempt to assess the SBI's performance regarding solar energy and its contribution towards sustainable development.

Rational Of The Study:

Linkage Between Green Banking and Sustainable Development:

Green bank is a normal bank which considers all the social and environmental factors with an aim to protect the environmental and conserve natural resources (Indian Banks Association – 2014).

Green banking includes the activities such as introduction of paperless statements, electronic communication with clients, internal efforts to save energy, use of solar energy, recycling program for solid waste, managing waste for reusing effectively green banking involves promotion of environmental friendly practices and reducing carbon footprint from the banking activities. The UNEP FI (2007) states that sustainable bank considers the impacts of operations of various products and services for the current as well as future generation. In order to promote reduction in the external carbon emission. The banks should focus on financing the technology and projects that are environment friendly.

Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. (Brundtland Commission Report -1987)

1. green banking optimizes on social safety and security through non-polluted environment.
2. Banks motivate environment protection through modernization and online banking.
3. Banks provide finance, loans, investments for green energy and eco-friendly projects.
4. It rationally guides and supervises the clients projects with less pollution method in real sense.
5. It uses efficiently natural resources so that it reduces its carbon emission to the lowest possible level.
6. It aims at environmental awareness among officials, staff of the banks and clients account holders with green sensibilities.

Objectives Of The Study:

The study is conducted with the following objectives

1. To present a brief conceptual dimension of green banking and relationship between the green banking and sustainable development.
2. To examine the performance of SBI regarding solar power and sustainable development.

Merterials And Methods

The present study is explanatory and based on secondary data. The necessary data was collected through annual reports the SBI and RBI reports and websites etc. and the officers of the bank in the western region. The data collected is analyzed and conclusions are drawn.

Data Analysis:

SBI's performance regarding Solar Energy and Sustainable Development:

Solar energy is that provided by the sun's light -photovoltaic energy. It is inexhaustible and renewables because it comes from the sun. such renewables do not emit greenhouse gases. Solar energy does not generate waste and contaminate water which help to the protect the environment. Solar and wind energy technologies are drastically reducing their costs and they have become competitive with the conventional sources of energy. In brief, renewable energies becoming the most sustainable solution not only environmentally but also economically, for powering the world.The government of India has undertaken various measures for the development of renewable energy. At present 4 percent of our energy requirements come from renewable resources. Prime Minister Modi has told the COP 26 climate summit in Glasgow recently, that 50 percent of our energy requirements will come from renewable resources.

Management of Energy Consumption and Conservation:

The SBI tries to achieve energy conservation, use of clean energy like solar and wind and reduction in green House Gases emissions. The bank has installed rooftop solar panels at various offices, the corporate centre and local head offices, solar powered ATM etc. The SBI's global IT centre in Mumbai uses wind power. ATMs are solar powered in many cities and rural branches. The total installed capacity of renewable energy at the bank's offices, branches and ATMs stood at 35 MWP as on 31st march2021.

The bank has various steps for energy conservation in order to achieve carbon neutrality and mitigating climate change. The bank has adopted energy-saving initiatives like installation intelligent power management utility software which is based on fine-grained power optimization on idle

components such as cores, graphic processing unit and user activity. This software is used for optimizing the distribution and use of electrical power in data centres and computer systems. This software has been installed since 2016 on all office desktops all over India. The bank has energy savings of around 10.84 GWh during the year 2019-20. This corresponds to 10833 tonnes of GHG emission avoided and more than 1 million cubic meter water saved. During 2019-20, this has led to a cost saving of Rs 10.84 crores.

Similarly the bank has installed the branch server consolidation to consolidate all physical servers to a centralized location in a secured virtual environment. Upto march 2019 total 10332 servers were migrated to the virtual setup and during 2019-2020 in addition 12631 servers were migrated. This has helped the bank to reduce energy consumption and increased space for branch operations. This migration has stopped the maintenance expenses for servers and estimated annual cost of Rs. 81.85 crore is being saved.

In addition, the electrical appliances which help to reduce the energy consumption like LED bulbs and tubes, air conditioners etc. are used by the bank. The bank has also adopted green building for some new offices as well as some old branch buildings are converted into green building. This has helped the bank to achieve energy conservation.

Promotion of Solar and wind power:

The SBI is supporting projects related to renewable energy and clean mobility. The SBI provides loans for installation of solar power plants- ground mounted and rooftop panels. The bank has been issuing green bonds, raising green fund and availing credit lines from international institutions and funding agencies. The proceeds from these sources are utilized for augmenting solar power capacity. The bank's efforts in this respect are summarized below.

Green bonds for renewable energy development

The State Bank of India has adopted sustainability policy measures to create a positive impact on the environment. The SBI has been issuing green bonds and its proceeds are allocated to the following projects-

1. Renewable energy – solar and wind energy, hydropower
2. Low carbon building – new residential and commercial.
3. Industry and Energy intensive commercial-energy Efficiency, Products, Appliances, data centers and energy efficiency processes.
4. Waste and pollution control- recycling, Waste to energy.
5. Sustainable transport projects – low emission or low energy transportation systems and infrastructure electrical vehicles, electrized mass transportation projects.

Table. 1. Performance of green bonds by SBI:

Date of Issue	Type of Instrument	Size (USD)	Jurisprudence of Issue	Climate Bonds Sector Criteria
July -2018	Use of Proceeds	50.0M.	India	Solar low carbon transport
Sep -2018		650.0M.		
Fiscal Year 2018-19		800.0M.		
Mar -2020		100.0M.		

Sources: SBI Sustainability Report 2019-20, 2020-21.

In addition to the proceeds of green bonds the SBI raises green loan and receives credit line from the international banks and agencies. This has been helping the bank to finance renewable energy projects. The details of credit line is as below 2020-21 50.0M. Euro was raised as green loan.

All these efforts make clear that the SBI is committed to develop the solar energy sector for achieving sustainable development. The SBI supports the government of India in developing solar energy in India.Financial institutions worldoverhave been taking various initiatives towards sustainable development by controlling their environmental and social impacts. The SBI is aware of its direct and indirect impact on the environment. Therefore, the SBI has started incorporating environmental management practices into its business operations. The SBI has undertaken two-fold measures for managing environmental and social impact of bank's own operations on the one hand and on the other hand helping to manage the impact of industries and business organizations whom it finances.Energy generated through these renewable sources can help in reducing carbon emission and protect environment. The banks can promote these renewable sources of energy by providing easier and cheaper finance. Moreover, the banks can also install such project for their captive use. The SBI has installed 10 windmills with a capacity of 1.5 mw each since 2010. The SBI also has been providing loans for windmill projects and as on 31st march 2021, it has provided 9137 crore credit to windmill projects. These are installed in Maharashtra (6), Tamil Nadu (3) and Gujarat (1). These windmills are installed for its captive consumption at various SBI offices and branches in these 3 states. It has also invested in solar power and possesses a total capacity of 21.23 mw in renewable power sources. The SBI has saved Rs 125 crores in the last eight years through these windmills and expects to save Rs 30 crores annually through the renewable energy investments. The total renewable energy at the bank's offices, branches and ATMs stood at 35 MWP as on 31st march 2020.

Impacts from Solar Energy Projects:

Proceeds of the green bonds have been utilized in augmenting solar energy capacities, leading to avoidance of Co_2 emissions as well as other air pollutants associated with energy generation. Further, proceeds have also been allocated to the Hyderabad Metro Rail Project, which is offering a eco-friendly mode of transportation and reducing emissions through regenerative braking technology and a modal shift from high emission road transport.

Table 2. Impacts of Solar Energy Projects

Sr. No	Project Description	Project Location	Projected emission Reductions (tons of CO_2/years)[1]	Estimated emission Reductions (tons of CO_2/years)[1]
1	50 MW Solar Energy Project	Tamil Nadu	78351.00	77086.00
2	50 MW Solar Energy Project	Tamil Nadu	73108.00	71928.00
3	49 MW Solar Energy Project	Tamil Nadu	86296.00	84904.00
4	50 MW Solar Energy Project	Karnataka	83962.00	82607.00
5	34 MW Solar Energy Project	Karnataka	48683.00	47897.00
6	16 MW Solar Energy Project	Karnataka	25544.00	25132.00
7	70 MW Solar Energy Project	Andhra Pradesh	109118.00	107357.00
8	30 MW Solar Energy Project	Andhra Pradesh	51827.00	50991.00
9	1 MW Solar Energy Project	Uttar Pradesh	1113.00	1095.00
10	1 MW Solar Energy Project	Rajasthan	1113.00	1095.00
11	100 MW Solar Energy Project	Tamil Nadu	155637.00	153125.00

12	100 MW Solar Energy Project	Tamil Nadu	155637.00	153125.00
13	100 MW Solar Energy Project	Tamil Nadu	155637.00	153125.00
14	209 MW Solar Energy Project	Tamil Nadu	*325281.00*	320031.00
15	100 MW Solar Energy Project	Tamil Nadu	155637.00	153125.00
16	100 MW Solar Energy Project	Tamil Nadu	155637.00	153125.00
17	Metro Rail Project	Hyderabad	15000^2	15000^2
Total			**1677580.00**	

Source: SBI Sustainability Report 2019-20 Page 67 2020-21&, Page 27.

It is clear from the table 2. that, how the solar energy projects will contribute towards reducing carbon emission in India. The table shows the amount of projected Co_2 emission reduction of each of the solar projects. The total projected emission reduction per year is 1677580 tons and presents a remarkable contribution to the environmental preservation.

SBI's Sustainability Goals and Achievements:

The SBI has been seeking innovative ways for creating sustained value for all its stakeholders. It has formulated a structured approach in the fiscal year 2015-2016 to integrate economic, social and environmental aspects across all its business operations. 'Sustainability' was added as a value in the fiscal year 2017-18 and has been remained a key focus in business decisions and operational changes. The SBI has developed a Sustainability and Business Responsibility Policy which is approved by the board. The policy acts a central guiding principle for all business functions and aims to develop an integrated management approach towards sustainable development.

The SBI has started formulating sustainability goals for every fiscal years and trying to achieve those goals. For example, the sustainability goals and achievementsin the fiscal year 2018-19 are shown in the table 3.

Table 3 Sustainability Goals and Achievements of SBI

ACHIEVEMENTS OF SUSTAINABILITY GOALS		
Natural Capital Management		
Goals and Targets Established for FY 2018-19	**Actual Performance against Goals and Targets**	**Status**
The bank will decrease its scope 2 emissions by at least 5 % from the previous reporting period	SBI reduced its scope 2 GHG emissions by 9.13%	Achieved
The bank will implement at least 1 pan-India energy savings project and quantify the impact created	The energy saving initiative of installing the IPM+ desktop software across all circles in India has resulted in a cumulative saving of 33.17 GWh	Achieved
The bank will conduct a tree plantation drive across India planting at least 100000 saplings.	During the reporting period, SBI planted approximately 90000 tree saplings across India	Achieved
SBI will implement at least 1 environmental awareness campaign	SBI started the 'Beat Plastic Pollution' campaign on the eve of Gandhi Jayanti 2018 across all its offices, to eliminate single use plastic within 12 months	Achieved

The bank will increase its RE financing portfolio by 5 % and in-house capex capacity will also be increased by 10% from the previous reporting period	As on 31st March 2019, SBI's RE sanctioned portfolio increased by 21.37 % from the previous reporting period and also increased its in-house renewable capex capacity by 28%	Achieved
Digitize at least one paper intensive internal process	SBI introduced 'Easy - Approve' - a customized, on-cloud solution for note approval on a pilot basis.	Achieved
SBI will quantify the volume of dry and wet waste generated at the corporate centre	The total volume of dry and wet waste quantified by the corporate centre during the reporting period is approximately 26584 Kgs and 20592 Kgs respectively	Achieved

Source: SBI Sustainability Report 2018-19, Page No. 78-79

Awards and Recognition:

Awards received by the SBI

Highlights the SBI's performance in the renewable energy sector.

1. The SBI has received outstanding performance Award 2016 by the Government of India for measures taken to support renewable energy sector.
2. The SBI has also received the National Excellent Award for rooftop solar projects.

Conclusions:

Solar is the best solution for environment conservation and achieving sustainable development. The key findings of the study are concluded below.

1. The SBI has adopted a sustainability and business responsibility policy which outlines the bank's approach to managing economic, environmental and social performance in an integrated manner.
2. The SBI has actively engaged in promoting environmentalfriendly products and services. It has emphasized on increasing its exposure to climate change mitigating industries by providing relaxations for extending credit facilities to borrowers in the renewable energy sector.
3. The unique initiatives of the SBI which is first in the Indian banking sector, is the installation of windmills for captive power consumption.
4. SBI is the first public sector bank in India to publish a separate sustainability report since 2015-16.
5. SBI is a signatory to the carbon disclosure project (CDP) and has been reporting there under since 2012.
6. As on 31st march 2021 the SBI has provided more 30000 crores for solar energy projects through the funds raised from green bonds, credit lines and green fund.
7. A welcome and important feature of the SBI is that it is associated with various organizations and industry association to implement the renewable energy agenda and achieve sustainable development.

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Education: An Approach For Sustainable Development

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Abstract

Sustainable development is the need to integrate social, environmental, and economic concerns so as to arrive at development paths which meet the needs of present generations, without compromising the ability of future generations to meet their own needs. Education for sustainable development is a vision of education that seeks to balance human and economic well-being with cultural traditions and respect for the Earth's natural resources. It emphasizes aspects of learning that enhance the transition towards sustainability including future education; citizenship education; education for a culture of peace; gender equality and respect for human rights; health education; population education; education for protecting and managing natural resources; and education for sustainable consumption. Education for sustainable development has come to be seen as a process of learning how to make decisions that consider the long term future of the economy, ecology and social well-being of all communities. Building the capacity for such futures-oriented thinking is a key task of education. It is the need of the hour to look into what Education can do to foster sustainability. In this paper an attempt has been made to view into the meaning of Sustainable development, its importance and need. It also discusses the role of education for sustainable development.

Key Words: Sustainable development, Education, development

Intoduction

Education encompasses teaching and learning specific skills, imparting of knowledge, positivejudgment and well developed wisdom. It has one of its fundamental aspects of imparting culture from generation to generation. It is an application of pedagogy, a body of theoretical and appliedresearch related to teaching and learning. The basic aim of the education system for sustainabledevelopment is to develop a man of sustainable type of thinking. Education in itscontemporary development should be aimed at the future, should "foresee" and form in a certainway and satisfy needs of future generations of people. "Education is critical for promotingsustainable development and improving the capacity of people to address environment anddevelopment issues. It is critical for achieving environmental and ethical awareness, values andattitudes, skills and behaviour consistent with sustainable development and for effective publicparticipation in decision making".The concept of sustainable development is not a mere concept leading to awareness or knowledge,but it is an act that requires more participation in the modern world. All the developed, developingand under-developed countries need to participate in sustainable development practices, so thatthe whole world becomes a better place to live for the present as well as for the future generationsto come. The depletion of nature and natural resources can be traced back to the times when manstarted to live in caves, lead a nomadic life and settled for practicing agriculture. The depletion of these resources reached its zenith when the basic needs of man has given way for his greed,whereby, he started to exploit the environment by cutting trees, destroying forests, destroyingland, constructing buildings, depleting of non-renewable resources, using various modes oftransportation, development in technology etc. It is from this realization that 'Education forsustainable development' (ESD) emerged with an immediate urge to preserve and conserve ournature and natural resources.

Objectives Of The Study

1. To study the term sustainable development
2. To study the importance of sustainable development
3. To study the need of sustainable development

4. To study the role of education in sustainable development
5. To find out the barriers in the path of sustainable development
6. To give some suggestions for promoting sustainable development through education

Methodology

The present study is based on the collection of data from secondary sources. Secondary data is obtained from various published and unpublished records, books, magazines, journals and websites.

Sustainable Development

Sustainable development is development that meets the needs of the present withoutcompromising the ability of future generations to meet their own needs. Sustainable developmentis generally thought to have three components: environment, society, and economy. The well-beingof these three areas is related. Thus, sustainability to be a paradigm for thinking about a future in which environmental,societal, and economic considerations are balanced in the pursuit of development and improvedquality of life. The humanrights community says that sustainability is attainable through and supported by peace, justice,and democracy. Sustainable Development is grounded on four independent systems such as environment,economic, social and political aspects. It include issues pertaining to poverty, biodiversityconservation, agriculture, capacity-building, climate change, desertification and drought, disasterreduction and management, energy, finance, forests, fresh water, health, international law, poverty,sanitation, toxic chemicals, waste management etc

Importance Of Sustainable Development

On 25 September 2015, the UN General Assembly adoptedthe 2030 Agenda for Sustainable Development (UN, 2015).This new global framework to redirect humanity towards asustainable path was developed following the United NationsConference on Sustainable Development in Rio deJaneiro, Brazil in June 2012, in a three-year process involvingUN Member States, national surveys engaging millions ofpeople and thousands of actors from all over the world.At the core of the 2030 Agenda are 17 SustainableDevelopment Goals (SDGs). The universal, transformationaland inclusive SDGs describe major development challengesfor humanity. The aim of the 17 SDGs is tosecure a sustainable, peaceful, prosperous and equitable lifeon earth for everyone now and in the future. The goals coverglobal challenges that are crucial for the survival of humanity.They set environmental limits and set critical thresholdsfor the use of natural resources. The goals recognize thatending poverty must go hand-in-hand with strategies thatbuild economic development. They address a range ofsocial needs including education, health, social protectionand job opportunities while tackling climate change andenvironmental protection. The SDGs address key systemicbarriers to sustainable development such as inequality,unsustainable consumption patterns, weak institutionalcapacity and environmental degradation.For the goals to be reached, everyone needs to do their part:governments, the private sector, civil society and every humanbeing across the world. Governments are expected to takeownership and establish national frameworks, policies andmeasures for the implementation of the 2030 Agenda. A key feature of the 2030 Agenda for SustainableDevelopment is its universality and indivisibility. It addressesall countries – from the Global South and the Global North– as target countries. All countries subscribing to the 2030Agenda are to align their own development efforts with theaim of promoting prosperity while protecting the planet inorder to achieve sustainable development. Thus, with respectto the SDGs, all countries can be considered as developingand all countries need to take urgent action.

The 17 Sustainable DevelopmentGoals (SDGs)

1. No Poverty – End poverty in all its forms everywhere
2. Zero Hunger – End hunger, achieve food security andimproved nutrition and promote sustainable agriculture
3. Good Health and Well-Being – Ensure healthy lives andpromote well-being for all at all ages
4. Quality Education – Ensure inclusive and equitablequality education and promote lifelong learningopportunities for all
5. Gender Equality – Achieve gender equality andempower all women and girls
6. Clean Water and Sanitation – Ensure availability andsustainable management of water and sanitation for all
7. Affordable and Clean Energy – Ensure access toaffordable, reliable, sustainable and clean energy for all

8. Decent Work and Economic Growth – Promotesustained, inclusive and sustainable economic growth,full and productive employment and decent work for all
9. Industry, Innovation and Infrastructure – Build resilientinfrastructure, promote inclusive and sustainableindustrialization and foster innovation
10. Reduced Inequalities – Reduce inequality within andamong countries
11. Sustainable Cities and Communities – Make citiesand human settlements inclusive, safe, resilient andsustainable
12. Responsible Consumption and Production – Ensure sustainable consumption and production patterns
13. Climate Action – Take urgent action to combat climatechange and its impacts
14. Life below Water – Conserve and sustainably use theoceans, seas and marine resources for sustainabledevelopment
15. Life on Land – Protect, restore and promote sustainableuse of terrestrial ecosystems, sustainably manageforests, combat desertification, and halt and reverseland degradation and halt biodiversity loss
16. Peace, Justice and Strong Institutions – Promotepeaceful and inclusive societies for sustainabledevelopment, provide access to justice for all and buildeffective, accountable and inclusive institutions at alllevels
17. Partnerships for the Goals – Strengthen the means ofimplementation and revitalize the global partnership forsustainable development

Need For Sustainable Development

Sustainable Development is a complex conceptwith its origin in the natural and social Sciencesthat has been developed through international dialogue in response to the challenges facing theworld today. A core principle behind sustainable development is the idea that economic, social andenvironmental conditions play a major role. Education Sustainable Development has fivecomponents; knowledge, skills, perspectives, values and teaching issues which are to be addressedin a formal curriculum for sustainable development. The basic vision of the United Nations Decadefor Education for Sustainable Development (DESD) is a world where everyone has the opportunityto benefit from education and learn the values, behaviour and life styles required for a sustainablefuture and for positive societal transformation. Some of the proposed DESD objectives are tofacilitate links and networking, exchange and interaction among stakeholders in ESD; provide aspace and opportunity for refining and promoting the vision of, and transition to sustainabledevelopment through all forms of learning and public awareness; foster increased quality ofteaching and learning in education for sustainable development; develop strategies at every levelto strengthen capacity in ESD.Education For Sustainable Development examine major environmental issues for local, national,regional and international points of view, so that students receive insights into environmentalconditions in other geographical areas, Focus on current and potential environmental situationswhile taking into account the historical perspective; Promote the value and necessity of local,national and international co-operation in prevention and solution of environmental problems;Enable learners to have a role in planning their learning experiences and provide an opportunityfor making decisions and accepting their consequences; Relate environmental sensitivity,knowledge, problem solving skills and value clarification to every age but with special emphasis onenvironmental sensitivity to the learner's own community in early years; Help learners discoverthe symptoms and real cause of environmental problems; Emphasize the complexity ofenvironmental problems and thus the need to develop critical thinking and problem solving skills;Utilize diverse learning environments and a broad array of educational approaches to teaching/learning about and from the environment with due stress on practical activities and firsthandexperience.

Role Of Education For Sustainable Development

"Education can, and must, contribute to a new vision of sustainable global development."

(UNESCO, 2015)Education for Sustainable Development (ESD) is simultaneously a sub-field of education and aconceptual tool to aid policy makers in authoring educational policies that take into account thepresent environmental, societal and economic challenges. According to the UNESCO, it is based onall levels and types of learning - learning to know, learning to be, learning to live together, learningto do and learning to transform oneself and society." It further says that, "Perhaps ESD can be

seenas the total sum of diverse ways to arrive at a 'learning society' in which people learn from andwith one another and collectively become more capable of withstanding setbacks and dealing withsustainability-induced insecurity, complexity and risks. From this point, ESD is abouteducation and learning- engaging people in sustainable development issues, developingtheir capacities to give meaning to SD and to contribute to its development and utilizing thediversity represented by all people- including those who have been or feel marginalized- ingenerating innovative solutions challenge.There is broad acceptance that education plays an important role in breakingthe intergenerational cycle of poverty, being variously associated with increasedearning potential, improved health outcomes, and reproductive choice (Rose andDyer, 2008).

Education Directly Affects Sustainability Plans In The Following Three Areas

1. Implementation: An educated citizenry is vital to implementing informed and sustainabledevelopment. In fact, a national sustainability plan can be enhanced or limited by the level ofeducation attained by the nation's citizens. Nations with high illiteracy rates and unskilledworkforces have fewer development options.
2. Decision making: Good community-based decisions which will affect social, economic, andenvironmental well-being- also depend on educated citizens.
3. Quality of life: Education is also central to improving quality of life. Education raises theeconomic status of families; it improves life conditions, lowers infant mortality, and improves theeducational attainment of the next generation, thereby raising the next generation's chances foreconomic and social well-being. Improved education holds both individual and nationalimplications.

Barriers In The Path Of Sustainable Development

As societies around the world struggle to keep pace with theprogress of technology and globalization, they encountermany new challenges. These include increasing complexityand uncertainty; more individualization and social diversity;expanding economic and cultural uniformity; degradation ofthe ecosystem services upon which they depend; and greatervulnerability and exposure to natural and technologicalhazards. A rapidly proliferating amount of information isavailable to them. All these conditions require creativeand self-organized action because the complexity of thesituation surpasses basic problem-solving processes that gostrictly according to plan. People must learn to understandthe complex world in which they live. They need to be able to collaborate, speak up and act for positive change(UNESCO, 2015).Sustainable development has been widely promoted as a holistic concept which aims or targets to integrate social, economic and cultural policies to ensure high-quality growth. However, there are barriers combating the implementation of sustainable development. These barriers are: Economic and financial barriers: Economists observed that the development tends to focus on economic growth as precedence rather than people's rights or welfare, and environmental processes and limits. This requires a shift in the worldview from treating the environment as part of the economy to treating the economy as part of the environment; strategically this means the economy should be adapted to ensure environmental services are maintained. Innovation Barriers: In the educational sector there is a lack of innovation-oriented research. This means that there has to be a closer connection between research institutes and the economy, which would also overcome problems concerning the knowledge transfer to applications in real life.

Social barriers: Population growth, paired with unsustainable consumption and production patterns among the wealthy, are the biggest social challenges to achieving sustainable development in the world. Absent of a significant change in human behaviour, sustainability will not be potential. Political barriers: Inadequate economic, social and environmental methods for policies, plans and projects are the major barrier combating the implementation of sustainable development. Poor monitoring and evaluation systems: A basic problem is lack of specific targets (globally, nationally and at local level), measurement and data to track progress, resulting in a lack of information available to decision-makers. It is suggested for strengthening monitoring and evaluation of sustainable development strategies in order to establish a dynamic improvement process, with an objective of increasing their effectiveness. It is recommended that governments should turn up deeper and assess the socioeconomic impacts of developmental projects, rather than the outcome alone. Institutional barriers: Institutional barriers as a result of lack of institutional experience to operate all the mechanism of democratic system has been combating and frustrating sustainable development in many developing countries.

suggestions for promoting sustainable development through education

1. Facilitate networking linkages, exchange and interaction among stakeholders in ESD.
2. Foster increased quality of teaching and learning in education for sustainable development.
3. Help countries make progress towards and attain the Millennium Development Goals throughеducation for sustainable development efforts.
4. Provide countries with new opportunities to incorporate ESD into education reform efforts.
5. Adequate resources and support for education for sustainable development are essential. Anunderstanding must be promoted among key decision makers of the potential of education topromote sustainability, reduce poverty, train people for sustainable livelihoods and catalyzenecessary public support for sustainable development initiatives.
6. The empowerment of women and girls must be supported by actions to improve their access tobasic and higher education, training and capacity building. The emphasis should be on gendermainstreaming.
7. Greater capacity needs to be built in science and technology through improved collaborationamong research institutions, the private sector, NGOs and government. Collaborations andpartnerships between and among scientists, government and all stakeholders, on scientificresearch and development and its widespread application need to be improved.
8. Mechanisms must be put in place to make available to developing countries the latesttechnologies at reasonable cost.

Conclusion –

Sustainable Development is development that meets the need of the present withoutcompromising the ability of future generations to meet their own needs. Education for sustainabledevelopment that includes key sustainable development issues into teaching and learning andrequires participatory teaching and learning methods that motivate and empower learners tochange their behaviour and promotes competencies like critical thinking, imagining future scenariosand making decisions in a collaborative way.Educational approaches must take into account the experiences of indigenous cultures and minorities, acknowledging and facilitating their original and important contributions to the process of sustainable development.The ethical issues and concerns of sustainable development need to be addressed through education at different levels to make an impact of people's lifestyles and responsible behaviours and help them build a sustainable future.

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Types of Rural Settlement in Solpaur District: A Geographical Analysis

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Abstract:-

The study of human settlement is fundamental to human geography. The nature of settlement in any region reflects the relationship of men to the environment. Settlement responds to man's environment as well as the religious and social customs of the society. Rural settlements are the important aspect of settlement and human geography. They reflect the complex relationship of human occupation to land and environment.In simple terms, the type of rural settlement is the distance between two houses as well as the number of houses in a particular area, from which the different types of rural settlements can be identified. For example, when houses are close to each other, they can be of a concentrated type, and when houses are far from each other, they are scattered settlements.Any settlement in which most of the people are engaged in agriculture, forestry, mining and fishing is known as a rural settlement. Rural settlements are often called agricultural workshops. The type, size and pattern of rural settlement generally depend on the type of work, farming techniques, type of soil and cropping pattern. Rural areas are dominated by open countryside, large land use, relatively low population density and simple lifestyle. The main types of rural settlements are compact, semi-compact; Semi-sprinkled and scattered varieties.The main objective of the present research paper is to identify the types of rural settlements and the influencing factors on the settlements in the study area. For the detail analysis of the rural settlement, degree of concentration has been calculated by using the Bernard's method. The present study is mainly based on the secondary data which is collected form the Census Handbook of Solapur District and Socio-Economic Abstract of Solapur district.

Keywords: - Rural Settlement, Concentration Index, Compact Settlement, Semi-Compact Settlement, Semi-Sprinkled Settlement, Dispersed Settlement,

Introduction:-

Rural settlements include populated areas whose inhabitants are engaged primarily in agriculture, forestry, or hunting. Types and patterns of rural settlement mostly depend on physical and socio-economic condition of the region.Rural settlements are comparatively small and simple agglomeration at favourable and convenient site, primarily are influenced by environmental factors and later on by socio-economic development of human groups. Generally, every settlement is different from the other, but with some generalization it is possible to classify them into many groups. Thus, it is interesting to study different types and patterns of rural settlements as well as factors affecting them. In simple words, the types of rural settlement mean the distance between the two houses as well as the number of houses in a particular area.It may be identified by the different types of the rural settlement. For example, when the houses are close to each other then it may be concentric types, and when the houses are away from each other then it is dispersed types of settlement. There are various types of rural settlements. The settlements have different types like compact, semi-compact, semi-sprinkled and dispersed. All human settlement is different from one another depending upon the surrounding environment. Hence, rural settlements show the common relationship of human occupancy feature and environment.

Study Area:- Solapur district is one of the important districts in Maharashtra. It lies entirely in the Bhima-Sina-Man basins.The district of Solapur is located between 17^0 10' North and 18^0 32' North latitudes and 74^0 42' East and 76^0 15' East longitudes. The East-West Length of the district is about 200 kilometer and North-South width is about 150 kilometer.

