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3.3.2: QnM: Number of books and chapters in edited volumes / books and paper published and papers published in national / international conference proceeding per teacher during last five years.

DVV clarification

Number of books and chapters in edited volumes / books and papers published in national international conference

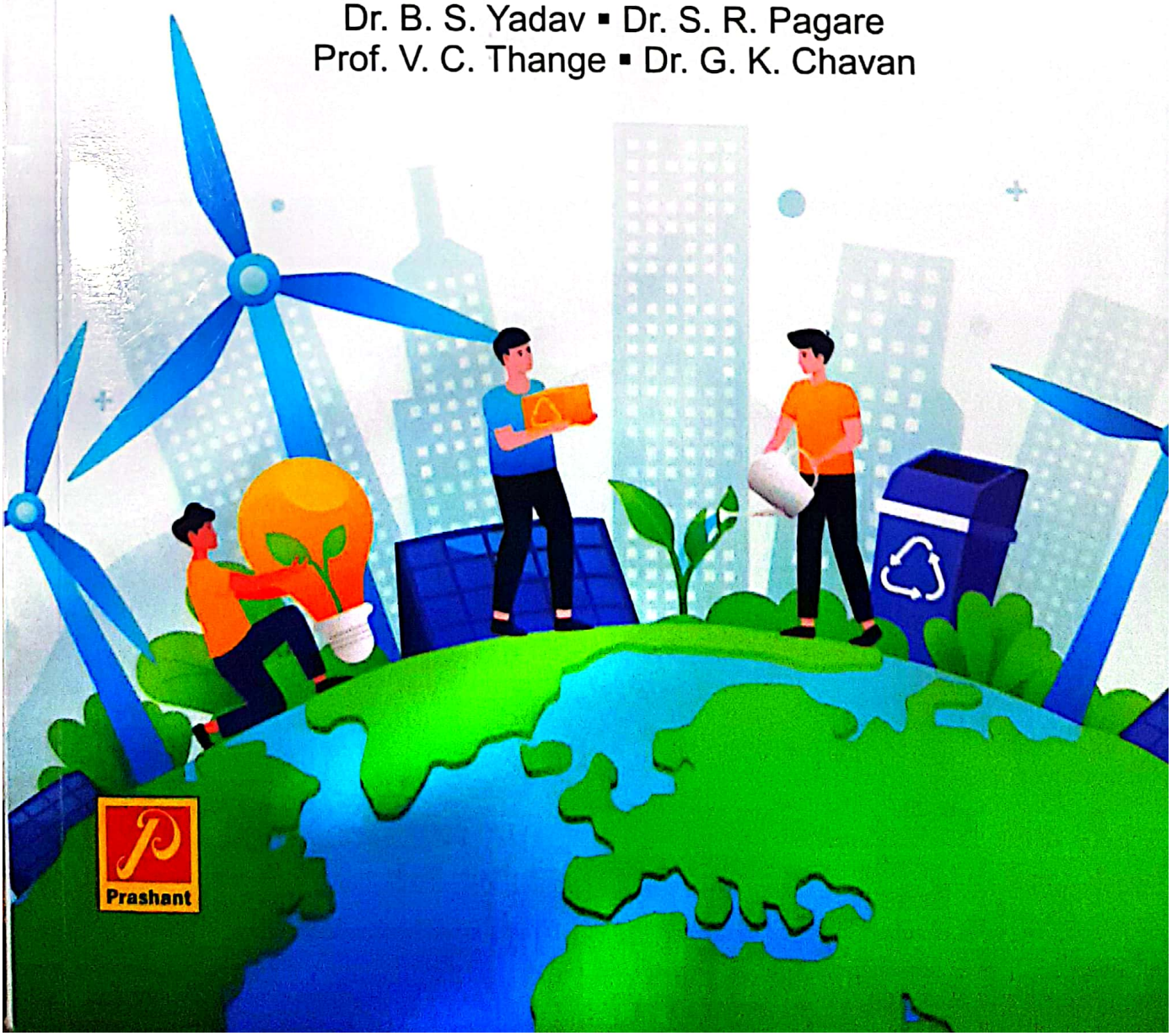
2020-21

ENVIRONMENT AWARENESS

ISSUES AND PERSPECTIVE

- Editors -

Dr. B. S. Yadav ▪ Dr. S. R. Pagare
Prof. V. C. Thange ▪ Dr. G. K. Chavan



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ENVIRONMENT AWARENESS: Issues and Perspective

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Environmental Sustainability and Human Development

- Vijay Thange
Coordinator, IQAC

Introduction:

Each human is qualified for the monetary, social, social and political turn of events. Regardless of whether the right to sound climate and right to improvement is ordinarily impenetrable, both are fundamental for the fortitude and opulence of humankind. So we want an adjusting idea that never negotiates either the financial turn of events or the nature of climate. Both turns of events and climate should be connected to the human development. There ought not to be advancement at the expense of climate as well as the other way around. Be that as it may, there ought to be improvement while taking due care and guaranteeing the assurance of the environment. Sustainable advancement is an adjusting idea among climate and improvement. It is a procedure for continued improvement without making harm to the climate.

The Growth of Nation and Environment

The improvement of a nation generally banks on businesses, which are the foundation of the economy. For the modern turn of events, we exploit our normal assets aimlessly. The over abuse of normal assets and contamination brought about by enterprises brings about ecological corruption.

In a biological setting, manageability is the capacity of an environment to keep up with natural interaction, their capacities, biodiversity and usefulness for quite a while. Maintainability implies the capacity to keep a specific state. Experience shows that in the natural local area there are numerous who don't comprehend the genuine significance of the maintainable turn of events. Natural manageability, financial maintainability and socio-political supportability are the 'three mainstays' of manageability. Manageability is working on the nature of human existence while living inside the conveying limit of supporting eco-frameworks. The earth and its assets are implied for the current

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age, yet additionally for the ages to come. So advancement ought to be inside the conveying limit of the climate. A manageable advancement is an approach for proceeding with improvement without influencing the nature of climate. It shows how advancement ought to be brought without risking natural interest. The option to take advantage of climate isn't bound to the over a wide period age, the group of people yet to come is likewise qualified for the assets gifted essentially. Consequently, while taking advantage of assets, we ought to guarantee their accessibility to the people in the future. While partaking in the right to improvement, we should consider the similar right of people in the future moreover. For securing the right of people in the future, the current age ought to be humble in their abuse of regular assets.

Essentially maintainability is working on the nature of human existence while living inside the conveying limit of supporting eco-frameworks. The earth and its assets are implied for the current age, yet in addition for the ages to come. So improvement ought to be inside the conveying limit of the climate.

Future of Environmental Sustainability

Practical advancement is an adjusting idea among climate and improvement. By taking on the standards of maintainable turn of events, the current age can fulfil their necessities without influencing the accessibility of assets. So the prosperity of the ages to come won't ever be in danger.

The utilization of normal assets should be in a supportable way. It doesn't need that the whole assets should be held for people in the future. However, the assets needed for financial development ought to be taken advantage of by the base. The possibility that to help people in the future, the present age ought to be humble in their double-dealing of regular assets which has tracked down far-reaching global endorsement.

The assurance of climate should successfully be possible by avoiding potential risks against natural harm. The preparatory standard gives accentuation upon the preventive part of ecological security. Prudent rule expresses that any substance or movement representing a danger to the climate is to be kept from antagonistically influencing the climate, regardless of whether there is no indisputable logical confirmation of connecting that specific substance or action to

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ecological harm. Here substance and movement indicate substances and exercises presented because of human intercession.

Sensible rule expresses that any substance or movement making a danger to the climate is to be kept from antagonistically influencing the climate. The public authority ought to take on such measures which expect, forestall and assault the reasons for ecological debasement. In case there are dangers of genuine and unsalvageable harm to the climate, the state ought to take on measures to forestall natural corruption even though there is no logical sureness. The damage can be forestalled even on a sensible doubt. Here the weight of verification lies on the entertainer to show that his demonstration is naturally solid.

Where there are dangers of genuine or irreversible harm, the absence of full logical sureness will not be utilized as a justification behind proposing financially savvy measures to forestall natural corruption. The preparatory rule has been perceived in practically all global archives.

The possible trust is that on the off chance that we lessen or stop further CFC outflow, so the natural maintainability control of things to come age. At first CFC emanation, at the appointed time the issue would presumably or perhaps be addressed commonalty's own ability for recovery. What's more, second, while science and innovation can offer financially suitable answers for limited scope ecological issues, like those for treating metropolitan wastewater or reestablishing moderately little spaces of defiled land, they can't be applied to address enormous scope or worldwide synthetic issue or to lighten them to accomplish worldwide natural supportability.

Experience shows that in the natural local area there are numerous who don't comprehend the genuine significance of the maintainable turn of events. Likewise, the ecological local area should release its aggregate proficient obligation in manners that are reliable with the centre prerequisites of a practical turn of events and worldwide natural maintainability.

The fundamental commitment of science and innovation to natural assurance has been in two particular regions. First making us aware of potential or show natural issues. For instance, it is through science that the worldwide effects of a portion of our contaminating exercises have been found predominantly as far as subjective Couse

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impact connections.

Conclusion

Ecological supportability, arrangement of clean drinking water and the street toward progress are the vision of tomorrow. Effective ecological maintainability and worldwide water drive are currently new logical visions. Arrangement of clean drinking water remains a significant privilege of effective maintainable advancement is created and emerging nations. Ecological contamination control, modern wastewater treatment, and authentically drinking water treatment in this day and age are at an appalling state with a crushing end. The history of science should be rebuilt at this essential crossroads. Ecological supportability is in an appalling condition of enormous pain. The history of human progress is at a genuine intersection. Man's vision, just as a researcher's advancement is currently re-envisioning with each progression of progress.

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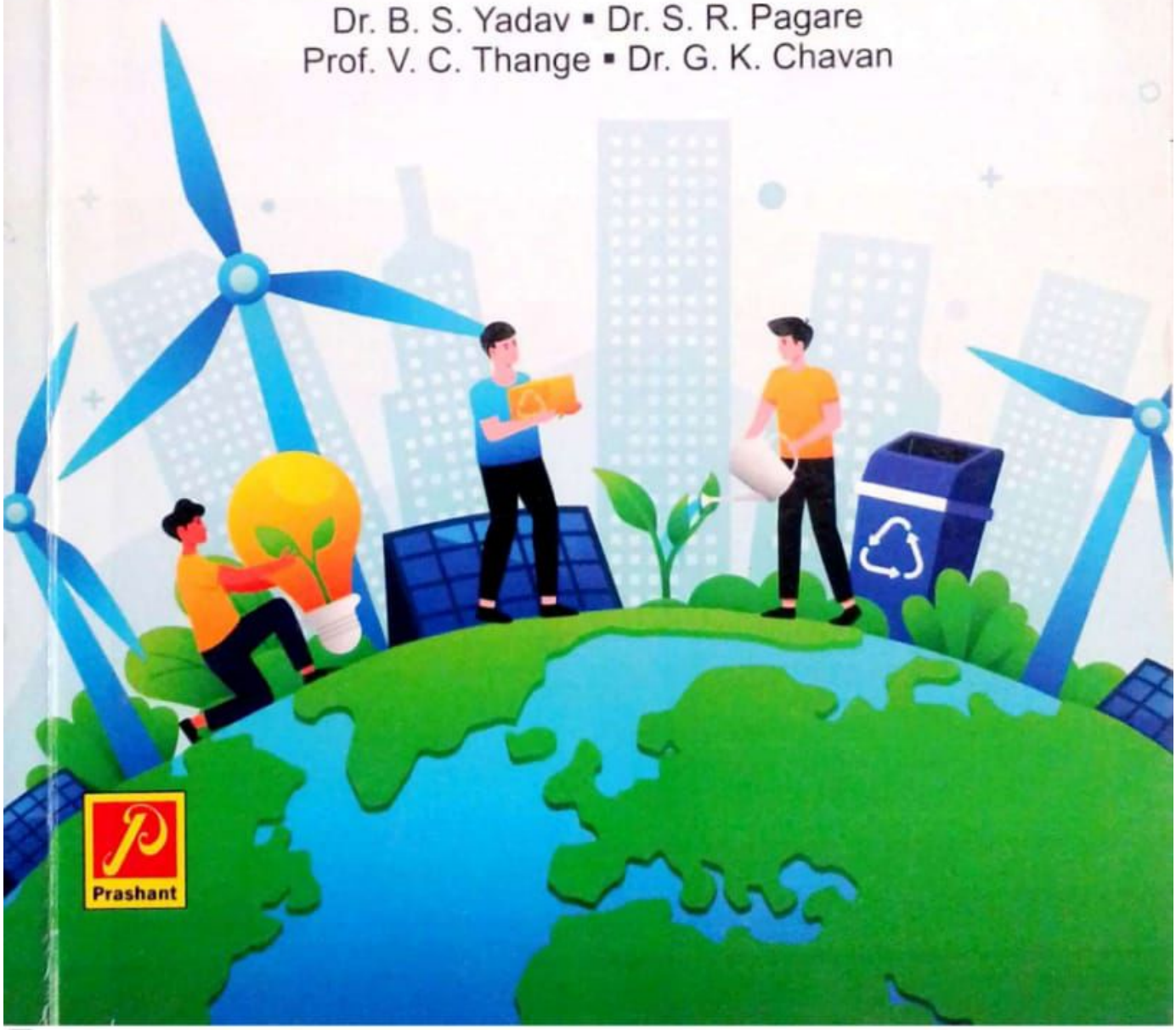

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In providing an identifiable status to man vis-à-vis environ... our objective has been to start at a point where human groups be... discernible as a collectivity. The question of the origin of humans is... our primary concern here. In information an understanding in rela... to the procedure of development of humankind is more significa... us as it helps us grasp the simultaneous development of man-... connection.

Till recently, up to the post-enlightenment period, the con... of a divine origin of nature and humans had been in prevale... The human beings were also subject to an evolutionary proce... was a theme strengthened through the theory first proposed thro... Charles Darwin. In his job The Origins of Species, Darwin argued ... dissimilar species had undergone to procedure of development and ... development was the result of minor variations in the features of ... individual members of species. Darwin also proposed that the adap... capability of species influenced the chances of their survival and ... termed it as the procedure of the survival of the fittest.

A Maker of Artefacts:

The human beings are endowed through nature to be reflec... and active. Their biological development has given them the capab... to set up adaptive connection with nature. Though, we can only ... speculative in relation to the factors and adaptive impetus respons... for the development of human skill to forge artefacts. Indeed this ... necessity have evolved in excess of a extremely extensive era of ... and would have begun with the local materials that were easily avail... and were suited to serve the purposes planned through the objects.

We know from archaeology that the first artefacts made thro... humans were of stone and had made their appearance more than ... million years ago. This had marked the beginning of the Palaeoli... Civilization. It was an extra ordinary occurrence and showed a hi... stage of forethought and knowledge of materials on the part of the St... Age Man suggestive of acute powers of observation and deduction ... of a sensitive awareness of much of the available potential of the w... approximately. Like other animals, the initial mode of sustenance ... humans was hunting and gathering.

It is approximately this time that early rock art specimens beca... available. An analysis of the depictions made in these specimens bro...

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A Review of 'Human & Nature Interface'

- Dr. Shailendra K. Bansode
Department of English
K. J. Somaiya College, Kopargaon, Dist: Ahmednagar

Abstract:

Nature is not an easy term to describe as it incorporates mainly of the visible manifestations of geography. Raymond Williams defines nature as, the material world itself, taken as including or not including human beings. 'Tracing the history of the term he suggests that nature has often been used to describe the countryside', the unspoiled spaces', as also plants and creatures other than man.'. Surely the common sense in which nature has been described relates to environment, where even the human has been an integral component. In the context of our discussion, therefore, nature and environment convey almost the similar meaning. In exploring human-nature/environment connection we consider the natural circumstances and powers that affect and sometimes determine the actions of human groups. In excess of an extensive era of time in history this connection operates at two dissimilar stages; at one stage it wields power as a widespread ongoing procedure, and at the other it acquires the form of the connection of specific human groups to their immediate environments. For our purpose we do not especially favor any one of the two and give a narrative that tends to draw information from both as the situation demands.

This paper is review of the Man–Environment relationship regarding the history of man and some changes done in the environment.

Introduction:

In the case of the Indian sub-continent an extremely wide range of climatic and topographic situations prevail to power the environment. As a result a delicate balance is maintained flanked by extreme environmental circumstances which is comparatively easily disturbed and we experience varying degrees of uncertainties extending in excess of one or more climatic zones. In the context of nature-human interface these environmental changes have had their role in determining the development of human history.

man to have some spare time as agriculture had been a seasonal acti
At the similar time demand for better apparatus for agriculture a
technology for irrigation to ensure greater manufacture as well as
relative shortage of raw material for apparatus forced man to seem
other sources/ types of materials. This gave rise to the use of metals a
their extraction through metallurgy. A significant feature of metallurg
had been the requirement of highly specialized knowledge and experti
therefore creation it a full-time job. Such specialists could be sustain
with the help of the available agricultural surplus. In this procedure
clearly see the emergence of a part of population that was not direct
involved with the procedure of food manufacture, yet was able to susta
itself on the labor produce of others. The parasitic character of this part
population had in information given rise to the possibility of sustain
solely on the foundation of the acquisition of special skills without havi
to participate directly in the procedure of agricultural manufacture.

The character of the agriculture based civilizations could now b
defined in conditions of intricate social formations having stratifi
social and occupational groups within. The rising skill to manage th
nature for social requires allowed agricultural civilizations to st
systematic use of natural possessions for the benefit of the superi
society giving, in turn, rise to socio- politico-economic hierarchie
In this procedure a gradual alienation of man from the immedia
environment was quite perceptible. The earliest location is at Mehrgar
situated on the Bolan River in Baluchistan. Approximately alike
the case of the municipalities of the Indus civilization. It is usuall
accepted that the region has not seen any major shift in the climat
circumstances since the emergence of Indus civilization.

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out the information that the humans had through this time become acutely aware of the animal world and had begun to illustrate signs of seeking refuge, even if temporarily under rock shelters, mounds and other natural locations. This should be measured an important development in nature-human interface. Here was the beginning of the procedure of domesticating animals and utilizing their power in the service of the mankind.

We necessity draw a word of caution here before the approximately euphoric feelings at having supervised nature in an efficient manner than the preceding Palaeolithic stage leads us astray. The information was that in spite of these growths the humans were even now at the mercy of their immediate environment and were in a extremely real sense dominated through it.

Social Animal:

The connection flanked by nature and man was redefined with the advent of agriculture. Till the beginning of agriculture, the sources of food had only been naturally available and man had no managed in excess of these sources. A significant contribution of agriculture has been the farming of cereals. The information that the shelf-life of cereals is extremely extensive whereas fruits and meat have a limited shelf-life necessity has added immensely to human capabilities. It is also important to note that this property of cereals encouraged accumulation which was one of the principal causes for social stratification to emerge and with it an intricate civilization to emerge with several dissimilar societies existing within and interacting with each other.

In the initial stage the agriculture was highly unreliable and as a regular source of food did not meet the demands of man. In information transition from the hunter-gatherer stage to the agriculture stage was an extensive drawn procedure. The development of technology/apparatus to augment the manufacture was also a gradual procedure and it was only after the development of irrigation technology that agriculture acquired a key role in food manufacture. Initially the agriculture was confined to highly favorable sites with natural irrigation. With the growth of population, though, man was forced to migrate to less-favorable sites necessitating the development of irrigation facilities that demanded superior social participation and better skills of management.

Food security and greater manage in excess of agriculture enabled

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Arundhati Roy's 'The God of Small Things': An Eco-Critical Study

- Ms. Aher Varsha Sahebrao
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Abstract:

Man and nature have an integral relationship, since ancient times. Human life on the earth is impossible without environment. Man has exploited the nature for his selfish-economical purposes, in a way; Man has threatened the human survival itself. As Literature is said to be the mirror of human life on the Earth, it reflects the deep association between Nature and Literature. Nature in literature appeases the mind and soul. At the same time, by raising concerns about the degradation of nature, literature creates awareness in literary way. Ecology and Eco-criticism are the significant aspects for the literary study and research. Eco-criticism has evolved into a theory and a specific field in literature and it deserves keen attention because of its relevance. The aim of this paper is to highlight how Arundhati Roy has expressed her concern for nature which has been exploited by human beings in the name of civilization, urbanization and modernization and how the damaging effects of humans' exploitation of nature directly affect human life and living space.