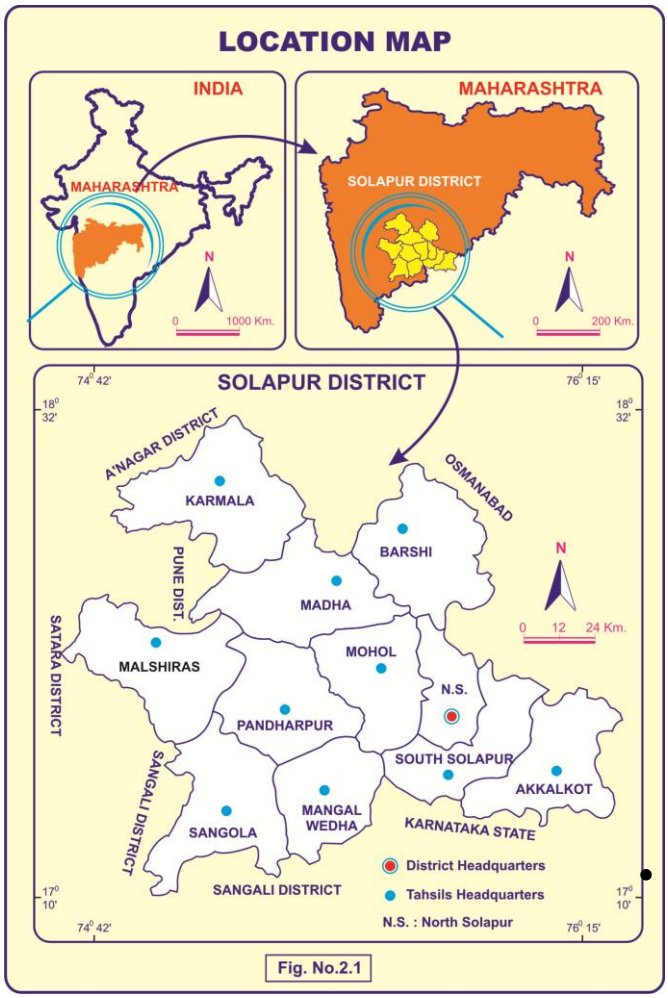

Fig. No.2.1

The total Geographical area of the Solapur district is about 14895 square kilometer and population of 43, 17,756 according to 2011 census. Within the region under study, Karmala is the largest tahsil in area and the lowest is North Solapur tahsil in the Solapur district. Solapur district plays significant role in the fields of agriculture, economics, industrial and social fields. The present paper deals with the types of rural settlement in the Solapur district.

Objectives:-

The important objectives of the present paper are as follows

To study the types of rural settlements in the Solapur district.

Database And Methodology:-

Present paper based is on secondary data. It has been collected through District Census Handbook, Socio-Economic Review and other materials. This study focuses on the types of rural settlements in Solapur district. Some other sources of information are used for current research, such as unpublished material.The information collected from different sources is processed and the percentage is calculated. With the help of these tables various figures, graphs are created and analyzed and final results are presented in the form of tables.The formula suggested by Bernard (1931) has been used to identify the types of rural settlements for the present study. The degree of concentration index for each tehsil is calculated using the following formula given by Bernard (1931).

Bernard Method For Settlement Concentration:-

The following formula was used by the French scientist Bernard in 1931 to study the colonies in France.

$$K = \frac{M \times S}{N^2}$$

Where, K = Degree of Concentration
M = Total number of Houses in the Tahsil.
S = Area of Tahsil.
N = Number of settlement Group in the Tahsil.

Bernard Method For Settlement Concentration:-

Different geographers have developed different methods and used different quantitative methods to study the type of rural population. Some important and significant quantitative methods are used to measure aggregation of settlements and dispersal indices. Among them is the method developed by Bernard to study colonies.According to Bernard's formula, a concentration index was drawn for each tehsil. For this, the period of 2011 has been taken into consideration. The values filled in the statistical formula and the results are calculated.

Table No- 1

Types of Rural Settlement Based on Bernard's Method for Settlement Concentration (2011)

Sr. No.	Name of Tahsil	Index (K)	Types
1	Karmala	5200	SP
2	Madha	6983	SC
3	Barshi	4138	SP
4	North Solapur	7248	SC
5	Mohol	7399	SC
6	Pandharpur	8470	C
7	Malshiras	9770	C
8	Sangola	8236	C
9	Mangalwedha	6484	SC
10	South Solapur	7392	SC
11	Akkalkot	3351	D
District Total		**6472**	**SC**

Source: Computed by researcher

(Note: - C:-Compact, SC:-Semi-Compact, SP:-Semi-Sprinkled & D:-Dispersed)

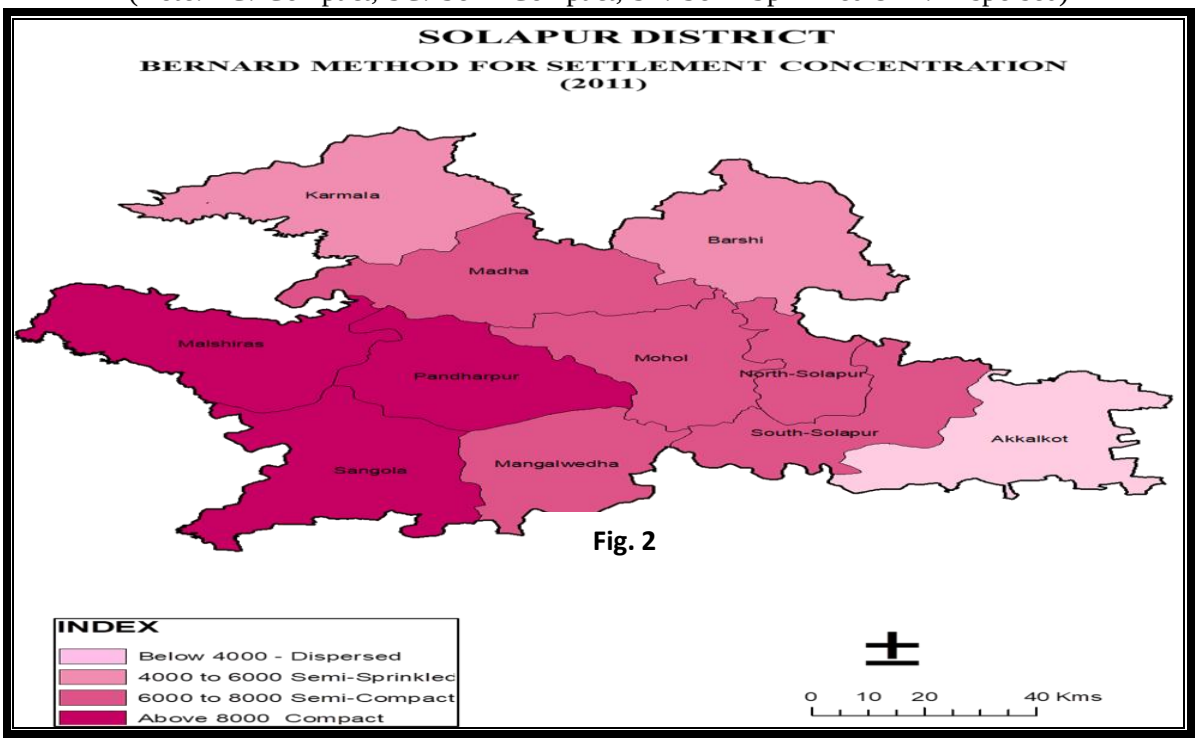

Fig. 2

The concentration of human settlements in Malshiras, Pandharpur and Sangolatahsilsis high, because Malshiras and Pandharpur tahsils are situated on the flat area with fertile soil and high development of irrigation. It leads to development of agricultural activities resulted high concentration of rural settlements. Sangolatahsil is located in dry area, which has inadequate irrigation facilities that

resulted in small settlements are developed around in water areas leads to high number of settlements. The low concentration of human settlements is recorded in Akkalkot tahsil. Because, there areextreme physical and socio-economicconditions responsible for low concentration values.Table 1 shows the extent of settlements in Solapur district. The type of settlement can be analyzed and divided into four groups. They are as follows.

Compact Settlement:-

Compact type settlements are found in Malshiras, Pandharpur and Sangolatahsils. The highest concentration values are calculated in these tahsil. Compact settlements are concentrated in areas where values are high. Most of the settlements in these tahsil have dense population and close distance between houses.The concentration values in this settlement are above 8000. Compact rural settlement is a product of permanent agriculture, productive land and favorable climatic conditions. Due to fertile black soil and good irrigation facilities, agriculture has been developed in Malshirastahsil. Therefore, the growth of compact type settlements in this tahsil was encouraged.In the case of Pandharpur tahsil, favorable conditions of agriculture and development of irrigation facilities are factors for the development of compact type of population. Due to, dry and drought condition in Sangolatehsil,there are small settlements raised around the availability of water.Therefore the number of settlements israpidly incitements in that area.

Semi-Compact Settlement:-

This type of settlements has been found in Madha, Mohol, Mangalwedha, South Solapur and North Solapur tahsils. There are semi-compact settlements in the entire Solapur district. The concentration values liebetween 6000 and 8000.Semi-compact type of settlement is intermediate settlements in compact and semi-sprinkled settlements. Such settlements are characterized by a small but compact nuclear encirclement.Favourable agricultural conditions and development of irrigation facilities in Madha, Mohol, Mangalwedha and South Solapur tahsils are responsible for the development of semi-compact settlements. As far as the north is concerned, Solapur is the main urban center and the development of industries resulted in the development of semi-compact settlements near major urban areas.

Semi-Sprinkled Settlement:-

This type of settlement is found in Karmala and Barshi tahsil. This type of settlement is small in size and close to fertile land under cultivation. The concentration values range from 4000 to 6000. These types of settlements are small in size and have separate individual settlements spread across the region with poor road quality as well as connectivity.

Dispersed Settlement:-

This type of settlement is found in Akkalkot tahsil of Solapur district. The value is below 4000. Scattered settlements are also known as isolated settlements, consisting of small groups from single house to house. Scattered settlements were found in this tahsil due to low productive soil, low rainfall, low employment opportunities, low industrial growth and water scarcity.

Conclusion:-

Types of rural settlements are the most important aspects of geography. Physical, social and economic factors are responsible for the variety of rural settlements in Solapur district. The main types of rural settlements are compact, semi-compact; Semi-sprinkled and scattered varieties. The Bernard method was used to identify different types of settlements in Solapur district.Compact type settlements are found in Malshiras, Pandharpur and Sangolatahsils. Concentration values in this settlement are above 8000. Compact rural settlement is a product of permanent agriculture, productive land and favorable climatic conditions. Semi-compact settlements have been found in Madha, Mohol, Mangalwedha, South Solapur and North Solapur tahsils.There are semi-compact colonies in the entire Solapur district. The concentration values are between 6000 and 8000. Semi-compact settlement types are compact and semi-compact settlement intermediate types.Semi-sprinkled settlements are found in Karmala and Barshi tehsils. This type of settlement is small in size and is close to the land under cultivation. Scattered settlements are found in Akkalkot tahsils of Solapur district. The value is below 4000.Scattered settlements are also known as isolated settlements, consisting of a small group of single house to house. Scattered settlements were found due to low productive soil, low rainfall, low employment opportunities, low industrial growth and water scarcity.

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A Study of Indra Sinha's Animal's People through the lens of Ecocriticism

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Abstract

This paper tries to explore Indra Sinha's novel Animal's People ,a fictionalized account of the Bhopal industrial disaster(1984) from the perspective of Ecocriticism which is a new dimension to the field of literary and theoretical studies for analysing and interpreting literary texts. It deals with how environmental issues, cultural issues concerning the environment and attitudes towards nature are presented and analysed. One of the main goals in ecocriticism is to study how individuals in society behave and react in relation to nature and ecological aspects. Indra Sinha's story centres around the story of , a nineteen year old boy literally named after the Hindi word Jaanvar ,his permanently twisted body affects his psyche ,his occasional misogynistic attitude results the permanently bent spine causing him to walk on all fours. It is a metaphor creating the trauma, both physical as well as mental whichtotally transforms protagonist's personality. His presence is the signifier of consequences of the toxic gas on the common people in general in Khaufpur which clearly resembles Bhopal Gas Tragedy in general. Indra Sinha being one of the writers belonging to the postcolonial era has penned down story of the chemical leakage to highlight its environmental injustice witnessed by the characters in the novel.The present study exhibits the consequences to the innocent people in the novel.

Key words: Ecocriticism ,Bhopal gas tragedy ,Environmental Injustice.

Introduction

William Rueckert is believed to have coined the term "ecocriticism" in 1978, which he defines as "the application of ecology and ecological concepts to the study of literature." Rachel Carson is known as the one of the forerunner of environmental studies. She first time highlights the issues of environmental decay through the use of chemicals like DDT. E Many poets and novelists have become eco-conscious or environment conscious. For many writers Literature became an important tool to highlight the environmental issues. Due to the eco-imbalance and the environmental pollution, the whole world is under the curse of global warming. The world is becoming the prey of the environmental imbalance and destructions. The healthy well balanced environment and atmosphere is the need of time. The environmental catastrophe did not remain confined to the natural sciences only rather it becomes Interdisciplinary. In postcolonial literature in general,deforestation, energy use, air quality, climate change, and animal sentience, are the formative concerns of the writers.This environmentally oriented study of literature brings about an ecological literacy and develops ecocritical perspective among the modern readers.Indra Sinha (1950) being one of the postcolonial writer of Indian and English descentcommemorated 25 years of Bhopal Gas Tragedy through the publication of the novel Animal People in 2009.The US based multinational company 'Union Carbide India Limited' (UCIL) .The pesticide plant was leaked 27 tons of Methyl isocyanate gasclaiming 15000 lives,nearly 6 lakh people sustained injuries ,affecting the subsequent generations. It was in the late 1990s that Greenpeace, upon testing the site of the.Union Carbide plant in Bhopal, found that toxicity had seeped into the soil and contaminated groundwater over the years the plant had been in Bhopal, affecting the lives and health of the people in thevicinity of the plant. Residents were complaining of cattle deaths and damage to crops even The autopsies revealed that the human blood seemed to be turned purple red, the lungs turnedash colour. The gas leak caused thousands blinded, breathless and giddy. The psychologicaltrauma caused by the incident lead to depression, anxiety, impotence,loss of appetite,nightmares .Large number of cattle ,dogs and cats and birds were killed. Plant life was severely damaged by exposure to the gas.There was widespread defoliation of trees. Later toxicological studies carried out by the Indian Council for Medical Research confirmed the presence of hydrogen cyanide in the tissue samples kept from autopsies carried out at thetime of the

disaster. Indeed the ICMR has said that the disaster is not due to MIC alone but itspyrolyzed products as well (ICMR Report,2010,7)

The novel Animal's People is set in the fictionalized town Khaufpur resemblingBhopal.("Khauf" meaning "terror" and "pur" a suffix meaning "city" in Urdu)The storyproceeds through the recordings in tapes.Twenty three tapes form the sections in the novel.These tapes talk about the people's sufferings. their world view, their protest against theKampani,s irresponsibility. The chemical fog and poisonous water caused terrible diseases.Khaufpur population is poverty stricken. The novel centers on a young man physicallydeformed by a larges scale chemical spill. The permanent bent spine forces the boy to walk on all fours. He gains the epithet 'Animal'. This disfiguredtransformation turns him into a strong, often vulgar personality.

The opening lines of the novel indicate Animal'snonchalant attitude when he says, 'I used to be human once .So I am told. I don't remember it myself, but people who knew me when I was small say I walked on two feet like a human being.' He lives by scavenging like street dogs on the streets of Khaufpur His jealousies turned him mad and made him shout also on peoples who are walking on two feet instead of four like him. Except Nisha and few others like Ma Franci, Zafar, Somraj, Elli, and Aliya,most of the Khaufpur is mocked at him and compared him with Jara, the female dog. Because of his physical disabilities, girls hardly sympathise with him but never love him. He loved Nisha but, she shows only her sympathytowards him, which hurts his heart lot. When Nisha refuses his marriage proposal, he decidesto commit suicide, "I ask myself do you want to die? comes the reply, yes (Sinha 334)" he consumed "thirteen golis" (Sinha 334) of 'datura' means "a highly poisonous plant (Sinha 369)"To his surprise, he Still survives. They have lost faith in humanity itself making them suspicious about everything and everybody. Elli Barber, an American doctor, who intends to open the free clinic for natives was suspected to beassociated with the Kampani,s furthergains their confidence. Ma Franci, a Roman Catholicnun from France ,Animal's surrogatemother looses her capacity to speak Hindi or English.She was mentally affected serving thepoor in Khaufpur.Aliya a small school girl was agranddaughter of the couple Huriya and Hanif Ali suffers due to the throat infection Somraj,once a famous singer losses the ability to sing. Pyare Bai looses her husband, Huriya Bailooses her daughter .Even the unborn children were not spared. Zafar the professional activistunites all to fight against Kampanis and the politicians. He loose his life in the hunger strikeas he refuses to sip a drop of water. Nisha lost her mother onthat night. She is a famous singerSomraj's daughter. Almost all character in the novel seem to have been affected by the gasdisaster. The city remains poisonous for decades after the accident with contaminatedecology. The lines of Animal "**No bird sing.No hoppers in the grass. No bee humming.Insects can't survive here. Wonderful poisons the Kampani made ,so good it'simpossible to get rid of them, after all these years they are still doing theirwork."(**29) The writer talks about the toxic wells ,blindness and deformedbabies ,as the aftermath of the gas leakage. So many unborn children were aborted .so thevery sight of a foetus in glass jar disturbs Animal His life is forever tied to the event of thatnight.Thus, he introduces himself growling, "My name is Animal. . . . I'm not a fucking human being, I've no wish to be one" (23).These in real sense are the marginalized people living in slums or around the pesticide factory. They have been denied the right to life,dignity, equality.The government's feeble response to the measures like hunger strike, agitations topressurize the government do not work at all. Indra Sinha emphasizes on the sufferings of the people by pointed out the toxic consciousness of the readers. Government seems to be indifferent to provide basic rights to the victims. Justice delayed is justice denied only. Thousands of people's health had been ruined by it.

Conclusion : Our ancestors have saved the ecology with eco spirit.People have realized the perishing condition of the land and the ecological awareness hasbeen created worldwide through literature also. Literature can become amedium to reach thetarget audience within the specific time.The late twentieth century has woken up to a new threat: ecological disaster. The most important environmental problems that humankind faces *as a whole are* nuclear war, depletion of valuable natural resources, population explosion, proliferation of exploitative technologies, conquest of space preliminary to using it as a garbage dump, pollution, extinction of species.The duplicity of the politicians and theGovernment is exactly revealed in the novel. The compensation was given to the victimsafter a long period without knowing the fact that the money they have offered is of no help tothe poor people in any way. Because the damage they have caused affected generation tocome

Moreover many years after the tragedy, the factory was not given orders to clean theleaked gas. As a result, soil, air and water were contaminated forever. Rabindranath Tagorehad fear of scientific advancement in the nation. In his notable play Muktadhara he addressedthe machine/dam, a symbolic development of science as a 'demon. Such man made disasterscan be avoided with environmental awareness only.

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An Exploratory Study of Employee Retention: A case of Aarohi Developers and Promoters Pvt. Ltd

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Abstract

Employee retention is a very important issue in every organization. The issue of retention is stressful for most of the. Satisfaction of employee can be the solution for the increase employee retention.Researcher have used some techniques for employee retention and made some strategies for employee retention. The objective of the study is to study factors affecting employee retention and to study how to retain the skills and knowledge in Aarohi Developers and Promoters Pvt. Ltd. The researcher carried out the survey by taking survey of 33 employees of the company by using the structured questionnaires.Secondary data is collected from reference books. Researcher has collected information from primary and secondary resources. Primary data was collected by using questionnaire. Secondary data were collected from companydocuments,records,journals, Company website and textbooks.

Keywords: Retention, satisfaction, culture

Introduction

Retention is defined as the continuous process through which employees are encouraged to remain with an organization for maximum period of time.People tend to leave organization for variety of reasons. Researcher has explained those reasons and solutions of dissatisfaction. If an employee is not satisfied by the job he's doing, he may switch over to some other more suitable job. In today's environment it becomes very important for organizations to retain their employees.Employee retention is deliberate act of management to withhold competent people in its fold. Employee retention refers to the length of time employees stay with the organization, as opposed to employee turnover, which is the percentage of employee who leave the organization. Employers measure overall retention as well departmental retention and retention according to position or title. According to Frank et al., "Employee retention is defined as the effort by an employer to keep desirable workers in order to meet business objectives".When an employee leaves from an organization, he does not leave alone, he also takes away knowledge, training, experience along with him for which organization has invested ample amount of time and money. Therefore organization need to create an environment in which employees would be willing to stay and continue to be productive.

The 3r's Of Employee Retention- To keep employees and their satisfaction level high, any organization needs to implement each of the three R's of employee retention:

1. Respect
2. Recognition
3. Reward

Objective of the Study

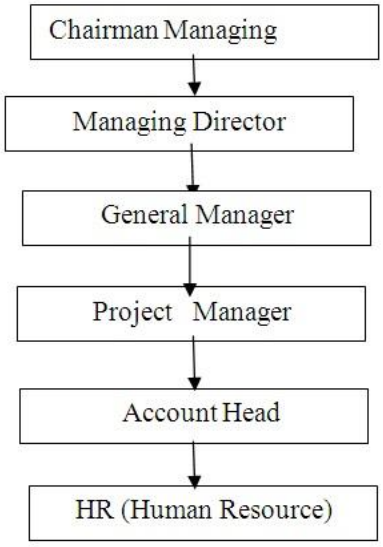
1. To study the factors affecting employee retention in Aarohi Developers and Promoters Pvt.Ltd.
2. To identify the measures for retention of talented employees.

Company Profile

Aarohi Developers has gained a very trusted name in the field of real estate and land development in Pune, with the experience of last two decades. Aarohi Developers have completed many projects successfully with an overwhelming response from the clients. Aarohi Developers has a simple vision but a very appreciable and genuine thought and that is to make a profit for the customers but no risk factor. In today's market, there are many investment options available on a large scale, but on comparing, the profit margin is very greater in land investment, than the other investment options.Aarohi Developers is a well-reputed name due to their principle of the customer satisfaction and securities. These ensure a very good, trusted relation between the company and the customers, which could carry on for many years. Aarohi Developers have a very good market presence in the field of Farm House Plots, agricultural land, which is provided with all the modern luxuries like

electricity, water, road etc., in and around Pune city. The projects, which the Aarohi developers had worked are 100% clear titled land and the company ensures the total safety of the projects at present as well as in the future. Aarohi Developers hereby, enhance the customer's trust and reputation of the company. Company's motto is to "Create true wealth through land investment". Aarohi Developer's entire skilled and experienced professional team work under the guidance and leadership of Chairman Mr. Vitthal K. ChavanandManagingDirector Mr. Kiran P. Buchade.

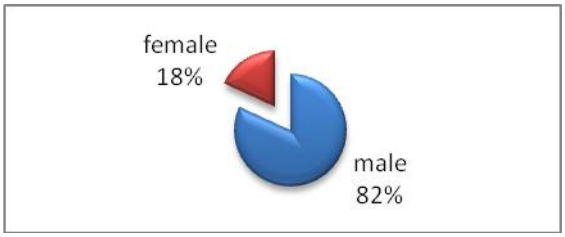
Organisational structure



Research Methodology

The research study is Descriptive in nature. The research has been carried out by taking a survey of 33 employees of the company by using the structured questionnaires and interview technique. Secondary data is collected throughreference books.Dta has been collected information from both the sources. Researcher has collected primary data by using questionnaire and secondary Data were collected from companydocuments,records,journals, Company website, and reference books.

Data Analysis and Interpretation

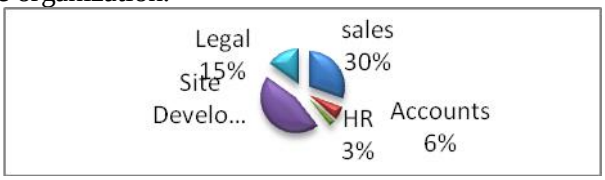


6.1: Number of males and females in the organization.

The study shows that, In this Organization, 82% of respondents are male and 18% of respondents are female.

Inference: The proportion of male employees is more than female employees in Aarohi Developers & Promoters Pvt. Ltd.

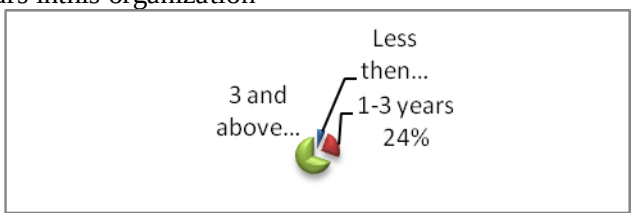
(6.2) : Departments in the organization.



The study shows that, in Aarohi Developers 46% of respondents are of site development, 30% of respondents are in sales department, 15% respondents are in legal department and remaining in Accounts and HR departments.

Inference:Majority of respondents work in site development and sales department.

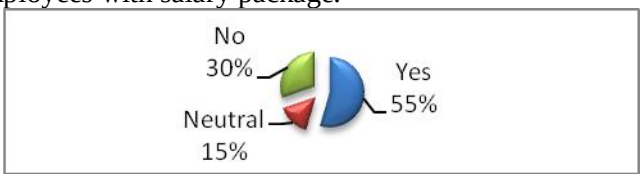
6.3) Totalnumber of years inthis organization



Interpretation: The study shows that, In Aarohi Developers 70% of respondents are working in this organization for more than 3 years, 24% of respondent are working for 1 – 3 years and 6% of respondents are working for less than 1 year.

Inference: Majority of respondents are working in this organization for more than 3 years.

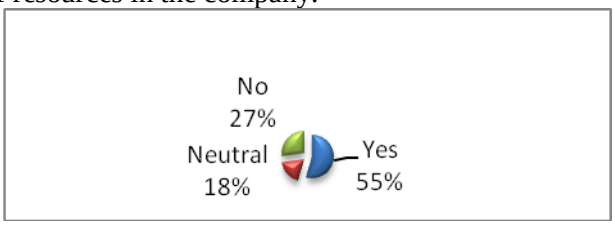
(6.4): Satisfaction of employees with salary package.



Interpretation: The study shows that, 55% of respondentsare satisfied with their salary package, 30% of respondents are not satisfied and remaining 15% of respondents are neutral i.e., they don't want to comment on this .

Inference: Majority of respondents are satisfied with the salary package.

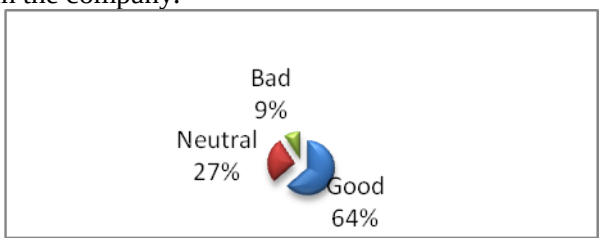
(6.5):Proper utilization of resources in the company.



Interpretation: The study shows that 55% of respondents said that there is a proper utilization of resources in the company, 27% of respondents said, there is no proper utilization of resources and remaining 18% are neutral i.e., they do not want to comment.

Inference: Majority of respondents said that there is a proper utilization of resources in the company.

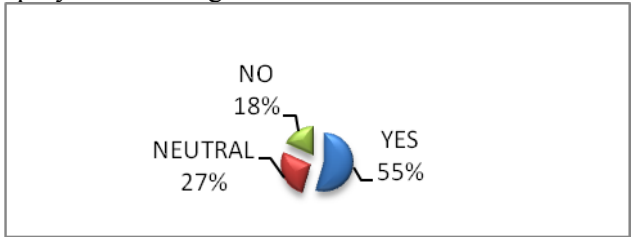
(6.6):Working condition in the company.



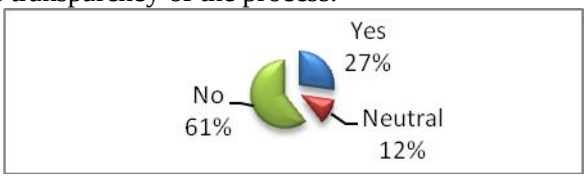
Interpretation: The study shows that 64% of respondents said that the working condition is good, 9% of respondents do not agree with this and remaining 27% of respondents are neutral i.e., they do not want to comment.

Inference: Majority of respondents said that, the working condition of the organization is good.

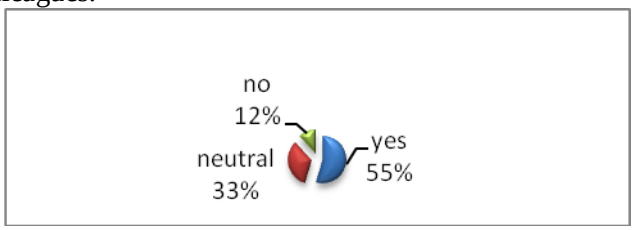
(6.7): Achievement of employee's carrier goals



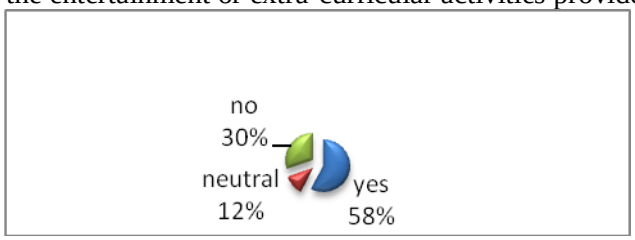
Interpretation: The study shows that 55% of respondents agree that they can achieve their carrier goals by working in this company, 27% of respondents do not want to comment on this and remaining 18% of respondents think that they cannot achieve their carrier goal by working in this company.
Inference: Majority of respondents agree that they can achieve their carrier goals by working in this organization.
(6.8): Satisfaction with the transparency of the process.



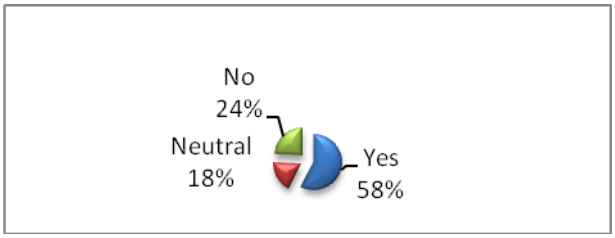
Interpretation: The study shows that 61% ofrespondents are not satisfied with the transparency of the process followed by the company, 27% of respondents are satisfied and remaining 12% of employees do not want to comment on this.
Inference: Majority of respondents are not satisfied with the transparency of the process followed by the company.
(6.9): Helpfulness of colleagues.



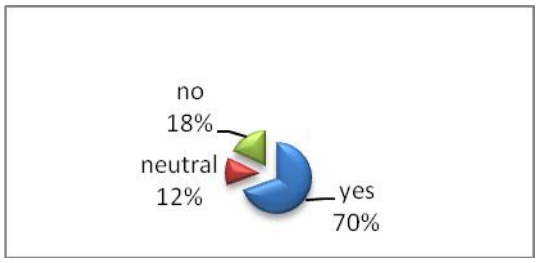
Interpretation: The study shows that 55% of respondents agree that their colleagues are helpful, 33% do not want to comment on this and remaining 12% do not agree that the colleagues are helpful.
Inference: Majority of respondents agree that their colleagues are helpful.
(6.10): Satisfaction with the entertainment or extra-curricular activities provided by the company.