Keywords: Eco- Criticism, Nature and Literature, Exploitation of Nature.

The Paper

The world of literature throngs with works dealing with beauty and power of nature. However, the concern for ecology and the threat that the continuous misuse of our environment poses on humanity has only recently caught the attention of the writers. It is this sense of concern and its reflection in literature that has given rise to a new branch of literary theory, namely Eco-criticism. The word 'Eco-criticism' first appeared in William Rueckert's essay "Literature and Ecology: An Experiment in Eco-criticism" in 1978.

India is a country with the variety of ecosystems which ranges from Himalayas in the north to plateaus of south and from the dynamic

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Sunderbans in the east to dry Thar of the west. Nature and its powerful force has always been represented by the literary writers. The new awareness has been increased and many poets and novelists have become eco-conscious or environment conscious. They have used Nature as landscape, as beautiful atmosphere/lively atmosphere such as R.K.Narayan, Raja Rao, Kamala Markandaya, Anita Desai, Kiran Desai, Jayant Mahapatra, Ramanujan, Bhavani Bhattacharya.

Earlier, the writers such as R. K. Narayan, Manohar Malgonkar, Raja Rao, Kamala Markandaya, and Anita Desai have invoked Nature and nature-elements for expressing their views, their contemporary regional and social atmospheres.

Arundhati Roy, a writer, an environmentalist and a social activist, is rightly recognized as a multifaceted personality. The God of Small Things, the masterpiece, of Arundhati Roy deals intensively with the topics of nature and environment. She was given the Booker Prize for this novel in the year of its publication. Her gesture of donating her Booker Prize money and royalties from her books on Narmada Bachao Andolan project speaks loudly about her great concern for environmental conservation.

In The God of Small Things, she has presented environmental problems as some of the small things which have been neglected for a long time in Indian society. She puts forth the idea that, like Indian women who remain silent against patriarchal oppressions, environment has been enduring a wanton destruction for ages. With great skill, Roy integrates nature with her subject matter. She vividly presents how nature is being exploited by human beings in order to be modernized. She gives expression to her thought that nature is being made the silent victim of human greed and insensitivity and these, in turn, have reflexive effects on human life. The story, which is a series of flashbacks and flash forwards, functions as a helping tool for the author to tell the readers how certain places were in the past and how they are at present. The novel points out the environmental pollution through the description of the changed condition of beauty, greenery and the look of Ayemenem and the river Meenachal. She has used nature images not only for describing the beauty or glorious atmosphere of the region and landscape but also for exposing the polluted atmosphere of Ayemenem. Through the depiction of the river Meenachal she contrasts the earlier

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condition of the river with its later condition.

Earlier Rahel feels: "It was warm, the water green like reapplied silk. With fish in it. With the sky and it. And at night, the broken yellow moon in it. (God of Small Things, 123). The river, during the childhood of Rahel, has become deformed and repulsive in her adulthood. Its charm and effect was deteriorating due to environmental pollution".

Later, when the adult Rahel visited the river, it was different in look and had lost its inspiring appeal: ...the river was no more than a swollen drain now. A thin ribbon of thick water lapped wearily at the mud banks on either side, sequined with the occasional silver fish. It was chocked with a succulent weed... (Arundhati Roy, 124) Actually, this is because of the pollution created by the inhabitants and factories of the region. The novelist tries to show the harmful effect of urbanization on environment. She has delineated the picture of beautiful, lively green Ayemenem as well as the polluted and disturbed Ayemenem. By the help of many picture sequence, descriptions of scenery and region, the degenerated gloomy environment of the region.

When the "engineers of the concerned municipality" cremated the electrocuted elephant, they carefully "sawed off the tusks and shared them unofficially" (219-220). Roy presents the sympathetic and empathetic stand of the modern people as far as animals are concerned.

Conclusion:

Arundhati Roy, being a socially aware intellect with deep concern for the environment, expresses her thoughts that human beings need to express a concern for the environment in order to make this earth livable for generations to come. Arundhati Roy presents Ayemenem from the viewpoint of a person who laments the human exploitation of nature and its elements. The parts of Ayemenem that are being damaged by human intervention and mishandling are carefully interwoven with the story. Roy tries to make the readers realize the impact of the damage caused to the environment.

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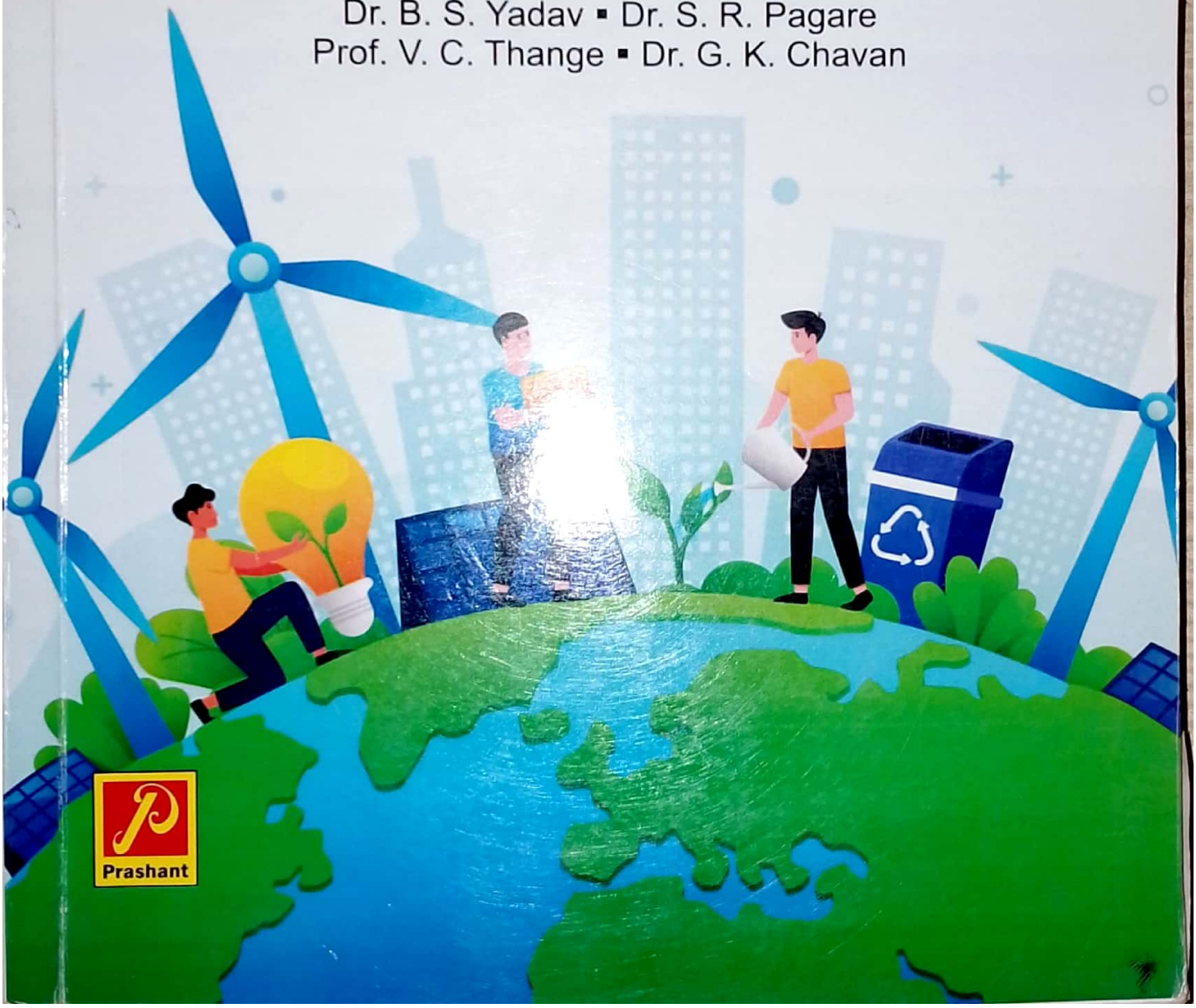

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Comparative Study of Romantic Poems and Modern Poems in the Light of Ecocriticism

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Abstract:

In this paper, the more focus has given to the environmental awareness and the topic, environmental aspects of English poetry in the light of Ecocriticism have been studied. The nature and mankind has an heartfelt bonding from years ago, even when the universe has been created. But, nowadays, people started destruction of our mother – Earth. This paper focuses on how the Ecocriticism studies the relationship between literature and nature with respect to the human life. The environmental aspects from English Poetry have been discussed.

Keywords: Globe, Deforestation, Degradation, Hazards, Nature, Poetry, Ecology, Ecocriticism, Plantation, Melancholy, Life.

Introduction:

Nature has always taken a great part in people's lives. We cannot make them apart from each other. It is also a kind of faith that nature is the reflection of heaven on the Earth and anyone trying to disturb the natural order is considered as an evil.

Man's attempt to rule this world, have caused many disturbances in this natural environment and this harmony has started to fail. The protection of the Environment today is the concern of the people all around the globe. In India Deforestation, land degradation siltation of rivers and pollution of water and air are the central features of environmental crises. Furthermore, the greatest tragedy in Bhopal amply revealed some of the inherent dangers of industrialization. In this paper, the environmental aspects of English poetry in the light of Ecocriticism have been studied.

Ecocriticism is literary and cultural criticism from an environmentalist viewpoint. Texts are evaluated in terms of their environmentally harmful or helpful effects. Beliefs and ideologies are assessed for their environmental implications. Eco critics analyze the

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history of concepts such as 'nature', in an attempt to understand the cultural developments that have led to the present global ecological crisis. Direct representations of environmental damage or political struggle are of obvious interest to ecocritics, but so is the whole array of cultural and daily life, for what it reveals about implicit attitudes that have environmental consequences.

The Romantic Period is especially known for the expression of nature and the relationship of human beings with nature. In the Romantic Period poets were writing about the beauty of nature and the expression of human feelings using the metaphors of Nature, e.g., Birds, Trees, Beaches, Rivers, Waterfalls etc. But in Modern Period of literature, we can see how the nature has degraded due to the human activities such as, people have cut down the number of trees and that has impacted the deforestation on the Earth.

Let's now focus on some Romantic Poems which depict the glory of nature and the prosperity of that time. William Wordsworth is one of the most leading figures in Romantic Era. Many of his poems are the free expression of natural imagery and the free flow of nature. For instance, Daffodils [I Wander Lonely as a Cloud] in this poem, he has commented on the inner solitude of the soul i.e., he's trying to locate the satisfaction in being with nature, he has got much sense through some words, like, lake, hills, tress, the sparkling waves in glee etc. In brief, when he saw the Daffodils, he writes, "And then my heart with pleasure fills and dances with the daffodils." It simply denotes that how the nature had its own impact on mankind and how prosperous it was! There are more poets too who has written about the nature and environmental balance. Let's take some more examples from various poems to get the point clearer. The poem, 'Spring, the Sweet Spring' by Thomas Nashe is also the perfect depiction of nature and the image used in it is a feeling of freshness. He points out that the birds sing in spring, daisy flowers are kissing the feet etc. He says, "In every street these tunes our ears do greet: Cuckoo, jug-jug, pu-we, to witta-woo!" Thus, the theme of nature has been depicted through happy images. Also, we can enlist many poets who has contributed to the Romantic Period to make the people aware of the circumstances happening around. Shelly's poems, like, To the Skylark, Ode to the West Wind also mention the limitations of human life before the nature and the

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power of natural world are the prominent themes. In addition to that 'A Bird Come Down' by Emily Dickinson also carries the major theme of nature prominently. The poem takes a subtle moment between the speaker and a bird and magnifies the occurrence. Further, John Clare's ['On a Lane in Spring'], Walt Whitman and many other poets from the Romantic Age have focus on the theme of nature. This is how the Romantic Period in literature was full of greenery and bounteous glory of the universe. When we think of the period wise comparative analysis of the nature, we can clearly note the difference between the two.

When it comes to the comparative analysis, we couldn't see the beauty and prosperousness of the nature during the Modern Period of literature especially in poetry. For instance, D.H. Lawrence, the Modernist poet, in his poetry, talking about the some of his most frequent concerns, like, man's modern distance from nature and some of his poems also deals with theme of religion. His best-known poems are those probably dealing with nature such as those in the collection of 'Birds, Beasts and Flowers' including the 'Tortoise Poems' and 'Snake'. Further we can see the concern and awareness about the nature in the poems of Robert Frost, one of the most influential poets of Modernism. Although he has written nature poems, he mostly paid his attention on the awareness regarding the environment. He says, "From out their greenery the old birds fly, and chirp and whistle in the morning sun, The pilewort glitters 'neath the pale blue sky'!" its crystal clear through these lines that the sky is PALE and not the clear one. The adjective 'pale' itself clarifies all the things. Thus, when we comparatively study the two periods, we could see the huge difference in the biodiversity.

The Indian poet, Mamang Dai expresses the optimistic approach towards the nature through her poetry 'Small Towns and the River' [2004]. In this poem, she immortalizes the water and the river at the end of the poem, "in the cool bamboo, restored in sunlight, life matters, like this. In small towns by the river, we all want to walk with the gods."

Conclusion:

We have seen the Nature in the Romantic Period Also in the Modern Period, there are huge differences between the two because man has made many unnecessary changes and has disturbed all the

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ecosystem. That is the prominent reason behind the hazards that we are all facing now, like, the flood calamities, land sliding, drought prone etc. if we ignore it the day is not far from our destruction. We want to survive without suffocation, we should go for Green, otherwise the Green will go forever!

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ENVIRONMENT AWARENESS

ISSUES AND PERSPECTIVE

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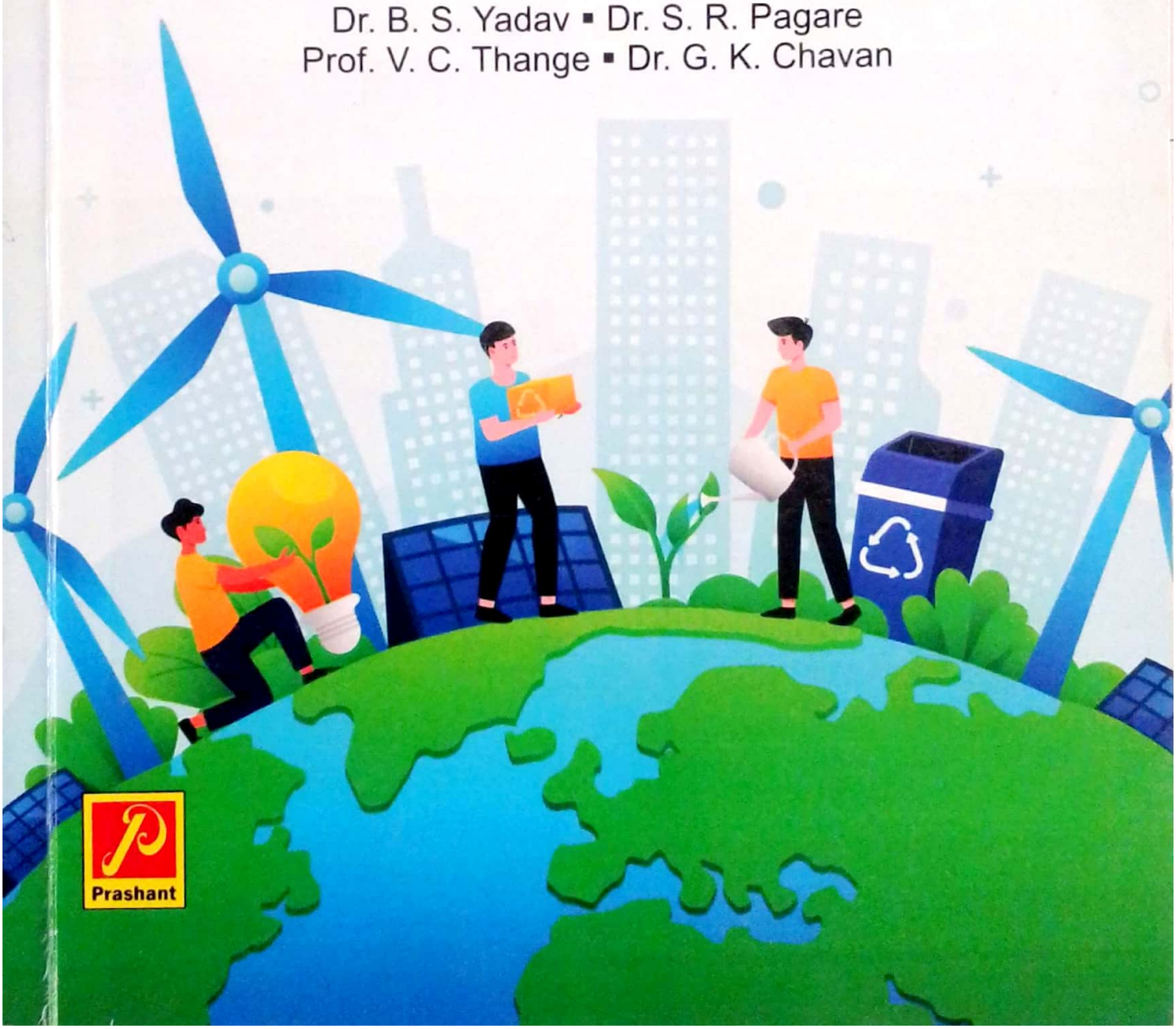

Prashant

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The Reliable Nature of the Earth reflected in Indian Literature (Fictions and Novels)

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Abstract:

Environment is real and reliable for human society as well as the Mother Earth but there is misuse of nature and natural resources that have left us at the brink of ditch. The rain forests are cut down, the fossil fuel is getting decrease, the cycle of season is at disorder, ecological disaster is frequent now round the globe and our environment are being vanished that's why for this panic situation, there is a new theory of reading nature writing called Ecocriticism.

It is a worldwide movement which came into existence as a reaction to man's attitude of dominating nature. The present paper seeks to explore the ecocritical perspectives in Indian Literature. This environmentally oriented study of literature brings about an ecological literacy among the readers who in the process become coconscious, and looking after of Mother Nature. Ecocriticism has rapid development during its short tenure since introduction. It is an impressive tool of analyzing nature writing which is commonly associated with environmental criticism, animal studies, green cultural studies, Deep Ecology, the like.

Keywords: Ecocriticism, Dominating, Coconscious, Ecology, Tenure.

In this research paper there are two very important terms today – ecology and ecocriticism. India is a country with variety of ecosystems which ranges from Himalayas in the north to plateaus of south and from the dynamic Sunderbans in the east to dry Thar of the west. With time, however, these ecosytems have been adversely affected due to mankind.

The Indian writers such as R. K. Narayan, Raja Rao and Kamala Markandaya, have invoked Nature and nature-elements for expressing their views, their contemporary regional and social atmospheres. R.K. Narayan is a very famous regional novelist. Malgudi is an imaginary world invented by R. K. Narayan. Narayan's novels and short stories have this Malgudi as specific region. He has used nature as the setting and background in his novels and short stories. Malgudi can be considered as the central setting of his writing. Nature plays both the positive and negative roles. The flowing Saryu River and the ruined temples affected Raju, the guide and transformed him into a saint in the novel, The Guide.

Raja Rao has also depicted nature and nature elements in his novels. His famous novel, Kanthapura, is the glaring example of this. Raja Rao has depicted the South Indian village, its customs, culture and environment realistically and precisely. He has portrayed the co-relation between mankind and Nature. His Kanthapura projects the role and importance of Nature beautifully in the human life. Through the depiction of rivers, mountains and other natural elements, he has proved value of this co-relationship.

Gopinath Mohanty is winner of the Jnanpith Award, and the first winner of the National Sahitya Akademi Award in 1955 - for his novel, Amrutara Santana. In the novel Paraja, Jili and her friend Kajodi are courted by Bagala Paraja and Mandia through songs to the accompaniment of a single-stringed instrument called dungudunga. The string is twanged and the gourd-shell base of the instrument is beaten with fingers covered with rings to produce a harmonious music which is the symbol of nature and kind earth. Paraja novel is in the tradition of the Indian novel in English and a critical understanding of the narrative in a specific socio-cultural context, it is imperative to have an overview of the Indian novel in English.

Kamala Markandaya is one of the greatest Indian novelists in English. Markandaya has also used Nature and natural elements for her effective and flawless expressions and descriptions of views. She considers nature as a wild animal. She thinks nature a destroyer and preserver both. Her well known novel, Nectar in a Sieve, is the fine example of the depiction and use of nature imagery.

That's why nature is a supportive element in Indian Literature that reflects various atmospheres, moods, feelings and status which is an expressive form for literature and that is very significant mode of expression for describing fertile, colorful atmosphere, happiness, gloominess, bitterness, disturbing, lively, tragic atmosphere etc. Each

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kind of environment can be presented through the help of nature and various elements of nature. Now-a-day's ecology, eco-balance, environment concerns are the points of attraction and concern. The prevalent environment imbalance has completed the intellectuals and rational people to consider this seriously. Therefore, the literary figures have used their strength for strengthening the attitude of people towards environment protection and eco-balance. Many poets and novelists have become eco-conscious or environment conscious.

These Indian writers have used nature as landscape, as beautiful environment such as R.K. Narayan, Raja Rao, Kamala Markanday, and Gopinath Mohanty. The literature has become a mode of expression about environment and its importance in human life and universe. Environmental balance has become the panic issues of the present time in the whole world. 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 is the need of time. The world needs eco-friendly atmosphere for the proper growth, development, sustainability and prosperity.

The various kinds of environmental issues such as biological, political, social, racial, regional, seasonal, and psychological etc. have been projected by those intellectual writers and with the environmental concern. They have focused their attention on the value of eco-balance and environmental balance. They advocate the balanced co-relation between nature and mankind.

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A Review Paper on Electricity Generation from Solar Energy

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Abstract:

The Solar Energy is produced by the Sunlight is a non-vanishing renewable source of energy which is free from ecofriendly. Every hour enough sunlight energy reaches the earth to meet the world's energy demand for a whole year. In today's generation we needed Electricity every hour. This Solar Energy is generated by as per applications like industrial, commercial, and residential. It cans easily energy drawn from direct sunlight. So it is very efficiency & free environment pollution for surrounding. In this article, we have reviewed about the Solar Energy from Sunlight and discussed about their future trends and aspects. The article also tries to discussed working, solar panel types; emphasize the various applications and methods to promote the benefits of solar energy.

Keywords: Renewable Energy, Solar Panel, Photovoltaic Cell, Modelling of Pv Panel, Solar Concrete Collector

Introduction:

Nowadays, due to the decreasing amount of renewable energy resources, the last two decades become more important for per watt cost of solar energy device. It is definitely set to become economical in the coming years and growing as better technology in terms of both cost and applications. Everyday earth receives sunlight above (1366W approx.) This is an unlimited source of energy which is available at no cost. The major benefit of solar energy over other conventional power generators is that the sunlight can be directly converted into solar energy with the use of smallest photovoltaic (PV) solar cells. There have been a large amount of research activities to combine the Sun's energy process by developing solar cells/panels/module with high converting form. the most advantages of solar energy is that it is free reachable to common people and available in large quantities of supply compared to that of the price of various fossil fuels and oils in

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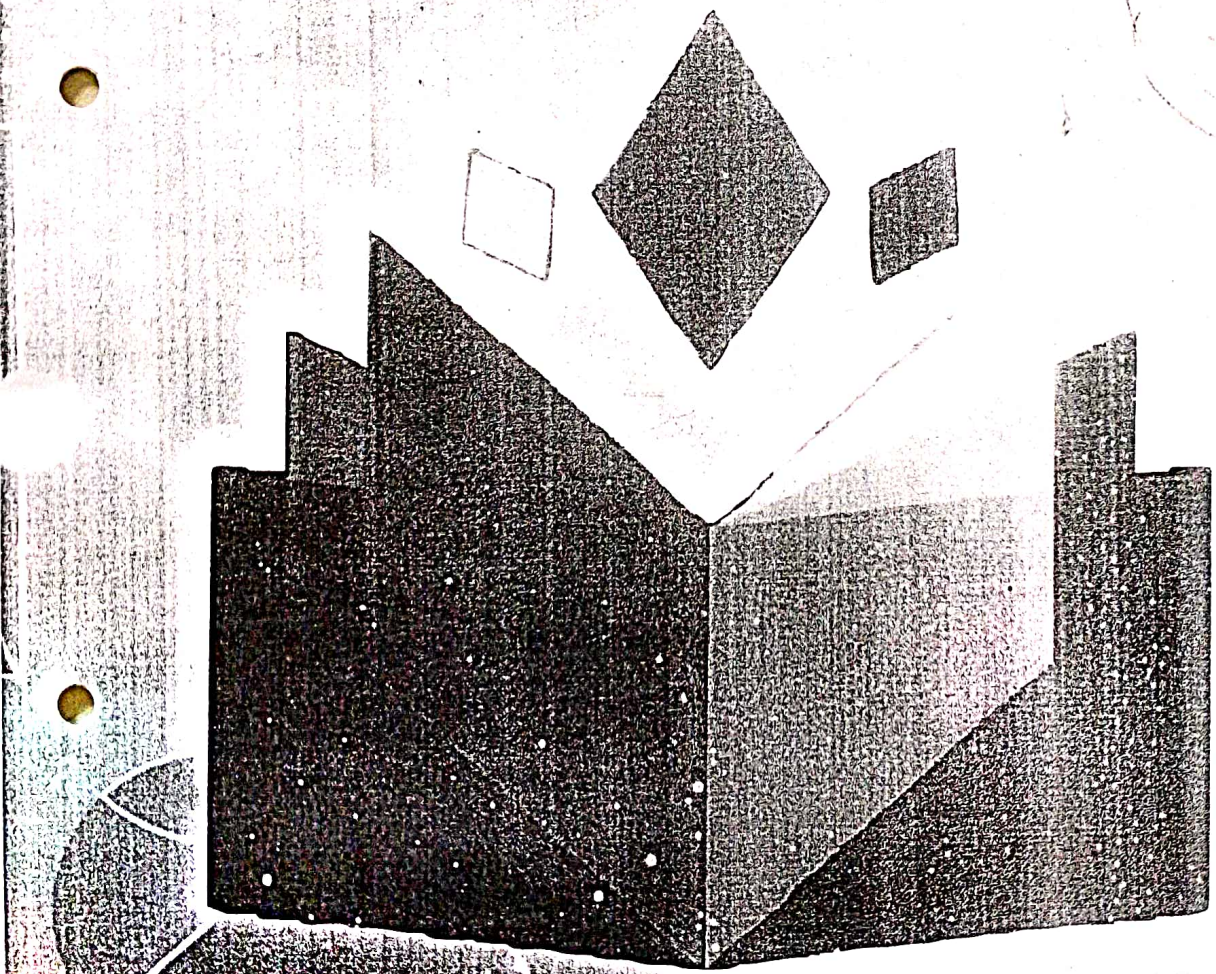

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संपादक

डॉ. नानासाहेब जावळे, डॉ. मनोहर जमदाडे

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प्रकाशक

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6.

परोपकारिता से प्राप्त दैन्यावस्था का जीता-जागता उदाहरण 'सरजू भैया'

- डॉ. संजय दवंगे

रामवृक्ष बेनिपुरी जीवन एवं साहित्यिक परिचय:-

हिंदी साहित्य के आधुनिक काल के लेखकों में रामवृक्ष बेनीपुरी का अपना विशिष्ट स्थान हैं, वे एक लेखक होने के साथ-साथ महान विचारक, चिन्तक, पत्रकार, और संपादक भी थे। वे हिन्दी साहित्य के शुक्लोत्तर युग के प्रसिद्ध रचनाकार हैं। रामवृक्ष बेनीपुरी जन्म २३ दिसंबर, १८९९ को मुजफ्फरपुर जिले के बेनीपुर ग्राम में एक कृषक परिवार में हुआ था। रामवृक्ष बेनीपुरी बहुमुखी प्रतिभा के रचनाकार थे। कहानी, नाटक, उपन्यास, रेखाचित्र, यात्रा-विवरण, संस्मरण एवं निबन्ध आदि विधाओं के माध्यम से उन्होंने साहित्य को समृद्ध किया। ७ सितम्बर, १९६८ को वे इस संसार से विदा हुए।

प्रकाशित कृतियां :
उपन्यास - पतितों के देश में,
कहानी संग्रह - चिता के फूल
निबंध संग्रह - गेहूँ और गुलाब, मशाल, वन्दे वाणी विनायक
रेखाचित्र - माटी की मूरतें, लाल तारा
संस्मरण - मील के पत्थर तथा जंजीर की दीवारें
यात्रा वृत्तान्त - पैरो में पंख बांधकर और उड़ते चल,
जीवनी - कार्ल मार्क्स, जयप्रकाश नारायण, महाराणा प्रताप सिंह
नाटक - अम्बपाली, सीता की मां, राम राज्य
सम्पादन - बालक अरुण, भारत युवक, किसान मित्र, कर्मवीर, कैदी, जनता, हिमालय, नयी धारा आदि।

हिंदी रेखाचित्र के इतिहास में रामवृक्ष बेनीपुरी सर्वश्रेष्ठ रेखाचित्रकार माने जाते हैं। 'माटी की मूरतें' यह उनका प्रसिद्ध रेखाचित्र संग्रह हैं। इस संग्रह में इन्होंने भारतीय समाज के उपेक्षित पात्रों को चुनकर उनको नायक का दर्जा दिया हैं। इसका प्रमाण सरजू भैया नामक रेखाचित्र हैं।

'सरजू भैया' रेखाचित्र में सरजू भैया का स्वभाव परोपकारी दिखाया हैं, जो दूसरों की खातिर अपने आप को मुसीबतों में डाल देते हैं। सरजू भैया की गिनती गांव के सबसे लम्बे और दुबले आदमियों में होती हैं। उनका रंग सांवला हैं। बगुले की सी लम्बी-लम्बी टांगों जैसी बाहें। कमर में धोती पहने कंधे पर अंगोछा डाले रहते हैं। जब वे खडे होते हैं तब आप उनके पसलियो की हड्डीयां गिन लीजिए। उनको देखने से तो उनकी तस्वीर निःसंदेह किसी भूखमरे, मनहुस आदमी की मालुम होती हैं। सरजू भैया लेखक के गांव के चंद जिंदादिल लोगों में से एक हैं। बढे मिलनसार, मजाकियां और हंसोड हैं। वे जब दिल खोलकर हंसते हैं, तो शरीर भर में जो सबसे छोटी चीजे उन्हे मिली हैं वे उनके पंक्तिबद्ध छोटे छोटे दांत हैं। तब वे बेतहाशा चमक पडते हैं।

सरजू भैया के पिताजी जब जीवित थे तब उनके पास खेती थी। रुपये का अच्छा लेन देन था। परिवार भी बडा नहीं था और नहीं खर्चीला। लेकिन सरजू भैया के पिता मरते ही लेन देन चौपट हो गया। बाढ ने खेती बरबाद कर दी और भूकंप ने मकान का सत्यनाश कर दिया। सरजू भैया हर समय लोगों की मदत करते हैं। गांव में यदि किसीका बच्चा बीमार होता तो वैद्य को बुलाने सरजू भैया को भेजा जाता था। बाजार में किसी का सौदा खरीदने से लेकर छोटे-मोटे काम के लिए लोग सरजू भैया को बुलाते थे। सरजू भैया का दरवाजा लोगों के लिए हमेशा खुला रहता था। सभी ने उसे सीधा समझकर ठगने की कोशिश की। इसमें सरजू भैया की खेती भी चौपट हो गई। इस कारण सरजू भैया किसी व्यवसाय में भी सफल नहीं हुए।

सरजू भैया अपने सीधेपण के कारण एक दिन सूदखोर (धन्ना सेठ) के चँगुल में फंस गये। इस सूदखोर से सरजू भैया हमेशा कर्ज लेते थे। सरजू भैया ने कुछ पैसे उनसे लिए थे। इसके बदले में सूदखोर कागज पर उनका अंगुठा चिपका लेते हैं और सरजू भैया गिरवी के रुप में ठग जाता हैं। दूसरों के खातिर सरजू भैया खुद मुसीबत में आ जाते हैं।

संक्षेप में 'सरजू भैया' इस रेखाचित्र में लेखक ने सरजू भैया का जीवन चरित्र को उजागर किया हैं। सरजू भैया सादगी, सरल स्वभाव और सहज भोलापन के कारण सदैव दूसरों की सहायता के लिए तत्पर रहता हैं। उनका हृदय विशाल हैं, उनके विचार भी विस्तृत और उदार हैं। सरजू भैया शरीर से कमजोर दिखते हैं पर उनमें आत्मिक विश्वास भरा हैं। वे गांव के लोगों का सारा उत्तरदायित्व अपने सिर पर लेकर उनकी सहायता करते हैं। परंतु गांव के लोग उनके सीधेपन का फायदा उठाकर उसे ठगने की कोशिश करते हैं। लेखक ने इस रेखाचित्र में ग्रामीण भागों में चलनेवाली सूदखोरी को दिखाते हुए सरजू भैया जैसे सरल स्वभाव के व्यक्ति अपने भोलेपण के कारण किस प्रकार इस व्यवस्था का शिकार बनते हैं यह दिखाया हैं। अर्थात सरजू भैया परोपकारिता के कारण अपना शरीर ही नहीं अपनी संपत्ति भी खो देते हैं।

आधार ग्रंथ :-

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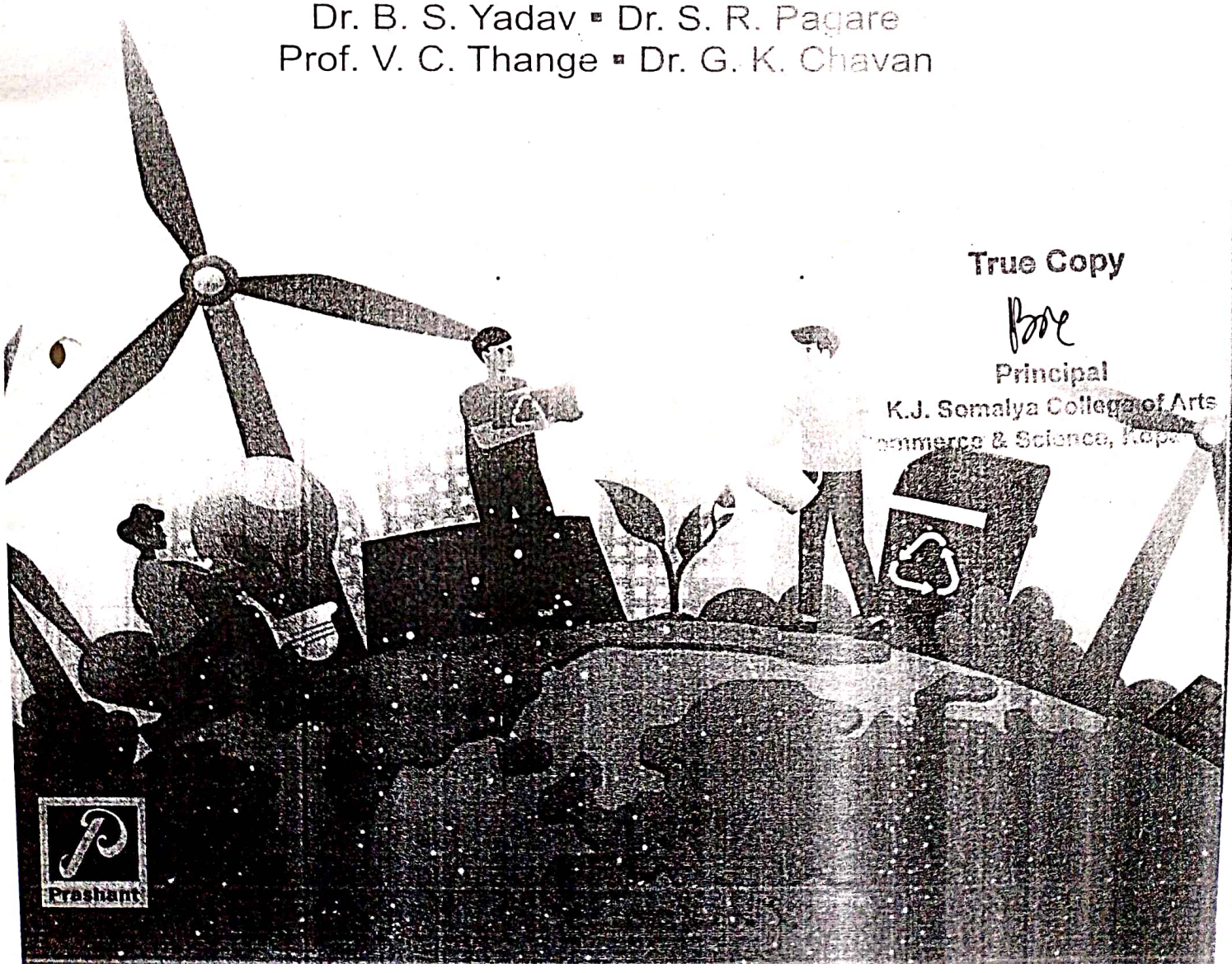

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हिंदी साहित्य, संस्कृति और पर्यावरण संवर्धन

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भारत की भूमि–ऋषि मुनियों के पावन स्पर्श से सदैव्य पवित्र रही है। इन ऋषि मुनियों ने प्रकृति के सानिध्य में रहकर अपनी साधना के बल पर स्वयं को तो पवित्र रखा साथ ही प्रकृति के महत्व को बरकरार रखते हुए भारतीय संस्कृति में विशेषकर पर्व–त्योहार में प्रकृति के अस्तित्व को स्विकार करते हुए मनुष्य का भावनिक संबंध प्रकृति से जोडा है यही कारण है कि हमारे प्राचीन वेद जैसे ऋग्वेद, सामवेद, यजुर्वेद और अथर्ववेद मे प्रकृति को प्रधानता देते हुए पर्यावरण संवर्धन का संदेश हमे मिलता है। भारतीय संस्कृति की संवाहिका साहित्य है, भारतीय प्राचीन संस्कृति की विरासत साहित्य के माध्यम से ही आज तक हमारे पास पहुंची है। हिंदी साहित्य भी भारतीय संस्कृति तथा पर्यावरण संवर्धन से अच्छुता नही है। आदिकाल से लेकर आधुनिक काल के कवि–लेखको ने भारतीय संस्कृति की महिमा गाते हुए अपनी रचनाओं में प्रकृति का गौरवगान किया है। आदिकाल में चंदबरदाई, भक्तिकाल में सूरदास, रीतिकाल में बिहारी तो आधुनिक काल में प्रेमचंद्र, पंत से केदारनाथ अग्रवाल आदि सभी कवि–लेखकों ने प्रकृति के महत्त्व को प्रतिपदित करते हुए प्रकृति का मानवीकरण रूप चित्रित करने की कोशिश की है। हिंदू मान्यता के अनुसार प्रकृति को मां के रूप मे पुकारा जाता है। साहित्य और संस्कृति का एक–दुसरे के साथ परस्पर संबंध है। संस्कृति समाज की आत्मा है और साहित्य समाज का हृदय होता है। संस्कृति को साहित्य द्वारा अभिव्यक्त किया जाता है। साहित्य और संस्कृति एक–दुसरे से संबंध रखते है। साहित्य का लक्ष्य या उद्देश लोकमंगल की भावना है। इसी कारण साहित्य को समाज का दर्पण कहते है। उत्सव और पर्व भारतीय संस्कृति में अत्यंत महत्वपूर्ण स्थान रखते है। उत्सव के माध्यम से हम किसी जाती या धर्म की वेशभूषा खानपान और विचारों से अवगत होते है। हमारे बहुत सारे उत्सव प्रकृति से संबंधित है जैसे दीपावली यह शरद ऋतू का उत्सव, तो होली वसंत ऋतु का आदि। प्रकृति में वायू, जल, पेड–पौधे, जीवजंतू तथा मानव का एक संतुलन विद्यमान है, जो हमारे अस्तित्व का आधार है। इसी बात को दिखानी की कोशिश अनेक लेखकों ने अपने रचनाओं के माध्यम से किया है।