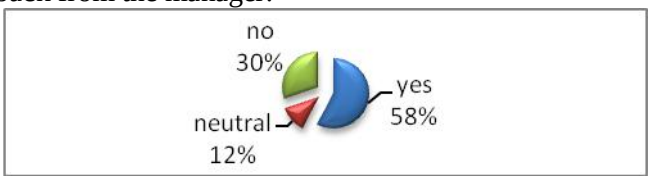
Interpretation: The study shows 58% of respondents are satisfied with the entertainment or extra-curricular activities provided by the company,30% are not satisfied and remaining 12% are neutral i.e, they do not want to comment on this.
Inference: Majority of respondents are satisfied with the entertainment or extra-curricular activities provided by the company.
(6.11):Satisfaction with your current work profile.



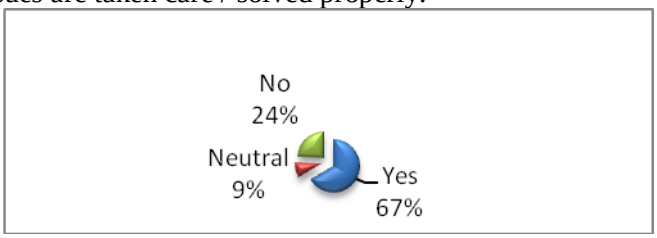
Interpretation: The study shows that 58% of respondents are satisfied with the kind of work they are getting , 24% are not satisfied and remaining 18% of respondents are neutral i.e, they don't want to comment on this .
Inference: Majority of respondents are satisfied with the kind of work they are getting.
(6.12):Awareness about the job responsibilities.



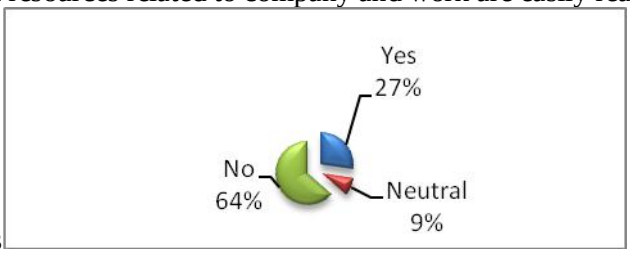
Interpretation: The study shows that 70% of respondents are fully aware about the job responsibilities, 18% are not aware of their job responsibilities and 12% don't want to comment.
Inference: Majority of respondents are fully aware about the job responsibilities.
(6.13):Continuous feedback from the manager.



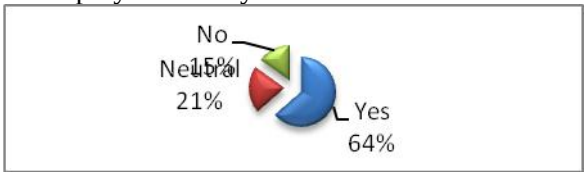
Interpretation: The study shows that 58% of respondents agree that they get continuous feedback from their manager , 30% do not agree with this and remaining 12% are neutral i.e, they don't want to comment on this .
Inference: Majority of respondents agree that they get continuous feedback from their manager.
(6.14): Work related issues are taken care / solved properly.



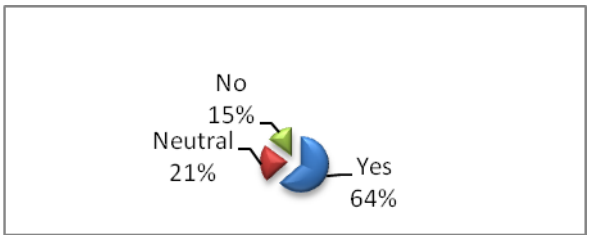
Interpretation: The study shows that, 67% of respondents agree that work related, infrastructure issues are taken care/ solved properly, 24%do not agree with this and remaining 9% are neutral i.e, they do not want to comment.
Inference: Majority of respondents agree that work related, infrastructure issues are taken care/ solved properly.
(6.15): The information resources related to company and work are easily reachable to the employees



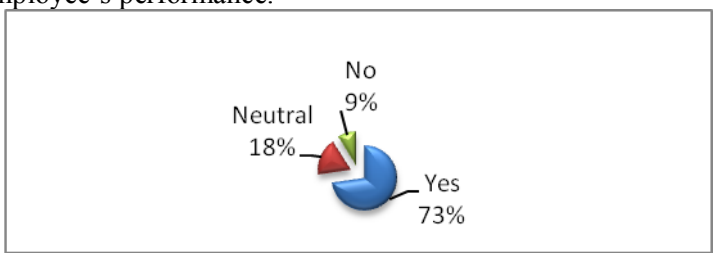
Interpretation:The study shows that, 64% of respondents do not agree that the information related to company and work are easily available to the employees, 27% agree with this and remaining 9% of respondents do not want to comment.
Inference: Majority of respondents do not agree that the information related to company and work are easily available to the employees.
(6.16): Company policies are employee friendly.



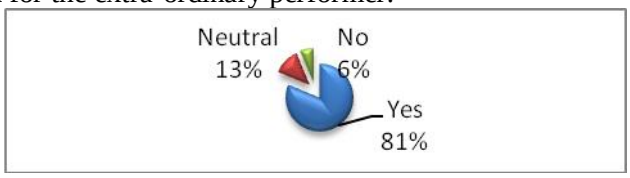
Interpretation: The study shows that, 64% of respondents agree that the company policies are employee friendly , 15% do not agree with this and remaining 21% are neutral.
Inference: Majority of respondents agree that the company policies are employee friendly.
(6.17):Regular training for developing talent of employees.



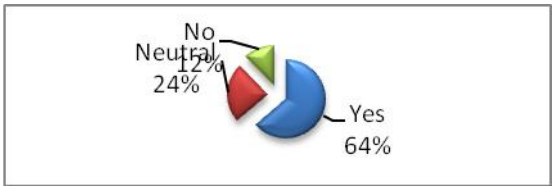
Interpretation: The study shows that , 64% of respondents agree that regular training have been organized by company for developing talent, 15% do not agree with tis and remaining 21% are neutral.
Inference: Majority of respondents agree that regular training have been organized by company for developing talent.
6.18):Rewards for employee's performance.



Interpretation: The study shows that, 73% of respondents say that the employees are rewarded for their performance, 9% do not agree with this and remaining 18% are neutral.
Inference: Majority of respondents say that the employees are rewarded for their performance.
Table(6.19):Recognition for the extra-ordinary performer.



Interpretation: The study shows that,81% of respondents agree that the recognition is given to the extra-ordinary performers, 6% do not agree and remaining 13% are neutral.
Inference:Majority of respondents agree that the recognition is given to the extra-ordinary performers.
(6.20):Equal opportunity to all employees irrespective of gender, caste, religion.



Interpretation: The study shows that, 64% of respondents agree that the organization gives equal opportunity to all employees irrespective of gender, caste, religion, 12% do not agree with this and remaining 24% are neutral.
Inference: Majority of respondents agree that the organization gives equal opportunity to all employees irrespective of gender, caste.
FINDINGS

The proportion of male employees is more than female employees in Aarohi Developers & Promoters Pvt. Ltd.
Majority of respondents work in site development and sales department.
Majority of respondents are working in this organization for more than 3 years.
Majority of respondents are satisfied with the salary package.
Majority of respondents said that there is a proper utilization of resources in the company.
Majority of respondents said that, the working condition of the organization is good.
Majority of respondents agree that they can achieve their carrier goals by working in this organization.
Majority of respondents are not satisfied with the transparency of the process followed by the company.
Majority of respondents agree that their colleagues are helpful.
Majority of respondents are satisfied with the entertainment or extra-curricular activities provided by the company.
Majority of respondents are satisfied with the kind of work they are getting.
Majority of respondents are fully aware about the job responsibilities.
Majority of respondents agree that they get continuous feedback from their manager.
Majority of respondents agree that work related, infrastructure issues are taken care/ solved properly.
Majority of respondents do not agree that the information related to company and work is easily available to the employees.
Majority of respondents agree that the company policies are employee friendly.
Majority of respondents agree that regular training have been organized by company for developing talent.
Majority of respondents say that the employees are rewarded for their performance.
Majority of respondents agree that the recognition is given to the extra-ordinary performers.
Majority of respondents agree that the organization gives equal opportunity to all employees irrespective of gender, caste.

Suggestions - 30% of employees are not satisfied with the salary package so the company must improve the structure of salary and provide bonus and other monetary incentives which is the most important tool for motivation and productivity. It is essential that an organization articulates and practices transparency through its well defined process.It helps to build interpersonal trust, something which is absolutely essential for getting people to share and collaborate with each other. Transparency implies openness, communication, and accountability. 30% of employees are not satisfied with the entertainment /extra-curricular activities provided by the company. Workplace recreation is increasingly gaining popularity as a strategy for improving the wellbeing and performance of employees in the workplace. Workplace recreation can be achieved as simply as having a facility for these extra fun activities within the company for example: gym or karaoke or staff party room.
Work related process documents should be prepared and updated so that any new employee can get work related details easily. This will decrease time required for learning new skills and growth of the company.

Conclusion - From this Employee Retention survey, I want to conclude that employees are the capital of the every organization. So to retain employee organization has to satisfy employee.By offering many facilities, events, incentives, appraisal programs, transparent communication company can retain to employees.Employee retention not only reduces the attrition rate but also increases the goodwill of the company in the market. This shows the good culture of the organization. The study gave the clear picture employee retention involves taking measures to encourage employees to remain in the organization for the maximum period of time.

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Natural Resources and Tourism Development reference to A Review of Agro Tourism in India

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Introduction

Flora is the plant life occurring in a particular region or time. The selected area for research work is under Raigad district in the state of Maharashtra, India. It lies between 18.39 North latitude and 72.55 East longitude.. Once we enter the Janjira fort we can see different types of plants such as twiner, herbs , shrubs , trees as well as climbers. In short we can observe the ancient construction as well as the biodiversity in case of plants. Unfortunately no one has done study over plant biodiversity. So I have decide to study plant present diversity in the Janjira Fort .

Material And Method

The survey of the plant in Janjira Fort which is near by murud janjira were carried out during the year 2020 . Repeated field visit in the different season in the janjira fort were performed. During these visits different plants were collected as well as photographs of these plants were taken for further identification and authentication by using flora of Maharashtra Collected plants specimens were identified using pertinent taxonomic literature such as Flora of Raigad district (Kothari and Moorthy ,1993) Flora of Maharashtra (Singh and *et.al*, 2001) Flora of Maharashtra vol.2 (Almeida , 1998)The collected plant specimens were processed for herbarium by using standard procedure given by Herbarium Techniques in BAMU by Survase and Dhabe (2012) . The voucher herbarium specimen were deposited in the department of Botany,D.U.S.S. College Dapoli.

Observation

Mimosa pudica Carl Linnaeus

• Vernacular name –Lajalu • Family – Fabaceae • Habit – small shrub with a creeping • Leaf - alternate, stipulate, imperipinnately compound • Flower – pale pink or pinkish pueple in colour, zygomorphic, capitulum(Head) inflorescence • Flowering period –Feb to April • Fruit – legume

II) *Ficus bengalensis* Carl Linnaeus

• Vernacular name –Wad • Family –Moraceae • Habit – large tree, • Leaf –cariaceous , ovate or orbicular ovate to elliptic abtuse , entire glaberous • Flower –inconspicuous flowers • Flowering period –April – June• Fruit –berry

III) *Ficus religiosa* Carl Linnaeus

• Vernacular name –pimpal • Family –Moraceae • Habit –large piphytic glabrous tree • Leaf - corianceous , ovate round , Lanceolate , rounded broad base Stipulate , ovate • Flower –axillary , sessile • Flowering period –May – june • Fruit –small figs

IV)*Holarrhena pubescens* Nathaniel Wallich

• Vernacular name – pandrakuda • Family – Apocynaceae • Habit – large shrub or small tree • Leaf - opposite, membrananous , ovate,obtusely acuminate • Flower – cremish yellow, terminal corymbose cyme inflorescence • Flowering period –April - MAY • Fruit – A pair of follicles with many seeds

V) *Riccinus communis* Carl Linnaeus

• Vernacular name – Erand • Family – Euphorbiaceae • Habit – Perennial plant • Leaf - simple, exstipulate, alternate , Multicostate, • Flower – unisexual, ebracteae, hypogynous Receme inflorescence. • Flowering period – june to august • Fruit – regma

VI) *Tectona grandis* Carl Linnaeu

• Vernacular name – sagvan • Family – lamiaceae • Habit – Tree • Leaf - opposite, long, serrate margin,unicostate reticulate, spike inflorescence • Flower – regular , bisexual ,hypogunous bractiate • Flowering period – September to December • Fruit – Drupe 2 lobed VII)Celosia argentia Carl Linnaeus

vii) *Celosia argentia* L.

• Vernacular name – Kurdu • Family – Amaranthaceae • Habit – Annual Herb • Leaf - alternate, anceolate, petiolate, Glabrouspale green with reddish tinge • Flower – small, crowded, spike inflorescence Flowers bright pink to white paper like. • Flowering period – mid-spring to summer • Fruit – capsule

VIII)*Nyctanthes arbortritis* Carl Linnaeus

• Vernacular name – parijat • Family – Oleaceae • Habit – shrub or small tree • Leaf - opposite , ovate, hairy, acuminate rough • Flower – delightfully fragment, sessile ,bractiate, solitary, cyme inflorescence • Flowering period – At night • Fruit – Berry IX)Justicia adatoda Carl Linnaeus

IX) • *Justicia adatoda* L.

• Vernacular name – Adulsa • Family – Acanthaceae • Habit – ever green dense shrub • Leaf - opposite, large , simple ,lanceolate • Flower – stalked, axillary spike, white with purple margin • Flowering period – December-June • Fruit – oblong 4 seeded capsule

X)*Cassia tora* (L) Roxb.

• Vernacular name – Takla • Family – Fabaceae • Habit – weed tender • Leaf - alternate, stipulate,bipinnately compound • Flower – regular , bisexual , terminal or axillary receme inflorescence pale yellow colored flowers • Flowering period – October to February • Fruit – pod • XI) *Zizipus jujube* Mill.

• Vernacular name – Bor • Family – Rhamnaceae • Habit – perennial shrub or tree • Leaf - alternate, entire, with 3 prominent basal veins sines are modification of leaves or part of leaves like stipule , multicostate convergent venation • Flower – small,wide,solitary,with 5 inconspicuous yellowish green petals • Flowering period – April to May • Fruit – oval Drupe

XII)*Tinospora cordifolia* (Thunb.)Miers

• Vernacular name – Gulvel • Family – Menispermaceae • Habit – Climbing shrub • Leaf - simple, alternate, exstipulate, heart shaped • Flower – unisexual, small on seprate plants, greenish yellow colour, axillary and terminal receme inflorescence • Flowering period – May-June • Fruit – drupe •

XIII) *Mangifera Indica* Carl Linnaeus

• Vernacular name – Mango • Family – Anacardiaceae • Habit – Tree • Leaf - Simple , alternate, exstipulate ,compound, trihaliate • Flower – regular, unisexual or bisexual , terminal or axilary panicle or cyme • Flowering period – December to April • Fruit – Drupe

XIV)*Amorphophallallus commutatus* (Dennst.) Nicolson

• Vernacular name – suran • Family – Araceae • Habit – Tuberous annual herb • Leaf - leaf with vertical leaf stalk and a horizontal blade , solitary • Flower – male flower and female flowers are present • Flowering period – june – August • Fruit – Tuber

XV)*Ocimum sanctum* Carl Linnaeus

• Vernacular name – Tulas • Family – lamiatae • Habit – Annual herb • Leaf - simple, alternate • Flower – long broadly ovate with a long slender acumen ciliate pedicel raceme inflorescence

XVI)*Sesamum orientales* Carl Linnaeus

• Vernacular name – til • Family – pedaliaceae • Habit – Annual herb • Leaf - opposite, lanceolate leaves, bracts present • Flower – solitary axillary ,pink coloured • Fruit – capsule

XVII)*Azadirachta indica* A.Juss.

• Vernacular name – kadulimbu • Family – meliaceae • Habit – fast growing tree • Leaf - opposite, pinnate, medium to dark green • Flower – white , fragrant flowers drooping axillry panicles , bisexual flowers • Flowering period –August to October • Fruit – glabrous olive like droop

XVIII)*Carissa caranda* Carl Linnaeus

• Vernacular name – karvande • Family – Apocynaceae • Habit – flowering shrub • Leaf - opposite, ovate, green with glossy appearance from above surface • Flower – white colour , clustered , scented • Flowering period – Feb . to June • Fruit – Globose berry

XIX)*Ficus racemosa* Carl Linnaeus

• Botanical name – Ficus racemosa • Vernacular name – umbar (cluster fig) • Family – Moraceae • Habit – Tree • Leaf - Ovate- elliptic, entire, glabrous, stipulate • Flower – Staminate, sessile, solitary , braciate • Flowering period – Nov- Jan • Fruit – Synconusorans – red to red and fleshy

XX)*Momordica charantia* Carl Linnaeus

• Vernacular name – Karale • Family – Cucurbitaceae • Habit – annual climber • Leaf - Alternate, foul smelling deep palmately lobed • Flower – Yellow (male and female flower on same plant), tubular shaped • Flowering period – June -July • Fruit – Berry

XXI)*Datura stramonium* Carl Linnaeu

• Vernacular name – Dhotara • Family – Solaneceae • Habit – Annual Herb • Leaf - simple, alternate, elliptical dentate, green or grey in colour • Flower – Trumpet shaped, white in colour axillary • Flowering period – march to may • Fruit – Black capsule

XXII)*Calotropis gigantea* (L.) Dryand

• Vernacular name – Rui • Family – Apocynaceae • Habit – shrub • Leaf - long, decussate, obvate, shortly acute, subsessile, cordate or often amplerical at the base • Flower – Large, white, flower buds ovoid , angled, umbellate cyme inflorescence • Flowering period – Nov to April • Fruit – Apair of follicles with many seeds

XXIII)*Bidens pilosa* Carl Linnaeus

• Family – Asteraceae • Habit – annual herb • Leaf - green , opposite, serrate, lobed • Flower – white or yellow • Flowering period – May – October • Fruit – Achenes

XXIV) *Euphorbia hirta* Carl Linnaeus

• Vernacular name – Gondan • Family – Euphorbiaceae • Habit – annual weed • Leaf - green with uneven stems , leaves are opposite with small teeth • Flower – ball shaped , green and white , unisexual , reduced bract like leaves under the inflorescence . • Flowering period – June to August • Fruit – Hairy yrllow capsule produed3000 tiny , oblong 4 sided seeds.

XXV)*Argemone mexicana* Carl Linnaeus

• Vernacular name – Katekol • Family – Papaveraceae • Habit – Annual herb • Leaf - alternate, simple with spines tipped lobed and whitish wax that rub off. • Flower – bright yellow in colour with many stamens • Flowering period – March to May • Fruit – Achenes

XXVI) *Ipomoea quamoclit* Carl Linnaeus

• Vernacular name – Ganesh vel • Family – Convolvulaceae • Habit – Annual climber • Leaf - Delicate , fern like compound leaf • Flower – red colored flower , tubular, star shaped , cyme inflorescence , petals fused . • Flowering period – Feb - May • Fruit – capsule with 4 seeds

XXVII)Bombax ceiba Carl Linnaeus

XXVII)– *Bombax ceiba*

• Vernacular name – katesavar • Family – Malvaceae • Habit – Tree • Leaf - Palmately compound, long , flexible • Flower – Cup shaped , solitary , axillary, fascicle at or near the end of branches • Flowering period – Jan to march • Fruit – Light green to brown capsule

XXVIII) *Nerium oleander* Carl Linnaeus

• Vernacular name – Kaneri • Family – Apocynaceae • Habit – Shrub • Leaf - Thick, leathery, in pairs, dark green , lanceolate • Flower – produced in clusters, pink in colour • Flowering period – Jan to April • Fruit – pair of follicles with numerous seeds

XXIX)*Cynodon dactylon*

• Vernacular name – durva • Family – poaceae • Habit – evergreen herb • Leaf - ligule white hairy blade glabrous Orupper surface hairy • Flower – spike inflorescence. • Flowering period – June to August

XXX) *Tridex procumbens* Carl Linnaeus

• Vernacular name – Dagadpala • Family – Asteraceae • Habit – Annual Herb • Leaf - ovate, pilose on both surface, petiolate, coarsely and deeply dentate leaf margin • Flower – yellow disc flower • Flowering period – May to December • Fruit – Achenes

XXXI) *Lantana camera* Carl Linnaeus

• Vernacular name – Ghaneri • Family – Verbinaceae • Habit – perennial shrub • Leaf - simple , opposite, toothed, ovate, fragnant when crushed • Flower – Spherical, cluster, tubular , White with five lobe in a flat topped ,cluster on a long stalk. • Flowering period – October • Fruit – Orange or red fleshy berry like drupe turns metallic blue or purple black

XXXII*) Helicteres isora* Carl Linnaeus

• Vernacular name – Murud sheng • Family – Malvaceae • Habit – shrub • Leaf - alternate, hairy, ovate, serrate margin. • Flower – Brick red in colour • Flowering period – October to December • Fruit – Green to grey and twisted pod

XXXIII) *Vitex negundo* Carl Linnaeus

• Vernacular name – Nirgundi • Family – Lamiaceae • Habit – erect shrub • Leaf - Impairinately compound, opposite, digitately 3-5 foliate, lanceolate leaflets, toothed leaf edges • Flower – irregular, flowers borns in panicles, long, white or blue in colour , hairs present on calyx and corolla , cymose inflorescence . • Flowering period – Feb to April • Fruit – Succulent Drupe

Mimosa pudica

L.

Ficus bengalensis

L.

Ficus religiosa

L.

Holarrhena pubescens Nathaniel Wallich

Riccinus communis

L.

Clerodendrum serratum

Tectona grandis

L.

Trichosanthe stricuspidata

Nyctanthes arbortritis

Justicia adatoda

L.

Cassia tora

L.

Zizipus rugosa

L.

Zizipus jujube
Mill

Tinospora cordifolia
(Thunb.)Mier

Mangifera Indica

L.

Amorphophallus commutatus

Ocimum sanctum
L.

Santalum album

L.

Sesamum orientale
L.

Azadirachta indica
A.Juss.

Carissa caranda
L.

Ficus religiosa

L.

Momordic acharantia

L.

Datura stramonium

L.

Bidens pilosa
L.

Calotropis gigantea (L.) Dryand

Ephorbia hirta
L.

Argemone Mexicana

L.

Ipomoea quamoclit

L.

Bombax ceiba
L.

Nerium oleander

L.

Cynodon dactylon
L.

Tridex procumbens
L.

Lantana camara
L.

Helicteres isora
L.

Vitex negundo
L.

Result And Discussion-

The total 33 species documented for Janjira Fort belonged to familesi. Which shows the plant biodiversity in the janjira fort area. which are Acanthaceae(1),Amaranthaceae(!),Anacardiaceae (1)Apocynaceae(4), Araceae(1), Asteraceae(2), Convolvulanceae(1), Cucurbitaceae(1), Ephorbiceae(2), Fabaceae(2), Lamiaceae(3), Malvaceae(2), Meliaceae(1), Menispermaceae(1), Moraceae(3), Oleceae(1), Papaveraceae(1), Pedaliaceeae(1), poaceae(1), Rhamnaceae(1), Solenaceae(1), Verbinaceae (1)etc. This research work will be helpful for further studies. Some plants have medicinal properties which we can use in herbal medicinal products. From the above observation it is stated that Janjira fort has more diversity in plants among the other forts.

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Changing Nature Of Environmental Education In India

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Abstract :
The environmental scenario of India is very wide. Ours is a country highly diverse climatically geologically,geographically,edaphically,floristically,faunistically,ethnically,lingually, socially, and economically, therefore environmental education has to be essentially location- specific. At the first level, special attention must be paid to school going children and woman .chief goals of environmental education in India must be to improve the quality of environment to create an awareness among the people on environmental problems and conservation and create an atmosphere so that people participate in decision making and develop the capabilities to evaluate the developmental programmes.Most people recognize the urgent need for environmental education but only some have clear ideas about what needs to be done and very few have either the actual experience or the knowledge about the course that need to be thought. The chief objective of environmental education is that individual and social groups should acquire awareness and knowledge develop attitudes, skills and abilities and participate in solving real life environmental problems. The perceptive should be integrated, inter disciplinary and holistic i character. The lay public in rural,tribal,slumand urban areas. Woman and student and teachers in schools colleges and universities as well as planners and decision policy makers, programmers implements and rural development workers need to be a educated about environment. There is need for new approach to education which cuts across various subjects at schools and higher levels .non formal environmental education it is designed for an age groups working in social, economic,and cultural development of the community. They form groups or clubs and arrange exhibitions, public lectures,meetings,environmental campaigns.

key words : Eco -Development,Adult Education and Environment

Objectives:

1. Study Of changing nature of environmental education inIndia
2. Find out the different types courses and programmes at environmentlevel.

Methodology:

The present study of changing nature of environmental education in India is totally based on secondary data .the has been collected from the various ecological and sustainable development related articles ,magazines research papers ,reports, and environmental governmental websites as well as published books of environmental subjects with daily news papers .

Introduction :the issues of environmental education has been thoroughly discussed at several national ands international seminars, workshop and conferences after the deliberations at four in 1971 and in united nations conference on human environment at Stockhome in 1972. In a national seminar,orgnised by the Indian environmental society in collaboration with the international progamme on environmental management at the Indian national science academy, new Delhi in 1979 ,emphasis was given to incorporate Gandhian thoughts and values as a part of environmental education. A number of new objectives and guiding principle for developing environmental education at all levels in both formal and non –formal levels were formulated at the Tblilisi conference (unesco-1977).

Meaning of non-formal environmental education :

"Non- formal environmental education includes awareness and training which plays a significant role in encouraging and enhancing peoples participation in activates aimed at conservation, protection and management of the environmently,essaintial for achieving sustainable development. Non formal environment education is integral part of lifelong learning concept that allows young people, and adults to acquire and maintain the skills, abilities and outlook needed to adapt to a continuously changing environment."

Non formal environmental education :
The following constitute main content of this education:
Adult education :
Adults may influenced other members for better ways of life. In local languages information packs, posters,slides,audio,audio-visuals etc.may be generated
Rural youth and non-student youth
They may organize in to groups.
Tribal/ forest dwellers:
The programmes of education can be taken up by involving their community leaders, women and youth. They are an important content of our forest wealth.
Children activities :this can be ensured through easy competitions different age groups. Ministry of environ ment forest with the help of united school organization of India organize such activities. On the spot painting, modeling and poster design contests are conducted for children by the national museum of natural history. Short term courses are also given by nmnhin environmental education every year.(P.D.Sharma.p.n 522&523)
Eco-development camps:
They help sound rural development involving youth. A set of guidelines has been prepared by ministry of environment and forests. The main objectives are: to create awareness in student and non student youth about basic ecological; principles to identified root cause of ecological problems as related to human activities; to taker steps to solve local ecological/environmental problems, and ;develop spirit of national integration.
Non governmentalorgnisation:
there are over 200 NGOs of which most are involved in environmental education and awereness, others in nature conservation, pollution control,afforestation and social forestry,floristicand faunal studies, rural development, wildlife conservations and waste utilization and eco – development.
Public representatives:
India has environmental forums for M.Ps and M.L.A.s to discuss environmental problems facing the country .they may build up sound public opinion and stimulate public interest.
Training senior executives/ administrators :
Regular course should be arranged for various institutions imparting such training. These are general environmental management, industry –specific environmental management etc.
Foundation courses :
The courses for probationary selected for the IAS.I.F.S I.P.S. and cadets of three wings of armed forces need to be supplemented with foundation courses on environment relevant to their area of work.
Research and development programmes:
Such programmes are supported by ministry of environment and forest in man and biosphere and basic and applied environmental problems.
Centres of excellence:
Ministry of environment and forest has established two centers of excellence in the country. They generate knowledge and methodology and training in the areas of tropical ecology (Bangalore)and environmental education(Ahmadabad).
Development of trained manpower:
there must be training programmes for the trainers, professionals technical, personnel, and legal experts.
Development of educational material and teachngaids :
Audio,audio-visual,materials for media (T..V,radio,films,newspapers etc.)Mobile exhibition etc.must be designed by competent manpower, one such centre is centre for environment education,Ahmadabad.
World environment day :
All Govts.in the states, U.Ts academic institutions, universities, colleges, schools and voluntary orgnizations organize suitable activities on this day (June -5). Ministry of of environment and forest support this financially.

National environment awareness campaign/national environment

Commencing from 1986, ministry of environment and forests conducts near and NEAC and NEM;from November 19th to dec;18th every year is observed as NEM. Each year there is a major environmental theme.

National green corps programme:

Implemented by the ministry of environment.and fiancé 2011-02with the objectives of spreading environmental awareness among school children by establishing eco-clubs.

Forestry education, training and expension:

The activities are performed by different institutions of the ministry of environment and forest like Indira Gandhi national forest academy,Dehradun,directorate of forest education.,Indian council of forestry research and education, Indian plywood industries research and training Institute,Banglore and Indian institute of forest management, Bhopal.

Conclusion:

Non –formal environmental eduaction is a problem oriented and practical programmerather than discipline- oriented. It is interdisciplinary in approach and emphasizes the collective efforts by natural and social scientists. The non –formal environmental education aims to provide scientific basis to solve real practical problems of resources management through understandings the environmental problems in the ecosystems context.finally,it intends to follow a system approach you find the best possible solution under a given set of conditions. Thus helps of this type education bringing together they planners, policy makers, managers and scientists for arriving at a rational decision on the issues of resource management. To utilize diverse learning about environment and different approaches to teaching and learning about environmental courses. To relate environ mental sensitivity ,knowledge, problem solving and values clarification at everylevel.

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Advantages and Disadvantages of Special Economic Zones

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Abstract:

Deng Xiaoping created the world's first special economic zone in 1979 in Shenzhen, China. This encouraged foreign investment and boosted industrialization. Special Economic Zones (SEZs) have also led to large-scale investment in China by multinational corporations, followed by the creation of special economic zones in various countries around the world. Special economic zones are playing an important role in the economic development of any country. Special economic zones are very essential for the development of the industrialization of any country. A special economic zone was created to stimulate industry, agriculture and services. A special economic zone is an area in a country that has different economic rules and regulations than other areas in the same country. Special economic zones attract foreign entrepreneurs as they are conducive to investment.