भारतीय संस्कृति में वृक्षो को देवतुल्य स्थान दिया गया है। भारतीय संस्कृति

में विविध परंपरा, पर्व, उल्हास वृक्षो के साथ जुडी है। इस संदर्भ में कमलेश माथुर का कहना है कि-'युंगो से युंगो तक मानव के आश्रयदाता वृक्षो ने मानव पर अमूल्य उपकार किए है और बदले में मानव को वृक्षो ने दी श्रद्धा, भक्ति, आस्था और विश्वास।' (पृ-१६५) 'पद्मनेत्रा' उपन्यास में लेखक भगवतीशरण मिश्र ने पर्यावरण संरक्षण संबंधित अनेक मत देकर पर्यावरण संतुलन में पेड-पौधे तथा वृक्ष का महत्व प्रतिपादित किया है। पुष्प का महत्व बताती हुई राजकुमारी वामा से कहती है- पुष्पोध्यान का अच्छी तरह परिभ्रमण कर लेना। हर पुष्प वृक्ष के पास रुकना पुष्पो को प्रेमपूर्वक दृष्टिगोचर करना बडे संवेदनशील होते है ये पुष्प-वृक्ष। ये पुष्प इनसे प्रेम करो तो तुमसे सौ गुना प्रेम उगलते है, ये तुम्हारे लिए वृक्षो का, पत्र-पुष्पो का सानिध्य तुम्हें उनकी सहानुभूती स्नेह..... तुम्हारे सफलता पथ को सुखद कर देते है। (पृ-२२१) प्रकृति ने मनुष्य को हमेशा प्रेरित किया है जीवन जीने की प्रेरणा हमें प्रकृति से मिलती है। प्रकृति मार्गदर्शक के रूप में हमें सिखाती भी है यही बात लेखक ने 'काके लागू पांव' उपन्यास में दिखाई है। प्रकृति का महत्व विशद करते हुए तेगबहादुर चक्रधर से कहते है - मनुष्य ने प्रकृती से बहुत कुछ सीखा है, उसे बहुत कुछ सिखना भी शेष है वह अपनी अमूल्य वस्तुओं की रक्षा का पूरा प्रबंध करती है। मनुष्य को प्रकृति प्रदत्त इस शिक्षा को गाठ बांधना चाहिए। (पृ-१११)

'लक्ष्मण-रेखा' यह एक पर्यावरण विषयक उपन्यास है। इस उपन्यास में मिश्रजी ने भारतीय संस्कृति का महत्वपूर्ण अंग प्रकृति को मानते हुए प्रकृति की रक्षा करने का संदेश दिया है। उपन्यास की भूमिका में लेखक ने लिखा है - 'उपन्यास का मूल विषय अथवा प्रतिपाद्य पर्यावरण है। पर्यावरण की रक्षा की ओर, उसके प्रदूषण को नियंत्रित करने की ओर, विश्व के सभी बुध्दी जीवियों का ध्यान आकृष्ट हुआ है। प्रकृति का महत्व बताते हुए वे आगे लिखते है- 'और वन? तुम्हारे प्राणरक्षक तुम्हारें फेफडों में निरन्तर प्राणवायू फुंकनेवाले? तुम्हे शीतलता और शरणस्थली से लेकर रूप में उदरपूर्ती का साधन बननेवाले? आदिवासियों, वनवासियों, गिरिजनों के अस्तित्व तो अस्तित्व उनकी संस्कृति के भी पोषक और प्रतीक? कोई लक्ष्मण-रेखा खिचोंगे की नहीं जो प्रकृति के साथ तुम्हारे इस विवेकहीन व्यवहार पर अंकुश दे? (भूमिका)

मनुष्य के जीवन मे प्रकृति का अहम् योगदान होता है, इसलिए मनुष्य का वनों के प्रति एक स्वाभाविक प्रेम रहता है। यह डॉ. भगवतीशरण मिश्र ने इस प्रकार स्पष्ट किया है मनुष्य को वन-पर्वतों से एक स्वाभाविक प्रेम होता है, आकर्षण होता है। इसलिए सभी व्यक्ती वनों को देखकर उनमें प्रवेश कर प्रफुल्लित हो जाते है। लोग अपने घरों के सामने लॉनो में, प्रांगण में यहां तक की छत के गमलों में भी

पौधे लगाते है। इसके मूल में उनके मन मे कही अंदर बैठा वृक्ष वनों के प्रति प्रेम ही है। मनुष्य वन में पैदा हुआ है। वृक्षो के नीचे पढा, बढा है। आरंभिक अवस्था में वन्य जीवों के मध्य ही सह-अस्तित्व की भावना से बढता रहा... पर उसका मूल प्रदेश वन ही रहा। सभ्यता के क्रमिक विकास में वह वनों के बाहर अवश्य आ गया पर वन, पौधे और वृक्ष अब भी उसको अपनी और दृढता से खींचते है। वनों से उसका प्रेम स्वाभाविक और अकृत्रिम है। मानव-जाति मूलतः वन प्रेमी है, प्रकृति प्रेमी। (पृ-१४५) डॉ.भगवतीशरण मिश्र ने प्रकृति को संस्कृति में महत्वपूर्ण मानते है उसे ईश्वरीय शक्ती माना है। 'सुरज के आने तक' उपन्यास का पात्र शिवचरण त्रिपाठी यही बात नारायण से कहता है कि- प्रकृति से ही सब होता है। आज तक तुमने सृष्टी में जोडा विहिन कुछ देखा है। नर और मादा दोनों साथ होते है की नहीं। गाय बिना सांड अथवा सांड के बिना गाय का अस्तित्व है क्या? जीव जंतु तो जीवजंतु, वनस्पती शास्त्रीयों से पूछो, वैज्ञानिकों से पूछो कि वनस्पति-जगत में भी पशु-जगत की यह व्यवस्था है की नहीं? तब पुरुष के बिना प्रकृति का अस्तित्व है क्या जब प्रकृति है तो पुरुष है और बोल दो अपने अनास्थावादी वैज्ञानिकों को कि पुरुष ही ईश्वर है जैसा मैने पहले कहा सृष्टी के पीछे की शक्ति का स्त्रोत है ईश्वर। यह शक्ति ही प्रकृति है और पुरुष यानी ईश्वर इस शक्ति का स्त्रोत। (पृ-८१)

प्रकृति के अस्तित्व की बात 'अथ: मुख्यमंत्री कथा' उपन्यास में केंद्रित है। प्रकृति अस्तित्व को स्विकार करती हुई श्रीमती ललिता प्रकृति को वरदान स्वरूप समझती हुई शिक्षा मंत्री से कहती है -आदमी जब थोडा खुश होता है तो हसता है। आपको तो मालुम ही है मुस्कारने और हंसने के ये दो वरदान प्रकृति ने मनुष्य के अलावा किसी और जीव को नहीं दिया है पर आज मनुष्य.... मुस्कारना और हंसना भूल गए है। (पृ-२७४) प्रकृति के प्रति मिश्र जी के मन में बचपन से ही प्रेम रहा है। 'मैं भीष्म बोल रहा हुं' उपन्यास में उन्होंने गंगाजल का महत्व बताते हुए उसे अमृतवाहिनी माना है। उपन्यास में वे लिखते है-'कहता है गंगा सलिल वाहिनी है? वह अमृत वाहिनी है। पियूष प्रयास्विनी। तभी तो मृतक के मुह में गंगाजल के दो चार बूँद उसी आशा के साथ डाले जाते है, कि कहीं इस अमृतपान से उसके गत हुए प्राण वापस आ जाए।' (पृ-५४) आस्थावान मनुष्य जल को भगवान सदृश्य मानते है इसलिए जल की पूजा की जाती है। जल की प्रासंगिकता बताते हुए 'पावक' उपन्यास में लेखक लिखते है-'जल इतना महत्वपूर्ण हो गया है कि इसके गुणों की तुलना श्रीकृष्ण के गुणों से की जाए? उसे इस प्रकार प्रभु के समक्ष ही रखना माना जाएगा अथवा नहीं? ईश्वर द्वारा ही यह चराचर सब कुछ सृष्ट है? जल का भी सर्ष्टा वहीं है तो ईश्वर द्वारा ही आस्तित्व में लाया गया यह जल ईश्वर

की समानता कैसे कर सकता है? (पृ-२४६)

'मीठी नीम' पर्यावरण पर चिंतन करते हुए एक ऐसे सशक्त उपन्यास के रूप में हमारे सामने आता है, जिसमे कुसुम कुमार ने उपन्यास के अंत तक मुख्य पात्र ओमना के माध्यम से हरियाली का प्रसार करने में अग्रसर दिखाई दिया हैं। हरित हरा का यह संकल्प जिस तरह पात्र ओमना ने लिया, लेखिका का उद्देश्य इसे प्रत्येक व्यक्ति के हृदय में उजाकर करना है। उपन्यास में लेखिका ने पर्यावरणीय संकट को यथार्थ रूप में प्रस्तुत किया है तथा यह अपील की है कि पृथ्वी को जितना हो सके हरा भरा बनाने में योगदान दें क्योंकि धरती के गुर्दे हरे रहेंगे तभी तो हमारे आपके गुर्दे स्वस्थ रह सकेंगे। (पृ.१४) हरी भरी प्रकृति के कारण हमारे आस-पास का वातावरण सौंदर्यमय बना है, पर भूमंडलिकरण के इस दौर में आज का मनुष्य स्वार्थवश प्रकृति को हानी पहुंचा रहा है मनुष्य के इस स्वभाव के कारण यह सुंदर धरती किस तरह बेरंग बन सकती है, इसका उदाहरण ग्लोबल गाँव के देवता उपन्यास में दिखाया है। - 'जंगल, बाकी खाली दूर दूर तक फैले उजाड बंजर से खेत बीच-बीच में बाक्साइट की खुली खदाने जहां से बाक्साइट निकाले जा चुके थे वे गडढे भी मुंह बाए पडे थे मानो धरती मां के चेहरे पर चेचक के बडे बडे धब्बे हों'. (पृ.९)

संक्षेप में साहित्य, संस्कृति तथा समाज के केंद्र में मनुष्य है। मनुष्य का संबंध समाज से है। पर्यावरण का प्रभाव मनुष्य अर्थात समाज पर रहता है। प्रकृति का सिधा प्रभाव पर्यावरण पर होता हैं, यही कारण है कि पर्यावरण संतुलन बनाए रखने में प्रकृति की अहम् भूमिका है। प्रकृति संवर्धन से ही मनुष्य, पशु पक्षी प्राणी आदि का संवर्धन. हो सकता है इसलिए हम सभी ने पर्यावरण संवर्धन में योगदान देना चाहिए।

संदर्भ ग्रंथसूची :

१. संस्कृति के संदर्भ - कमलेश माथुर
२. पद्मनेत्रा - डॉ. भगवतीशरण मिश्र
३. सुरज के आने तक - डॉ. भगवतीशरण मिश्र
४. पावक - डॉ. भगवतीशरण मिश्र
५. अथः मुख्यमंत्री कथा - डॉ. भगवतीशरण मिश्र
६. लक्ष्मण रेखा - डॉ. भगवतीशरण मिश्र
७. मैं भीष्म बोल रहा हुं - डॉ. भगवतीशरण मिश्र
८. काके लागू पांव - डॉ. भगवतीशरण मिश्र
९. मिठी नीम - कुसुम कुमार
१०. ग्लोबल गांव के देवता - रणेंद्र

21.

भ्रष्ट व्यवस्था पर करारा व्यंग्य 'सावधान, हम ईमानदार हैं'

श्री लतीफ घोंघी का वास्तविक नाम अब्दुल करीम है। उनका जन्म छत्तीसगढ़ के जिला महासमुंद के बेलसोडा नामक गांव में 28 सितंबर, 1935 को एक सामान्य मुस्लिम परिवार में हुआ था। ऐसा कहा जाता है कि उनका जन्म एक हिंदू देवता से मन्नत मांगने पर हुआ था। उनका वास्तविक नाम अब्दुल करीम था। वह अपने माता पिता के इकलौते पुत्र थे। उनके पिता का नाम उस्मान और माता का नाम हुरबाई था। 18 वर्ष की आयु में उनका विवाह जिनाबाई नामक एक निरक्षर युवती से हुआ। उनकी पारिवारिक स्थिति बहुत अच्छी नहीं थी। फिर भी उन्होंने सागर विश्वविद्यालय (मध्य प्रदेश) से प्रथम श्रेणी के साथ बीए और बाद में एलएलबी तथा होमिओपैथी का डिप्लोमा भी पूरा किया था। इसके बावजूद भी उन्हें जीविका के लिए काफी संघर्ष करना पड़ा। उन्होंने अनेक छोटे-बड़े व्यवसाय और नौकरी धंधे भी किए। जैसे टेलरिंग, किराना, फोटोग्राफी, ठेकेदारी (इंटे बनाना) आदि और बाद में कोर्ट में नकल नवीस, क्लर्क और अध्यापकी।

आधुनिक हिंदी व्यंग्यकारों में लतीफ घोंघी का स्थान महत्वपूर्ण है। लतीफ घोंघी उनका उपनाम है। लतीफ से तात्पर्य मजेदार, बढ़िया, उत्तम तो घोंघी का अर्थ है शंख या सीप। अब्दुल करीम जी में लिखने की तीव्र इच्छा थी, किंतु सरकार द्वारा पकड़े जाने का डर होता था। इसी कारण उन्होंने अपने लिए 'लतीफ घोंघी' इस उपनाम का चयन किया। तत्कालीन साहित्यिक समाज की भी यह मांग थी कि लेखक उपनाम से पहचाना जाए। अपने स्वभाव और व्यंग्य लेखन के मुताबिक उन्होंने अपना उपनाम 'लतीफ घोंघी' रखा था। उन्हें लेखन की प्रेरणा उनके वकील मित्र श्री कृष्ण मुरार अग्रवाल से मिली। जिन्हें साहित्य में रुचि थी। घोंघी जी को शोषित, पीड़ित और कमजोर वर्ग के प्रति विशेष सहानुभूति थी। वैयक्तिक जीवन में वे गरीब और जरूरतमंद लोगों की सहायता भी किया करते थे। अपनी कमाई का कुछ हिस्सा वे प्रतिदिन दान करते थे। यही कारण है कि सामाजिक विडंबना पर इनका ध्यान ज्यादा रहा है। भूखमरी, कालाबाजारी, नारी शोषण, मिथ्याडंबर (झूठ और ढोंग) धर्म के नाम पर ढकोसलेबाजी, पर्दा प्रथा, दहेज, देशी फिल्में, शिक्षा और साहित्य जगत में दिखने वाली राजनीति एवं घपले बाजी आदि को उन्होंने सूक्ष्मता से देखा और उस पर पैने व्यंग किए हैं।

घोंघी जी ने 500 से अधिक व्यंग्य रचनाएं हिंदी संसार को दी है, जो कुल 34 संग्रह में संकलित हैं। उन्होंने 'तिकोने चेहरे' शीर्षक से एक लघु हास्य व्यंग्य उपन्यास भी

लिखा है। उड़ते उल्लू के पंख, मृतक से क्षमा याचना सहित, बीमार न होने का दुख, संकट लाल जिंदाबाद, बब्बू मियां, कब्रिस्तान में, खबरदार व्यंग्य, जूते का दर्द, किस्सा दाढ़ी का, कुत्ते से साक्षात्कार, सोने का अंडा, मेरी मौत के बाद आदि उनकी प्रसिद्ध व्यंग्य रचनाएं हैं।

'सावधान, हम ईमानदार हैं' श्री लतीफ घोंघी का एक प्रसिद्ध व्यंग्य पाठ है। इस व्यंग्य पाठ में घोंघी जी ने दो पात्रों की सहायता से एक छोटी सी कथा सुनाते हुए ईमानदारी की विडंबना को बड़े मजेदार ढंग से चित्रित किया है। वे पात्र हैं- पहला ईमानदार और दूसरा ईमानदार। इस कथा में तीसरा पात्र स्वयं लेखक है। लेखक को लगता है कि इस दुनिया में ईमानदार आदमी नहीं मिलेगा। तभी उनकी भेंट पहले ईमानदार से होती है। पहले ईमानदार के अनुसार उससे बड़ा ईमानदार इस देश में नहीं मिलेगा अर्थात वह स्वयं को सबसे बड़ा ईमानदार समझता है। परंतु जैसे-जैसे लेखक के साथ उसका संवाद बढ़ता है, उसकी ईमानदारी की परतें खुलती जाती हैं। लेखक के द्वारा पूछे जाने पर कि वह क्या करता है? तब उसका उत्तर है- 'ईमानदारी करते हैं। हर काम वे ईमानदारी से करते हैं। किसी को गोली भी मारते हैं या किसी का गला भी काटते हैं तो पूरी ईमानदारी और निष्ठा के साथ।' वह यह कहना भी नहीं भूलता की ईमानदारी से गला काटने का मजा ही कुछ और है। साथ-साथ वह कहता है कि जिस से पैसा लिया, दारू पी, मुर्गा खाया उसको पूरी ईमानदारी के साथ वोट देते हैं। किसी का भी काम वे बिना पैसे लिए नहीं करते। वे पिछले दरवाजे से पैसे नहीं लेते बल्कि सामने से लेते हैं। उसके अनुसार पिछले दरवाजे से पैसे लेने वाले भी ईमानदार हैं। सिर्फ वह अलग तरह की ईमानदारी है। तभी तो ऐसे लोग सरकार में ऊंचे ऊंचे पदों पर हैं। वे बेईमानी नहीं करते लेकिन बेईमानी की रोटी जरूर खाते हैं। बेईमानी के पैसों से उनके बच्चे देहरादून के स्कूलों में पढ़ते हैं, उनकी बीवियां विदेशों की सैर करती हैं। ऐसे लोग दूसरों के नाम बता कर घूस जमा करते हैं और ऊपर से दिखाते हैं कि वे ईमानदार होकर बेईमानों के बीच फंसे हुए हैं। वरना वे पैसे लिए बिना हमारा काम कर देते।

लेखक पहले ईमानदार की ईमानदारी को सुन रहे थे तभी वहां दूसरे ईमानदार आ गए। वे बोले कि पहले वाले से बचों वह एक नंबर का बेईमान है, साला कमीशन खाता है। अब दोनों बेईमानों का विवाद शुरू होता है। दोनों स्वयं को ईमानदार बताते रहते हैं और एक दूसरे के बुरे कर्मों की लिस्ट सुनाते जाते हैं। स्वयं की ईमानदारी को सिद्ध करने की होड़ में रहते हैं। दूसरा ईमानदार कहता है- "व्यक्तिगत मामले का ईमानदारी से कोई संबंध नहीं है। इस देश में लोगों के व्यक्तिगत मामले और ईमानदारी के मामले अलग-अलग होते हैं। सार्वजनिक रूप से मैं आज भी ईमानदार हूं।" इस प्रकार पहला स्वयं को ईमानदार और दूसरे को बेईमान कहता है तो दूसरा अपने को ईमानदार और पहले को बेईमान कहता है। लेखक दोनों की तथाकथित ईमानदारी को सुनते रहने के सिवा और कुछ नहीं कर सकते। दोनों की बातचीत से बड़ी मजेदार बातें पता चलती