Keywords- SEZ, EPZ, SEZ, OBU etc.

Objectives: To study and investigating of advantages and disadvantages of special economic zone is the main objective is selected for this research work.

Information and data sources: For the study related data of SEZ are collected from various secondary sources which published and unpublished material by various governmental as well as nongovernmental institutes and agencies reports,articals etc.

Methodology: For this study many cartographic and statistic techniques are used. As well as for the consideration of the positive and negative role of the SEZ comparative data are used with investigation method.

Study area: For this research work study area are used global level especially related with the reference of developing countries such as India and China.

Concept of the SEZ:

• A special economic zone is a territory with a special economic status, free of charge, deliberately fixed for the production of goods and services. "

"SEZ is an enclave within a country that is typically duty free and has different business and commercial laws chiefly to encourage investment and create employment."

• A special economic zone is a geographically limited area in which various concessions are easily made available through the government to promote industry, trade and services. - UNCTAD 2019. "A geographically delimited area within which government facilitates industrial activity through fiscal and regulatory incentives and infrastructure support is known as SEZ" - World investment report 2019. A Special Economic Zone or SEZ is a geographically bound zones where the economic laws matters related to export and import are more broad-minded and liberal as compared to rest parts of the country.

Special Economic Zone Features -

1. The rules and regulations of business and trade in special economic zone are different from other regions (same country).
2. Special economic zones are created within the borders of that country.
3. Businesses in special economic zones are exempted from all taxes.
4. Establishing a business is a simple, easy process.
5. Special Economic Zones have minimum restrictions, rules and regulations for setting up industries.
6. Government policy is favourable for special economic zones.

Special Economic Zone Objectives-

1. To create increased financial turnover.
2. Promoting the export of goods and services.
3. Promoting local and foreign investment.

4. To create employment opportunities.
5. To develop basic or basic service facilities.

Types of SEZ-

Types of SEZ are as follows:

1. Free Trade Zone – FTZ
2. Export Processing Zone – EPZ
3. Free Economic Zone – FEZ
4. Industrial Estate – IE
5. Free Port Zone – FPZ
6. Bonded Logistic Park – BLP
7. Urban Enterprises Zone – UEZ

The World Bank has prepared the following table to illustrate the differences between the types of special economic zones.

Table: 1 Type of Special Economic Zones

Type	Objectives	Size	Location	Activities	Market
Free Trade Zone (FTZ)	To facilitate trade	less than 50 hectares	Entrance of port	Industry and trade	Native, re-exported
Export Processing Zone (EPZ)	To Export of product	less than 100 hectares	-	Commodity manufacturing process	Mainly export
Free Port Zone (FPZ)	Integrated development	less than 1000 hectares	-	- for multipurpose	Internal, Indigenous, export
Urban Entrepreneur Zone(UEZ)	Urban Revitalization	Less than 50 hectares	Urban/ Rural	Multipurpose	Indigenous

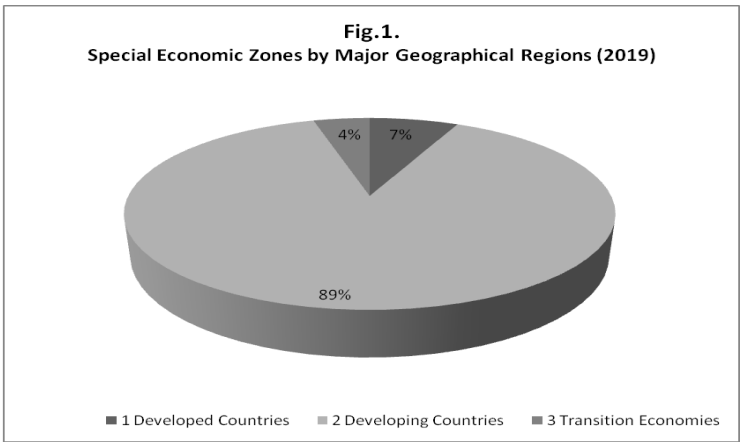
Geographical Distribution of Special Economic Zones in the World –

According to a UNCTAD's report, there will be 5,383 special economic zones in 147 countries of the world in 2019. Specialization in developing nations, globalization has led to the growth of special economic zones

Table: 2 Distributions of Special Economic Zones by Major Geographical Regions (2019)

Sr. No.	Regions/Country	Number of SEZ	Percentage
	Developed Countries	374	7.0
1.	United States	252	4.70
2.	Europe	105	2.0
	Developing Countries	4742	88.80
1.	Africa	237	4.40
2.	Asia	4046	75.0
3.	China	2543	47.20
4.	Philippines	528	9.80
5.	India	373	7.0
6.	Malaysia	45	0.83
7.	United Arab Emirates	47	0.90
	Oceania(New Zealand, Australia, Pacific Islands)	03	0.05
8.	South America and the Caribbean Islands	486	9.0

9.	Columbia	101	1.88
10.	Dominican Republic	73	1.30
	Transition Economies	237	4.40
	World	5383	100



The developed and developing and Transition Economies nations have 374, 4742, and 237 special economic zones, respectively, as shown in Table 2 andfig.1 above. Developing countries have the most special economic zones in the world, considering the global special economic zone. Asia has 4046, or 75% of the world's special economic zones. The lowest special economic zones are found in Oceania. Eighty per cent of the world's special economic zones are in developing countries, only 7 per cent in developing countries, and Oceania has the lowest, at 0.05 per cent.The world's first known in stance of SEZ have been found an industrial park set up in Puerto Rico in 1947. In the 1960s, Ireland and Taiwan followed sait, but in the 1980s China made the SEZS gain global currency with its largest SEZ being the metropolis of Shenzhen. From 1965 onwards, India experimented with the concept of such it's in the form of Export Processing Zones (EPZ). But a revolution came in 2000, when Murasoli Maran, then Commerce Minister, made a tour to the southern provinces of China. After returning from the visit, he incorporated the SEZs into the Exim Policy of India. Five years later, SEZ Act (2005) was also introduced and in 2006 SEZ Rules were formulated.

SEZs are projected as duty free area for the purpose of trade, operations, duty and tariffs. SEZ units are self-contained and integrated having their own infrastructure and support services. With SEZA, units may be set up for the manufacture of goods and other activities including processing. Assembling, trading, Repairing, reconditioning, making of gold/ silver, platinum jewellery etc. As per law, SEZ units are deemed to be outside the customs territory of India. Goods and services coming into SEZs from the domestic tariff area or DTA are treated as exports from India and goods and services rendered from the SEZ to the DTA are treated as imports into India.

Apart from providing state-of the-art infrastructure and access to a large well-trained and skilled work force, the SEZ also provides enterprises and developers with a favourable and attractive framework of incentives which include 100% income tax exemption for a period of five years and an additional 50% tax exemption for two years thereafter. Similarly, 100% FDI is also provided in the manufacturing see tor. Exemption from industrial licensing requirements and no import license requirements is also given to the SEZ units.The area under SEZ covers a wide range of zones, including Export Processing Zones (EPZ), Free Zones (FZ), Industrial Estates (IE), Free Trade Zones (FTZ), Free Ports, Urban Enterprise Zones and others. Usually the goal of an SEZ structure is to increase foreign investment in the country.

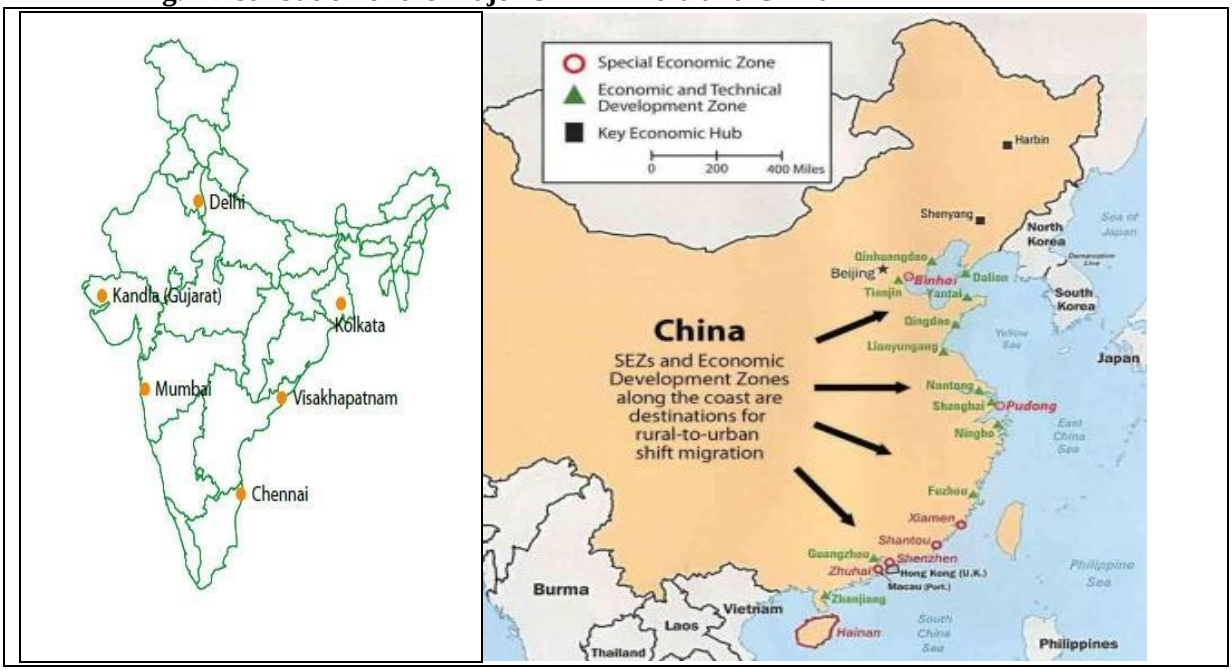
A SEZ unit which has been set up for carrying on manufacturing, trading or service activity has both advantages as well as disadvantages SEZ advantages are quite far more as compared to its disadvantages which are almost negligible.

China - In China, the world's first special economic zone has been established in Shenzhen, along with Shantou, Xiamen, Zhuhai (1979), Hainan Island (1988), and recently a large number of special

economic zones have been created in northern Hong Kong and southern Jiangsu. About 50 percent of the world's special economic zones are in China.

India - Recognizing the importance of exports in economic development, India had created export processing zones since 1965. It started at Kandla in Gujarat state. In addition, Santa Cruz started Noida FATA at Cochin, Chennai, Visakhapatnam and Surat. The export processing sector was benefiting to some extent. But there was a need to adopt some bold and proven policies in some other countries to boost production and exports. Against this background, it took 23 June 2005 to pass the Special Economic Zones Act and 20 February 2006 to pass the rules. India has 373 Special Economic Zones in 2019, accounting for 7% of the world's total.

Fig.2 Distribution of the Major SEZ in India and China



Advantages or Positive role of SEZ:

15 year corporate tax holiday on export profit 100% for initial 5 years, 50% for the next 5 years and up to 50% for the balance 5 years equivalent to profits ploughed back for investment.

1. Allowed to carry forward losses.
2. No licence required for import made under SEZ units
3. Duty free import or domestic procurement of goods for setting up of the SEZ units.
4. Goods imported/procured locally are duty free and could be utilized over the approval period of 5 years. Exemption has been given from customs duty on import of capital goods, raw materials, consumables. spares, etc.
5. Exemption from Central Excise duty on the procurement of capital goods, raw materials, and consumable spares, etc. from the domestic market. Exemption from payment of Central Sales Tax on the sale or purchase of goods, provided that, the goods are meant for undertaking authorized operations.
6. Exemption from payment of Service Tax
7. The sale of goods or merchandise that is manufacture the SEZ (i.e. in DTA) and which is purchased by the Unit (situated in the SEZ) is eligible for deduction and such sale would be deemed to be exports. The SEZ unit is permitted to realize and repatriate to India the full export value of goods or software within a period of twelve months from the date. of export."Write-off" of unrealized export bills is permitted up to an annual limit of 5% of their average annual realization.
8. No routine examination by Customs officials of export and import cargo. Setting up Off-shore Banking Units (OBU) allowed in SEZs. OBU's allowed 100% income tax exemption on profit earned for three years and 50 % for next two years. Exemption from requirement of domicile in India for 12 months prior to appointment as Director. Since SEZ units are considered as public utility. Services', no strikes would be allowed in such companies without giving the employer 6 weeks prior notice in addition to the other conditions mentioned in the Industrial Disputes Act, 1947.

9. The Government has exempted SEZ Units from the payment of stamp duty and registration fees on the lease/license of plots. External Commercial Borrowings up to $500 million a year allowed without any maturity restrictions.
10. Enhanced limit of Rs. 2.40 crores per annum allowed for managerial remuneration.

Disadvantages or Negative role of Special Economic Zone

1. Revenue losses to government because of the various tax exemptions and incentives. Many traders are interested SEZ, as they can acquire land at cheap rates and create a land bank for them.
2. The number of units applying for setting up EOU's is not commensurate to the number of applications for setting up SEZ's leading to a belief that this project may not match up to expectations.

Suggestions:

1. The Way Ahead -Why does a landowner of agricultural land hesitate to dispose his/her land right to the industrialist/ government for SEZ development or for land acquisition event with an offer of lucrative compensation package? The sole answer to this can be found from the sentiments of the landowners who are forced to sell land for SEZ ment. They often complain that they develop got so much income every year out of their agricultural crop production, which would cease now permanently if disposed for development of SEZ. If a way is found to safeguard the land ownership right of landowner as well as compensating loss of livelihood generated out of land in a sustainable manner, no landowner would perhaps be disinterested to lease out his land. However, with certain pre-conditions such model frame work is to be developed. To develop such corporate-private partnerships, Panchayati Raj Institutions (PRIs) can play a dual role.
3. During the acquisition of agricultural/ private land for SEZ development, ownership right should not be fully sold out rather should be given to the entrepreneur under a lease agreement for 25 years, which means neither the Govt. nor the entrepreneur operating in SEZ would enjoy absolute ownership of land.
4. Since land keeps conceptually minimum importance of 25% of stake in an industrial components unit, the land should be regarded as minimum 25% of the stake of the total value of the industry. This means, in tune of growth of the industry, the value of land would be increasing and with downfall of the industry, the value of land will be coming down to its original price. Hence, an industrial unit coming up in SEZ ideally needs to allocate 25% share of its industrial value to the land owners. An industry coming up in SEZ often enjoys acquisition right with Govt. nominal price over land However, private land belongs to farmers or local inhabitants, and of which only a small portion SEZ need only to be acquired with proper compensation.
5. The industry acquiring the agricultural/ need to private land to employ at least the sole bread earner of the family of landowner from the very day the owner loses his right to earn agricultural livelihood from its land.
6. High priority to be given to local work force for recruitment of unskilled labour utilization in the industries of SEZ.
7. The entrepreneurs should ensure local skill up gradation as per the requirement of industry through setting up Industrial Training Institutes in the surrounding areas of SEZ
8. These basically suggestions are for SEZ. For land acquisition under Land Acquisition Act, though compensation is paid, there still exists some sort of mysterious cloud as regards the intention of the govt. Therefore it is suggested that every time Govt. acquires a land for public purpose', it should make an attempt on its part to communicate such intention to the people adequately and if possible to make them a part of such project by engaging them for the same. But these are at best directory guidelines.

Conclusions:

Developing countries have the most special economic zones in the world, considering the global special economic zone. Asia has 4046, or 75% of the world's special economic zones. The lowest special economic zones are found in Oceania. Eighty per cent of the world's special economic zones are in developing countries, though, there are several similarities in Land Acquisition Act and SEZ Act which might appear marginal, there are ample differences too which might reduce such similarities to mere eyewash. The need of the hour is to maximize the utility of both for the welfare of public and reduce the discontentment caused thereby to whatever extent possible.

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Types of Rural Settlement in Solpaur District: A Geographical Analysis

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Abstract:-

The study of human settlement is fundamental to human geography. The nature of settlement in any region reflects the relationship of men to the environment. Settlement responds to man's environment as well as the religious and social customs of the society. Rural settlements are the important aspect of settlement and human geography. They reflect the complex relationship of human occupation to land and environment.

In simple terms, the type of rural settlement is the distance between two houses as well as the number of houses in a particular area, from which the different types of rural settlements can be identified. For example, when houses are close to each other, they can be of a concentrated type, and when houses are far from each other, they are scattered settlements.Any settlement in which most of the people are engaged in agriculture, forestry, mining and fishing is known as a rural settlement. Rural settlements are often called agricultural workshops. The type, size and pattern of rural settlement generally depend on the type of work, farming techniques, type of soil and cropping pattern. Rural areas are dominated by open countryside, large land use, relatively low population density and simple lifestyle. The main types of rural settlements are compact, semi-compact; Semi-sprinkled and scattered varieties.

The main objective of the present research paper is to identify the types of rural settlements and the influencing factors on the settlements in the study area. For the detail analysis of the rural settlement, degree of concentration has been calculated by using the Bernard's method. The present study is mainly based on the secondary data which is collected form the Census Handbook of Solapur District and Socio-Economic Abstract of Solapur district.

Keywords: - Rural Settlement, Concentration Index, Compact Settlement, Semi-Compact Settlement, Semi-Sprinkled Settlement, Dispersed Settlement,

Introduction:-

Rural settlements include populated areas whose inhabitants are engaged primarily in agriculture, forestry, or hunting. Types and patterns of rural settlement mostly depend on physical and socio-economic condition of the region.Rural settlements are comparatively small and simple agglomeration at favourable and convenient site, primarily are influenced by environmental factors and later on by socio-economic development of human groups. Generally, every settlement is different from the other, but with some generalization it is possible to classify them into many groups.

Thus, it is interesting to study different types and patterns of rural settlements as well as factors affecting them. In simple words, the types of rural settlement mean the distance between the two houses as well as the number of houses in a particular area.It may be identified by the different types of the rural settlement. For example, when the houses are close to each other then it may be concentric types, and when the houses are away from each other then it is dispersed types of settlement.

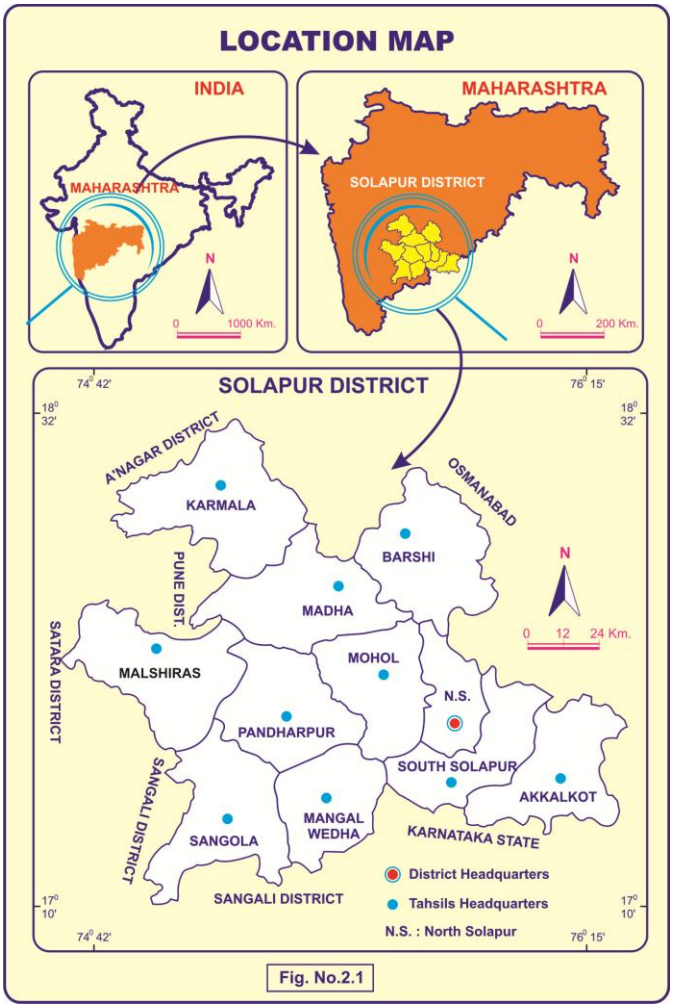


Fig. No.2.1

There are various types of rural settlements. The settlements have different types like compact, semi-compact, semi-sprinkled and dispersed. All human settlement is different from one another depending upon the surrounding environment. Hence, rural settlements show the common relationship of human occupancy feature and environment.

Study Area:-

Solapur district is one of the important districts in Maharashtra. It lies entirely in the Bhima-Sina-Man basins.The district of Solapur is located between 170 10' North and 180 32' North latitudes and 740 42' East and 760 15' East longitudes. The East-West Length of the district is about 200 kilometer and North-South width is about 150 kilometer.

The total Geographical area of the Solapur district is about 14895 square kilometer and population of 43, 17,756 according to 2011 census. Within the region under study, Karmala is the largest tahsil in area and the lowest is North Solapur tahsil in the Solapur district. Solapur district plays significant role in the fields of agriculture, economics, industrial and social fields. The present paper deals with the types of rural settlement in the Solapur district.

Objectives:-

1. The important objectives of the present paper are as follows
2. To study the types of rural settlements in the Solapur district.

Database And Methodology:- Present paper based is on secondary data. It has been collected through District Census Handbook, Socio-Economic Review and other materials. This study focuses on the types of rural settlements in Solapur district. Some other sources of information are used for current research, such as unpublished material.The information collected from different sources is processed and the percentage is calculated. With the help of these tables various figures, graphs are created and analyzed and final results are presented in the form of tables.The formula suggested by Bernard (1931) has been used to identify the types of rural settlements for the present study. The degree of concentration index for each tehsil is calculated using the following formula given by Bernard (1931).

Bernard Method For Settlement Concentration:-

The following formula was used by the French scientist Bernard in 1931 to study the colonies in France. M x S

$$K = \frac{\text{M x S}}{\text{N2}}$$

Where, K = Degree of Concentration
M = Total number of Houses in the Tahsil.
S = Area of Tahsil.
N = Number of settlement Group in the Tahsil.

Bernard Method For Settlement Concentration:-

Different geographers have developed different methods and used different quantitative methods to study the type of rural population. Some important and significant quantitative methods

are used to measure aggregation of settlements and dispersal indices. Among them is the method developed by Bernard to study colonies.According to Bernard's formula, a concentration index was drawn for each tehsil. For this, the period of 2011 has been taken into consideration. The values filled in the statistical formula and the results are calculated.

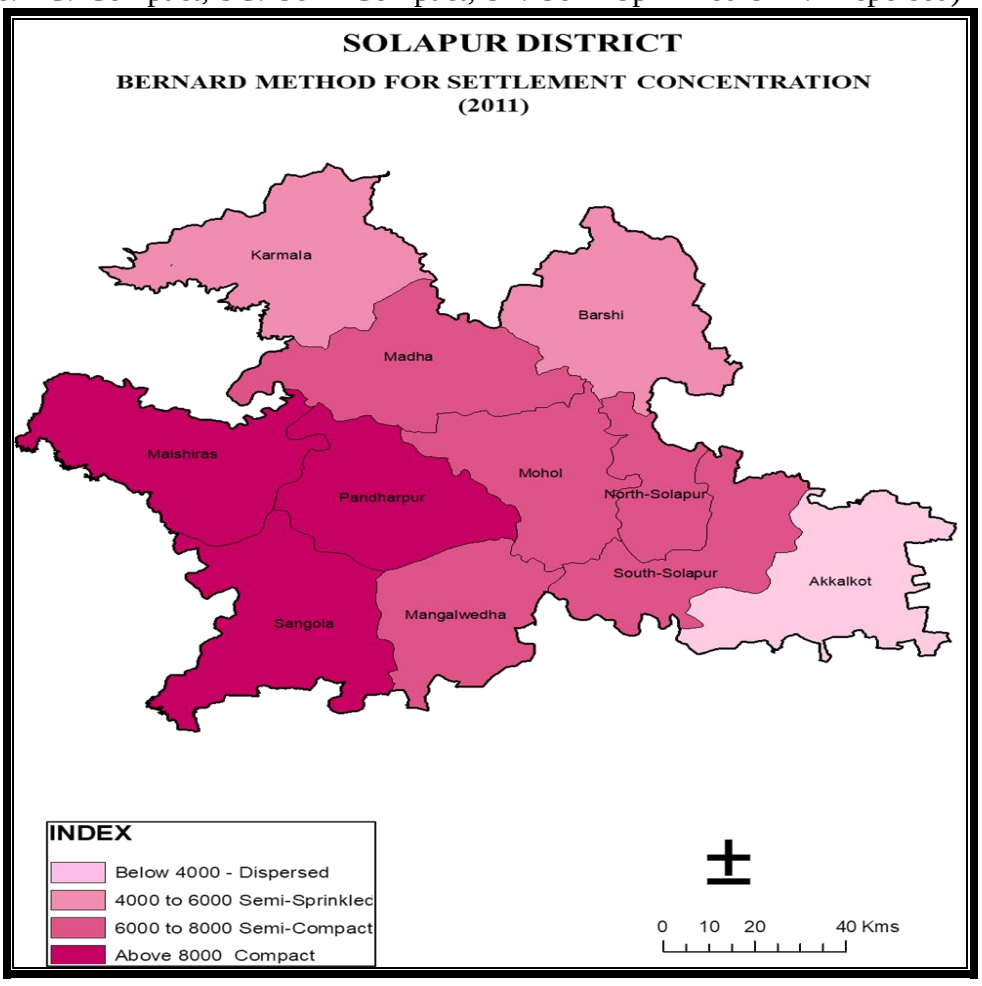
Table No- 1

Types of Rural Settlement Based on Bernard's Method for Settlement Concentration (2011)

Sr. No.	Name of Tahsil	Index (K)	Types
1	Karmala	5200	SP
2	Madha	6983	SC
3	Barshi	4138	SP
4	North Solapur	7248	SC
5	Mohol	7399	SC
6	Pandharpur	8470	C
7	Malshiras	9770	C
8	Sangola	8236	C
9	Mangalwedha	6484	SC
10	South Solapur	7392	SC
11	Akkalkot	3351	D
District Total		**6472**	**SC**

Source: Computed by researcher

(Note: - C:-Compact, SC:-Semi-Compact, SP:-Semi-Sprinkled & D:-Dispersed)



The concentration of human settlements in Malshiras, Pandharpur and Sangolatahsilsis high, because Malshiras and Pandharpur tahsils are situated on the flat area with fertile soil and high development of irrigation. It leads to development of agricultural activities resulted high concentration of rural settlements. Sangolatahsil is located in dry area, which has inadequate irrigation facilities that resulted in small settlements are developed around in water areas leads to high number of settlements. The low concentration of human settlements is recorded in Akkalkot tahsil. Because, there areextreme physical and socio-economicconditions responsible for low concentration values.

Table 1 shows the extent of settlements in Solapur district. The type of settlement can be analyzed and divided into four groups. They are as follows.

Compact Settlement:-

Compact type settlements are found in Malshiras, Pandharpur and Sangolatahsils. The highest concentration values are calculated in these tahsil. Compact settlements are concentrated in areas where values are high. Most of the settlements in these tahsil have dense population and close distance between houses.The concentration values in this settlement are above 8000. Compact rural settlement is a product of permanent agriculture, productive land and favorable climatic conditions. Due to fertile black soil and good irrigation facilities, agriculture has been developed in Malshirastahsil. Therefore, the growth of compact type settlements in this tahsil was encouraged.In the case of Pandharpur tahsil, favorable conditions of agriculture and development of irrigation facilities are factors for the development of compact type of population. Due to, dry and drought condition in Sangolatehsil,there are small settlements raised around the availability of water.Therefore the number of settlements israpidly incitements in that area.

Semi-Compact Settlement:-

This type of settlements has been found in Madha, Mohol, Mangalwedha, South Solapur and North Solapur tahsils. There are semi-compact settlements in the entire Solapur district. The concentration values liebetween 6000 and 8000.Semi-compact type of settlement is intermediate settlements in compact and semi-sprinkled settlements. Such settlements are characterized by a small but compact nuclear encirclement.Favourable agricultural conditions and development of irrigation facilities in Madha, Mohol, Mangalwedha and South Solapur tahsils are responsible for the development of semi-compact settlements. As far as the north is concerned, Solapur is the main urban center and the development of industries resulted in the development of semi-compact settlements near major urban areas.

Semi-Sprinkled Settlement:-

This type of settlement is found in Karmala and Barshi tahsil. This type of settlement is small in size and close to fertile land under cultivation. The concentration values range from 4000 to 6000. These types of settlements are small in size and have separate individual settlements spread across the region with poor road quality as well as connectivity.

Dispersed Settlement:-

This type of settlement is found in Akkalkot tahsil of Solapur district. The value is below 4000. Scattered settlements are also known as isolated settlements, consisting of small groups from single house to house. Scattered settlements were found in this tahsil due to low productive soil, low rainfall, low employment opportunities, low industrial growth and water scarcity.

Conclusion:-

Types of rural settlements are the most important aspects of geography. Physical, social and economic factors are responsible for the variety of rural settlements in Solapur district. The main types of rural settlements are compact, semi-compact; Semi-sprinkled and scattered varieties. The Bernard method was used to identify different types of settlements in

Solapur district.Compact type settlements are found in Malshiras, Pandharpur and Sangolatahsils. Concentration values in this settlement are above 8000. Compact rural settlement is a product of permanent agriculture, productive land and favorable climatic conditions. Semi-compact settlements have been found in Madha, Mohol, Mangalwedha, South Solapur and North Solapur tahsils.There are semi-compact colonies in the entire Solapur district. The concentration values are between 6000 and 8000. Semi-compact settlement types are compact and semi-compact settlement intermediate types. Semi-sprinkled settlements are found in Karmala and Barshi tehsils. This type of settlement is small in size and is close to the land under cultivation. Scattered settlements are found in Akkalkot tahsils of Solapur district. The value is below 4000.Scattered settlements are also known as isolated settlements, consisting of a small group of single house to house. Scattered settlements were found due to low productive soil, low rainfall, low employment opportunities, low industrial growth and water scarcity.

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Female Education A model And Impact In Siwan District

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Introduction:

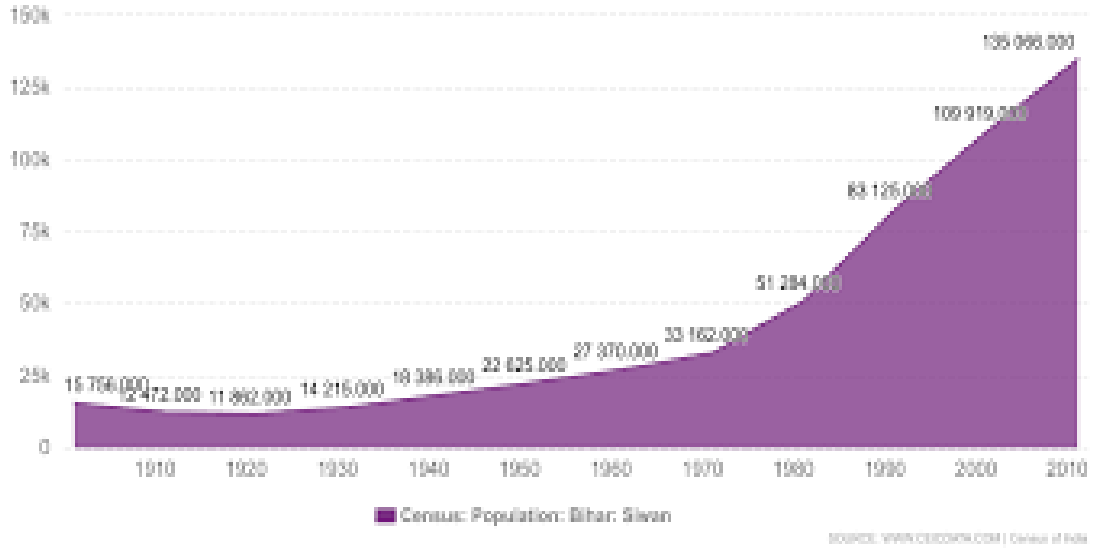
Education has always been a foundation for economic and social development & it will be essential for the knowledge economies of the 21st century.Education manifests itself in many ways like cognitive, thinking, affirmative thought system etc. It brings well-being to the society.Education of women is vital not only on ground of social justice but also because it accelerates social transformation. Level of literacy and education attainment are important indicators of development of any given society and we cannot exclude rural women in the development of any society as they equally contribute to the progress of the society and largely to the economy The last decade in Bihar (2004-14) has seen an exceptional development in education. Efforts by the Government of Bihar to increase accessibility to educational facilities in the state are showing signs of positive change.

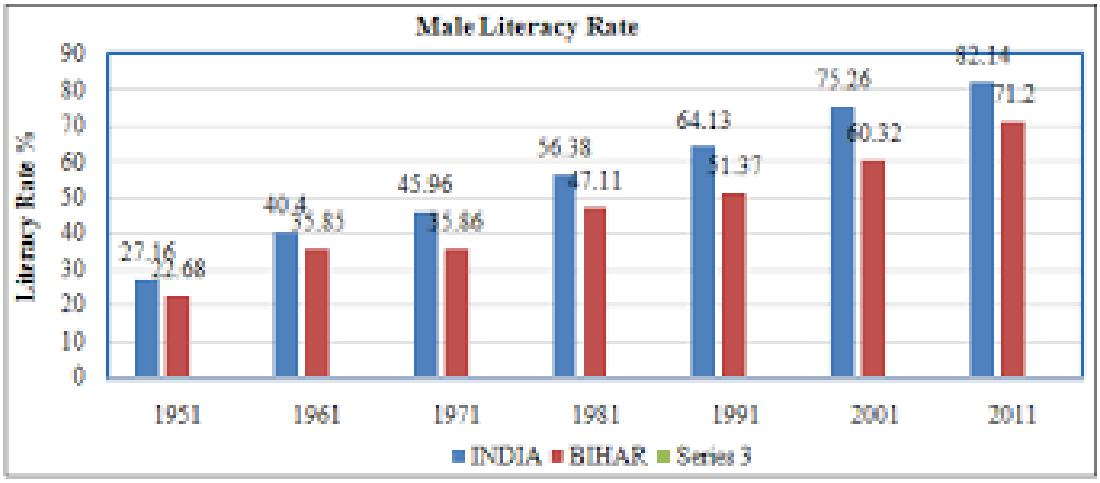
The improvement of Female Literacy Rate in Bihar during 2001-11 (20 percentage points) was the highest, achieved by any state in India during that period. Although the growing literacy rates are showing some positive results, still literacy cannot be considered as the only sign of an educated society. On the other hand education rate in Bihar is characterized by wide gaps between the urban and rural woman (Urban female literacy is 72.6% & Rural female literacy is 49.6%) as well as in between the male and female population.

"If you educate a man you educate an individual, but if you educate a woman you educate a family (nation)." - Dr. James Emmanuel Kwegyir-Aggrey (1875-1927, Ghana)

Women literacy in Siwan:

Siwan is Block in Bihar state, As per the 2021 Aadhar estimates, Siwan Block population in 2021 is 255,337. According to 2011 census of India, Total Siwan population is 205,917 people are living in this Block, of which 105,022 are male and 100,895 are female. Population of Siwan in 2020 is 247,100 Literate people are 121,384 out of 71,622 are male and 49,762 are female. Literacy percentage is 58.95 percent, out of these 34.78 percent is male literates and 24.17 percent is female literates.





Issues and Challenges with Female Literacy of Rural Siwan :

Although the rural women are playing a crucial role in the advancement of agriculture and economy and largely to the society, a number of challenges are being faced by the rural women of our society due to various reasons like- the gender discrimination, inadequate access to the health care etc. They are also having light access to the medical services, less income, limited inheritance and land rights. The females of rural area are deprived of job security. Injustice, violence and insecurity are the major issues that persist in the rural society. The ultimate reason behind all these issues is lack of having quality education for the women of rural Bihar. There are other burning social issues such as child marriage and gender inequality which are reasons for several social problems. These too can be tackled through girls' education. The Bihar Government has expressed a strong commitment towards education for all; however the state still has one of the lowest rural female literacy rates in Asia. This low level 6 | P a g e of literacy not only has a negative impact on rural women's lives but also on their families' lives and on their country's economic development.

Collaborative Efforts and Incentives for the betterment of rural women education

The cause for female education has attracted the efforts of many organizations and governments, and different initiatives have proven the importance of financial incentives, non-formal training, the hiring of women in the education sector, and community engagement. Financial incentives have been used both to encourage educators to enter the field of girls' education and specially enabling the rural girls to come into the main flow of development. Following are some of the major initiatives taken by the Government time to time for the betterment of women education of rural Bihar

Educational Schemes by Government of Siwan- -

Fund Released under Maulana Azad National Fellowship for Students Belonging to Minority Communities in Bihar,Kasturba Gandhi Balika Vidyalayas (KGBVs) Operational and Girls Enrollment in Bihar and Sarva Shiksha Abhiyaanetc .

Conclusion:-

Not only the government but every literate citizen should contribute in battling with the evil spirit of illiteracy. Our motto should be "each one teach one", If we are to become a developed state. It's now turn of the youth to step up and take the responsibility on their shoulders to take the rural women of this state towards the light of literacy. President of United States, Barak Obama said, "change will not come if we wait for some other person or some other time. We are the ones we have been waiting for. We are the change that we seek". The time for the change is now. There is need to redefine the status and role of rural women. There is a need to formulate reducing feminized poverty, promoting education of women, and prevention and elimination of violence against women, specifically the rural part of our society. The government as well as NGOs has been working on solving this problem of how we can eradicate illiteracy in rural Bihar for both children and female. In a way to achieve the ultimate goal of quality education and reach of education the following measures can be helpful

1. Creating better schooling programs.
2. Creating better health care more accessible in the rural part of the state.

3. The son preference that has resulted in sex imbalances and excess mortality among girls needs to be addressed.
4. Achieve appropriate student-teacher ratio with quality of teaching.
5. Bring back the drop out children.

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Sustainable Rural Development with Self- Help Group

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Abstract-

India is a country where most of the population lives in rural areas and due to lack of employment opportunities in rural areas, they are mainly dependent on agriculture which leads to poverty. The main point we cannot ignore is education that helps them understand how to progress in the economy and how to use innovative techniques, because poverty does not allow them to develop enough funds for their own development. In order to make progress, both men and women need to be involved in the progress of economic development. It is essential to include them established, full support of government and efforts of self-help groups.Play an important role in providing self-employment, training, social mobilization and government grants and thus improve the living of standards of the rural people. The self- help group is important because it has joined the low-income sections along with the rest of the rural community. In this paper my focus on self- help groups development and the important stages, their activities build the economic self -reliance of the rural poor people. They develop themselves through their own determination through their own efforts.

Keywords: Self Help Groups, Rural Development

Introduction-

The world Bank defines rural development as planintended to improve the economic and social life of a specific group of people the rural poor. It involves extend the benefits of development to the poorest among those who seek a livelihood in the rural areas. The group includes small scale farmers, tenants and the landless&Women .Overall growth of rural areas with a view to improve the excellence of life of rural persons. Sustainable Rural development is a process of developing and utilising natural and human resources, technologies, infrastructural facilities, institution and organisations. And government policies and self group programmes to encourage and speed up economic growth in rural areas. To deliver jobs and to improve the quality of rural life to self-sustenance.The SHG program is a practical approach to poverty alleviation. That it has been started as a self- employment program in terms of poverty alleviation measures as well as empowerment programs in the country.NGOs promotes community enhancement of the group by as long as suitable trainings and advisory sessions whereas banks main contribution towards SHG is to provide lending Services as SHG Bank linkage monetize money saving habits as well as availability of credit facilities to the women SHGs (Jung.2008)

Objectives of the study-

The Self-help program is being used as participatory approach and development and thereby eradicating of poverty at gross-root height present research work has the objectives:

1) to Understand the Importance and characteristics of good self – help Group
2) to find-out the sustainability stages of development of SHG .
3) To study the Type and Function of Self -help Group.

Data Collection-

Secondary data are collected from the annual reports of various districts, newspaper and article published, Ph.D. Theis , there were some WSHGs visited randomly to confirm the actual functioning of these institutions.

Self- Help Group(SHG)

4. The group enthuses its members in the art of collective management. A group is a unit of two more people in reciprocal interaction or communication with each other .

1) According to the National Bank for Agriculture and Rural Development(NABARD)- A Self- Help Group(SHG) is small ,economically homogeneous and affinity group of rural poor, voluntarily formed to save and mutually agree to contribute to a common fund, to be lent to its member as per group decision for their socio-economic development. Some outside assistance may be needed in the initial stages of formation and working of the group. This assistance shall be gradually withdrawn and ultimately eliminated so that the group can function independently.
2) Members of self help groups containing 10 to 20 members of having same economic background, belong to the same village ,same community who assembled together in order to solve their common problems .(Soni 2015)

Sustainable Rural Development-

Development that meets the wants of the current group without compromising the aptitude to meet the needs and ambitions of the future generation. Growth is not just about economic but about improving living standards.

Importance of self- help Groups-

The following are Importance of Self help Group
1. The SHGs provide access to credit to their members from mainstream financing agencies like banks.
2. The SHGs inculcate a culture of saving among the members of the group.
3. The group contributes to reduce the dependence on money lenders and make available timely credit at much lower rates to the individual members.
5. The members acquire visibility and voice in the household and in the community.

Characteristics of a good self- help Group

1) An ideal SHG comprises 12-20 members. (In a bigger group, all members cannot actively participate)
2) All the members should belong to the same socio-economic strata of society, specifically poor.
3) The group consist of either only men or of only women. (Mixed groups are generally not preferred)
4)Group should have strong bond of affinity.
5) Rotational leadership should be encouraged for the distribution of power and to provide leadership opportunities to all the members.
6) Members should attend meeting, save and participate in all activities voluntarily.
7) An SHG should be a socially viable institution.
8) The procedure of decision making in SHG should be democratic.
9) It should be non- partisan in nature.
10) The group frames rules and regulations, which are required for its effective functioning.
11) Group accounts should be maintained and updated regularly.

Stages of development of SHG

According to NABARD , there are five stages in the development of self Help Groups
These are presented along with time period required and focus of activities in each stage.

Stages of development	Time period	Role of NGO/ SHPI*	Focus of activities
Pre- formation	1-2 months	Initiator/ Promoter	Identifying the poor through participatory rural appraisal methods in hamlets/ villages/ towns
Formation	3-6 months	facilitator	Motivation to form groups, select group leaders, develop rules and norms, conduct meeting, pooling saving, issue and collection, adjustment systems and maintenance of accounts.
Stabilization (Phase-I)	7-12 months	Advisory/ Managerial	Leadership stabilization, training of leaders and members, regularized and increased savings, informal interaction with other groups/clusters, Begin the process of issuing loans, handling/

			helping defaulters to repay, sourcing loans for groups through normal credit system etc.
Stabilization (Phase-II)	13-18 months	Advisory/ Managerial	In addition to above activities imitation of income generating programs linkage of banks, support to new groups, demonstrative effect on others to form group.
Growth and expansion	19 months and above	Advisory/ Managerial/ Consultative/ Institution building	Strengthen linkages with banks, creation of assets for groups and members, spreading concept building and promotion of new groups ,attempts at cluster development and federation of SHG

- SHPI= Self- help promoting Institutions.
  Source- NABARD

Types of Self- Help Groups

The self- Help Groups can be broadly classified into three categories, Following Andhra Pradesh Model.

1. SHGs having a direct bearing on income generation.
2. SHGs focusing on natural resources management and development.
3. SHGs effecting reduction in human poverty.

- The Nature of SHGs, type of participants, their role, aims and objectives and the outcomes are summarized below

A. SHGs focusing on Income Generation

Types of SHGs	Target Group	Aims and objectives (Participants)	Outcomes
1. Women SHGs 2. CMEY*	Women Youth	Thrift and credit Thrift and credit	Microcredit for income generation and consumption. Self-employment through micro enterprises.

B. SHGs Focusing on Natural Resources Management and development

1. Water user Association (WUAs)	Farmers	Participation in irrigation management and maintenance of irrigation systems	Increase in agricultural production and productivity.
2.Watershed Committee	Framers in the watershed villages	Soil and moisture conservation, prevention of erosion, dry land agriculture, management and increase in agricultural productivity	Soil and moisture conservation, prevention of erosion, groundwater recharge, employment generation.
3. VS (VanasamrakshnaSmithi)	Members- one male and one female from each family	Protection of the forest, regeneration of degraded forest, soil and moisture conservation and fodder development.	Increase in forest cover employment generation, groundwater recharge sustainable ecosystem.

C. SHGs Focusing on Human poverty

1. Mother's Committee	Mothers of 0-6 age children and pregnant mothers	Pre- school education, supplemental health nutrition to pregnant and lactating mothers and children in the age of 0-6 years.	Improved child care and health, better adoption of the schooling.
2. School Education Committee	Parents of school going children	Primary and secondary education, non-formal and functional literacy	Accountability of teachers, better enrollment, less dropout, improved rate of girl child education.
3. Health Advisory Committee	Elected representatives of people in the local bodies	Health management Population control and sanitation	Improved health awareness, small family norm, immunization, healthy society.

Source- Official Reports, Govt. of Andhra Pradesh. Chief Ministers Empowerment of youth *

How SHGs function work

Some rules are required for SHGs to function properly. These are

1. Common agreement on when to meet
2. Decision on time and place of meeting
3. Agreement on amount of saving
4. Giving small loans to each other
5. Taking loan from banks and ensure repayment.

Training of the members is important for successful functioning of SHGs. The following areas of training could do well to the members:

1. Basic mathematics
2. Keeping of accounts
3. Basics of lending money, borrowing and repaying.

An effective method of training of SHG members is to take them to a good working SHG and following free interaction with its members.

SHG- Bank linkage program

NABARDs linkage program with SHG in India was initiated from more years following are the objectives:

1. To evolve supplementary strategy for meeting the credit needs of the poor by combining flexibility, sensitivity and responsiveness of the informal sector credit system, with the strength of technical and administrative capabilities, and financial resources of formal credit institutions.
2. To build up mutual trust and confidence between the bank and the rural poor.
3. To encourage banking activity both on thrift as well as credit under formal financial institutions.
4. To improve the flow of rural credit with reduced transaction cost both for the financing bank and the borrowers.

The financial assistance for lending to SHG is emerging as an instrument in socio- economic development in the sense that it promotes small saving, quick credit for emerging needs, particularly for basic social expenditure like health care, education of child etc. SHG approach has indicated positive effects on the targeted people and communities in sustainability through saving and credit programs.

Credit rating of SHGs

As per NABARD guidelines, SHGs should fulfil the following essential minimum criteria to be considered for credit

1. SHGs should have been in existence for over sir months
2. Size of the SHGs should be in the range of 12-20 members.
3. SHG meetings should have been conducted at regular intervals
4. The recovery of internal and external loans should not be less than 85 percent.

5. At least 50 percent of group members should have take internal loans from group fund.
6. Saving should be contributed on regular basis by all the members.
7. The group should have maintained proper accounts and must have well-defined rules and regulations approved by resolution.

The screening is done by a joint appraisal committee consisting of representatives of banks and NGOs. The financing bank will have the final say. Once the group fulfils the eligibility norms, credit rating of the groups will be done based on group dynamics, financial performance, repayment and credibility: book keeping, auditing and rules/ regulations. SHG which score 70 marks and above will be considered for credit limit not less than four times of the savings. SHG scoring 50-69 marks will not be considered for credit at present (Govt. of India 2000)

Models of SHG- Bank linkage program.

1. Model I- SHG formed and financed by banks

Under this model, bank themselves act as self-help promoting institution i.e. forming and nurturing the groups, opening their savings accounts and providing them bank loans.

2. Model II – SHGs formed by NGOs and formal agencies, but directly financed by banks

This appears to be the most popular model amongst bankers. Below this model, NGOs and formal agencies in the field of micro- finance act as organizers. They propagate the message,organize groups, train them in thrift and credit management and nurture them over a period. Banks, in due course, link these groups by directly providing loans to them.

3. Model III- SHGs financed by banks using NGOs as financial intermediaries

In this model, NGOs take on the dual role of facilitators and financial intermediaries. They help in formation of SHGs , nurturing them, training them in thrift and credit management. Eventually, the NGOs approach banks for bulk loan assistance for lending to the SHGs. The share of cumulative number of SHGs linked under this model is relatively small.

Conclusion-

SHG is an informal group where rural people come together and work as a team that builds team Sprit among them, both farmers, Women socially and economically. Self-help groups create awareness and implement it to make a fruitful contribution to the growth and development of rural areas. It is an effective strategy that brings evolution to the backward rural people which motivates them to implement the program started by the government. Unemployment causes poverty and the government tried to solve such problems, but the benefits did not reach the poor people in rural areas successfully as most of them were neglected because the government could not establish direct relations with them. To alleviate these problems, self-help groups form an effective approach to establishing direct relationships with the poorest people in each group and influencing them to join the group. The need for finance and saving groups is not only to solve the problem of poverty but also for personal development. This is one way and brings the most neglected poor villager to the light of the zone. Despite various problems and difficulties, they make a positive difference in the lives of the poor in rural areas. It is a movement that has achieved great success by bringing women, farmers, rural poor people into all economic activities that benefit not only the individual but also the entire family and community through join action for sustainable development.

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"Impact Of Covid-19 On Educational System Of India"

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Abstract:

The spread of pandemic Covid-19 has drastically disrupted every aspect of human life including education. It has created an unprecedented test on education. In many educational institutions around the world, campuses are closed and teaching-learning has moved online. Internationalization has slowed down considerably. In India, about 32 croreslearners stopped to move school and colleges and all educational activities brought to an end. Despite of all these challenges, the all Education Institutions have reacted positively and managed to ensure the continuity of teaching-learning, research and service to the society with some tools and techniques during the pandemic. This article highlights on major impacts of Covid-19 on educational system of India. Some measures taken by HEIs and educational authorities of India to provide seamless educational services during the crisis are discussed. Due to Covid-19 pandemic, many new modes of learning, new perspectives, new trends are emerged and the same may continue as we go ahead to a new tomorrow. So, some of the post Covid-19 trends which may allow imagining new ways of teaching learning of higher education in India are outlined. Some fruitful suggestions are also pointed to carry out educational activities during the pandemic situation.

Since its outbreak in late December 2019, COVID-19 has wreaked havoc across the world and like any critical sector, education has been hit hard. Students, schools, colleges and universities have been deeply impacted. According to the United Nations Educational, Scientific and Cultural Organisation (UNESCO), over 800 million learners from around the world have been affected, 1 in 5 learners cannot attend school, 1 in 4 cannot attend higher education classes, and over 102 countries have ordered nationwide school closures while 11 have implemented localised school closure.

Globally, over 259,014,754 cases of the coronavirus have been reported in world, which have resulted in more than 5182968 deaths and left several States dealing with severe outbreaks. The COVID-19 pandemic will adversely impact the progress some governments were making around increasing the education budget. Therefore, this is a crisis that requires urgent attention and collective action by all Governments, stakeholders and communities.

Keywords: Covid-19, education, impact, India, post Covid-19

Introduction:

No one would have guessed that a virus-like Covid-19 would come and without differentiating, it will alter the lifestyle of people. Due to Covid-19, many changes came to our world and it took some time for everyone to adopt the new normal. The Covid-19 impact was everywhere, which resulted in the closure of Schools and other educational institutions.Initially, most governments have decided to temporarily close the schools to reduce the impact of Covid-19. Later it was reopened for a few grades, which increased the number of infection rates and then closed again.

Though schools are closed, students are attending their classes through various education initiatives like online classrooms, radio programs etc. Though it is a good thing happening on the other side, there are lots of students who didn't own the resources to attend the online classes suffer a lot. Many students are struggling to obtain the mobile required for online classes.Teachers who are all experts in Blackboard, Chalk, books and classroom teaching are really new to this digital teaching, but they are adopting the new methods and handling it like a pro to aid the students in the current position.

But on the negative side, many teachers are looking for an alternative job to support their families.Educated parents are supporting their children throughout the pandemic, but we require to understand that there are some illiterate parents and their feeling of helplessness to help their children in their education.There are students in India who came to school just because they can get food. The great midday meal scheme has helped many children who couldn't bring their food from the home to

get their nutrition.Because of the closure of the schools; many students were suffering from not having enough food for their survival.There is always a delay or cancellation of exams, which leads to confusion for many students and there is no room for curriculum.Most of the school-going children are involved in child labour to support their families.There is a lot of chance that the education of female children and transgender children will affect, as their parents may see, the financial and opportunity costs of doing so.This pandemic has not only affected the students but also the Low-budget institutions and schools, resulting in close-down the same.There are both positive and negative matters happening around us amid the Covid-19.

Objective:

Objective the present study is focused on the following objectives:

1. Highlight the impact of Covid-19 on education system.
2. Enlighten various emerging approaches of India for education.

Methodology:

Various reports of national and international agencies on Covid-19 pandemic are searched to collect data for current study. As it is not possible to go outside for data collection due to covid-19, information is collected from different websites, journals and e-contents relating to impact of Covid-19 on educational system of India. Impact on Education Pandemic Covid-19 has severely affected the total educational system of India some of the most impacted areas of education of India are as pointed below.

1. Destabilized all Educational Activities: Outbreak of Covid-19 has compelled lockdown in every sector including education. The institutions got closed with cease of educational activities and created many challenges for the stake holders (Pravat, 2020a). So, the various activities like admission, examinationsand entrance tests, competitive examinations conducted by various boards, schools, colleges and universities are postponed. Many entrance tests for higher education got cancelled which created a great challenge in the life of a student of higher education. The primary challenge was to continue teaching learning process when students, faculties and staff could no longer be physically present on the campuses. The obvious solution for the institutions was to depend online teaching learning. However, within a relatively short time, HEIs have been able to provide support to the students through online modes. Covid-19 has accelerated adoption of digital technologies to deliver education. It encouraged all teachers and students to become more technology savvy.

2. Mixed Impact on Academic Research & Professional Development: Covid-19 has both negative and positive impacts on research. If we take the negative side, it has made impossible for researchers to travel and work together with others nationally and internationally. Some joint research work or project work are made complicated to complete. Some scientific laboratory testing/research work could not be conducted. If we look at the positive side, academicians got much time to improve their theoretical research work. Academicians got acquainted with technological methods and improved their research. Webinars and e-conferences became normal methods for sharing expertise among students and academicians around the globe with similar issues. They could get much time to concentrate on professional development by doing research and to improve knowledge by sharing ideas through webinars and e-conferences. They enhanced their technical skill and could get the scope for publishing articles in journals, publishing books in this free time.

3. Severely Affected the Educational Assessment System: Most of the external examinations have been postponed and almost all the internal assessments have been cancelled. The cancellation of assessments has negative impact on students' learning. Many institutions have been managing the internal assessments through online mode using different digital tools but the postponement of the external assessments, has a direct impact on the educational and occupational future of students' life. This uncertainty has created anxiety among students as they are stuck in the same grade/class without promotion. Similarly, many students who had appeared final or board examinations would suffer a lot as by the time they get their certificates, it might be too late for them to apply for the forthcoming academic year in other countries due to lockdown.

4. Reduced Employment Opportunities: Many entrance tests job recruitments got cancelled which created negative impact with a great challenge in the life of a student of higher education. The Indians who have been doing their jobs abroad became upset of their job withdrawal also. In India, there is no recruitment in Govt. sector and fresh graduates are in pressure of fearing withdrawal of job offers from corporate sectors because of the pandemic situation. Many students may lose their jobs from

India and overseas. The pass out students may not get their job outside India due to various restrictions caused by Covid-19. All these facts imply towards increase of unemployment rate due to this pandemic. With increase of unemployment situation, the interest for education may gradually decrease as people struggle for food rather than education (Pravat, 2020b).

Emerging approaches of India for Education during Covid-19 Many challenges are created by Covid-19. The HEIs have responded positively and adopted various strategies to face the crisis during the pandemic. The Government of India has also taken number of preventive measures to prevent spread of pandemic Covid-19. The MHRD and University Grants Commission (UGC) have made several arrangements by lunching of many virtual platforms with online depositories, e-books and other online teaching/learning materials, educational channels through Direct to Home TV, Radios for students to continue their learning. During lockdown, students are using popular social media tools like WhatsApp, Zoom, Google meet, Telegram, YouTube live, Facebook live etc. for online teaching learning system. Some of the digital initiatives for education during COVID-19 are pointed as below:

1. e-GyanKosh is a National Digital Repository to store and share the digital learning resources which is developed by the Open and Distance Learning Institutions of India. Items in eGyanKosh are protected by copyright, with all rights reserved by Indira Gandhi National Open University (IGNOU).
2. Gyandarshan is a webbased TV channel devoted to educational and developmental needs for Open and Distance Learner. A web-based TV channel devoted to educational and developmental needs of the society
3. Gyandhara is an internet audio counseling service offered by IGNOU. It is a web radio where students can listen to the live discussions by the teachers and experts on the topic of the day and interact with them through telephone, email (gyandhara@ignou.ac.in) and through chat mode.
4. Swayam provides Massive Open Online Courses (MOOCs) with 140 universities approved credit transfer feature. Swayam Prabha provides high quality educational programs through 32 DTH channels transmitting educational contents. e-PGPathshala (https://epgp.inflibnet.ac.in/) is for postgraduate students. Postgraduate students can access this platform for e-books, online courses and study materials. The details of these three digital plat forms are described by the author in the previous paper (Pravat, 2020b).
5. e-Adhyayan (e-Books) is a platform that provides 700+ e-Books for the Post-Graduate courses. All the e-Books are derived from e-PG Pathshala courses. It also facilitates play-list of video content.
6. e-Pathya (Offline Access) is one the verticals of e-PG Pathshala which is software driven course/content package that facilitates students pursuing higher education (PG level) in distance learning as well as campus learning mode. It also facilitates offline access.
7. National Digital Library of India is a repository of e-content on multiple disciplines for all kinds of users like students (of all levels), teachers, researchers, librarians, library users, professionals, differently-abled users and all other lifelong learners. It is being developed at Indian Institute of Technology Kharagpur. It is designed to help students to prepare for entrance and competitive examinations, to enable people to learn and prepare from best practices from all over the world and to facilitate researchers to perform inter-linked exploration from multiple sources. It is a virtual repository of learning resources with a single-window search facility. It is also available to access through mobile apps.
8. e-Yantra provides hands on experience on embedded systems. It has about 380 Lab and made 2300+ colleges benefited.
9. FOSSEE is short form for Free/Libre and Open Source Software for Education, which is developed to promote open source software for education as well as professional use.
10. Virtual Labs has developed web-enabled curriculum based experiments designed for remote operation. It has over 100 Virtual Labs consisting of approximately 700+ web-enabled experiments which are designed for remote-operation. It provides remote-access to Labs in various disciplines of Science and Engineering. These Virtual Labs caters to students at the undergraduate level, post graduate level as well as to research scholars.
11. e-ShodhSindhu is a collection of e-journals, e-journal archives and e-books on long-term access basis. It has 10,000+ e-journals, 31, 35,000+ e-books. It provides access to qualitative electronic

resources including full-text, bibliographic and factual databases to academic institutions at a lower rate of subscription.

12. Shodhganga is a platform for research students to deposit their Ph.D. theses and make it available to the entire scholarly community in open access. The repository has the ability to capture, index, and store, disseminate and preserve Electronic Theses and Dissertations submitted by the researchers.
    a. VIDWAN is a premier database and national research network which has profiles of scientists/researchers and other faculty members working at leading academic institutions and other Research & Development organisations in India.
13. National Educational Alliance for Technology (NEAT) is an initiative for skilling of learners in latest technologies through a Public-Private partnership model between the Government (through its implementing agency AICTE) and the Education Technology companies of India. It brings the best technological products in education pedagogy on a single platform for the convenience of learners. The opportunities created by the pandemic Covid-19 will lead towards a better tomorrow. Tomorrow will be a new morning which will entirely be in our own hands. New technologies will certainly challenge the traditional paradigms such as classroom lectures, modes of learning and modes of assessment. The new trends will allow the education sector to imagine new ways of teaching learning and some trends may be pointed as below.

1. May Encourage Personalised Learning: Learning may not be confined to classes or to any specific boundaries.Students may be the virtual learners with one teacher leading dozens of students in the new age. The learning modules may be modified to suit different learning styles and the learning contents may come from different sources to meet the learners' aspirations and needs. Students may pursue their learning in the new paradigm as per their choice.

2. Student Attendance may Slow Down: Many parents may be reluctant to send back their children to schools and colleges suddenly after the end of lockdown. Some poor family parents who have lost their livelihood during the pandemic may not be able to afford the expenditure to send their children to institutions. This may lead to home education for another few months.

3. National and International Student Mobility for Higher Study may be Reduced: Student safety and well-being issues are important deciding factors for students and their parents for movement to international institutions for study. New modes of social distancing will continue for quite some time and may affect on-campus face to face teaching learning. Most of the parents will prefer to find workable alternatives closer to their home and may restrict for less movement within the country due to the pandemic. The international education has also been affected by the crisis. Many international universities have been closed and are delivering all educational activities online. Many international conferences in higher education have been cancelled or turned into a series of webinars. So, the national and international student movement may be diminished.