है कि कैसे-कैसे कारनामे वे करते रहते हैं। जैसे - 'उधार लेने से ईमानदारी का कोई संबंध नहीं है', 'ईमानदारी अपनी जगह और उधार अपनी जगह', 'कमीशन खाना भी एक आर्ट है', 'कितने भी गुंडागिरी करो, मारकाट करो, कमीशन खाओ लेकिन पब्लिक को समझा दो कि हम ईमानदार है।' इस तरह दोनों एक दूसरे को बेईमान घोषित कर एक-एक कर चले गए। फिर शाम को लेखक ने दोनों को शराब के अड्डे पर देखा जहां दूसरा पहले को समझा रहा था, "अबे फालतू बक-बक कर रहा था पब्लिक के सामने... इस तरह पब्लिक के सामने बक-बक करने से हमारी ईमानदारी किसी दिन खतरे में पड़ जाएगी। और लोगों को पता चल जाएगा कि हम ईमानदार नहीं हैं।" यह कहकर दोनों ईमानदारी से दारु पीने लगे।

इस तरह इस व्यंग्य पाठ में घोंघी जी ने बड़ी सहजता के साथ चुटीला व्यंग्य प्रस्तुत किया है। अपनी अन्य व्यंग्य रचनाओं की तरह इस व्यंग्य पाठ में भी उन्होंने बिना किसी लाग लपेट के एक सामाजिक विसंगति को चित्रित किया है। किस तरह सभी प्रकार की बेईमानी करने के बावजूद भी लोग अपने को ईमानदार सिद्ध करते हैं? ऐसा उदाहरण सचमुच दुर्लभ है। भाव पक्ष की तरह घोंघी जी के इस व्यंग्य पाठ का शिल्प पक्ष भी उतना ही सरल और सटीक है।

आधार ग्रंथ :-

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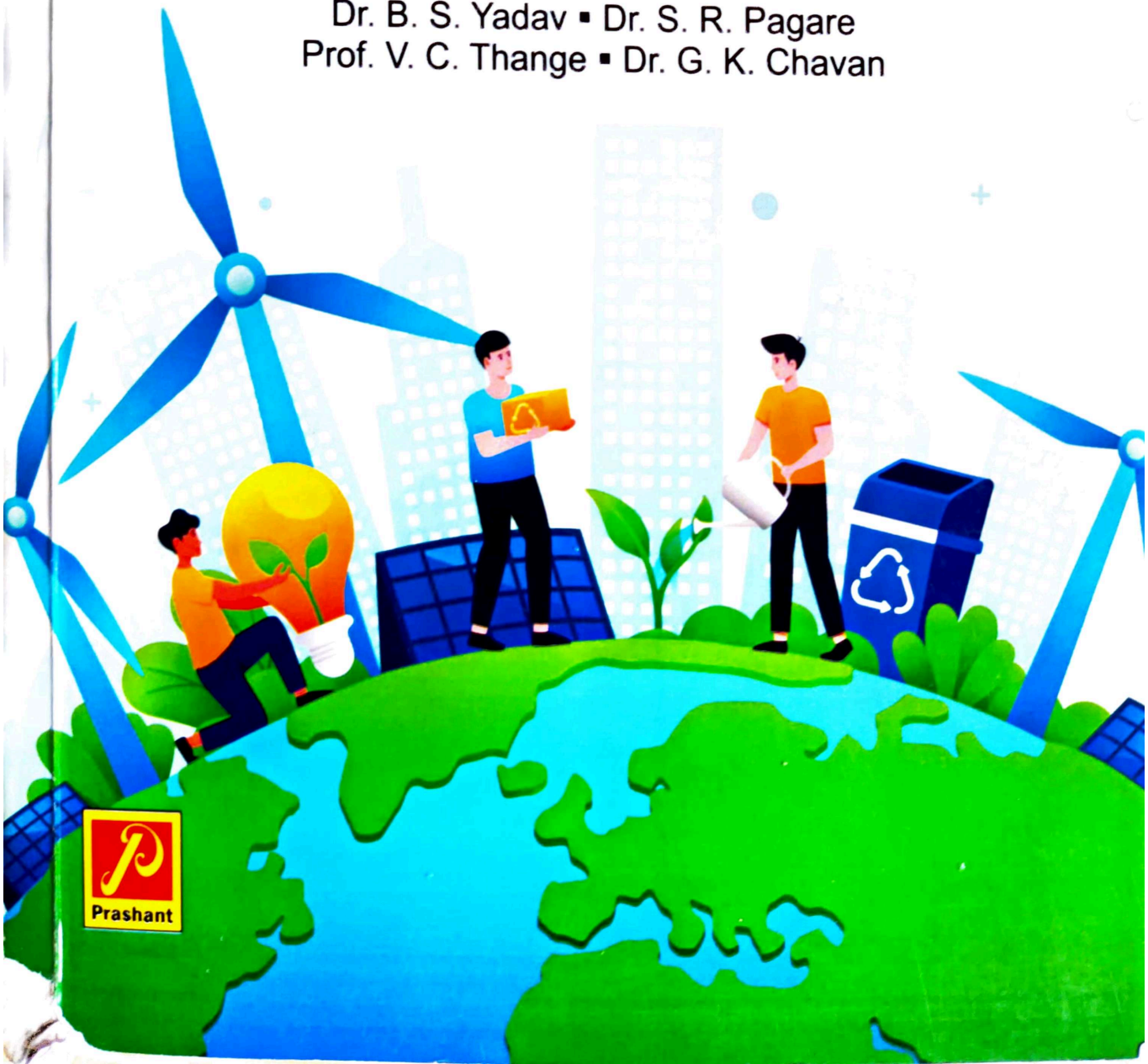

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डॉ मुकेश गौतम के 'प्रेम समर्थक हैं पेड़' कविता संग्रह में पर्यावरण-चेतना

– डॉ. जिभाऊ गा. फ

स्त्रीवादी चेतना, दलित चेतना, आदिवासी चेतना, अल्पसंख्यक विमर्श किन्नर विमर्श, मुस्लिम विमर्श, किसान एवं मजदूर विमर्श आदि की भांति वर्तमान समय का एक और चर्चित विमर्श है - पर्यावरण विमर्श या पर्यावरण चेतना। विगत २०-२५ वर्षों से या ऐसा कहिए कि बीसवीं सदी के उत्तरार्ध से पर्यावरण-रक्षा की चिंता हमें लगातार महसूस होने लगी है । और अब २१ वीं सदी में तो यह चेतना और तीक्ष्ण होती जा रही है। इसकी वजह भी ऐसी ही है । अखिल मनुष्य समाज के द्वारा कभी विकास के नाम पर तो कभी उसके लालच के कारण पेड़ की बेशुमार कटाई, नदियों से रेती का बेतहाशा निकाला जाना और उनमें गंदा और जहरीला पानी छोडना, पहाड़ों को चीर कर और तराश कर समतल बनाना, जमीन के गर्भ से इंधनों का बेतहाशा दोहन जो हो रहा है । इस तरह से कुल पर्यावरण के साथ जो पिछले कुछ जो अतिचार हुआ है और लगातार हो रहा है, वह निश्चय ही अखिल मानवता के भविष्य के लिए चिंता और दुख का कारण बनता जा रहा है। डॉ. नवल किशोर के अनुसार जैसे-जैसे मनुष्य अपनी बनाई संकुलताओं में घिरता जा रहा है, उसका जीवन और अधिक कठिन होता जा रहा है। सारे वैज्ञानिक और औद्योगिक विकास ने हमारे सामने पर्यावरण की समस्या को अत्यंत गंभीर बना दिया है । भौतिक प्रगति के उपादानों ने पर्यावरण को इतना प्रदूषित कर दिया है कि प्रदूषण से बचने की गंभीर समस्या हमारे लिए निरंतर उग्र रूप धारण करती जा रही है। आज पर्यावरण को प्रदूषण मुक्त बनाने के अनेक उपायों पर चर्चा होने लगी है, और कहीं कहीं उसके अनुसार कृति भी की जा रही है। यह आश्वस्त करने वाली बात है। यह चिंता अनेक पर्यावरण-प्रेमी व्यक्ति और सेवाभावी संस्थाओं के द्वारा जाहिर रूप से जताई जा रही है । ऐसी स्थिति में एक कवि या संवेदनशील लेखक इससे अछूता कैसे रह सकता है? आज लगभग हर सजग साहित्यकार पर्यावरण-ह्रास को लेकर चिंतित है। यही कारण है कि साहित्य जगत में पर्यावरण चेतना की अवधारणा अब दिनोंदिन अधिक तीव्र होती जा रही है। हमें लगता है कि यह नितांत जरूरी भी है । वरना हम ही हमारे विनाश को देखकर भी मानो चुप हैं और इस विनाश-लीला को मौन स्वीकृति दे रहे हैं । प्रकृति और पर्यावरण

परस्पर अभिन्न घटक है या यूं कहें कि प्रकृति या निसर्ग के अभाव में पर्यावरण की कल्पना भी नहीं की जा सकती । दूसरी तरफ प्रकृति के बिना भारतीय साहित्य की कल्पना भी असंभव है ।

जहां तक हिंदी साहित्य का संबंध है प्राचीन हो या अर्वाचीन कविता की विकास यात्रा में प्रकृति मनुष्य का और मनुष्य प्रकृति का श्रृंगार है । प्रकृति कहीं प्रेम के क्रीड़ा स्थल के रूप में उपस्थित हुई है तो कहीं घटनाओं की पृष्ठभूमि और कहीं भावनाओं के उद्दीपक रूप में सहयोगी की भूमिका में सामने आती है। कवियों ने प्रकृति के कण-कण में जीवन के सूत्रों को तलाशते हुए जीवन का संबंध बैठाते हुए कुंजों में, शैल वनों में, प्रेम की राग-विराग की गूंज भरी है। फिर चाहे वह आदिकाल, भक्तिकाल और रीतिकालीन काव्य हो या आधुनिक काल का काव्य हो। हर युग की कविता प्रकृति के मनोरम चित्रों से भरी पड़ी है । साथ ही साथ पर्यावरण रक्षण की चिंता से भी वह ओतप्रोत है। स्पष्ट है कि प्रकृति और भारतीय मनुष्य का सनातन रिश्ता है । इसलिए वर्तमान युग में जब प्रकृति और पर्यावरण के साथ लगातार अत्याचार हो रहा है तो उसे देखकर संवेदनशील कवि या लेखक की कलम कैसे शांत रह सकती है? भूमंडलीकरण की आँधी और विकास की अंधी दौड़ में हम निरे स्वार्थी बनकर जल, जंगल और जमीन के साथ दुराचार कर रहे हैं। हर दिन, हर पल हमारी आंखों के सामने हजारों की संख्या में कटते पेड़, नष्ट होते पहाड और बढ़ता सिमेंट का जंगल कवि-लेखकों में गहरी चिंता और टीस उत्पन्न कर रहा है। कवियों की दृष्टि में पेड़ को उखाड़ना हमारी संस्कृति को उखाड़ने के बराबर है । कवियों को पेड़ों की चिंता, मिट्टी की चिंता, जल की चिंता और हवा की चिंता खाए जा रही है । इसीलिए वे चाहते हैं कि अभी भी इस अतिचार को रोका जा सकता है। इसी आशावाद के सहारे दर्जनों कवि अपनी कविताओं के द्वारा हमें पर्यावरण-रक्षण का बहुमूल्य संदेश देते हैं ।

डॉ. मुकेश गौतम वर्तमान युग के एक जागरूक कवि और संजीदा लेखक के रूप में जाने जाते हैं। अपनी सरकारी नौकरी के साथ-साथ वे लगातार सृजनरत हैं। स्रोताओं के बीच जाकर मंच पर कलात्मक रूप से की जाने वाली हास्य-कविताओं की प्रस्तुति लिए भी डॉ. गौतम विशेष रुप सेजाने जाते हैं। परंतु उनके भीतर हास्य-कवि के साथ-साथ सामाजिक प्रतिबद्धता या सामाजिक चेतना को जगाने वाला कवि भी मौजूद है । डॉ. गौतम के अभी तक 'अपनों के बीच', 'सतह और शिखर', 'वृक्षों के हक में', 'सच्चाइयों के रु-ब-रु', 'लगातार कविता' और 'प्रेम समर्थक हैं पेड़' जैसे कई कविता संग्रह प्रकाशित हो चुके हैं । ये कविता संग्रह उनकी सामाजिक प्रतिबद्धता के प्रमाण हैं। विशेष बात यह है

कि पर्यावरण रक्षण की चिंता को लेकर डॉ. मुकेश गौतम लगातार रचनारत रहे हैं। उनकी इसी प्रतिबद्धता को देखते हुए उन्हें अब तक अनेक सरकारी तथा गैर सरकारी पुरस्कारों से भी नवाजा गया है । यहां मैं डॉ गौतम के २०१६ में प्रकाशित कविता संग्रह 'प्रेम समर्थक हैं पेड़' में पर्यावरण चेतना को लेकर अपनी संक्षिप्त बात रखना चाहता हूँ।

जहां तक मेरी जानकारी है डॉ मुकेश गौतम अपनी पर्यावरण चेतना और चिंता के चलते प्रतिदिन पर्यावरण रक्षण के लिए कुछ पंक्तियां अवश्य लिखते हैं। पर्यावरण-रक्षण के संबंध में बिना कुछ लिखे वह अपनी लेखनी को व्यर्थ समझते हैं। उनका 'प्रेम समर्थक है' पेड़ कविता संग्रह इसी पर्यावरण-रक्षण की चिंता का प्रतिफल है। इस संग्रह में कुल ७५ कविताएं हैं। सब की सब कविताएं उनकी पर्यावरण चेतना का सटीक परिचय देती है। प्रस्तुत आलेख में सभी कविताओं पर बात करना मुश्किल है, फिर भी चयनित कविताओं के आधार पर अपनी बात को रखा जा सकता है। प्रस्तुत संग्रह की शीर्षक रचना 'प्रेम समर्थक है पेड़' के अलावा 'धन्यवाद', 'मिट्टी', 'वृक्ष और धर्म', 'प्यार की भाषा', 'मेरे प्रणाम', 'चंदन', 'महत्व', 'युद्ध', 'वरदान', 'धरती मां चादर', 'जीवन संगीत', 'इतिहास', 'पेड़ की तलाश', 'उड़ान', 'प्रेम समर्थक', 'उदासी', 'एहसास', 'श्रेष्ठ मित्र', 'प्रेम के प्यासे', 'प्रेम की भाषा', 'अपनी मिट्टी', 'गांव का पेड़', 'प्रणाम', 'वृक्षों को इंतजार', 'घर', 'आदमखोर', 'पेड़ और मुक्ति', 'अस्तित्व', 'वृक्षों की जय', 'पेड़ होने का अर्थ', आदि अनेक कविताएं पाठकों का ध्यान बरबस अपनी ओर खींच लेती हैं। हर कविता को पढ़ते हुए यह आश्चर्य होता है कि कवि कितनी सरलता के साथ अपनी पर्यावरण रक्षण की बात कह सकता है ?

कवि गौतम संग्रह की प्रथम कविता 'धन्यवाद' में कहते हैं -

''मंदिर बने, मस्जिद बनी,
बढे झगड़े
फैली अशांति
लगा कर्फ्यू,
मरे पच्चीस !
पेड़ लगे
पंछियों ने गाए गीत
गुनगुनाए भौंरे
आई तितलियां
महका घर -आंगन

प्रेम समर्थक हैं पेड़''

इन पंक्तियों के द्वारा कवि बहुत सरल शब्दों में पेड़ों की महत्ता समझाते हैं । आज सभी ओर धर्म का बोलबाला है । अंधधार्मिकता और कट्टरता के कारण समाज का लाभ तो कुछ नहीं, उल्टे समाज में भेदभाव ही बढ़ता है । ऐसी स्थिति में कवि चाहता है कि मंदिर-मस्जिद की अपेक्षा पेड़ लगाना निश्चय ही अखिल मानवता के लिए लाभकारी होगा । आजादी से पूर्व जैसे कवि हरिवंश राय बच्चन ने अपनी 'मधुशाला' शीर्षक अमर कविता के माध्यम से राष्ट्रीय एकता का महत्त्वपूर्ण संदेश दिया था और अपील की थी कि मंदिर-मस्जिद की अपेक्षा समाज को कविता रूपी 'हाला' की आवश्यकता है, उसी तरह आज युवा कवि मुकेश गौतम मंदिर-मस्जिद की अपेक्षा पेड़ लगाने का मूल्यवान दे रहा है, जो निश्चय ही सार्थक है ।

संग्रह की 'मिट्टी' शीर्षक कविता में पेड़ों के साथ-साथ मिट्टी और धरती के प्रति भी कवि का अटूट लगा अभिव्यक्त हुआ है । इस कविता में कवि ने पेड़ और मनुष्य की तुलना करते हुए मनुष्य को स्वार्थी, सगे भाई का विश्वासघात करने वाला बताया है । जबकि पेड़ को सबका हित करने वाला और अखिल मानव जाति का उपकार करने वाला सिद्ध किया है । प्रकृति और मनुष्य का अंतर स्पष्ट करते हुए कवि ने अपनी दूरदर्शिता का परिचय दिया है । कवि गौतम ने अपनी कविताओं के द्वारा अखिल मानव जाति से कुछ अहम सवाल भी किए हैं । जैसे - तथाकथित धर्म की रक्षा के लिए अखाड़े बनाता मनुष्य पेड़ को काटने वाले हाथों के खिलाफ खड़ा क्यों नहीं होता? जबकि बचपन में हमें सिखाया जाता है कि बरगद दादा है, पीपल बाबा है, नीम भाभी है, और तुलसी वंदनीय । फिर भी मनुष्य उन पर कुल्हाड़ी क्यों चलाता है ? यों कवि ने अपनी कविताओं के द्वारा पाठकों को बार-बार सोचने के लिए विवश किया है । 'प्यार की भाषा' शीर्षक छोटी-सी कविता में कवि ने समझाया है कि पेड भी जीवो की भांति प्यार की भाषा समझते हैं । तभी तो पेड़ के तले खड़े हर व्यक्ति, बच्चे, बूढ़े या जवान पर भी पेड़ पत्ते, फूल और फलों की बरसात कर देता है । इस प्रकार डॉ. गौतम जी कविताएं छोटी हो या लंबी, अनेक मौलिक विचार और परामर्श से युक्त सार्थक रचनाएं प्रतीत होती हैं । 'मेरे प्रणाम' शीर्षक कविता में भी कवि ने मनुष्य और पेड़ों की तुलना करते हुए कहा है कि बदलते युग में पेड़ तो संत महात्माओं की तरह सदियों से वैसे ही रहे किंतु मनुष्य दिनोंदिन अधिक मतलबी, स्वार्थी और हिंसक बनता गया । कवि को इसी बात से रंज है । 'युद्ध' शीर्षक कविता में कवि कहते हैं - आज पानी के लिए छोटे-मोटे झगड़े हो रहे हैं परंतु कवि को वास्तविक डर यह है कि

यदि मनुष्य अब भी नहीं संभला, तो संभव है भविष्य में पानी के लिए ही महायुद्ध हो जाएगा । इसलिए कवि की चेतावनी है कि पेड़ों को ही जीवन मानकर महायुद्ध से बचा जा सकता है । कवि ने संग्रह की अनेक कविताओं में पेड़ों के लिए कई समर्पक और सार्थक विशेषणों का प्रयोग कर अपनी मौलिकता का परिचय दिया है । जैसे - संत, महात्मा, अहिंसा का पुजारी, ईश्वर का सर्वश्रेष्ठ वरदान आदि।

कवि कहते हैं कि धरती यदि हमारी मां है तो फिर पेड़ अपने भाई हैं । ऐसा होते हुए भी हम पेड़ यानी भाई की हत्या क्यों करते हैं? क्या इससे हमारी धरती मां को पीड़ा नहीं होगी ?