4. Learning with Social Distancing may Continue: All will maintain social distancing and avoid warm handshake, hug, personal greeting and intimacy for a long time. Invisible restrictions may constraint the fun and joy of campus life. Sports, Gyms, tournaments may be in low gear for a longer period resulting less physical activities of students.

5. Educational Institutions may run with Different Shifts per Day: The need for social distancing may imply lesser students in each class. So, most of the educational institutions may work in different shifts per day which may put more pressure on the teaching and administrative staff of the institution to manage.

6. May Raise the Gap between Privileged and Unprivileged Students: Learners from low-income families and disadvantaged groups are the more likely to suffer as they may not afford high-speed internet connection and required technical gadgets for online learning. It will widen the gap between privileged and unprivileged learners creating inequality.

7. Teaching Learning may run with Technology: More and more students will depend on technology and digital solutions for teaching learning, entertainment and connecting themselves with the outside world. Students will use internet technology to communicate virtually with their teachers and fellow learners through E-mail, WhatsApp, and Videoconference, Instant message, webinar or any other tool.

8. Assessment System may be changed to new Shape: Artificial Intelligence (AI) may help teachers to deal with assessment, evaluation, preparing mark-sheets and monitoring the performance of each

student easily. AI may use digital platform extensively to reduce burden of examiner in handling examination and evaluation systems. If these activities are made simpler, the academicians would be able to concentrate more on course development, qualitative teaching-learning and skill development.

9. Demand for Open and Distance Learning (ODL) and Online Learning may grow: Covid-19 has forced the human society to maintain social distancing. It has created more challenges to continue teaching learning by maintaining social distancing. To meet these challenges there is more demand for ODL and online modes of education and the same trend may continue in future also.

10. Blended Learning may take the Leading role: Blended learning combines both face to face and online learning modes. Covid-19 has accelerated adoption of digital technologies to deliver education and encouraged the educational institutions to move towards blended mode of learning. All teachers and students became more technology savvy. The traditional face to face mode with post Covid-19 technology mode will lead the education towards blended mode of teaching learning and it may transform the structure of the education system.

11. Student debt Crisis may Rise. In India, lots of students or their parents take education loans for higher education. If the employment market does not pick up, student debt crises may rise and create serious issue. Students may face increased stress, anxiety and depression due to their student loans.

12. Unemployment rate is expected to be increased. There is no recruitment in Govt. sector and fresh graduates fear withdrawal of their job offers from private sectors because of the pandemic Covid-19 (Pravat, 2020b). Many Indians might have returned home after losing their jobs overseas due to Covid-19. Hence, the fresh students who are likely to enter the job market shortly may face difficulty in getting suitable employment.

Conclusions:

This study has outlined various impacts of Covid-19 on higher education in India. The recent pandemic created an opportunity for change in pedagogical approaches and introduction of virtual education in all levels of education. As we do not know how long the pandemic situation will continue, a gradual move towards the online or virtual education is the demand of the current crisis. UGC and MHRD have lunched many virtual platforms with online depositories, e-books and other online teaching and learning materials. Combination of the traditional technologies (radio, TV, landline phones) with mobile or web technologies to a single platform with all depositories would enhance better accessibility and flexibility to education. This would involve upgrading the service platform to enable it to meet the required volume of educational demands of students. All service providers need to be mobilized to provide proper access to the educational service platforms to the disadvantaged groups of population also. Virtual education is the most preferred mode of education at this time of crisis due to the outbreak of Covid-19. The post Covid-19 education seems to be an education with widely accepted online or virtual education which may perhaps be a parallel system of education. This paper has not covered any statistical analysis on impact of Covid-19 on education.

Suggestions:

1. Educators and learners should be trained to utilise online teaching learning process using technology. Policy should be adopted by Government/educational institutions to provide free internet and free digital gadgets to all learners in order to encourage online learning as a result of which people would get engaged and remain safe during pandemic (Pravat, 2020c).
2. Immediate measures are required to lessen the effects of the pandemic on job offers, internship programs and research projects.
3. Many online learning platforms offer multiple programmes on the same subjects with different levels of certifications, methodology and assessment parameters. So, the quality of programmes may differ across different online learning platforms.
4. If the pandemic Covid-19 continues, new approaches for academic assessment should be adopted by educational institutions. Academic assessment of the students may be done through online mode or through quizzes and small projects.
5. Government should support to all education institutions strengthen their resources to run virtual educational activities. Students also need to be supported with better access to internet and technology as most students are unable to afford the facilities. During this pandemic, the HEIs should focus more on virtual educational activities including television, radio and web-based education.
6. WHO has recently pointed out that the Covid-19 may never be eradicated and people will have to live with it. “It is important to put this on the table: this virus may become just another endemic virus

in our communities and this virus may never go away. HIV has not gone away, but we have come to terms with the virus. I think there are no promises in this and there are no dates. This disease may settle into a long problem or it may not be" WHO emergencies expert Mike Ryan said in an online briefing (Sandhya, 2020). With reference to this statement, many countries are now planning to continue education through distance or virtual mode and India should plan for the same also.

7. Across the globe, Indian traditional knowledge is well known for its scientific innovations, values and benefits to develop sustainable technologies and medicines and this knowledge systems in different fields should be integrated with a present-day mainstream higher education system.

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Seismic Vulnerability Assessment of Existing Public School Buildings of Himalayan Foothill Region : A Case Study of RamnagarTown,India"

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Abstract

The paper focused on seismic vulnerability assessment of existing public school buildings. To fulfil this purpose 26 public school building are surveyed in Ramnagar Town.Schools buildings comes under the category of critical or lifeline infrastructures. On site seismic vulnerability assessment through **Rapid Screening Process (RSP)** modify version of FEMA, RVS (Rapid Visual Screening) methodology for primary data collection, Secondary data like school faculty and student strength is collected from District Education department. For calculation the damage modified FEMA scoring and EMS 98 is used. A few research have been done in School Building assessment against seismicity,There fore the main aim of this project is to assess the critical infrastructure and to promote safety in school and risk reduction awareness among community. The result show 43 % of surveyed building units classified in Vulnerability Grade 5. The study finds more active action is required in related field. The result will benefit responsible parties for appropriate action expected to enhance seismic performance of school buildings.

Key Words :Earthquake ,School Buildings Vulnerability , Rapid Screening Procedure /ATC ,EMS 98

Introduction

Himalayas formation was associated with northern movement after its fragmentation from the Gondwanaland colliding with Eurasian plate somewhere 65 Ma years ago giving rise to Himalayas(Yin, 2006).The Indian plate beneath Eurasian plate succeeded by a continent -continent collision south Tibet at ~2 meters a century that occurred 57 million years ago (Auden, 1935). The under thrusting of Indian plate in northwest have accommodated 2000 -3000 km of convergence and -700 km of this convergence have been accommodated by shortening along the Himalayas (Molnar, 1975)(Prasath, 2019). This motion have generated earthquake greater then M~ 8.0 in past 20year of decades. (Rajendran, 2005). The seismic gap as termed as central Seismic Gap is 500 -800 km long segment that lies between the epicentres of great 1934 Nepal -Bihar and the 1905 Kangra earthquakes(Bilham, 1995).Seismic vulnerability of built up environment assessed in these region, post disaster damage of lifeline infrastructure in an earthquake is a major concern. school building collapse in an event of earthquake can be of major concern, as can be a safe haven for children that help them slowly move back to normalcy.History has shown the collapse of school building during earthquakes. Bhuj earthquake in 2001 killed 1002 students and teachers, 2005 Kashmir earthquake in Pakistan killed 19,000 children and in 2008 Sichuan earthquake in China destroy about 6898 schools(Lopez O et al., 2008). Schools buildings provide shelter, emergency care and medical treatment in after math of an disaster , assessing vulnerability of school buildings is a matter of concern, "Relief camps and shelters, community kitchen are often organised around the school infrastructure that is also utilised for warehousing of relief supplies, accommodation of rescue workers and organising medical and relief camps , together with relief distribution centres." School constitute important public infrastructure centres for various purpose post disaster.

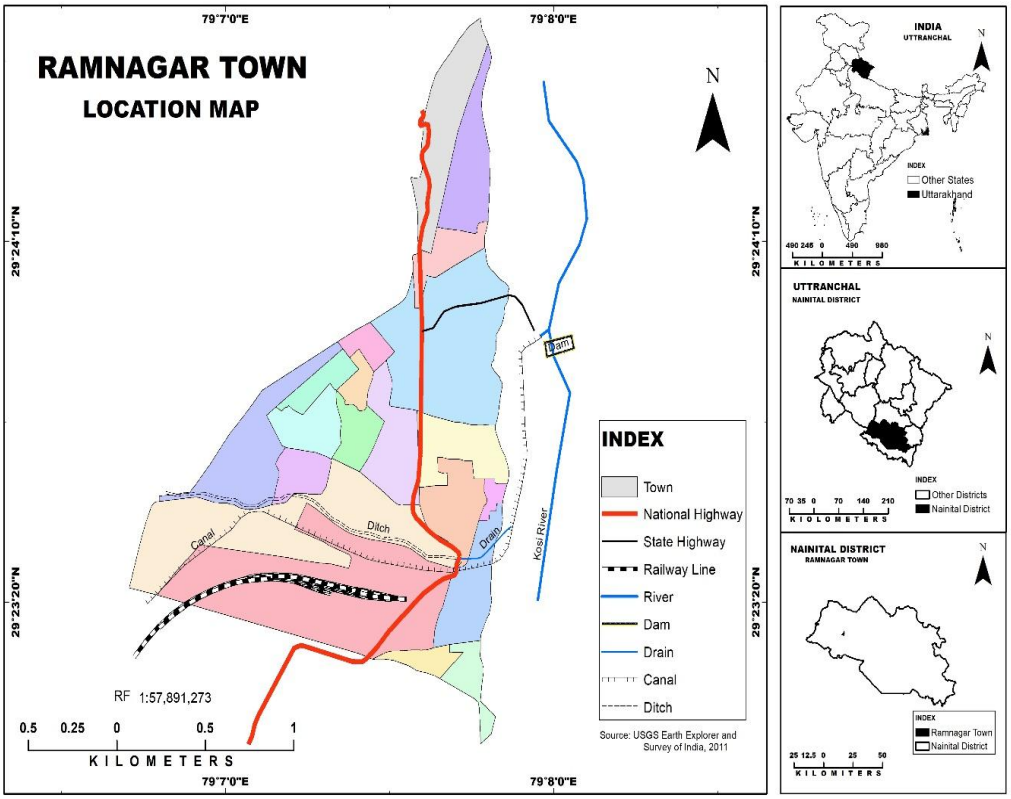


Fig.1. location map of the study area

Present study is an attempt to address the issue of seismic vulnerability oflife line building in foothill region of Himalaya. The study intended to promote safe school environment practice in society.The attempt is to help authoritiesassessing structural performance modification factors that would help improving seismic performance of lifeline buildings and to i) identify seismic vulnerability ii) identify structure in need for retrofitting and reconstruction iii) structural classification based on their typology , construction material.

Methodology

Many recent and past research show different seismic vulnerability assessment methodologies of which FEMA RVS generally recognised as fast and economic technic for detail and corrective measures(Rautela Piyoosh et al., 2015).**Rapid Screening Procedure (RSP)** modification of FEMA RVS by S.KAgarwal and AjayChaursia(Agarwal, 2007)identify primary structural lateral load resisting system along with building attributes that modify seismic performance of the building. The decision is based on the data collection done at inspection site of the structure, the screening is based on vulnerability score of the structure.Final Structural score (S) is based on identifying building performance Basic Structure Hazard (BSH) and Modification Factors (PMF) of the assessed structure. BSH reflects estimated likelihood of a typical building of that category sustaining major damage in the given seismic environment(Joshi, 2019). Based upon damage data of Mw~6.2 Killari 1993, Mw~5.8 Jabalpur 1997 and Mw~7.6 Bhuj 2001 earthquakes Agrawal and Chourasia (Agarwal, 2007) have modified BSH score suggested by ATC -21-1(ATC-21, 1988) and ATC -21(ATC-21, 1988)of FEMA to suit Indian context.The score have been suitably modified in Indian context, and categorised Indian structures as (i)TYPE A reinforced concrete (RCC) with unreinforced masonry infill walls (ii) TYPE B unreinforced masonry building (URM) and (iii) TYPE CBuilding made of GI sheets ,thatch and other light material, assigned BSH score of 3.0 ,2.5 and 2.0. PMF, factors thatare associated with building

structure and condition include (i) number of stories, (ii) minimum gap between adjacent buildings, (iii) building site location, (iv) soil type, (v) irregularity in elevation, (vi) soft storey, (vii) vertical irregularity, and (vii) cladding for allocating PMF scores that are based on damage surveys undertaken previously. Apart from these, parameters pertaining to (i) roofing material, (ii) parapet height, (iii) re-entrant corner, (iv) heavy mass at the top, (v) construction quality, (vi) condition/maintenance, and (vii) overhang length(Agarwal, 2007) are considered in the present study[Table 01].

Table 01 :Performance Factors (PMF) score

Parameters	Specification/ Boundary	Modification Factor
Number of Stories	< 2	0
	2 to 5	-0.15
	> 5	-0.5
Minimum gap between adjacent building	< 100 mm per storey	-0.2
	Otherwise	0
Building site located	Hill top	-0.2
	High slope of hill	-0.15
	Mild slope	-0.1
	plain	0
Building location	Isolated	0
	Internal	-0.1
	End	-0.15
	Corner	-0.2
Soil Type	Rock/Had soil	0
	Medium soil	-0.1
	Soft soil	0.25
	Reclaimed/Filled soil	0.2
	Partially filled soil	0.15
	Loose sand	0.3
Roofing Material	RCC Slab	-0.15
	Tiles	-0.25
	Gi Sheets	0
	Asbestos sheet	-0.1
	Wooden building	-0.25
Parapet	Secured	0
	Not secured	-0.2
Re – entrant corner	≤15%	0
	> 15%	-0.25
Regularity/irregularity in elevation	Regular	0
	L – shaped	-0.3
	T – shaped	
	▪ shaped	
Soft storey exist	Yes	-0.3
	No	0
Heavy mass at top	Yes	-0.25
	No	0
Construction Type	Engineered	0

	Non -Engineered	-0.2
Building Construction Quality	High	0
	Medium	-0.1
	low	-0.2
Building condition/ maintenance	Excellent	0
	Good	0
	Damaged	-0.1
	Distressed	-0.2
Overhang length, balcony (in m)	< 1.5	0
	> 1.5	-0.2
Plan Irregularity	Symmetric	0
	Asymmetric	-0.25

Source :(Joshi, 2019)

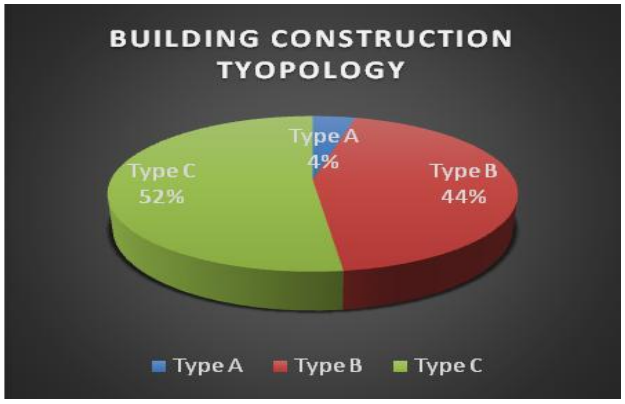
Vulnerability Assessment

For this purpose 26public school were surveyed in Ramanagr town located at foothill region of Himalayan. The damage grade is classified into five categories based on final Structural Score (S); < 0.80 = Grade 5, 0.81–1.60 = Grade 4, 1.61–1.80 = Grade 3, 1.81–2.00 = Grade 2 and > 2.00 = Grade 1, by integrating BSH and PFF of the structures. The grade represents the damage sustain by the structure in a given earthquake in which the intensity exceeds VIII on MSK scale as expected seismic intensity in Zone IV and Zone V of earthquake zoning map of India(Rautela Piyoosh et al., 2015). The calculated damage risk is bases of EMR 98 parameters not BSI codes.Grade 1 and Grade 2 denote no and slight structural damage together with slight and moderate non-structural damage respectively which implies hair-line cracks in very few walls and cracks in many walls of masonry structure and fine cracks in plaster over frame members or in walls at the base with fine cracks in partitions and infills and cracks in column and beam of frames together with structural walls and cracks in partition and infill walls of RCC structure. The buildings falling in Grade 1 and Grade 2 are therefore considered as being safe in an earthquake event.

Risk Observation

Out of 26 observed public school buildings that are located in zone IV (Seismic Zoning Map of India) 52% of the building found to be RCC type followed with 44% unreinforced masonry and 4% to be GI sheet units Fig 02.

Figure 02 : Building Typology In The Ramnagar Municipal



Height of Buildings and its location

Vulnerability of building increase with height and number of stories, 9-10 feet per storey for residential and 12 feet per storey for commercial building(ATC-21, 1988)..Most surveyed building structure observed to be single story 63.9% followed with 26.5 % double story and 9.6 % to be three story [Tab 2]. Most construction 99% was observed to be RC/RB slab roof type.

Table 02:Number of stories surveyed in the study area

Stories	Surveyed Unit	In Percentage
Three Story	2	7.69
Double Story	8	30.7
Single story	16	61.5

The table show the influence of single story buildings. The location of a structure affects the amplification of the ground motion during earthquakein present study location is categorised into following : A) plain ground slope is less that 5^0 B) mild slope $5\text{-}10^0$. C) High slope $11\text{-}30^0$, d) Hill Top and e) River Bed.76 % school building found to be on mild hill slope and 23.4% is located in plain ground area.

Age of Buildings

Time of built is an important parameter of RSV procedure as: i) Construction practise are tied with prevailing building codes ii) Deterioration of building is link to its age. Building are designed to sustain vertical load for a long period as 30 years but not lateral. Many building lasts more than their maximum period however building vulnerability increase with age [Tab3].

Table 03 : Table Showing year of construction

Year Of Construction	Surveyed Units	In Percentage %
1900	1	3.84
1901-1950	3	11.53
1951-2000	11	42.3
2001-2011	6	23.0
2012-2019	4	15.38
1901-1950	1	3.84

Heavy Mass on Roof

Presences of heavy mass on roof top increase seismic forces in the member of building thus increase its vulnerability(Joshi, 2019). In the survey water tank are mainly observed on roof top30.7% of building have cement water tank with water logging problem intensify in monsoon season resulting in dampness and excess moisture.23 % of buildings have syntax (plastic) water tanks. These water tanks are not harness to the main building.This depict heavy mass in roof top which is a traditional and common practice followed . Heavy mass in roof top can be falling hazard in a event.

Roofing Material

Considering other factors different roof type was observed. Roof are basically climate dominant but due to urban influence its RCC cement mortar dominant. Material used to built building roof help determine its score to vulnerability. In the survey most of the buildings 70% are RCC slab while 26% have RB (Made with bricks) only 4% units found to be Asbestos sheets. Heavy built material will lead to injury and major damage.Its evident that most school building are RCC/RB slab.During survey it was notice that the roof quality was low, due to lack of maintenance dampness is high resulting water logging in monsoon season ,during this season condition became worse .Cracks in roof are observed to result in the building the corrosion of reinforced due to its expose to rainfall and moisture.

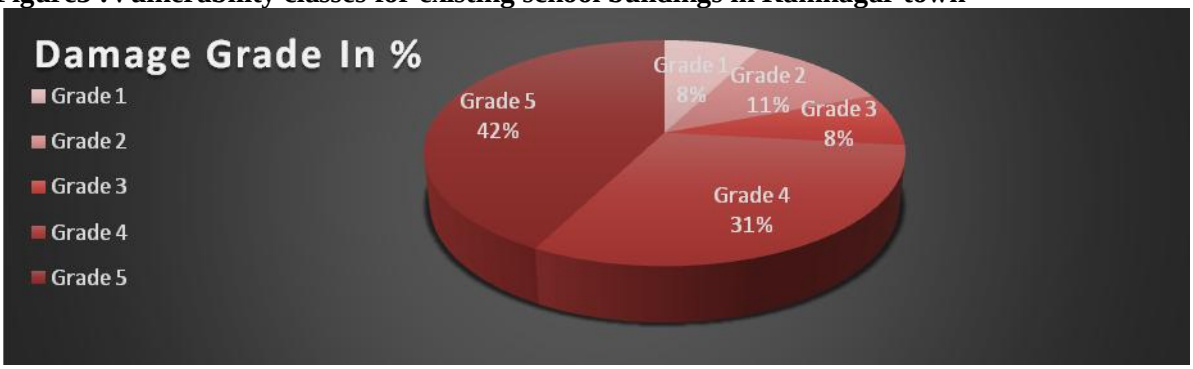
Damage Grade -The damage classifications based on the European Macro seismic Scale (EMS-98) define building damage to be in ‘‘Grade 1 to Grade 5’’. The damage classifications help in evaluation of earthquake intensity following an earthquake. They are used in RVS to predict potential damage of a building during code-level earthquake[Tab4].

Table04 : Distribution of Damage grade

Damage grade	Surveyed units	In percentage
Grade 1	2	7.69%
Grade 2	3	11.53%
Grade 3	2	7.69%
Grade 4	8	30.76%
Grade 5	11	42.30%

Grade 1 and Grade 2 denote no or slight structural damage ,which implies hair line cracks in very few walls and cracks in many masonry structure, cracks in column and beams of frames ,cracks in infills walls of RCC structure, therefore building falling under these grades considered safe.7.69% building units fall under ‘‘Grade 1& Grade 3’’ falling under safe or slight damage .Table 4 suggest 42.30% building units fall under ‘‘Grade5’’ which likely to collapse during earthquake .As against this 30.76% fall in ‘‘Grade 4’’ that are to sustain major structure and non -Structure damage. Followed the table 11.53% falling under ‘‘Grade 2’’ sustaining large cracks in walls ,column and beam.

Figure3 :Vulnerability classes for existing school buildings in Ramnagar town



The study highlighted the negligence of building code and engineer input in buildings, thus it is recommended to fix personal responsible of official engaged in construction of public building to follow stick measurement .The construction practice society or system follow definitely put a question , making it essential to perform detail seismic vulnerability and retrofitting a of such critical infrastructure.

Finding and Discussion

Disaster weather human or nature induced conclude in loss and life .The work discussed above is to assess the seismic vulnerability of existing public school buildings and critical lifeline infrastructure. It shows that Grade 4 & 5 would no longer in position to perform in the after math of an disaster. The percentage show half of these critical units will not be operational leading to immense pressure to the rest of units. Such situation would further create trauma nad misery. The situation calls for more active actionis required in related field as our future generation safety depends on all the stakeholders of society or system. The finding shows that more than public schools , private schooling is prominent in the township as business ,these schools are running in basements , poorly maintained building with no evacuation plan ,narrow ally ,single escaping route exit to all the school members .Many private school not even have mechanism to everyday issues in relation to school expansion and development ,fire drill ,power outage , unexpected weather event and health and safety concerns. In comparison to public private school have high number of student strength confined to small basements with high dampness. This situation would expose the immense pressure to other facilities and managing post disaster would be uphill task, increasing trauma and misery of affected people .

Age and Height of building are major factors determine its structural vulnerability. public school unit get funded with the grants available time to time by governing organisation. Maintenance solely depends on these funds which vary in time , It is noted during the survey as these building belong to government. The construction vary by one to other engineered department of provisional government this result in variation in construction quality ,irregularities ,overhang vulnerability and placement of heavy mass at top of many building units.. Lack of maintenance is observed during the survey majority of units found to be high in dampness, water logging in monsoon season is common sometimes leads to shut down of schools ,disturbing daily task and disruption in education. The delay in allocation of these funds for routine maintenance and upkeep which result in deteriorated condition to the public buildings. Moreover many departments do not have engineered staff to assess the vulnerability and undertake corrective measurements. Any need in post disaster will jeopardise the relief and rescue.

The condition existing is not as expected to be anyway better and therefore recommended strict implementation of building code, imposing penalty in failure non following building by laws.

Massive awareness drive for risk and seismic risk reduction. Further recommended practice safe school environment and seismic safety audits in annual budget allocation.

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Irrigation system in Dharwad District: A Geographical analysis

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Abstract

Irrigation in India has been practiced from ancient times and irrigation tanks and wells are a familiar feature of the India landscape to supplement and conserve the rainfall. Artificial lakes and canals that dot the country in the hundred are centuries old and some of them has served for more than thousand years. Storages and their water courses are common in south, central and eastern India. Hindu monarchs and the Mughal emperors later on, the Britishers undertook a large number of irrigation works. Water is needed in almost every sphere of human activity. Irrigation through major and medium canal systems was a key component of green revolution that transformed India and made the spectre of famines in India history. Irrigated agriculture is thus responsible for the rapid improvement in the agriculture productivity in the 1960's, 70s, and 80's. There is a marked difference in the levels of contribution from agriculture in the rain-fed and the irrigated areas. In general irrigation is seen to be affecting poverty by increasing returns to the physical, human and social capital; integrating the poor with factor, product and information markets and improving the overall national growth rates. Among taluks, the area of corps, production and productivity of crops are higher in Dharwad and Navalgund taluks owing to more area under irrigation. Even horticulture crops are also more in these two taluks as compared to other taluks as a consequence of more area under irrigation. The available utilizable water resource of the District, viz: Dharwad, Hubli, Kalghatgi, Kundagol, Navalgund; is considered insufficient to meet all the future needs. Under such a situation, in order to face the challenge of water deficit, apart from accelerating pace of development of available utilizable water resources, all out efforts, on the part of people from every walk of life, would need to be made to conserve every drop of water and improve efficiency in all areas of water use.

Keywords: Irrigation, Sources of Irrigation, Yielding, Cropping, Agriculture Economy

Introduction:

Irrigation is defined as "Artificially supplying and systematically dividing of water for agriculture and horticulture in order to obtain higher or qualitatively better production. Water is essential to plant growth. Successful farmers have used different methods to apply water to their crops. This artificial addition of water is called irrigation. Irrigation is essentially the artificial application of water to overcome deficiencies in rainfall for growing crops. Irrigation is a basic determinant of agriculture because its inadequacies are the most powerful constraints on the increase of agricultural production. In traditional agriculture, irrigation was recognized for its protective role of insurance against the vagaries of rainfall and drought. But now, adoption of high yielding varieties, chemical fertilization and multiple cropping highly used controlled irrigation is quite essential for increasing productivity.

Need for irrigation: The need for irrigation in Dharwad arises from the following reasons:

Variability in rainfall: Rainfall

in India is very uncertain, which increase the element of risk and makes crop production rather difficult. Normal rainfall is marked by its wide fluctuations in different part as also variation from season to season and year to year in its quantity, incidence and duration. This uncertainly compels irrigation facilities to be provided.

Unequal distribution of rainfall :

In most parts of the district, 80% of the annual rainfall is received from June to September from the south-west monsoon South kannada And North kannada, where there is a constant deficiency of water.

To meet crop requirements and soil needs :

Different crops require different quantities of water supply throughout their growing provide. For example grain crops require their maximum supply during the time ear heads are formed; while sugarcane, cotton, chillies require more water. Most annual crops do not require water when they are maturing. Besides, sandy soils require frequent water supply than the alluvial or black soil.

To maximize production :

To get high yields and maximum production from land, and to facilitate double and treble cropping, irrigation is a must. According to the I.C.A.R.(Indian Council Of Agricultural Research) the production of irrigated crops is on an average 50p.c. to 100p.c. higher than that of the unirrigated crops in the same locality.

To get efficient use of utilizable flow : Many of the rivers are not perennial and they carry insignificant flows during the rabi season. There is also a wide disparity in the water flow from year to year.

Objectives:

1. To study the impact of irrigation system on the rural farm economy in terms of productivity, cropping pattern and cost of production.
2. To study the impact of irrigation system of Dharwad district on different taluka categories with reference to agriculture.
3. To study the overall impact of irrigation system on auxiliary activities like Yield rate, Cropping, High producing of crops.

Data based Methodology:

The present study selected for Dharwad District for the purpose of enquiry among all the districts of Karnataka State. Since Irrigation is the major source of agricultural development in the district concerned. of the different categories of sources are selected randomly from the Talukas whose distribution is given and techniques that are developed by geographer and other scientists have been employed. The details of tools and techniques used, maps and graphs have been used for showing water resources and irrigation. The present study made use of secondary sources of data. The secondary sources of data include reports and records from District Statistical Officer Dharwad.For the purpose of the present study, a year period secondary data covering the period to 2017-18.

Hypotheses:

1. The impact of irrigation system on agriculture economy is positive in terms of agri income and its variability is significantly across the different categories of the sources.
2. The impact of irrigation system is more on the growth of the farm related activities when compared to that of nonfarm related activity. Towards the end of the objectives and hypotheses, the following methodology is adopted.

Study area:

Physical aspects have been considered as basic factors which gives real characteristics of the particular region. Therefore, it is need to understand the physical aspects of the study area to conduct any investigation. Hence, an attempt is made to deal briefly the formation, location and extent, physical features, settlement characteristics, demographic characteristics and economics characteristics. These dimensions have really guiding the researcher to proceed for understand the reality prevailing in a region and helps for planning for further development of a region in different aspects.

Location and Extent:

The study area is located at the fringe zone of Semi -Malnad and Maidan of the north-western parts of the Karnataka State .It has extended between 15 2` to 15 42` northern latitude and 7443` to75 32` eastern longitude having Dharwad, Hubli, Kalaghatgi, Kundgol and Navalgund as the talukas of its junction. There are 367 Revenue Villages and 27 Hamlets, 06 Urban Centers with 05 Municipalities, 127 Gram Panchayat have been distributed on a geographical space in a region. The study region has an area of 4263 square kilometers with population of 1987580. (2019 census) The density of population is 434 persons per square kilometers (2019 census). The Navalgund taluk (1080 sq. km.) is biggest and Hubli taluka (631sq. km.) is the smallest taluka in terms of area. It is an educational hub in north Karnataka.