कवि प्रस्तुत संग्रह की कविताओं में बार-बार अपनी सर्जनशीलता का परिचय देते हैं । 'बूढ़ा आदमी' और 'बूढ़े पेड़' का अंतर स्पष्ट करते हुए कवि कहते हैं - जवान पेड़ की भांति बूढा पेड़ भी हरा भरा होता है । उसमें भी फूल और फल लगते हैं । उस पर भी घोंसले और गौरैया का फुदकना देखा जा सकता है । इस तरह पेड़ जीवन दाता है । इसलिए मनुष्य से भी वह श्रेष्ठ है । अतः उनकी रक्षा हमारा प्रथम कर्तव्य है । यही मूल्यवान संदेश कवि देना चाहता है।

'पेड़ की लाश' जैसी कविता का शीर्षक ही समझदार पाठक के लिए पर्याप्त है । इस तरह अपनी अनेक कविताओं के द्वारा कवि केवल पेड़ ही नहीं बल्कि नदी, पर्वत, प्राणी, पक्षी आदि कुल पर्यावरण का रक्षण करने का मूल्यवान संदेश देते हैं । 'प्रेम समर्थक है पेड़' जैसा शीर्षक भी हर पाठक के लिए प्रेरक प्रतीत होता है । कवि के आंगन में स्थित रजनीगंधा का पौधा कवि के अकेलेपन को मिटाकर किसी के होने का एहसास दिलाता है । कवि के लिए पेड़ श्रेष्ठ मित्र की तरह है । इसीलिए 'श्रेष्ठ मित्र' शीर्षक कविता में पेड़ हर मौसम में हर तरह से कवि और कुल मानवता की सुविधा बनता है और श्रेष्ठ मित्र साबित होता है । अतः उसका अर्थात पर्यावरण का महत्व निर्विवाद है । पुराणों में सागर मंथन से निकला कालकूट पीने वाले भगवान शिव जगदीश्वर और नीलकंठ कहलाते हैं परंतु अनादि काल से कार्बन के जहर को पीने वाला वृक्ष-समाज हमें भगवान शिव की भक्ति पूजनीय क्यों नहीं लगता ? शायद यही भावना कवि की 'उम्मीद' जैसी छोटी-सी कविता में व्यक्त होती है ।

कवि गौतम की कविताओं में चित्रित पेड़ मौन रहकर भी अखिल मानव समाज को अनेक मूल्यवान संदेश देता प्रतीत होता है। कभी वह मनुष्य को कहता है कि 'भागों नहीं, सिर्फ जागो और पर्यावरण को बचाओ' तो कभी पेड़ की रक्षा करने वाले मनुष्य का आभार व्यक्त करता है । इस प्रकार कवि ने कई कविताओं में मानवीकरण अलंकार का प्रयोग करते हुए पेड़ों को मनुष्य की भांति बतियाते

या प्रेम-स्नेह की बरसात करते हुए चित्रित किया है । यह कवि की कुशल प्रतिभा का नतीजा है । डॉ. मुकेश गौतम ने पर्यावरण-प्रदूषण और बेतहाशा होने वाली पेड़ कटाई की समस्या को भारतीय दृष्टि से समझने का प्रयास किया है और यह रेखांकित किया है कि हमारे देश में प्रकृति के साहचर्य की महत्ता को इसीलिए समझा गया है कि मनुष्य शुद्ध पर्यावरण में जिए। उनका यह कविता संग्रह पर्यावरण प्रदूषण के भारतीय संदर्भों को समझते हुए पेड़ के जरिए नदी, पहाड़, पर्वत,जंगल की रक्षा का पुरजोर आवाहन करता है।

संदर्भ ग्रंथसूची :

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डॉ. सुनिल चव्हाण

द्वारा प्रकाशित



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सर्वाधिकार सुरक्षित। इस प्रकाशन के किसी भी हिस्से को प्रकाशक की पूर्व अनुमति के बिना इलेक्ट्रॉनिक या किसी अन्य माध्यम द्वारा पुनः प्राप्ति समेत किसी भी रूप में प्रतिलिपिकृत, अनुवादित, संगृहीत नहीं किया जा सकता है और न ही किसी भी रूप में या किसी भी माध्यम द्वारा इसे प्रसारित किया जा सकता है।

इस पुस्तक में लेखक द्वारा व्यक्त विचार उनके व्यक्तिगत हैं जिसका प्रकाशक से कोई संबंध नहीं है।

भारत में प्रकाशित

झपसू यादव द्वारा "अखण्ड पब्लिशिंग हाउस' के लिए प्रकाशित। वी.एम. ग्राफिक, दिल्ली द्वारा कवर डिजाइन व शब्द संयोजन तथा आरना इंटरप्राइजेज, दिल्ली से मुद्रित।

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5

संजीव के 'फाँस' उपन्यास में चित्रित किसान एवं मजदूर विमर्श

संजीव जनवादी धारा के एक सुप्रतिष्ठित कथाकार हैं। उन्होंने अब तक हिंदी जगत को अनेक महत्वपूर्ण उपन्यास एवं कहानियाँ दी हैं। यद्यपि उनकी रचना यात्रा का आरंभ 20 वीं शती के उत्तरार्ध में हुआ, परंतु उन्हें वास्तविक ख्याति मिली 21वीं शती में। आज कल संजीव जी एक चर्चित एवं पाठकप्रिय रचनाकार हैं। वे हिंदी के ऐसे बिरले कथाकारों में से हैं, जिन्होंने एक साथ उपन्यास और कहानी विधा पर समान अधिकार से कलम चलाई है। यहाँ मेरे अभीष्ट उनके 'फाँस' उपन्यास में किसान एवं मजदूर विमर्श पर चर्चा करना है, परंतु उससे पूर्व उनके अब तक प्रकाशित उपन्यासों पर प्रकाश डालना अनुचित नहीं होगा। 'किशनगढ़ के अहेरी' से उनके भीतरी उपन्यासकार की शुरुआत हुई थी, परंतु 'सर्कस' और 'सावधान नीचे आग है' की रचना के बाद वे वास्तविक रूप से उपन्यासकार के रूप में प्रतिष्ठापित हुए। इसके तुरंत बाद उन्होंने 'धार' उपन्यास की रचना की। 'सर्कस' उपन्यास में उन्होंने सर्कस में काम करने वाले कलाकारों के त्रासद और विडंबना पूर्ण जीवन की कथा सुनाई, तो 'सावधान नीचे आग है' और 'धार' में झारखंड के कोयले की खदानों में काम करने वाले मजदूरों के शोषण और संघर्ष की गाथा अंकित की है।

डॉ. जिभाऊ शा. मोरे, एसोसिएट प्रोफेसर तथा समन्वयक, हिंदी अनुसंधान केंद्र, के.जे.सोमैय महाविद्यालय कोपरगाँव (अ.नगर)

आगे चलकर सन 2000 के बाद अर्थात 21 वीं सदी में भी लगातार उनके कहानी–उपन्यासों का सिलसिला जारी है। सन 2000 को 'जंगल जहां शुरू होता है' और 2002 में आए 'सूत्रधार' इन दोनों उपन्यासों से तो उनकी कीर्ति में चार चाँद लग गए। इसी तरह आगे भी 'आकाशचम्पा', 'रह गई दिशाएँ इसी पार', 'फाँस', और 'प्रत्यंचा' के साथ यह यात्रा बरकरार है।

जहां तक मेरे शोधालेख के शीर्षक के संबंध है, संजीव जी वास्तव में किसान एवं मजदूर विमर्श को सही अंजाम देने वाले यशस्वी कथाकार ठहरते हैं। संजीव जी की विशेषता है कि वे गाँव से आए हुए और गाँव में रचे–बसे उपन्यासकार हैं। गाँव और वहाँ का जीवन उनकी रग–रग में व्याप्त है। ऐसी स्थिति में भला किसान और मजदूर उनकी नज़रों से दूर कैसे हो सकते हैं ? भारत के दूर–दराज अंचलों–जंगलो में बसे किसान, मजदूर, भूमिहीन किसान, आदिवासी आदि समूचा सर्वहारा वर्ग और उनके दुःख, उनके प्रश्न, उनकी समस्याएँ संजीव जी की चिंता और सोच के विषय हैं। दूसरी बात संजीव जिस विषय पर रचना का निर्माण करना चाहते हैं, उस विषय पर पहले विस्तृत शोध और चिंतन, चाहे तो अनुसंधान कहे; करते हैं फिर बाद में उस साहित्यिक कृति को अंजाम देते हैं। उनके सन 2015 में प्रकाशित उपन्यास 'फाँस' भी इसका अपवाद नहीं हैं। 'फाँस' उपन्यास उनके अनेक वर्षों के अनुसंधान का फल हैं इसके लिए संजीव जी लंबे समय तक महाराष्ट्र के विदर्भ में जाकर रहे। वहाँ के आत्महत्याग्रस्त किसानों के परिवार के साथ रहे। इस उपन्यास के आधार पर तो यह बात पूरे विश्वास के साथ की जा सकती है, कि वे किसान एवं मजदूर विमर्श को अंजाम देने वाले एक यशस्वी कथाकार हैं। अब मैं 'फाँस' उपन्यास को केंद्र में रखकर ही अपनी बात को आगे बढाऊँगा। 'फाँस' पिछले बीस–पचीस वर्षों में महाराष्ट्र और शेष भारत में हो रही' किसानों की आत्महत्याएँ' जैसे ज्वलंत विषय को आधार बना कर लिखा गया एक महत्वपूर्ण उपन्यास हैं। लगभग बारह वर्ष पूर्व वरिष्ठ जनवादी कथाकार और आलोकि स्व. मार्कण्डेय जी ने अपनी त्रैमासिक पत्रिक 'कथा' के संपादकीय वक्तव्य में इस विषय पर तीव्र दुःख व्यक्त करते हुए और यह कहते हुए प्रबुद्ध समाज को सोचने के लिए विवश कर दिया था, कि "आजादी के साठ साल बाद भी देश का प्रथम नागरिक किसान

आत्महत्या कर रहा है, यह इस विकासशील कहलाने वाले देश के लिए शर्मनाक बात हैं''1 आज मार्कण्डेय जी तो इस दुनिया में नहीं हैं, परंतु संजीव जी का 'फाँस' उपन्यास स्व. मार्कण्डेय की उसी चिंता की एक सशक्त साहित्यिक प्रतिक्रिया हैं। मार्कण्डेय जी की ही तरह अन्य कई प्रगतिशील लेखक–चिंतकों की भी यही चिंता रही है कि कब इस देश का किसान सुखी बनेगा? कब उसे भूख, अभाव और महाजनों के शोषण से मुक्ति मिलेगी? उसी विषय के साथ आलोच्य उपन्यास पूरी तरह न्याय करता है।

जहां तक कथ्य का संबंध है, यह उपन्यास महाराष्ट्र के विदर्भ में स्थित यवतमाल जिले के बनगांव के एक किसान परिवार की त्रासद कथा को प्रस्तुत करता हैं किन्तु व्यापक अर्थ में यह उत्तर प्रदेश, बिहार, आंध्र प्रदेश, कर्नाटक आदि सभी राज्यों के शोषित किसानों की व्यथा –कथा को उजागर करने वाले महत्वपूर्ण उपन्यास है। आज़ादी के सत्तर साल बाद भी दिन भर की मेहनत–मजदूरी पर दो जून की रोटी जुटाने वाले किसान, मजदूर, कुली यह इन जैसे गरीब वर्ग की हालत आए दिन बद से बदतर होती जा रही हैं। लाखों की संख्या में किसान आत्महत्या कर रहे हैं। दूसरी ओर धर्म और जाति के नाम पर राजनीति करने वाले स्वार्थी राजनेता समाज में दरार पैदा कर रहे हैं। ऐसे माहौल में संजीव जैसे संजीदा उपन्यासकार का देश और दुनिया का पोशिंदा (भरण–पोषण करने वाले) कहलाने वाले किसानों के भयावह यथार्थ को 'फाँस' जैसे उपन्यास के द्वारा चित्रित करना बहुत बड़ा योगदान हैं। मोहन बाघमारे, सुनिल काका, शिबू, सिंधु ताई, आशा, कलावती आदि पात्रों के साथ प्रस्तुत की गई किसानों के शोषण और संघर्ष की मर्मस्पर्शी कथा पाठक–समाज को सोच–विचार के लिए विवश कर देती हैं। उपन्यास में किसानों के प्रतिनिधि सुनिल काका द्वारा किसानों को कर्ज न लेने तथा आत्महत्या का कदम न उठाने की अपील करना आश्वस्त करता हैं। 'खबरदार जो किसी ने कर्ज लिया, खबरदार जो किसी ने आत्महत्या की तरफ कदम बढ़ाए। कोई भी खुद–ब–खुद यमराज के पास नहीं जाएगा...!'[2] सुनिल काका के संवाद इस ओर संकेत करते हैं। परंतु काका का यह प्रतिरोध तब डिगने लगता है, जब वन–कर्मचारी खुदाबख्श द्वारा उसकी बेटी कलावती

के साथ छेड़–छाड़ की घटना होती हैं। उधर किसान मोहन बाघमारे कर्ज़ के लिए सरकारी अधिकारी के पास जाता है तब उसके साथ जो व्यवहार होता है, उसे पढ़ कर लगता है कि हम अभी भी अंग्रेज़ी राज में जी रहे हैं। विडंबना देखिए कि जहां मोटर साईकिल के लिए बड़ी आसानी से कर्ज मिल जाता है वहाँ खेती के कर्ज़ के लिए ढेरों नियम और बहाने। नतीजा किसानों को साहूकार और महाजनों की शरण में जाना पड़ता है, जिनके ब्याज के भाव कई गुना ज्यादा होते हैं। फिर कैसे उबर पाएग किसान? हजार कोशिशों के बाद कर्ज़ लेकर खेती करने वाला किसान बाघमारे बाद में सूखे का शिकार बन जाता हैं। फिर उसका एक बैल सर्पदंश का शिकार बनता है तो दूसरे को अर्थभाव के चलते बेच देना पड़ता है। इस तरह भारतीय किसान के लिए हमेशा घाटे का सौदा बनने वाली खेती वर्तमान युग में किस तरह फाँस बन जाती है, इसका चित्रण पाठकों के आँखों में पानी छलका देता है। यही हाल कमोबेश शिबू, सुनिल काका आदि किसानों का हैं।

संजीव जी ने 21 वीं शती के किसान–जीवन की त्रासदी को बड़ी क्षमता के साथ चित्रित किया हैं साथ ही साथ यह भी दिखाया है कि महाराष्ट्र के गाँवों में आज भी सामाजिक, धार्मिक कुप्रथाएँ किस तरह अपनी जड़ें जमा बैठी हैं। फिर वह लड़का –लड़की में भेदभाव का विषय हो या जवान लड़की की पढ़ाई का प्रश्न हो। भारत का गाँव फिर वह उ.प्र./बिहार का गाँव हो या महाराष्ट्र का ; हर ग्रामीण भूभाग में लड़की को लड़के से कमतर ही समझा जाता है। इसीलिए तो शिबू की लड़की स्कूल के एक सांस्कृतिक कार्यक्रम के बाद जब अपनी सहेली के साथ उसके गाँव चली जाती है, तो घर में बवाल खड़ा हो जाता है। पिता शिबू का आदेश निकलता है, कि "और पढ़ाओ इन मुलगियों को, जैसे बैरिस्टर बनेगी .....आगे से स्कूल जाना बंद।"[3] इसी तरह जब मोहन बाघमारे की खेती सूखे की चपेट में आकर बरबाद हो गई, तो उसे अपना बैल कसाई को बेचना पड़ा। तब स्वामी निरंजन देव जैसे धर्म के ठेकेदार कसाई को बैल बेचना महापाप है, कह कर बैल के गले का फंदा गले में डाल कर भिक्षा माँगने का प्रायश्चित बताते हैं। नतीजा धर्म का यह चक्कर बेचारे मोहन को दर–दर की ठोकरें खाने के लिए विवश कर देता हैं।

एक अन्य किसान बिटबल के घर का बचा–खुचा सुख भी तब खत्म हो जाता है, जब उसे अपनी गर्भवती पत्नी के हार्ट के इलाज के लिए पाँच लाख का कर्ज़ लेना पड़ता है। इस कर्ज़ को ना चुका पाने के कारण व आत्महत्या करता हैं। ऐसे अनेक मार्मिक घटना–प्रसंगों से भरा पड़ा है यह उपन्यास। इस तरह पूरे उपन्यास में भारत के अभावग्रस्त गाँव और वहाँ अपनी खेती में खून बाहता–कर्ज़ के बोझ से दबा और हारा हुआ तथा अंत में आत्महत्या की राह पकड़ता हर किसान, उसके बाल–बच्चे, ढ़ोर–डंगर, खेती–बाड़ी, उनकी बदहाली आदि समूचा चित्रण पढ़ कर प्रेमचंद का और उनके 'गोदान' उपन्यास का स्मरण हुए बिना नहीं रहता। 'गोदान' के बाद पहली बार भारत के गाँव और कृषक–जीवन का समग्रता के साथ और इतना सटीक चित्रण 'फाँस' में पढ़ने को मिलता है। यह भी 'फाँस' उपन्यास की एक बड़ी उपलब्धि कही जा सकती हैं।

विशेष बात यह कि कथ्य यह विषय की तरह इस उपन्यास का शैली पक्ष भी श्रेष्ठतर हैं। महाराष्ट्र के विदर्भ के ग्रामीण जीवन की कथा होने के कारण वहाँ की मराठी बोली के आई, मुलगा, मुलगी, नवरा, बायको, शेती, शेतकरी, दारू, लुगड़ा आदि कई शब्दों का यथावत प्रयोग कर उपन्यासकार ने शैलीगत नवीनता का भी परिचय दिया हैं। इसी तरह मुहावरें, लोकोक्तियाँ, प्रतीक और बिंबों आदि का प्रयोग भी उपन्यास की कलात्मक क्षमता में इज़ाफा ही करता है।

निष्कर्ष के रूप में कहा जा सकता है, कि 'फाँस' उपन्यास में संजीव जी ने महाराष्ट्र और कुल मिलाकर भारत के उस किसान वर्ग क चित्रण किया है, जो पीढ़ी दर पीढ़ी कर्ज़ के बोझ तले दबा रहता हैं। जीने के लिए यह वर्ग हड्डी–तोड़ मेहनत करता है। फिर भी अपनी और परिवार की जीविका नहीं चला पाता। बच्चों की पढ़ाई, शादी–ब्याह, दान–दहेज की चिंता से वह निरंतर घुलता रहता है। गरीबी, अभाव और कर्ज़ के कारण वह हर रोज़, हर पल मरता है। इस असहनीय वेदना के चलते ही आखिर में आत्महत्या का रास्ता अपनाता है।

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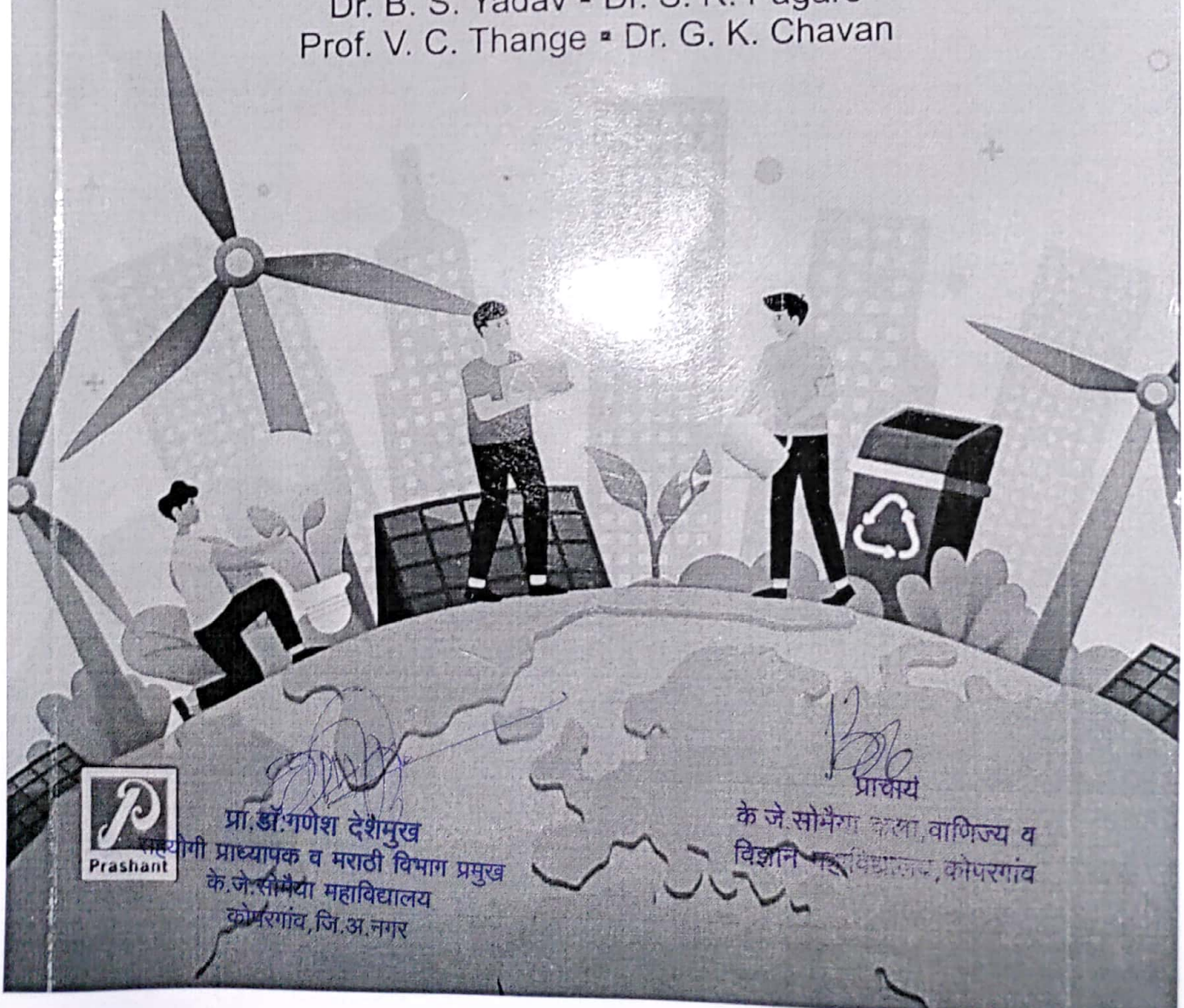

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ENVIRONMENT AWARENESS: Issues and Perspective

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पर्यावरण ऱ्हासाची कारणे – परिणाम व उपाय योजना

– प्रा. डॉ. गणेश दि. देशमुख
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के. जे. सोमैया कला, वाणिज्य व विज्ञान महाविद्यालय, कोपरगाव.