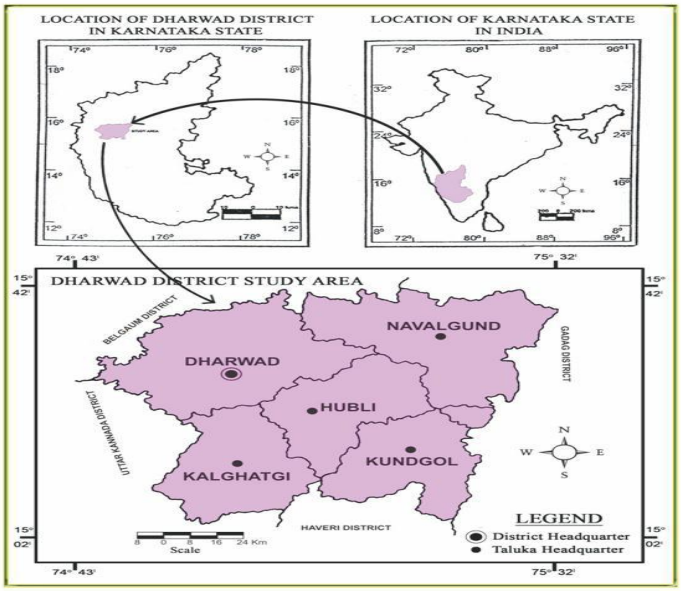

FIG 1: LOCATION MAP

Results and Discussion:

Geographical factors favouring irrigation: There are certain geographical factor which have led to the development of irrigation in Dharwad district. They are:

1. The slope of the plains is so gradual that the canals which are taken out in the upper course of the rivers can easily irrigate the land in the lower valley.
2. The soil is fertile which makes the greatest use of irrigation.
3. The clay in the sub-soil is deep which acts as reservoir for the rain water which sinks through the porous alluvium of the plains and which is later tapped by wells.

The main sources of irrigation in Dharwad are:

1. Canals2. Wells (and tube wells)3.Tanks and reservoirs and other sources

Canal Irrigation:

A canal is an artificial watercourse constructed for water supply and irrigation.

There are two types of canals:

Inundation Canals – These are taken out from the rivers without any regulating system like weirs etc at their head. Such canals are useful only during the rainy season.

Perennial Canals – These are those which are taken off from perennial rivers by constructing a barrage across the river. Most of the canals at present in India are perennial.

Canals can be an effective source of irrigation in areas of low relief, deep fertile soils, perennial source of water and an extensive command area. Therefore the main concentration of canal irrigation is in Navalgund taluka.

Merits of canal irrigation: (1) Perennial Source (2) Provides safety from droughts (3) Brings fertile sediments to the fields (4) Economical to serve a large area

Demerits: (1) Canal water soaks into the ground and leads to water logging, increases salinization, and leads to marshy conditions leading to malaria and flooding (2) Wastage of water.

Wells (and Tube Wells)

A well is a hole dug in the ground to obtain the subsoil water. An ordinary well is about 10-12 meters deep but deeper wells up to 20-30 meters are also dug.

A tube well is a deeper well (generally over 20-30 meters deep) from which water is lifted with the help of a pumping set operated by an electric motor or a diesel engine.

Well irrigation is gradually giving way to energized tube wells. But there are many wells still in use where electricity is not available or the farmers are too poor to afford diesel oil.

This method of irrigation is popular in those areas where sufficient sweet ground water is available.

At present irrigation from canals and tube wells accounts for more than 60% of the net irrigated area in the district.

Dharwad district has the largest area under well irrigation which accounts for 18% of the well irrigated area of the District. Hubli, Dharwad, Kundagol Talukas account for about three-fourths of the total well-irrigated area

Merits of well irrigation:

Simplest
Cheapest
Well is an independent source of irrigation and can be used as and when the necessity arises. Canal irrigation, on the other hand, is controlled by other agencies and cannot be used at will.
Some ground water salts are useful for crops
Does not lead to salinization and flooding problems
There is a limit to the extent of canal irrigation beyond the tail end of the canal while a well can be dug at any convenient place.

Demerits:

Only limited area can be irrigated. Normally, a well can irrigate 1 to 8 hectares of land.
Not suitable for dry regions.
Overuse may lead to lowering of water table.

Tank irrigation:

A tank is a reservoir for irrigation, a small lake or pool made by damming the valley of a stream to retain the monsoon rain for later use.

It accounts for approximately 4% of the net irrigated area in Dharwad District.

Tank Irrigation is popular in the Hubli and Dharwad areaare the leading districts.

The undulating relief and hard rock's make it difficult to dig canals and wells
There is little percolation of water due to hard rock structure and ground water is not available in large quantities.
Scattered nature of agricultural fields.

Merits:

Most of the tanks are natural and do not involve cost for their construction
Independent source for an individual farmer or a small group of farmers
longer life span
can be used for fishing also

Demerits:

Depends on rain and these tanks may dry up during the dry season
Silting of their beds
Require large areas
Evaporation losses
Sometimes there might be a need to lift the water to take it to the field

Gross and Net Area Irrigated under Different Sources 2017-18

Table No – 1

Sl. No.	Taluk	2017-18 Net Area Irrigated (in Hectares)											
		Canals				Tanks				Wells			
		Length in Kms	Gross Irrigated Area	Net Area Irrigated	Percentage	Number of Tanks	Gross Irrigated Area	Net Irrigated Area	Percentage	Number of Wells	Gross Irrigated Area	Net Irrigated Area	Percentage
1	Dharwad	0	0	0	0	371	0	0	0	406	0	0	0
2	Hubli	8	0	0	0	64	0	0	0	422	0	0	0
3	Kalaghatagi	0	0	0	0	782	0	0	0	89	0	0	0
4	Kundagol	0	0	0	0	14	0	0	0	106	0	0	0

5	Navalagund	78	15383	12774	100.00	14	0	0	0	89	0	0	0
	District Total	**86**	**15383**	**12774**	**100.00**	**1245**	**0**	**0**	**0**	**1112**	**0**	**0**	**0**

Sources: Dharwad District a Glance

Gross and Net Area Irrigated under Different Sources 2017-18

Table No – 2

Sl. No.	Taluk	2017-18 Net Area Irrigated (in Hectares)													
		Tube Wells				Lift Irrigation				Other Source			Total		
		Number of Tube wells	Gross Irrigated Area	Net Irrigated Area	Percentage	Number of Lift Irrigation	Gross Irrigated Area	Net Irrigated Area	Percentage	Gross Irrigated Area	Net Irrigated Area	Percentage	Gross Irrigated Area	Net Irrigated Area	Percentage
1	Dharwad	1712	14599	13556	51.72	0	0	0	0	0	0	0	14599	13556	27.66
2	Hubli	1508	5957	5341	20.37	0	0	0	0	0	0	0	8201	5758	11.74
3	Kalaghatagi	2798	8201	6758	25.77	0	0	0	0	0	0	0	5957	6758	13.79
4	Kundagol	506	274	203	0.77	0	0	0	0	0	0	0	274	203	0.41
5	Navalagund	281	351	351	1.33	0	0	0	0	10105	8605	100.00	25839	22730	46.38
	District Total	6805	29382	26209	100.00	0	0	0	0	10105	8605	100.00	54870	49005	100.00

Sources: Dharwad District a Glance

Net area irrigated under different sources in Dharwad District

High zone canal irrigation: This zone comprises the north eastern taluka like Navalgund which is highly irrigated good development of irritation. Entire taluka has level topography has recorded. It is very good water supply to the taluk and 100% irrigation system in Navalgund. The total gross irrigated area is 15383 hectors and total net area irrigated is 12774 Hectors.

Moderate zone tanks irrigation: This zone comprises the northwestern talukas of Dharwad. the number f tube wells in this taluka is 1712 tube wells in the year 2017—18. Dharwad taluka's gross irrigation are in talukas has 14599 hectors area.

Low zone area – Wells and others: The number of tanks is 371 tanks but this type of irrigation is very popular in the district. Other source if irrigation in the Navalgund taluka's total gross irrigated area is 8605 Hectors.This zone has Hubli, Kaghatagi, Kundagol talukas are very low irrigated.

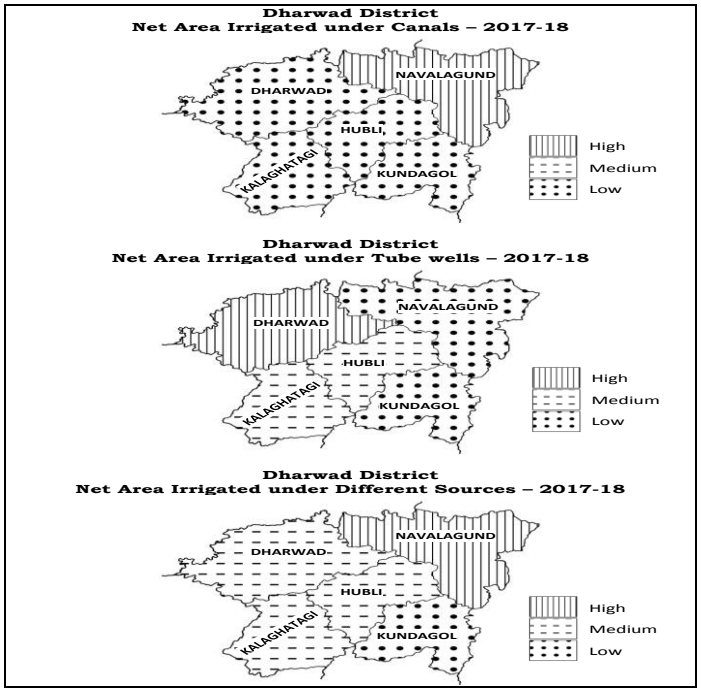

Fig 2: Net area irrigated under different sources in Dharwad District

Conclusion:

Historical evidences suggest that Dharwad was a popular seat of human habitation even during PaleolithicAge.Dharwad district is a part of Northern transitional zone, having a typical dryland eco-system except parts of Navalgund taluks which have irrigation facilities from MalaprabhaCanal.Erratic monsoon and frequent dry spells elevates the risk in farming. The soil and water conservation measures through watershed approach, drought proofing is absolutely necessary to ensure reasonable level of crop yields.The whole district represents un- uniform rainfall pattern.Under AIBP (Accelerated Irrigation Benefit Programme), various activities are proposed by major irrigation, minor irrigation departments wherein incomplete works are proposed to be taken up in different taluks at an estimated cost of Rs. 23688.89 crores and this would create irrigation potential of 49673 ha in the district

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Perspectives Role of Agro – Tourism With Special Reference To Mapro Gardens, Mahableshwar

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Abstract The World Tourism Organization (WTO) defines rural tourism (Agro-tourisim) as tourism that gives to visitors a personalized contact, a taste of physical and human environment of the countryside and as far as possible, allowsthem to participate in the activities, traditions and lifestyles of local people. In the most recent 30 years of the twentieth century the term Agritourism showed up in worldwide writing. There exists a parallel word Agro-Tourism. Agro tourism offers a unique opportunity to combine aspects of the tourism and agricultural industries in order to provide tourists, producers and communities with a number of financial, educational and social benefits. Agro tourism provides producers with the opportunity to generate additional income and avenue for consumers to market directly. This paper describes the significance of agro tourism for the farmers, towards improvement of standard of living of people involved in agro tourism and overall development of our Indian economy. This research paper also analyzes the reasons for the growth of agro tourism in India. The research objectives are to investigate the contribution of Mapro gardens as a place to visit in promotion of agro tourism at Panchgini, Mahableshwar.
Keywords: Environment, Tourism, , Agro tourism, Visitors

Introduction

Aagro- tourism approach has got lot of potential to transform and develop a rural economy into a modern economy by utilizing the local resources to its fullest potential. About 65 – 70 percent of the population is dependent on agriculture directly or indirectly and generates their livelihood. About 16 – 17 percent of total GDP comes from agriculture. It would certainly increase the contribution of agriculture to national GDP by providing additional income generating activities for existing agriculture. Agro tourism is the latest concept in the Indian tourism industry that usually takes place on farms. It offers the opportunity to experience the real enchanting and authentic contact with rural life, taste genuine local food and learn about the various agricultural tasks during the visit. It offers a welcome escape from everyday hectic life in a peaceful rural setting. It gives the chance to relax and revitalize in the pure natural environment, surrounded by magnificent setting. Simply put, agro - tourism can be seen as a crossroads between tourism and agriculture. More technically specified, agro - tourism can be defined as a form of commercial enterprise that links agricultural production and / or processing with tourism to attract visitors to a farm, ranch or other agricultural business for the purpose of entertaining and / or educating visitors and generating income for the owner of the farm, ranch or business. Whatever the exact definition or terminology, the following four factors should be included in any definition of agro - tourism:

1. designed to increase farm income ; and
2. Provides visitors with recreation, entertainment and/or education.
3. combines the essential elements of the tourism and agricultural industries ;
4. attracts members of the public to visit agricultural operations ;

The present paper is an attempt to understand significance of agro tourism in India in terms of its contribution towards raising the standard of living of people associated with agriculture, generating employment and overall development of our economy. The paper tries to analyze significance of Mapro garden as a destination for agro tourism as well.

Statement Of The Problem

This research paper aims to probe into, the significance of agro tourism towards raising standard of living or contribution towards economic growth. The researcher has tried to analyze the opinions of the tourists visiting the agro tourism places towards their experiences and purpose of their visits at such places. To understand in an elaborative way about the agro tourism a case study of Mapro gardens at Panchgini, Mahableshwar is also highlighted.

Objective Of The Study

Present study aims to examine the significance and reasons for the growth of agro-tourism development. In this broader framework, an attempt is made to achieve the following specific objectives: To examine the importance of agro-tourism in the development of farmer's livelihood.

- To describe the significance of agro-tourism development
- To understand the reasons for the growth of agro tourism in India
- To identify the problems of the agro-tourism and make suggestions to establishment and operations of agro-tourism
- To discuss the case study of Mapro gardens at Panchgini, Mahableshwar.

Scope Of The Study

The benefits of agro-tourism development are manifold. Agro tourism is an inexpensive gateway as it takes travel and tourism to the larger population, widening the scope of tourism due to its cost effectiveness. Employment opportunities to the farmers including farm family members and youth is increased many folds and the additional income source for the farmers act as shield to protect against income fluctuation. It enhances the tourism industry by increasing the volume of visitors to an area and the length of their stay. Agro tourism also provides communities with the potential to increase their local tax bases and new employment opportunities. Additionally, agro tourism provides educational opportunities to the public, helps to preserve agricultural lands, and allows states to develop business enterprises.

Limitations Of The Study

1. Case study of only Mapro gardens has been considered for the study as a place of agro tourism.
2. From among the total number of tourists visited agro tourism places 100 sample respondents are interviewed.

3. Review Of Literature

Agro-Tourism has the potential to change the economic face of traditional agriculture. Examine the importance of agro-tourism development in Maharashtra. To define a suitable framework for the of agro- tourism centers in the view of marginal and small.

Literature has it that Agritourism started in the United States in the early 1800s (Karabati et al., 2009). A number of countries of the world have transformed their economies through agro-tourism activities. The Inter-American Institute for Cooperation on Agriculture (IICA) has been promoting agritourism in the Caribbean since 2005 to strengthen links between tourism and agriculture (IICA, 2011). In Thailand, it has been used as one of the main medium to attract tourists from all over the world. Since the advent of agritourism in Thailand in 2002, agro tourism has created a great impact by having a record of more than half a million tourists visiting farm areas in a national scheme (Taemsaran, 2005). In Europe, agritourism has become a way of life for Europeans as a large percentage of Europeans take farm holidays (Frater, 1983). Agro-tourism industry is gaining ground in Malaysia as the country has a wealth of products for visiting tourists (Hamzah, 2011).

- Naidu (2016)2 The paper aims to study the ongoing Agro-tourism initiative & existing schemes to promote agro tourism in the country. It also highlights Documentation of existing business models in Agro-tourism – suggesting viable model. Further research aims to find out the strategic role of extension and advisory services in sustenance of Agro-tourism.

Privitera (2015) the research paper aims to differentiate agro tourism and organic agro tourism definitions specifying the principal characteristics. It tries to investigate the role of organic-agro tourism, as a tool for development of the landscape and attraction for sustainable tourism.

The purpose of this paper was to identify and examine those factors that have helped rural communities successfully develop agro tourism, in particular organic agro tourism and its entrepreneurship opportunities.

Upadhye (2015) examines the importance of agro-tourism development in Western Maharashtra. The research paper focuses on various factors instrumental enhancing agro tourism in Maharashtra. The paper analyzes the various products provided by Agro Tourism in Maharashtra and also discusses the problems of agro tourism industry in Maharashtra.

Methodology & Data Sources Of Data Collection

1. Primary data

The study is based on primary and secondary data. In order to achieve objectives of the study and to test the hypothesis, moreover, 100 sample respondents are contacted and interviewed.

2. The secondary data

The data is gathered from relevant research journals, websites, published and unpublished sources etc. Some data has furnished from the websites of the government of India and Maharashtra, as well as Ministry of agriculture. Some ideas have been taken from the Tourism Development Corporation of Maharashtra.

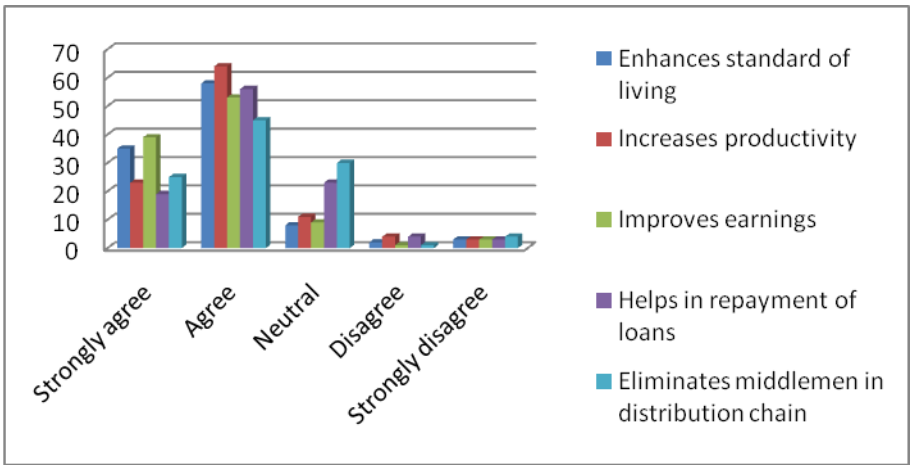
Results & Analysis:

The opinions of tourists respondents have been analyzed in terms of:

- Significance of agro tourism for the farmers
- Benefits of agro tourism
- Reasons for the growth of agro tourism in India
- Opinions towards visit to Mapro gardens in terms of purpose to visit, the most preferable liking at Mapro
- Mapro gardens a contributor towards growth of agro tourism

Table: 1-Beneficial to the Farmer

Particulars	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Enhances standard of living	35	58	8	2	3
Increases productivity	23	64	11	4	3
Improves earnings	39	53	9	1	3
Helps in repayment of loans	19	56	23	4	3
Eliminates middlemen in distribution chain	25	45	30	1	4



It can be noted from the chart that there are mainly five ways in which agro tourism benefits the farmers. Majority of the people agree to these ways being beneficial to the farmers. Agro tourism helps the farmers to generate more income and attain a better standard of living. Around 85-90% respondents believe that it enhances standard of living, increases productivity and improves earning. 65 - 75 % respondents are in opinion that it helps in repayment of loans and eliminates the middle men.

Table: 2-The most preferable Thing at Mapro Garden

Reasons	Percentage
Food Quality	43
Scenic View	43
Hospitability	8
Other	6

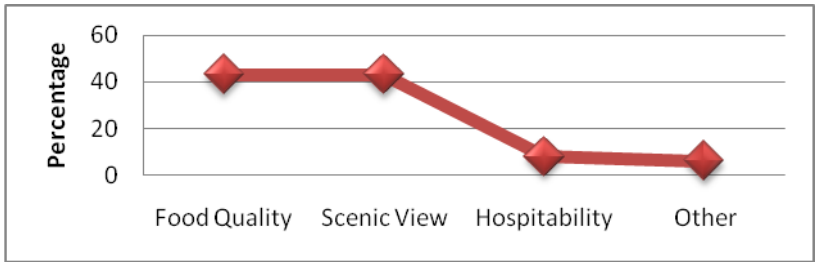
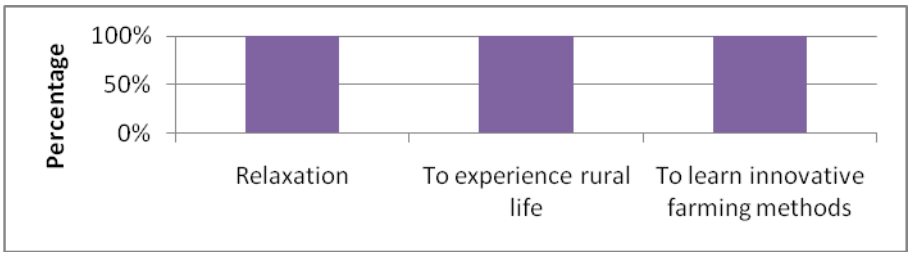


Table: 3-The purpose of Visit of Mapro Garden

Reasons	Percentage
Relaxation	52.5%
To experience rural life	18.75
To learn innovative farming methods	13.75



More than 50% of the people visit the Mapro Garden for relaxation. They find an escape in this garden away from their busy lives. 15% people visit the garden to learn about new innovative farming methods and experience rural life. Among the population size of 100 around 15 are interested to visit such place to be the first hand learners by experiencing the innovative methods at such places.

Findings & Conclusion

The Maharashtra has a greater potential of the development of the agro-tourism centres due to the good natural and climatic conditions. But there are some problems in the process of agro-tourism development in the state. Few problems researcher could come across while doing the survey. Major challenges and problems are as follows;

- Lack of perfect knowledge about the agro tourism Weak communication skill and lack of commercial approach of the small farmers
- Lack of capital to develop basic infrastructure for the agro-tourism
- Ignorance of the farmers towards the hospitality for the urban tourists
- Presence of unorganized sector in the agro-tourism industry
- Ensuring hygiene and basic requirements considering urban visitors.

SUGGESTIONS

Agro-Tourism is a one of the business activities. So, farmers must have commercial mindset and some marketing techniques for the success. For the better success in the agro-tourism farmers should follow the following things;

- Train your staff or family members for reception and hospitality Understand the expectations of tourists and try to reduce the gap between their expectation and perception
- Charge optimum rent and charges for the facilities/services on the commercial base
- Do the artificially use local resources for the entertain / serve to tourist
- Develop a good relationship with the tourist for future business and chain
- Develop different agro-tour packages for different type of tourist and their expectations.
- Preserve an address book and comments of the visited tourists for future tourism
- Small farmers can develop their agro-tourism centers on the basis of cooperative society
- Participation in training and skills development programs with Maharashtra State Development corporation

Conclusion

Agro tourism is still a developing sector in India. There is a lot of scope for growth in this sector but necessary steps should be taken by the government for the same. With appropriate policies, agro tourism can generate tremendous revenue for the government and can be one of the sought after vacation options.

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Status of Water Resource & Water Harvesting

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Abstract- Significance of the use of water resource economic development hardly needs to be emphasized. Increasing need of water consequent upon agricultural development may be met by intensive and extensive use water. Intensive use refers to local circumstances such as well or tubewell irrigation, while the latter involves regional aspects of irrigation such as canal irrigation. Therefore, one of the major purposes of inquiry into the water resources is to define and specify temporal and regional patterns of quantity and quality of surface and ground water and to study the fluctuations in the level of ground water and seasonal or monthly flow of surface water.

Significance of Water Resources

Farming in dry land without irrigation is a suicidal and uneconomic venture. In such conditions, the availability of water is the only redeeming factor. An inadequate and poor water supply, otherwise, productive dry land cultivated by assiduous farmers produces only an inferior and subsistence farming and poor living standard for the peasantry. On the other hand, sufficient and assured water supply to the same farming systems would yield superior and commercially profitable farming and superior living standard of peasants. In the areas having meagre concentrated and highly truant rainfall, the establishment of prosperous farming begins with the utilization of water resources. An assured and regulated supply of Agricultural water from ground and surface sources is the basic and essential aspect upon which any future planning of irrigation depends. There are four major sources of water available to man (a) surface water (b) ground water (c) atmospheric water and the (d) oceans, but surface and ground water are most dominant. Surface water in the form of rivers streams and lakes is the most important source for irrigation purposes. Ground water is equally important particularly in those areas deficient surface water. Its ability or inability- so also the efficiency or inefficiency depend upon its depth, quality and quantity.

Role of Ground Water

Ground water resources are formed by hydrostatic pressure. The permeable rocks get saturated with water leached through the soil. The quality and quantity of ground water, however, depends upon the geological structure. The zone of saturation may extend up to the upper surface in some places, notably in seep areas and in some stream channels, Lakes and marshes. At other places above the groundwater zone there exists a ' zone of aeration' that may range in thickness from few centimetres to several hundred metres. In the zone of aeration some amount of water is perennially held by molecular attraction. Soil may hold significant volume of water against the downwards pull of gravity. Well cannot extract any of this water, they must be drilled through a zone of aeration whereby they obtain their supplies from groundwater. There are isolated places where thickness of the water holding layer even exceeds a kilometre. Such gigantric reservoirs of groundwater provide a perennial water supply for agriculture. Despite the abundance of surface water in Ganga plain considerable amount of deep ground water continue to promote productive agriculture. On the whole, groundwater is very unevenly distributed beneath the surface. Variations entirely depend upon local differences both in water yielding capabilities of aquiferous and at the depths at which water can be reached. The behaviour of ground and rainfall varies from year to year and season to season causing widespread regional imbalances rise in water-table is mainly controlled by:

(i) Shallow depth of the water table before the advent of rains;
(ii) Relatively heavy seasonal rainfall.
(iii) High intensity of irrigation and a dense irrigation network heading to excessive seepage.
(iv) Proximity of the rivers and steams, and
(v) Low-lying terrain accommodating the accumulation of rainwater which ultimately seep downward.

In some of the arid and semi-arid regions of the world, huge amount of ground water are available; however, they are unsuitable for farming owing to the presence of salts and other harmful constituents. It is, therefore, essential to make a judicious use of ground water resources avoid excessive overdraft and to

prevent depths in an area the most common measures, if deemed fit may be adopted.

(a) Construction of carthen embankments to hold the water available in rainy season to percolate into the subsoil.

(b) Making provision for collecting flood water of the seasonal streams by constructing reservoirs seep into groundand

(c) Increasing the provision of Canal irrigation in rainfed areas.

Optimum and judicious water utilization is absolutely necessary to ensure increased agriculture production- surface water resources though plentiful in some parts of the country, should not be depended solely upon for irrigating the crops throughout the growing seasons, since rainfall is often erratic. Tapping ground water resources and their conjunctive use along with surface water. Irrigation, therefore, forms a major aspect of water resource, management. However, in some arid and semi-arid areas ground water is not suitable for irrigation owing to the presence of salts and other harmful constituents in excess. Characterization of groundwater and the related soil and crop factors, therefore, become very important for planning the utilization of ground water in those problematic areas where it may be the largest replenishable source constituting agricultural water.

Role of surface water

Surface water is the water on the land, surface available in flowing rivers lakes and ponds. Surface flow is derived partly from the rainfall. Apart from the rainfall that is absorbed by the soil also becomes surface water by its discharge when it seeps into rills and tunnels. The portions of rain or snow that melt penetrate and form the groundwater. Ground water effluent becomes the base flow that maintains the flow of streams in fair weather. Surface water is most important means for providing substantial irrigation which stabilizes and improves agro-economic life in an area that has otherwise plenty of land potential. Because of the uncertainty in the amount of surface water, it is probable that any attempt to improve agricultural technique and land use planning without combating the problems which held the shallow and deep water tables is bound to be abortive. The main problem in surface water utilization in dry lands is the prevention of losses by evaporation and percolation and absorption. Soil is essential to adopt certain methods for measuring evaporation of water from surface and to adopt suitable techniques to check water losses. I Surface water supply is controlled by several factors such as a large quantity of water in the form of rivers, streams, lakes, glaciers, gentle surface gradient and soft land. They make possible the construction of a network of canals. The rivers that rise in the Himalayas, for example, are perennial in nature but their discharge is very irregular from year to year, season to season, and month to month. The diminishing winter flow of the river is reinforced in the spring season by melting, thus compensating the water shortage in the critical period right up to the onset of the monsoon rains. The fluctuation of discharge severely obstructs successful crop. Moreover, it affects the intensity of irrigation. The extent of area cultivated, the proportion of double cropped area, the production per unit area ultimately influences the cropping pattern. The variation in availability of water is most disconcerting to farmers. If the farmer can anticipate the fluctuation the task of planning their cropping pattern in advance can become much easier.

Need of Water Harvesting

Large scale depletion of water is a very serious problem which must be tackled urgently. Shortage of water is felt in rural areas for irrigation and domestic as well as industrial use in urban areas. Wastes of water in our nation and study area is very alarming. A disturbing feature will be apparent from the fact that in Delhi every day about 80 crore litres of fresh water is wasted by the leakage of the old networks of pipes and cisterns. The another survey report regarding the depletion of water says that about 25000 tanks were dug in the old Mysore for irrigation point of view. Out of these about 15000 tanks got dried. (Source: India Today, June, 2003). In cities and towns demand of water is increasing day by day. The percolation of surface water to ground level is blocked and the natural recharge of ground water does not take place. Consequently, the ground water level in wells tube wells falls and several go dry. This results in acute shortage of water and in certain areas is not available for even domestic use. This problem can be solved to a certain extent by rain water harvesting.

Methods of Rain Water Harvesting

Protection, preservation and efficient utilization of water resources is very important for following reasons: water scarcity, increasing population, rapid industrialization, vegetation and wild life and others.

1. Construction of dams may be useful from the point of view of management of water resource but at the cost of environment. Dams are not considered environment friendly. Many dams lie in the seismic zones like:

(i) Hanuman Nagar Barrage on Kosi – Located at Bihar-Nepal border.

(ii) Balmiki Nagar Barrage on Gandak - Located at Bihar-Nepal border.
(iii) Indrapuri Barrage on Sone-Located at BiharChattisgarh border.
Yet dams are a necessity, therefore, more dams should be constructed on the different Northern and Southern rivers of Bihar for the irrigation and power generation.

2. Check Dams: These are generally natural catchment dams in water deficit areas like Western and Southern Bihar. Several schemes are presently in operation. Rain water is allowed to be collected in natural depressions. Artificial bunds are erected to prevent water run off. Rain water is used for irrigation and promoting vegetation cover on ground.