२१ वे शतक हे मानवी इतिहासात अनेक बाबतीत क्रांतिकारी ठरणार आहे. माणूस या शतकात कदाचित दुसऱ्या ग्रहावर वस्ती करेल, एवढा विकास आपण ज्ञान-विज्ञान-तंत्रज्ञानाच्या सहाय्याने करीत आहोत. मात्र त्याच बरोबर आज व उद्या जगासमोर काही भयंकर अशा समस्याही उपस्थित होत आहे, ज्यामुळे माणसाचेच नव्हे तर, एकूण प्राणी व जीवसृष्टीचे अस्तित्व धोक्यात येते आहे. त्यातील महत्वाच्या समस्या म्हणजे बदलते हवामान व ज्यामुळे अचानक उद्भवणारी संकटे, पाणी प्रश्न, वाढते उष्णतामान व यासारख्या सर्व आपत्तीच्या मुळाशी माणसाने चालविलेला पर्यावरण ऱ्हास हे होय. आपल्या इच्छापूर्तीसाठी माणसाने जल, जमीन, व जंगल यांची नको तेवढी नासधूस चालविली आहे. त्याचमुळे यापुढे पर्यावरणाच्या सुरक्षेविषयी आजच आपण जागृत झालो नाही व कृती केली नाही तर येणारा काळ, पिढ्या आपल्याला माफ करणार नाही. ग्रेटा थनबर्ग या १६ वर्षाच्या स्विडीश पर्यावरण तज्ञ मुलीने त्याबाबतीत निर्माण केलेला आदर्श आपणासमोर आहे.[१] त्याप्रमाणे आपणही जागृत होऊन या संदर्भात कामाला लागणे गरजेचे आहे.

१९९२ साली हवामान बदल करार संदर्भात या प्रक्रीयेला सुरुवात झाली. १९९७ साली क्योटो करार व २०१५ साली पॅरिस करार झाला. त्यामध्ये जगातील सर्व देशांनी कार्बन उत्सर्जन रोखण्यासाठी व वैश्विक तापमान रोखण्यासाठी २ अंशापर्यंत सीमित ठेवण्याचा निर्णय झाला, परंतु अद्यापही या देशांनी केलेले प्रयत्न पुरेसे केले नाहीत. २०५० ते २०६० पर्यंत कार्बन उत्सर्जन शून्य स्तरांवर आणण्यासाठी सर्व देशांनी प्रयत्न करणे जरुरीचे आहे.

वाढती लोकसंख्या, वाढती शहरे, वाढते उद्योगधंदे यामुळे आपल्या पर्यावरणाचे प्रदूषण होत आहे. पर्यावरणात असे काही घातक घटक कमी-जास्त प्रमाणात असतात की, ज्यामुळे पर्यावरणाची हानी होते. मानवी आरोग्यालाही धोका पोहचतो. अशा घटकांना 'प्रदूषके' म्हणतात. त्यांच्यामुळे हवा, पाणी आणि जमीन हे सर्व घटक दूषित होतात. या सर्व घटकांमुळे 'प्रदूषण' होते. या सगळ्याचा परिणाम म्हणजे होणारा पर्यावरणाचा ऱ्हास व हवामान बदल व त्यामुळे मागील

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काही वर्षात अनेक देशातच नव्हे, तर भारतातही आलेले महापूर... दुष्काळ, वणवे, हिम नद्या, हिमनग वितळणे वगैरेनी केलेले प्रचंड विध्वंस आपल्या समोर आहे. त्याचमुळे संयुक्त राष्ट्राच्या पर्यावरण कार्यक्रमाचे माजी संचालक राजेंद्र शेंडे यांनी तर या संकटाला एक जागतिक महामारी, असे म्हटले आहे.[२]

पर्यावरण म्हणजे सजीव आणि त्याच्या सभोवतालची परिस्थिती होय. युवक म्हणजे उद्याचे ध्येय होय. पर्यावरण निसर्गाचा महत्त्वाचा प्रमुख घटक आहे. मानवाने खूप प्रगती केली आहे आणि अधोगती ही केली आहे. मानवाने व्यापार, उद्योगधंदे, दूध उत्पादन, दळणवळण आणि वाहतूक यामध्ये खूप प्रगती केली; परंतु प्रगतीमुळे ध्वनी प्रदूषण, वायू प्रदूषण, जल प्रदूषण आणि भूमी प्रदूषण होते. त्यामुळे निसर्गाचा समतोल ढासळला. मानवाने वृक्षतोड करण्याचे एक मोठ्या प्रमाणावर अधोगतीचे काम केले आहे.

ध्वनीप्रदूषण हे वाहतुकीचा आवाज, लाऊडस्पीकर, टेप, टी.व्ही. इत्यादीमुळे होते. याचे कारण मानव आहे. हे सर्व मानवाने निर्माण केलेले आहे. ध्वनी प्रदूषणाचा परिणाम हा आपल्या दैनंदिन जीवनाचा अनिवार्य भाग आहे. फार मोठ्या आणि जोराच्या आवाजामुळे आपली चिडचिड होते. रेल्वे, रस्त्यावरील वाहतूक, विमाने, कारखान्यातील यंत्रे, बांधकाम, खाणकाम व बऱ्याचदा सार्वजनिक सण समारंभ, यामुळे त्रासदायक आवाज निर्माण होतात. शहरामध्येच नव्हे तर लहान-मोठ्या गावांमध्ये ही ध्वनी प्रदूषणाचा अनुभव येतो.

वायू प्रदूषण हे हवेमध्ये अनेक वायू मिसळल्याने कारखान्यातील धुरामुळे, वाहनांच्या विषारी धुरामुळे होते. याचे कारणही माणूस आहे. कारण या सर्व मानवाने तयार केलेल्या वस्तू आहे. वायूच्या प्रदूषणाचे परिणाम जगभरातील बहुतेक सर्व शहरी भागांमध्ये मोठ्या प्रमाणावर होतात. हवेचे प्रदूषण झालेले आढळते. तसेच शहरांच्या लहानश्या भागात ही प्रदूषणाचे अनेक स्रोत एकवटलेले दिसून येतात. आपल्याला जीवन जगण्यासाठी सर्वात महत्त्वाचा घटक 'हवा' आहे. आपण तिचा फारसा विचार करत नाही. तसेच तिचे अस्तित्वही आपल्याला फारसे जाणवत नाही. शहरांमध्ये वाढत चाललेले उद्योगधंदे व प्रचंड प्रमाणात वाढत चाललेल्या वाहनांमुळे मोठ्या प्रमाणात धूर हवेत सोडला जातो. त्याचप्रमाणे शहरांमध्ये दररोज सुमारे ८ हजार टन इतका विषारी वायू हवेत सोडला जातो. धुरात कार्बन डायऑक्साईड, कार्बन मोनॉक्साईड, नायट्रोजन डायऑक्साईड, शिसे, पॉलिव्हीनाईल क्लोराइड इत्यादी प्रदूषके असतात. त्यामुळे फुफ्फुसांचा कर्करोग होऊ शकतो. या वाहनांमुळे एकूण प्रदूषणाच्या ५२ टक्के प्रदूषण होते तर ४३ टक्के प्रदूषण कारखानदारीमुळे होते. ही प्रदूषणाची समस्या दिवसेंदिवस वाढत आहे.

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त्यामुळे सल्फर डायऑक्साईडचे हवेतील प्रमाण वाढल्यास डोळ्याची, घशाची जळजळ होते. खोकला, श्वसनमार्ग-दाह आणि तत्सम श्वसनक्रियेसंबंधी विकार होतात. हायड्रोजन सल्फाइड व हायड्रोजन फ्लुओराइडमुळे श्वसनसंस्थेचा पक्षघात वा कर्करोग होतो. मागील वर्षात व या वर्षीही दिल्ली, गुरुग्राम, नोयडा, या शहर व परिसरात या संदर्भात किती भीषण परिस्थीती निर्माण झाली आहे, ती भारतभर निर्माण होण्यास वेळ लागणार नाही. तसेच हवेचे प्रदूषण असेच वाढत गेल्यास विशेषत: कार्बन डायऑक्साइडचे प्रमाण वाढत गेले तर उत्तर व दक्षिण ध्रुवावर असलेले बर्फ वितळण्याची क्रिया जास्त प्रमाणात होण्याची शक्यता आहे. ते तयार झालेले पाणी समुद्रात मिसळल्यावर समुद्रकिनाऱ्यावरील पाण्याची पातळी साठ फुटांनी वाढणार आहे. असा विचार एका रशियन शास्त्रज्ञाने मांडला आहे.

जलप्रदूषण हे कारखान्यातील सांडपाणी, शहरांच्या नाल्यातील सांडपाणी, विटाच्या-धातूंच्या भट्ट्या, रासायनिक खतांचे कारखाने वगैरे या सर्वांचे सांडपाणी नद्यांत मिसळते. त्यामुळे जलप्रदूषण होते. जगातील जवळजवळ ७० टक्के गावे व शहरे लहान-मोठ्या नद्यांच्या काठी वसलेले आहेत. पाणी अशुद्ध व घातक स्वरुपातच नद्या-तलाव सरोवरे-सागर यात सोडले जाते. पृथ्वीवरील ६७ टक्के पाणी समुद्राच्या, नदीमुखाच्या व दलदलीच्या रूपात आहे. त्यातल्या क्षारांमुळे हे पाणी माणसाला निरुपयोगी होते. नद्या व तलाव यांच्या रूपाने उपलब्ध पाणी फक्त ३ टक्के आहे. ते सर्व प्राणीमात्रांच्या गरजा भागवण्यास पुरेसे आहेत. सुमारे ५० वर्षांपूर्वी भारतातल्या बहुतेक नद्यांचे पाणी पुष्कळसे शुद्ध होते. नद्यांच्या गावांच्या पाण्याच्या गरजा व्यवस्थित भागविल्या जात होत्या. त्यांच्यावर अवलंबून असलेल्या प्राणीसृष्टीला व वनस्पती सृष्टीलाही भरपूर पाणी मिळत होते, पण लोकसंख्या प्रचंड वाढल्यामुळे व औद्योगिकीकरणामुळे देशातील जलसंपत्तीचा अनिर्बंध वापर केला गेला. त्यामुळे आता देशातील बहुतेक नद्यांचे पाणी मोठ्या प्रमाणात दूषित झाले आहे. त्यामुळे पाण्याच्या साठ्यावर व पर्यावरणावर अनिष्ट परिणाम झाले आहेत. भारतात मोठ्या नद्या १४ आहेत, पण त्या प्रदूषित झाल्या आहेत. भारतातील जवळ जवळ ८० टक्के लोक नाईलाजाने प्रदूषित पाणी पितात. वर्ल्ड बँकेने म्हटले आहे की, भारतातील २१ टक्के संसर्गजन्य रोग हे त्यामुळे होतात व दूषित पाणी पिल्यामुळे होणारा खर्च हा दरवर्षी २६,००० कोटी इतका प्रचंड आहे.[३] त्यासाठी भारतरत्न ए. पी. जे. अब्दूल कलाम यांनी शुद्ध पाण्याचे ७,५०,०००/- वॉटर ए. टी. एम. ची. सविस्तर कल्पना-तक्त्यासह मांडली आहे. ती प्रत्यक्षात आणली तर फक्त १७,०००/- कोटी खर्च होणार आहेत.[४] परंतु त्यासाठी गरज आहे ती समाजजागृती व राजकीय इच्छाशक्तीची. ज्या ठिकाणावरून गावाला किंवा

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शहराला पाणी पुरवठा होतो त्या ठिकाणी आंघोळी करणे, कपडे धुणे, गुरांना पाणी पाजणे वा आंघोळी घालणे, यामुळे पाणी दूषित होते. काही वेळा ज्या पाईपालईनने पाणी पुरवठा होतो, त्यामध्येच फुटून तेथून पाणी वाया जाते, शिवाय डबकी साचून वेगवेगळ्या रोगांचे जंतू तयार होतात. तेच जंतू परत पुरवठा करायच्या पाण्यात येतात व असे दूषित पाणी गाव, शहरांला पुरविले जाते. पाण्याचे प्रदूषण हे विविध खनिज द्रव्ये, जीव जंतू वा इतर पदार्थ पाण्यात मिसळले गेल्यामुळे होते. त्यामुळे पाण्यातील जीव व प्राणीसृष्टी सुद्धा धोक्यात आली आहे.

भूपृष्ठावरून वाहणाऱ्या पाण्यात धुलीकण वा मातीचे कण मिसळतात. त्यामुळे ते रंगीत, गढूळ दिसते. या पाण्यातील गाळ पाण्याच्या तळाशी बसल्याशिवाय ते वापरता येत नाही. भारतातील सर्वात लांब नदी गंगा आहे. तिच्या काठावर १५२ शहरे आणि ३०२ खेडी वसलेली आहेत. या सर्वांतून दररोज ६०२ कोटी लिटर दूषित सांडपाणी नदीत सोडले जाते. पुणे शहरात दररोज ५ कोटी लिटर दूषित सांडपाणी मुळा-मुठा नदीत सोडले जाते. आज नद्यांवर मोठमोठी धरणे बांधली जातात. पण या धरणांमुळे सुद्धा पाणी दूषित होते. या धरणांच्या खालच्या भागातून जे पाणी सोडले जाते त्यात विरघळलेला प्राणवायू कमी असून कार्बन डायऑक्साइड जास्त प्रमाणात असतो व हायड्रोजन सल्फाइड सारखे वायू असतात. त्यामुळे मासे वगैरे जलचरांवर त्याचा विपरित परिणाम होऊन माशांची संख्या घटते. शिवाय त्यांना अंडी घालायला योग्य परिस्थिती रहात नाही. नद्यांचे पाणी प्रदूषित झाल्यामुळे हे प्रदूषित पाणी आजूबाजूच्या जमिनीत झिरपत जाते. त्यामुळे त्या नदीच्या परिसरातील विहिरीचे पाणी ही प्रदूषित होऊन ते पाणी वापरण्या योग्य वा पिण्यायोग्य रहात नाही. सर्व लहान-मोठी खेडी, शहरे ही कोणत्याही पाण्यालगतच असतात. वाढत्या लोकसंख्येमुळे व योग्य सोयी नसल्यामुळे जवळजवळ सर्वच नदी-नाल्यांमधील पाणी दूषित झाले आहे. प्रदुषणाच्या या समस्येचा विचार होणार कधी? तो करणार कोण? असे एक ना अनेक प्रश्न निरुत्तरीतच आहेत. मात्र आता सावध होणायची वेळ अगदी जवळ आली आहे. पर्यावरणाचा असाच ऱ्हास होत राहिला तर माणूस व प्राणीसृष्टीचाही तो होणार आहे. आणि एक दिवस ही पृथ्वी आपल्याला सोडावी लागणार आहे. किंबहुना त्यासाठी प्रसिद्ध शास्त्रज्ञ स्टिपन हॉकिंग यांनी ही पृथ्वी सोडून जातांना आपल्याला २०५० ही त्याची अंतिम मर्यादा सांगितली आहे. त्याकडे आता संपूर्ण जगाने गंभीरपणे बघणे व वेळीच उपाय करणे आवश्यक आहे.

त्यासाठी सौर उर्जेचा अधिकाधिक वापर, वनीकरण, पाणी-इंधनबचत, जैवविविधतेचे संवर्धन, सर्वप्रकारचे प्रदूषण बंद करण्यासाठी सर्व प्रकारच्या

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उपयायोजना तात्काळ सुरु करणे आवश्यक आहेत. त्यादृष्टीने ग्लासगो येथे दि. ३१ ऑक्टोबर ते १२ नोव्हेंबर २०२१ मध्ये होणारी हवामान बदल परिषद ही जगाला वाचविण्याची अखेरची संधी आहे असे वाटते.