3. Vegetation Cover: It is the most important measure to harvest rain water continuously. The roots of vegetation percolate into the soil deeply and it allows rapid seapage through the roots. Thus, ground water level will be maintained every year. In Bihar forest is very poor and scattered. About 6.72 per cent area is covered by forest. So Bihar is ecologically imbalanced and more plantation work in the barren and waste land should be done to make the state ecologically strong. **4. Inter basin Water Transfer:** By this scheme water will be transfered by canals and pipelines from the ever flowing rivers to the seasonal rivers and rain water can be stored and decentralized. Thus water can be used more by preventing canals breaches and seepage.

5. Prevention of Water Pollution: Almost all the civilizations took place in the river valleys. Therefore, industrial development has taken place near to the river channel. Towns and cities are located at their sides as well. So the river water is being polluted regularly by the disposal of industrial and urban wastes. This should be prevented.

6. Roof Top Water Harvesting: Conservation of roof top rain water in urban areas and utilising the same to augument ground water storage by artificial recharge requires connecting the outlet pipe from roof top to divert collected water to existing well /tubewell / borewell or a specially designed well. It is estimated that 65,000 litres can be collected on a roof of 100 sq. metre area in Delhi and this water can be used for recharging the ground water. It can meet the water requirement of a family of four persons for drinking and domestic purposes for duration of 15 to 60 days. **Advantages of Roof Top Rain Water Harvesting**

(i) This is an appropriate option for augumenting ground water storage in urban areas where natural recharge has been considerably reduced due to increased urban activities.
(ii) Monsoon run off which otherwise flows into sewerages and storm drains and is wasted, is harvested and utilized.
(iii) Rain water is bacteriologically safe, free from organic matter and is soft in nature.
(iv) It helps in reducing flood hazards.
(v) It mitigates the effects of drought.
(vi) It improves the quality of ground water through dilution, specially for fluoride and nitrate.
(vii) Rain water may be harvested at place of need and may be utilized at the time of need.

Methods of Rain Water Harvesting and Ground Water Recharge

Following structures are usually used for rain water harvesting and ground water recharge:
(i) Recharge pits (ii) Recharge trenches (iii) Abandoned dug wells (iv) Recharge wells (v) Hand pumps (vi) Recharge shafts (vii) Lateral shafts with bore wells. (viii) Spreading techniques like percolation ponds, check dams, cement plugs, gabian structure etc.

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A Study on Contribution of Vikram Seth and His Works to Indian Writing in English

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Abstract : The Indian writing in English has a great deal of contribution to English Literature. It was criticized as 'a Mathew Arnold in a Saree' in olden days. However, it is flourished in multiple ways by providing sublime works of arts covering wide genres as well. It is no more restricted to Indian geographical boundaries. In fact, it is liked, read by the readers, scholars, academicians and students in different parts of the world. The present article deals with the notable works and contribution of Vikram Seth to the Indian writing in English. 'The Golden Gate (1986)', 'A Suitable Boy' (1993) and 'An Equal Music' (1999) are some of the notable works in English. It is noteworthy to mention that Vikram Seth has master his art of writing and proved the metal by covering various themes such as love, human relationships, realism, modernism, cosmopolitan sensibility, nature landscapes and emotional turmoil in human life.

Keywords: Indian Writing in English (IWE), Vikram Seth, The Golden Gate, Realism, Indian Novel, Indian Poetry

Introduction:

Literature is the mirror of society. The Indian writing in English has a great deal of contribution to English Literature. It was criticized as '*a Mathew Arnold in a Saree*' in olden days. However, it is flourished in multiple ways by providing sublime works of arts covering wide genres as well. It is no more restricted to Indian geographical boundaries (Mokashi-Punekar, 2008). In fact, it is liked, read by the readers, scholars, academicians and students in different parts of the world. The present article deals with the notable works and contribution of Vikram Seth to the Indian writing in English. It is noteworthy to mention that Vikram Seth has master his art of writing and proved the metal by covering various themes such as love, human relationships, realism, modernism, cosmopolitan sensibility, nature landscapes and emotional turmoil in human life (Bhabha, 2004). His poems are the best evidences which portray the plight of human mind, emotions, feelings, mood and mentality from time to time. He is one of the prominent writer, novelist, and poet of modern generation. The Golden Gate (1986), A Suitable Boy (1993) and An Equal Music (1999). Each novel is unique in its own way. The present article examines what is the contribution of Vikram Seth to Indian writing in English.

Background of Study:

Literature is the mirror of society. The two fundamental dualities Indian writers in English effectively tackled in their writings were the complicated multiphonic, multicultural social environment of rising post-independence India and the tradition bound pre-independence India (Macaulay, 1970). Indian writing in English has a lengthy history, dating back to R. K. Narayan and continuing now with ChetanBhagat. In terms of realism and social truth, the great Indian three of R. K. Narayan, Mulk Raj Anand, and Raja Rao demonstrated how Indian life might be honourably and imaginatively depicted through their works. In depicting social reality, realism played a key role. A quick analysis of the works of the above listed pioneers is required to determine how this narrative mode was successfully created in Indian Writing in English. (Sajeev, 2014).

Scope and Significance of Study

Vikram Seth is a well-known writer, novelist, and poet of the modern age. Vikram Seth's first novel, 'The Golden Gate,' was published in 1986. For narrative writing, this novel adds a new layer and complexity to the sonnet form. Although he was born in India, he has lived and studied in a variety of nations. He is impacted by the culture, customs, and conventions of the several nations where he has spent significant time. He was a relative newcomer to the field of Indo-Indian literature. By theme and method, he has contributed and developed Indian English novels. Vikram Seth is a writer who uses personal and family relationships to allow the reader to peek into the minds and consciousness of the characters. Human beings are born social and stay so throughout their lives, although they suffer as a result of certain desires,

attitudes, losses, and gains.Vikram Seth is the recipient of various national and international awards and honours such as Thomas Cook Travel Book Award (1983); Commonwealth Poetry Prize (1985); Order of the British Empire (2001); PravasiBharatiyaSamman (2005) and Padma Shri in Literature and Education (2007). In addition, He was also honoured with "25 Greatest Global Living Legends In India" by NDTV in 2013. All of these make India and Indian writing in English proud creating sense of identity and own place in the world of English literature.

Objectives of Study:

The present article has the following objectives:

1. To study the notable works of Vikram Seth
2. To comprehend the contribution of Vikram Seth's works to Indian Writing in English
3. To analyze the various themes, aspects reflected in the notable works of Vikram Seth

Review of Literature

Rupali Gupta (2005) in her research stated that Vikram Seth's three novels viz. The Golden Gate (1986), A Suitable Boy (1993) and An Equal Music (1999) have created long-lasting impact on the minds of readers. Each novel is unique in its own way. The Golden Gate is the first novel written entirely in verse in English. With 1349 pages, A Suitable Boy is one of the longest novels ever written. An Equal Music is a musical novel about love and music that has a musical feel to it. Seth has five collections of poetry under his belt.

His first book of Mappings (1980) was originally self-published by Vikram Seth. It received little notice, and Philip Larkin, to whom he submitted it for feedback, mocked it around his friends, albeit he encouraged Seth. Seth submitted four poems to Oxfam in 2009, each of which serves as an introduction to one of the four collections of UK stories that make up Oxfam's 'Ox-Tales' book project. For From Heaven Lake, Vikram Seth received the Thomas Cook Travel Book Award in 1983, the Commonwealth Poetry Prize in 1986, and the 'SahityaAkademi Award' in 1988. From 1986 to 1987, he was a recipient of a Guggenheim scholarship (Hosking, 2005).

In the opinion of SeemitaMohanty (2007), Seth prefers traditional arranged weddings, but the point is that the young woman (like India) battles for independence only to make a rational decision in contrast to the lives of many around her who are damaged by foolish romantic fancies, uncontrolled sexual desires, religious and cultural fanaticism. The message is tolerance, common sense, and practicality, not mindless, biassed traditionalism.

The novels of Vikram Seth represent the social milieu of India and the world respectively of the contemporary. A Suitable Boy in his own world getting more and more cynical and indifferent to the pain and suffering of others in the name of difference, it affirms its faith in life and in values that we have almost forgotten care, compassion, concern, moral responsibility, brotherly love (Pandurang, 2004).

Discussion and Analysis:

Realism in Works of Vikram Seth:

According to Rajagopalachary&Krishnaiah (2019), Vikram Seth's novels are excellent examples of realism in all of its forms. His work is notable for its realistic narration, characterization, storyline populating with everyday persons, devotion to realism and plausibility, and his singular social focus. 'The Golden Gate' is a verse poem that comes after his greatest masterpiece, 'A Suitable Boy.' 'An Equal Music' is a masterful, realist analysis of western classical music. The reality and familiarity of the setting, plot, and characters are crucial in determining the author's realism experiment's merit.

Characterization and Common People

The characters are the mouth-pieces of the author. The author has stressed his narration around the everyday reality of common people in all the three novels (Prasad, 2011). In his works, he has built the much-needed sense of history that George Lukacs envisioned in his epic studies on Realism. The first two texts are told in third person by an omniscient narrator who observes and delivers the plot's basics to the reader. Because of the everyday nature of the individuals and events, the story's credibility is unquestionable. Seth, like a true classical realist, focuses on middle-class characters and their sensibility, while also emphasizing the lowest strata and working-class portions of society in appropriate places throughout the story.

Multiculturalism

As Vikram Seth has demonstrated in the pages of 'A Suitable Boy', 'multiculturalism' and 'multilingualism' are well integrated skillfully in his work. Vikram Seth, Anglicized and Americanized as he may appear, maintains connected to Asian family values, his continuous understanding of Hindi, and his writing of A Suitable Boy provided a vantage point on western history that may be the result of hybridization, but cannot be Western or European (Mélanie, 2014).

Findings of Study

1. The above research insights prove that Vikram Seth is a versatile, modern, thought-provoking writer. He has unique sense of noting minute observations from common people to metropolitan life. There are various notable themes handled in his works (novels, poems etc.).
2. Social realism is prominently found in several works of Vikram Seth. It represents the large middle-class dilemma, problems, and human relations.
3. Vikram Set has developed command over his art of characterization. His characters are found in day to day life around us.
4. It is found that human relationships are prevalent and reflect in various situations in most of his works from time to time. The love, romance, marriage, conflicts are sub-themes of the same.
5. Modernism is another salient feature of Vikram Seth's works with a great deal of contribution to the Indian writing in English. It represents the post-independence form of Indian English.
6. One side, Indianness is the way of life reflected in his works through marriage, natural landscapes, human relationships, characterizations. On the other hand, Vikram Seth also ensures modernism by adding situations. In short, it can be said that "Vikram Seth is A Citizen of The World."

Conclusion:

Vikram Seth has mocked experimental literature and romantic and extreme attitudes towards life. The keen interest evinced by Vikram Seth in literature urged him to undergo a course in creative writing. He was born in Calcutta and spent his childhood in Patna. Then he moved to England and kept on visiting different cities of the world. However, Indianness is deeply rooted in his thoughts, experiences, and works several times. Realism, modernism, human relationships, natural landscapes are prevalent in his works. Both his novels and poems are sublimes works of literary arts. It is his love for motherland as well. At the same time, his mastery on themes, genres, style of writing made him and Indian writing popular in the world.

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भारतातील घन कचरा प्रदूषण

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प्रस्तावना (Introduction) :

घनकचरा म्हणजे रोजच्या वापरातून उरलेला निरूपयोगी पदार्थ. ग्रामीण भागापेक्षा शहरी भागातून निघणारा घनकचरा व त्याची विल्हेवाट ही जगापुढील एक मोठी समस्या आहे.पूर्वीच्या काळी घनकचरा विल्हेवाटीची फार समस्या नव्हती. कारण लोकसंख्या कमी होती आणि घनकचरा टाकण्यासाठी जमीन मोठ्या प्रमाणावर उपलब्ध होती. परंतु आता लोकसंख्या वाढल्यामुळे घनकचरा मोठ्या प्रमाणात तयार होतो व जमीन पूर्वी होती तेवढीच आहे. घनकचरा मोठ्या प्रमाणात निर्माण होण्याचे कारण म्हणजे शहरीकरण, औद्योगिकीकरण प्लॅस्टिक वस्तू, वाढलेल्या राहणीमान आणि त्यासाठी लागाऱ्या वेगवेगळ्या प्रकारच्या वस्तू, वाढलेल्या लोकसंख्येची अन्नाची गरज भागविण्यासाठी शेतातील वाढलेले उत्पादन व त्यापासून निघणारा घनकचरा या सर्व घनकचऱ्याचे व्यवस्थापन करणे दिवसेंदिवस अवघड होत चालले आहे.

घनकचरा प्रदूषण दिवसेंदिवस वाढतच आहे. भारतात दरमाणसी दर दिवसाला 0.4 कि.ग्रॅ. एवढा घनकचरा तयार होतो. यावरून घन कचरा प्रदूषणाची कल्पना आपण करू शकतो. शेतातून किंवा घरातून निघालेला घनकचरा उघड्यावर टाकला जातो, तो कुजतो व त्यापासून दुर्गंधी सुटते. याबरोबर किटकांची उत्पत्ती होऊन आरोग्यास हानी पोहचते

उद्देश (Objective) :

भारतातील घन कचरा प्रदूषणाचा सविस्तर अभ्यास करणे.

अभ्यास क्षेत्र(Study Area) :

1. **भारताचा अक्षवृत्तीय विस्तार :**8^0 4’ 28 उत्तर अक्षवृत्त ते 37^0 6’ 53” उत्तर अक्षवृत्त आहे.
2. **भारताचा रेखावृत्तीय विस्तार** $68^0$7’33” उत्तर रेखावृत्त ते $97^0$25’47” उत्तर रेखावृत्त आहे.
3. **भारताची लांबी रूंदी व क्षेत्रफळ :** भारताची उत्तर-दक्षिण लांबी काश्मीरच्या उत्तर सीमेपासून दक्षिणेस कन्याकुमारीपर्यंत 3214 कि.मी. तर भारताची पश्चिम-पूर्व रूंदी गुजरातच्या पश्चिम किनाऱ्यापासून अरूणांचल प्रदेशाच्या पूर्व टोकामधील 2, 933 कि.मी. आहे. भारताचे क्षेत्रफळ सुमारे 32,87,263 चौ.कि.मी. आहे.

धनकचरा – व्याख्या:

ज्या गोष्टी वापरानंतर आणि निर्मितीप्रक्रियेनंतर निरूपयोगी त्याज्य म्हणून शिल्लक राहतात, शिवाय त्यांचा कोणताही भावी लाभ मिळणार नसतो अशा सर्व घनपदार्थांना केरकचरा /घनकचरा असे म्हणतात.

घनकचरा - प्रकार आणि स्त्रोत

नागरी कचरा :घरे, उपाहारगृहे, मोठे हॉटिल्स, कार्यालये, व्यबाजार, जनावराचे बाजार, दुकान, फेरीवाल, सार्वजनिक स्थळे , पडझड व नवीनआलेले पदार्थ , छोटे उद्योग , दवाखाने या सर्वांचा समावेश नागरी कचऱ्यामध्ये होतो.

औद्योगिक कचरा :कोळसा, लाकडाचे तुकडे, राख, धातूचा चुरा, लाकडाचा भुसा, कापूस-धागे, बॅट़्या, रंग, रबर, प्लास्टिक, काचा, कागद, कातडी, मळी, डांबर, कच्चे तेल, आम्ल-अल्कली पदार्थ, भंगार, माती-शाडूचे साचे, सामान बांधणीचे साहित्य अशा अनेकविध घटकद्रव्यांचा औद्योगिक कचऱ्यात समावेश होतो.

धोकादायक कचरा:मोठमोठे कारखाने, रासायनिक प्रक्रिया, शस्त्रास्त्रे व स्फोटके निर्मिती उद्योग, अणुऊर्जा प्रकल्प, दवाखाने, संशोधन संस्था , प्रयोगशाळा यातून बाहेर पडणाऱ्या त्याज्य पदार्थांना धोकादायक कचराअसे म्हणतात.

घनकचऱ्याच्या निर्मितीची कारणे

उच्च राहणीमान :घनकचरा निर्मिती हा बहुतांश मानवी हव्यास आणि चंगळवादाचा परिपाक आहे.उच्च राहणीमान म्हणजे अधिकाधिक खरेदी , वस्तुसंचय, वापरा, फेकून द्या व दरवेळी नवनवीन वापरा ' अशा विचारांचा पगडा यामुळे घनकचरा निर्मिती अव्याहतपणे वाढत आहे.

वाढती लोकसंख्या : वाढत्या लोकसंख्येला गरजेच्या जीवनावश्यक वस्तूंची निर्मिती , तेवढ्याच प्रमाणात निर्माण होणारा घनकचरा ही अशीच वाढत जाणारी मालिका उग्र समस्या बनते.

नागरिकीकरण :नगरे अनियंत्रित , अनियोजित, अस्ताव्यस्त पसरतात आणि घनकचरा निर्मिती वसाठवणुकीची केंद्रे सांडपाणी, मैला, केरकचरा, कारखान्यातील टाकाऊ पदार्थ निष्काळजीपणे फेकून देणे हा नागरिकीकरणाचा स्थायिभाव झालेला आहे.

औद्योगिकीकरण:उद्योगाचे केंद्रीकरण, उच्च राहणीमानातून उत्पादनाची वाढती मागणी आणि घन कचऱ्याची निर्मिती हे एक दुष्टचक्र आहे. मागणी तसा पुरवठा हा उद्योगाचा नियम आहे. त्यामुळे लोकसंख्यावाढीबरोबर नाही.विविध वस्तूंच्या उत्पादन प्रक्रियेतही वाढ होत जाणार हे साहजिकच आहे. म्हणून औद्योगिकीकरण हे घनकचरा निर्मितीचेमुख्य कारण आहे.

तांत्रिक प्रगती/तंत्रज्ञानतांत्रिक प्रगतीबरोबर अनेक वैविध्यपूर्ण अजैविक घटकांची निर्मिती वाढली. विविध उपकरणे, यंत्रे, रेडिओ, दूरचित्रवाणी संच, संगणक, कॅसेट्स, सी.डी., पंखे, शीतपेटी, वातानुकूलित यंत्रे, प्लॅस्टिकचे प्रकार अशी कितीतरी मोठी यादी तयार करता येईल. या गोष्टी स्वस्त व आकर्षक आहेत; पण या प्रचंड अविघटनकारी घनकचऱ्याचे काय करायचे? हा प्रश्न आहे.

भारतातील घनकचरा प्रदुषण:

पाश्चिमात्य संस्कृतीचा भारतीय जीवनमानावर परिणाम होऊ लागला आहे. 'वापरा आणि फेका ' ही संस्कृती आपल्याकडे नागरी भागात काही प्रमाणात रुजू लागली आहे. यातून व अन्य काही कारणातून घनकचऱ्याची समस्या निर्माण होऊ लागली आहे.

1. देशातील तीन लाखांहन अधिक लोकसंख्या असलेल्या 45 नागरी केंद्रांचा अभ्यास करण्यात आला. त्यावर दिसून आले आहे की, या नगरातून दररोज 50,000 टन घनकचरा निर्माण होतो.
2. मुंबई महानगरातून दररोज 4,400 टन घनकचऱ्याची निर्मिती होते. हा घनकचरा जमा करण्यासाठी 16,000 कार 270 मोठ्या मालवाहू गाड्या कार्यरत आहेत. देवनार, मालाड, मुलुंड आणि धारावी या उपनगरातून मोठ्या प्रा घनकचरा निर्माण होतो. हा घनकचरा कचरा-आगारामध्ये फेकून दिला जातो. त्याची विल्हेवाट लावली जाते.
3. कोलकता महानगरातून दररोज 4,000 टन निरुपयोगी घनकचऱ्याची निर्मिती होते. यातील सत्तर टक्के घनकच मात्र शास्त्रीय पद्धतीने विल्हेवाट लावली जाते.

4. दिल्ली महानगरातूनदेखील दररोज 4,000 टन घनकचरा निर्माण होतो. हा कचरा घाझीपूर , जैतपूर, मंडी आणि मी येथील सखल भागात विसर्जित केला जातो. दरडोई दर दिवशी कचरानिर्मिती 425 ग्रॅम आहे. चेन्नई महानगरातून दररोज 2,500 टन घनकचरा निर्माण होतो. किनाऱ्यावरील भागात याचे मोठ्या प्रमाणात विसर्जन केले जाते.
5. अहमदाबादमध्ये दरडोई घनकचरा निर्मितीत याचा वरचा क्रमांक लागतो. दरडोई 535 ग्रॅम निरुपयोगी घनकचरा दररोज निर्माण केला जातो. या बाबतीत वडोदरा खालच्या क्रमांकावर आहे. दरडोई प्रति दिवशी 300 ग्रॅम कचरा निर्माण केला जातो.
6. कानपूर व लखनौ या महानगरातून दररोज अनुक्रमे 1,000 टन आणि 900 टन घनकचरा निर्माण केला जातो. कानपूरमधील या कचऱ्यांपैकी दोन-तृतीयांश कचऱ्याची योग्य पद्धतीने विल्हेवाट लावलेली नाही. घनकचऱ्यातील त्याज्य पदार्थ कुजल्याने दुर्गंधी पसरते. उपद्रवी कीटकांची निर्मिती होते. यामुळे नागरी पर्यावरणाची हानी होत आहे.

वैद्यकीय घनकचरा: मुंबई, कोलकता, दिल्ली यांसारख्या महानगरातील हॉस्पिटल , डिस्पेंसरीज, नर्सिंग होम यांमधून मोठ्या प्रमाणात वैद्यकीय घनकचरा निर्माण होतो. याची योग्य पद्धतीने विल्हेवाट लावली जात नाही. काही हॉस्पिटल्स व नर्सिंग होम यांनी हा घनकचरा जाळून/भस्मीकरण (Incineration) करून यशस्वीरीत्या त्याचीविल्हेवाट लावण्याची स्वतःची यंत्रणा उभारली आहे.

खाणक्षेत्रे :

ताल्चेर खोऱ्यात कोळशाच्या खाणी आहेत. भूपृष्ठाला लागूनच हा कोळसा मिळत असल्याने खाणकामातून निघालेली निरुपयोगी माती , कचरा, मुख्म जवळच्या उघड्या जागेत टाकला जातो. या ढिगाऱ्याच्या टेकड्या निर्माण केल्या जातात. पावसाळयात या टेकड्या कोसळतात. यामुळे जवळपासची घरे गाडली जातात. कृषिक्षेत्रावर याचे संचयन होते. उघड्यावरील खनिज उद्योग प्रक्रियेमुळे ओडिशातील 95 टक्के खाणीजवळील जमिनी या निरुपयोगी व नापीक बनल्या आहेत.

घनकचरा प्रदूषण समस्येची अत्यंत शास्त्रीय पद्धतीने सोडवणूक करणे आवश्यक आहे. यासाठी चक्रीकरण प्रक्रिया '3-R' नियमाचा वापर आवश्यक असतो. Reduce, Reuse, Recycle असा हा Three R-Formula आहे. कचरानिर्मिती कमी करणे , निर्माण कचऱ्याच्या अन्य काही कारणासाठी वापर करणे आणि त्याचे पुनर्चक्रीकरण करणे आवश्यक आहे.

1. या कचऱ्यापासून शेतीला व बागांना आवश्यक असे खत निर्माण करता येऊ शकते.
2. घनकचऱ्यापासून वीजनिर्मिती होऊ शकते.

घनकचऱ्याचे परिणाम:

1. माशा, डास, चिलटे, उंदीर, घुशी यांची निर्मिती होऊन मलेरिया , डेंग्य. प्लेग, विषबाधा यांसारखे भयंकर रोगउद्भवतात.
2. कुत्री, डुक्कर, गाढव हे प्राणी या कचऱ्याच्या आसपास एकत्र येतात. त्यांच्याकडून कचरा अस्ताव्यस्त पसरला जाताआणि किळसवाणे दृश्य निर्माण होते.
3. घनकचऱ्याच्या कुजण्यामुळे दुर्गंधी पसरून हवा प्रदूषित होते. श्वासावाटे घातक सूक्ष्म जीव शरीरात जाऊन श्वसनाघसा व फुप्फुसाचे रोग, दमा, क्षय या रोगांना निमंत्रण मिळते.
4. गटारी तुंबतात आणि घाण सर्वत्र पसरते. बऱ्याचदा प्रचंड खर्चीक सांडपाणी/निस्सारण योजना निकामी होतात.
5. प्रचंड पावसामुळे घनकचरा विशेषतः प्लॅस्टिक पिशव्या वाहत जाऊन गटारी, सांडपाण निर्माण होते.

6. कचरा, धूळ, आसपासची घरे , दुकाने, पादचाऱ्यांना त्रासदायक ठरतो. तसेच उघड खाद्यपदार्थावर दुकान-हॉटेलमधील पदार्थांवर ही धूळ पड़ून अन्न-पाण्याचे दूषितीकरण होते, त्यातून विषबाधा होते.
7. शहरांमधील रिकाम्या जागा म्हणजे उकिरडा झाली आहेत. शिवाय अशा जागा व रस्त्यांचा वापर लोक बहिर्विधीसाठी करत असल्याने दूर्गंधी, कुजण्याची क्रिया, विषारी वायू निर्मितीतून हवा प्रदूषित होते.
8. दवाखाने, इस्पितळे यांच्या आसपास तेथन निर्माण होणारा दवाखान्यातील विशिष्ट प्रकारचा घातक स्वरूपाचाअनेक दिवस पडून राहिल्यास त्याच्या संपर्कातील लोकांवर विशेषतः रुग्णांवर अनावस्था प्रसंग गुदरता.
9. घनकचरा जनावरांच्या खाण्यात आल्यास आतड्यांमध्ये तो अडकून मृत्यू येतो.
10. घनकचरा जमिनीवर पडून एक दृढ आच्छादन निर्माण होते. घनकचऱ्यामुळे सूर्यकिरणांना प्रत्यक्ष जमिनीवर पोहोचण्यासाठाअवरोध निर्माण होतो. याच्या परिणामाने मदेची प्रत खालावते. उत्पादनक्षमता नष्ट होते. पारिस्थितिकी यंत्रणा खोडत हातव सूक्ष्म जीव , पशु-पक्षी, वृक्ष यांना हानी पोहोचते.

कचऱ्याच्या नियंत्रणाचे उपाय:

1. पर्यावरण संरक्षणात योगदान देणे हे सांविधानिक कर्तव्य आहे याची सार्वत्रिक जाणीव निर्माण करणे. अनावश्यक खरेदी म्हणजे साधनसंपत्तीचा गैरवापर ' हे सत्र लक्षात ठेवल्यास घनकचरा निर्मिती कमीतकमी होईल.
2. घरातील कचरा, कारखान्यातील जैविक कचरा , पालापाचोळा खड्ड्यात गोळा केला किंवा झाडाच्या बुंध्यापाशीपाचळण करण्याने उत्कृष्ट खतनिर्मिती होते.
3. घरे-कारखान्यातील कचऱ्यांवर चालणारे छोटे बायोगॅस प्लान्ट ही ऊर्जानिर्मितीची साधने ठरून स्वावलंबी वसमुचित तंत्रज्ञानाकडे योग्य वाटचाल करतील,
4. वारंवार लागणाऱ्या जीवनावश्यक वस्तू पुनर्वापरक्षम बनविणे.
5. बांबूच्या वस्तू, मातीच्या वस्तू यांसारख्या विघटनकारी वस्तूंना प्राधान्य दिल्याने छोटे कुटीरोद्योग वाढीस लागतील, न्या लाई रोजगारनिर्मिती होईल. शिवाय पर्यावरण रक्षण होईल.
6. फळे, फळांच्या साली, बिया, चोथा, पेंड यांचा जनावरांचा चारा म्हणून उपयोग होतो.
7. अल्कोहोल निर्मितीसाठी फळ प्रक्रिया, साखर कारखाने, गु-हाळे येथील त्याज्य पदार्थ उपयोगी ठरतात.
8. छोट्या कुटीरोद्योगाच्या स्वरूपात जैविक पदार्थाचे ताप-अपघटन करून कोळसा तयार करता येतो.
9. नगरीय घनकचरा नियम' |Municipal Solid Wastes (Management and Handling) Rules, 2000] कायद्याचीकाटेकोर अंमलबजावणी करणे.
10. घनकचरा निर्मलनात शासन , स्वयंसेवी संस्था, सर्वसामान्य जनता या सर्वांचेच सहकार्य मोलाचे आहे. त्यासाठी लोकशिक्षण-लोकजागृती याला पर्याय नाही

निष्कर्ष (Occlusion) :

1. घनकचरा प्रदूषणाची समस्या ही मानवनिर्मत आहे. त्यामुळे त्या त्या परिसरात दुर्गंधी पसरून रोगराई बळावते.
2. भारतातील घनकचऱ्याचे प्रदूषण हे उच्च राहणीमान, वाढती लोकसंख्या, नागरीकरण, औद्योगिकीकरण आणि तांत्रिक प्रगती/तंत्रज्ञानामुळे अर्थातच मानवाच्या दुर्लक्षितपणामुळे निर्माण झालेले आहे.

3. धोकादायक कचऱ्यामुळे हवा, भू व जलप्रदूषणात वाढ होऊन त्याचा सजीवावर (मानव, प्राणी, वनस्पती) वर विपरित परिणाम होत आहे.
4. नागरी घनकचऱ्यामुळे आणि डंपींग ग्राऊंडवरील कचऱ्यांच्या डेपोमुळे त्या त्या परिसरातील मानवी जीवनावर विपरित परिणाम होत आहे.
5. भारतातील महानगरातून दररोज (मुंबई-4400 टन, कोलकत्ता-4000 टन, दिल्ली- 4000 टन, चेन्नई-2500, कानपूर- 1000 टन, लखनऊ- 900 टन) घनकचरा निर्माण केला जातो. यांपैकी जवळपास 2 तृतीयांश घनकचऱ्याची योग्य पद्धतीने विल्हेवाट लावली जात नाही, यामुळे त्याज्य पदार्थ कुजल्यामुळे दुर्गंधी पसरते, त्यामुळे नागरी पर्यावरणाची हानी होते.
6. घनकचऱ्याच्या परिणामामुळे मलेरिया, डेंगू, प्लेग यासारखे भयंकर साथीचे रोग त्या त्या परिसरात निर्माण होतात.
7. घनकचऱ्याच्या कुजल्यामुळे दुर्गंधी पसरून हवा प्रदूषित होते, त्यामुळे घसा व फुप्फुसाचे रोग, दमा व क्षय इ. रोग मानवास जडतात.
8. घनकचऱ्यामुळे प्राणी जीवनावर देखील विपरित परिणाम होतात.
9. घनकचऱ्यामुळे भूमीचे सौंदर्य नष्ट होते आणि पर्यावरणाचे संतुलन ढासाळते.

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