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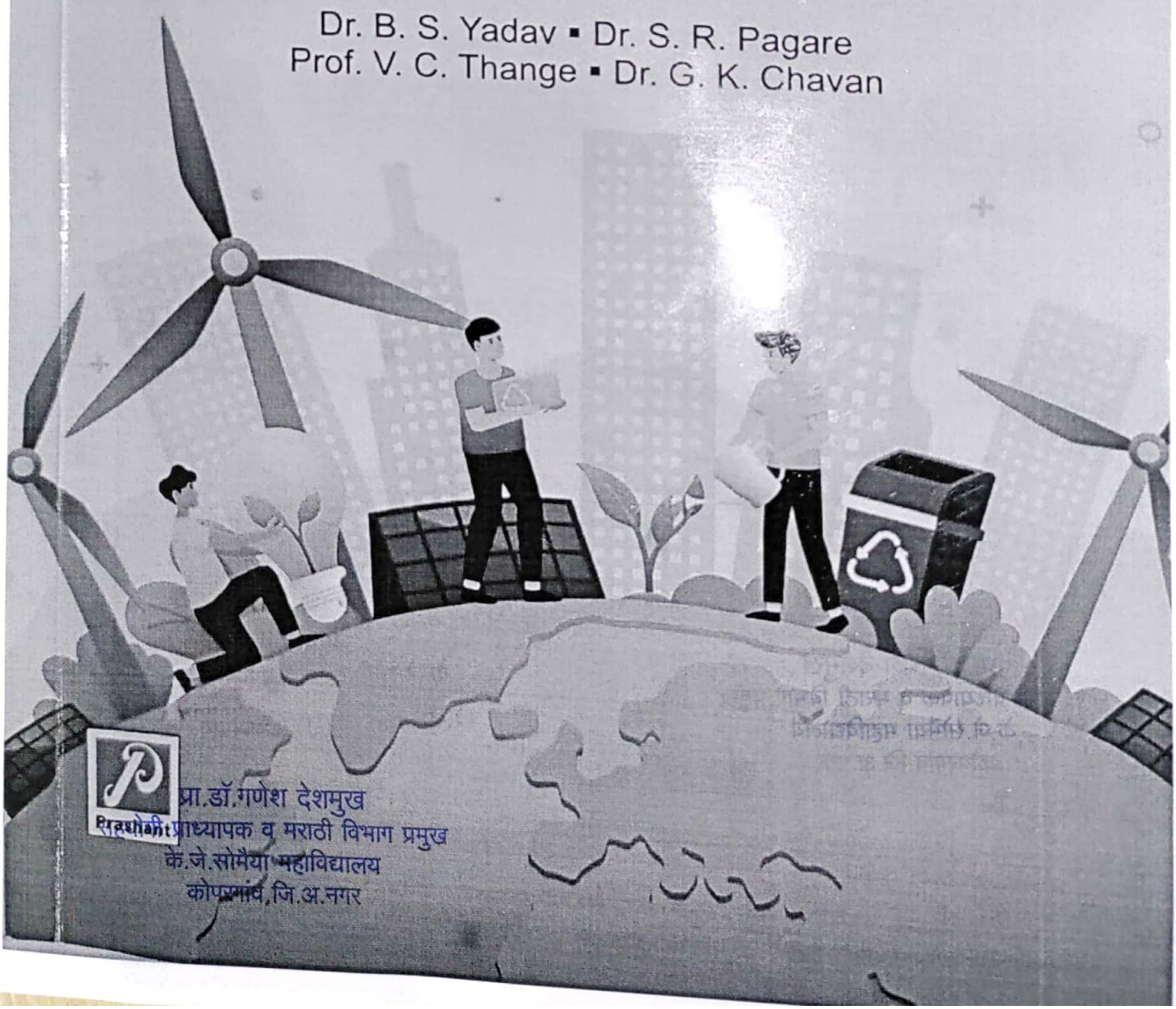

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पशू-पक्ष्यांवर पर्यावरण ऱ्हासाचे परिणाम

– प्रा. डॉ. विठ्ठल पं. लंगोटे
मराठी विभाग
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मानवाच्या दैनदिन गरजा पूर्ण करण्यासाठी मानव आजही इतर सजीवांच्या प्रमाणेच निसर्गावर अवलंबून आहे. पर्यावरणचा तो स्वतः एक घटक आहे. स्वतः गतिमान असणारा मानव पर्यावरणावर परिणाम करत त्या मध्ये बदल घडवून आणत आहे. मानवाने स्वतःची जीवनशैली सुधारताना कळत नकळत पर्यावरणाचा ऱ्हास केला आहे. पर्यावरण म्हणजे सभोवतालची भौगोलिक स्थिती होय. त्या संदर्भात फंक व वॅगनलस असे म्हणतात, व्यक्ती, जीव अथवा समूह यांचे अस्तित्व व विकास यांच्यावर परिणाम करणारी बाह्य स्थिती, घटक किंवा वस्तू म्हणजे पर्यावरण[१] पर्यावरणातील भौगोलिक स्थिती ऋतूमानातील बदल हे या पर्यावरणातील सजीवांच्या जीवनावर परिणाम करीत असतात. पर्यावरण असेल व त्यात निसर्गाच्या चक्राप्रमाणे बदल होत असतील, तर ते मानवी जीवनाप्रमाणे पशुपक्ष्यांच्या जीवनाला ही पोषक असतात; निसर्गाच्या रचनेविरुद्ध होत असतील ते सजीवांच्या जीवाला व अस्तित्वाला घातक असतात. पर्यावरणा संदर्भात Encyclopaedia Britanica यामध्ये पर्यावरणाची व्याख्या, सजीवावर परिणाम करणारे सर्व जैविक व अजैविक घटक म्हणजे पर्यावरण अशी व्याख्या दिलेली आहे.[२]

मानवाने आपल्या बुद्धीच्या जोरावर निसर्गामधील अनेक घटकांचा वापर केला आहे. आपल्या गरजा पूर्ण करण्यासाठी झाडे, वेली, प्राणी, पाणी, हवा, दगड, खनिजे इत्यादी गोष्टींचा वापर करण्याचे कौशल्य प्राप्त केले आहे. पर्यावरणामधील ज्या पदार्थाचा वापर मानवाने स्वतःच्या गरजांच्या साठी केला आहे. त्या पदार्थाना साधन संपत्ती असे म्हणतात. त्या साधन संपत्तीच्या संदर्भात झिम्पर मॅन म्हणतो, ज्या पदार्थ किंवा वस्तूमुळे मानवी गरजांची समाधानकारक पूर्तता करता येते त्याला साधन संपत्ती म्हणतात[३] या व्याख्येवरून एक लक्षात येते की, निसर्ग हा आपल्या गरजा पूर्ण करणारा आहे. परंतु अलिकडे मानवाद्वारे पर्यावरणावर मोठमोठे आघात होत आहेत. निसर्गाची फार मोठ्या प्रमाणात हानी होत आहे. निसर्गाच्या रचनेत फार मोठी ढवळाढवळ मानवाकडून होत आहे. मानवाच्या या ढवळाढवळीचा विघातक परिणाम दिसून येत आहे. प्रचंड प्रमाणातील वृक्षतोड, नद्यांतील मोठ्या प्रमाणात वाळू उपसा, डोंगराचे सपाटीकरण मोठ्या प्रमाणात कारखाने उभारणी

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व त्या कारखान्यातील रासायनिक द्रव्यांना नदी किंवा नाल्याच्या पाण्यात सोडणे, कारखान्याचे धुराडे जास्तीत जास्त उंच न करणे या बाबी पशु पक्ष्यांच्या जीवीतालाही घातक आहेत. जागतिक तापमानात वाढ झाल्याचे दुष्परिणाम साऱ्या जगभर दिसू लागले असून तो आता सर्वांच्याच चिंतेचा विषय बनला आहे. स्वीडनमधील ग्रेटा थनबर्ग या सोळा वर्षांच्या मुलीने २०१८ च्या ऑगस्ट महिन्यात स्वीडनच्या संसदेच्या आवारात सलग तीन आठवडे आंदोलन केले होते. संसदेचे अधिवेशन चालू असतानाच्या काळात ती शाळेच्या वेळेत शाळेत न जाता संसद भवनाच्या भिंतीला पाठ लावून अभ्यास करत राहिली. त्या काळात तिने आपली भूमिका पत्रकाद्वारे मांडली. विविध वृत्तपत्रांना, दूरचित्रवाहिन्यांना मुलाखती दिल्या. दहावीत शिकणाऱ्या त्या मुलीच्या आंदोलनाची दखल स्वीडनच्या संसदेने घेतली नाही पण इंग्रजीतील प्रमुख वृत्तपत्रांनी घेतली. हळूहळू तिच्या म्हणण्याकडे गांभीर्याने पाहिले जाऊ लागले आणि एका टप्प्यावर विविध देशातील शालेय मुलांनी त्याच प्रकारची आंदोलने सुरू केली. परिणामी जगभरात या आंदोलनांनी लक्ष वेधून घेतले आणि सोशल मीडियातून व्यापक प्रमाणात चर्चा सुरू झाली, जागतिक तापमान वाढीचा आणि पर्यावरण रक्षणाचा विषय ऐरणीवर आला.

पर्यावरण व वातावरणातील बदलांच्या संदर्भात विचार व्यक्त करण्यासाठी ग्रेटाला आंतरराष्ट्रीय परिषदांमध्ये बोलावण्यात येऊ लागले. २०१८ मध्ये पोलंड येथे झालेल्या 'युनायटेड नेशन्स क्लायमेट चेंज' परिषदेत आणि जानेवारी २०१९ मध्ये दाओस (स्वीत्झर्लंड) येथे झालेल्या वर्ल्ड इकॉनॉमिक फोरम मध्येही तिला निमंत्रित करण्यात आले. ग्रेटाचे आंदोलन हे निमित्त ठरले. मात्र 'क्लायमेट चेंज' हा विषय सर्वत्र चर्चेचा बनला आणि 'पर्यावरणीय ऱ्हास' ही समस्या खऱ्या अर्थाने जगभरात अग्रक्रमाने गंभीर चिंतेची बाब म्हणून पुढे आली. तशी गेल्या अनेक वर्षापासून जागतिक स्तरावर पर्यावरण विषयक समस्यांची चर्चा विविध परिषदांतून होत राहिली आहेच, पण ग्रेटा थनवर्गच्या आंदोलनाच्या निमित्ताने या प्रश्नाकडे अधिक गांभीर्याने पाहिले जाऊ लागले.[४]

ऑस्ट्रेलियातील परिस्थिती तर त्याहून भयानक झाली आहे. तेथील जंगलाला अलीकडेच लागलेल्या आगीत प्रचंड प्रमाणात हानी झाली आहे. वणव्यामुळे आतापर्यंत एक कोटी हेक्टर जमिनीवरील झाडे जळाली असून जंगलातील प्राणी, पक्षांच्या हजारो प्रजाती आगीच्या भक्ष्यस्थानी पडल्या आहेत. तसेच दोन हजाराहून अधिक घरे भस्मसात झाली तर सव्वीस लोक मृत्यू पावले. मेलबोर्न या सुंदर शहरातील हवेचा दर्जा वणव्यांच्या प्रदूषणामुळे खूपच खालावला असून तो आता जगातील सर्वात वाईट बनला आहे. मेलबोर्न प्रमाणेच सीडनी शहरातील हवा ही

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प्रचंड प्रमाणात प्रदूषित बनली आहे. ऑस्ट्रेलिया हे समृद्ध जंगलामुळे पर्यटनासाठी प्रसिद्ध आहे. पण तेथील अवस्था देशभरातील जंगलांना लागलेल्या आगीमुळे अत्यंत शोचनीय बनली आहे. ब्राझील मधील अमेझॉन जंगलांना लागलेल्या आगीमुळे त्या देशातील पर्यावरणावर ही अत्यंत गंभीर दुष्परिणाम झाला आहे. या दोन देशातील जंगलांच्या व तेथील जीवसृष्टीच्या हानीमुळे जगातील सुमारे एक दशांशहून अधिक जंगलक्षेत्रावर अवकळा पसरली आहे. या बुशफायरफ आगीचा परिणाम आगामी काळात अनेक वर्षे भोगावा लागणार हे स्पष्ट आहे. या नैसर्गिक आपत्तीला सामोरे जाणे, या दोन्ही विकसित देशासाठी खूपच कठीण जाणार आहे. आगामी काळात एखाद्या विकसनशील देशांवर जर अशी वेळ आली तर त्याला सावरता येणे किती अवघड जाईल याची कल्पनाही न केलेली बरी, जेथे वणवे पेटतात त्या परिक्षेत्रात दुष्काळ, महापूर या सारख्या आपती तर उद्भवतातच पण पर्यावरणाचा समतोल बिघडल्याने मानवी जीवन ही असह्य बनते. अशा प्रकारचे अनुभव इतर काही देशानी ही यापूर्वी घेतले असून, जागतिक तापमान वाढीमुळे ते पुनश्च घ्यावे लागण्याची शक्यता ही नाकारता येत नाही.

जागतिक पातळीवरील या दोन गंभीर घटनांच्या पार्श्वभूमीवर तापमान वाढीचा प्रश्न पुन्हा एकदा ऐरणीवर आला असून त्याविषयी व्यापक चर्चा सुरू झाली आहे. आपल्या देशात मात्र याचे कुणाला फारसे गांभीर्य वाटत नसावे. ना हवामान स्वच्छ ना राजकीय नेते या संदर्भात बोलताना दिसतात. सत्ताधारी मंडळी तर देशातील जंगल किती वाढले आणि विकास किती झाला हेच सांगत आहेत. बदलत्या परिस्थिती विषयी खंत वाटणे तर दूरच, उलटती कशी सुधारली आहे याचे गोडवे गाण्यातच ते मश्गुल आहेत. 'जिथे हर प्रकारची झाडे असतात, हर प्रकारचे प्राणी-पक्षी अधिवास करत असतात, ते जंगल' या सर्वसामान्य व्याख्ये नुसार देशात २० टक्के पेक्षाही कमी जंगल असून त्यात दरवर्षी घटच होत राहिली आहे. प्रचंड प्रमाणात होणारी बेकायदेशीर वृक्ष तोड आणि खनिजासाठी होणारे उत्खनन तसेच वाढते औद्योगिकरण शहरांच्या गावांच्या हद्द वाढीमुळे आणि रस्ते, रेल्वे मार्ग आदींसाठी दर वर्षी लाखो वृक्षांची कत्तल होत असते. याबाबतचे कायदे पुरेसे कडक नाहीत आणि आहेत त्यांची योग्य प्रकारे अंमलबजावणी होताना दिसत नाही. परिणामी जंगलांचा ऱ्हास होत चालला असून त्या प्रमाणात नव्याने वृक्ष लागवड होताना दिसत नाही ही वस्तुस्थिती आहे. जंगल-गावराने क्षेत्रावर होणारी बेकायदेशीर अतिक्रमणे आणि नागरी वस्त्यासाठी उभी राहणारी उभी कॉंक्रिटची जंगले या मुळे खऱ्या जंगल व वृक्षलागवडी योग्य जमिनी आक्रसत असून देशातील एकंदर जंगलक्षेत्र कमी होत चालले आहे. तरी देखील दरवर्षी कोट्यवधी झाडे

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नव्याने लावल्याची जाहिरात बाजी होत असते आणि जंगल क्षेत्रात वाढ झाल्याची सरकारी आकडेवारी प्रसिद्ध केली जात असते. हे सारे कागदोपत्री होत असते. याची जाणीव साऱ्यांनाच असते, पण तरी देखील सारे निमूटपणे सोसले जाते. वस्तुस्थिती वेगळी असल्याची तक्रार केली तरी तिची दखल घेतली जातेच असे नाही आणि संबंधितांना ते सिद्ध करणे ही शक्य होत नसते. त्यामुळे सरकारचे फावते आणि सारे काही पूर्ववत चालू राहते. पर्यावरण विषयक आपल्या जाणीवाच बव्हंशी बोथट झाल्या असल्यामुळे किंवा तक्रारी करुनही काही उपयोग होत नाही. या अगतिकतेमुळे देशातील पर्यावरण विषयक परिस्थिती जरी गंभीर बनत चाललेली असली, तरी तिला निमूटपणे सामोरे जाण्याची आपली मानसिकता तयार झाली आहे. तेव्हा जागतिक (ग्लोबलवॉर्मिंग) वाढीची समस्या हा अद्याप तरी आपल्या सरकारच्या आणि देशवासियांच्या दृष्टीने ही अग्रक्रमाचा विषय बनू शकलेला नाही.

पर्यावरणात वाढत्या वृक्षतोडीमुळे ऑक्सिजनचे प्रमाण घटत आहे. त्याचप्रमाणे वाढत्या कारखानदारीमुळे कार्बन डायऑक्साईड वायू वाढतो आहे. त्याचा परिणाम केवळ मानवी जीवनावरच होत आहे, असे नाही तर पशुपक्ष्यांच्या जीवनावर याचा विपरीत परिणाम होत आहे. पशुपक्ष्यांची संख्या झपाट्याने कमी होत आहे. वृक्षांची वाढ खुंटत आहे. फुलांवर व फळांवरही विपरीत परिणाम होत आहे. पशु पक्ष्यांवर व झाडावेलींवर प्रकर्षाने बदल दिसून येत आहेत. या सर्व गोष्टीमुळे निसर्गाचा समतोल ढासळत आहे.

पक्ष्यांच्या विहारात कमालीचा बदल-निसर्गाच्या रचनेतील वाढता मानवी हस्तक्षेप, प्रचंड वृक्षतोड, डोंगराचे सपाटीकरण यामुळे पशुपक्षी अस्वस्थ अवस्थेत दृष्टीस पडत आहेत. प्रचंड प्रमाणात ऑक्सिजनच्या कमतरतेमुळे व झाडांच्या तोडीमुळे पक्षी जास्त काळ अवकाशात विहार करू शकत नाहीत. उंचावरही उडू शकत नाही. काही सेकंद उडाले की ते तात्काळ थकतात व झाडावर किंवा जमिनीवर बसतात. याचे मुख्य कारण म्हणजे प्राणवायुची कमतरता होय. वृक्षतोडीमुळे जंगले विरळ झाली. वृक्षांचे प्रमाण घटले. पशु पक्ष्यांनी विसाव्यासाठी सावली नाही. लपण्यासाठी सुरक्षित जागा नाही. यामुळे त्यांच्यावर प्रचंड प्रमाणात मानसिक तणाव पडत आहेत असे दिसून येते. त्यांच्यात एक प्रकारची भिती दिसत आहे. पूर्वीच्या काळी सकाळी सकाळी ऐकू येणारा पक्षांचा किलबिलाट आता फारसा ऐकू येत नाही. पक्ष्यांचे थवेच्या थवे दिसत नाहीत. पक्षांचे पूर्वीसारखे फडफडणे आता दृष्टीस पडत नाही. थोडक्यात त्यांच्या जीवनातील चैतन्य, उत्साह, जोम जणू संपला की काय ? असे वाटते. पशुही झपाट्याने कमी होत आहेत. त्यांचाही

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मुक्त विहार नाही. त्यांच्या झुंडीच्या झुंडीपण नाही. हा सर्व वृक्षतोडीचा परिणाम वाटतो. पूर्वीसारखे स्वच्छंदी, आनंदी जीवन पक्ष्यांना नाही. म्हणून ते अस्वस्थ, अस्थिर, निरुत्साही दिसतात. वाढते प्रदूषण वाढते तापमान, आटलेल्या नद्या हे सर्वच या अस्वस्थेला कारणीभूत घटक आहेत. पशू पक्ष्यांना नैसर्गिकरित्या जीवन जगणे आता दिवसेंदिवस कठीण होत आहे. त्यांना पुरेसे खाद्यपदार्थ मिळत नाही. पाण्यासाठी वन वन भटकावे लागते. एखादा प्रसंग आला तर लपण्यासाठी सुरक्षित जागा नाही. या सर्व बाबींचा परिणाम पशू पक्ष्यांची अस्वस्थता वाढविण्यात झाला आहे.

परिणाम पक्षी जीवनावर होत आहे. याबाबत सावधानता बाळगणे काळाची गरज आहे. अपुरी विश्रांती-प्रचंड प्रमाणात निसर्गातील ध्वनी, तापमान, गोंगाट, वाहनांचा आवाज थोडक्यात वाढते ध्वनी प्रदूषण यामुळे पशू पक्षी यांच्या जीवनात अस्वस्थता व भीती निर्माण होते. यामुळे त्यांना पाहिजे तेवढी विश्रांती मिळत नाही. म्हणून त्यांची अस्वस्थता वाढतच आहे. खाद्य पदार्थांचा अभाव आहे. वन्य पशुची शिकार करू नका, असा शासकीय कायदा असला तरी काही प्रमाणात शिकार होतेच. यामुळे पशु पक्ष्यांना नेहमी स्वरंक्षणासाठी सतर्क राहावे लागते. त्यांना पुरेशी विश्रांती घेता येत नाही. या बाबीवर नियंत्रण हवेच व पक्ष्यांचे जीवन वाचवायलाच हवे. रात्रीच्या समयी पशू भक्ष्य शोधार्थ येतात. अशा समयी वाहनांच्या धडकेने अनेक पशू मृत्युमुखी पडतात. तसेच जंगलात जे काही पाण्याचे डबके असतात ते पाणी शुद्ध असतेच असे नाही. पशू पक्षी प्रदूषित पाणी पितात व त्यामुळे मृत्यूमुखी पडल्याची अनेक उदाहरणे आहे. प्रदूषणयुक्त पाणी, प्रदूषण युक्त हवा पशु पक्ष्यांच्या अस्तित्वाला घातकच आहे. तसेच विजेच्या तारा, ध्वनी लहरी यामुळेही पक्ष्यांचे वाढते अपघात होतात. त्यामुळेही पक्षी संख्या घटत आहे. या वाढत्या प्रदूषणामुळे पशु पक्ष्यांच्या प्रजनन क्षमतेवर फार मोठा परिणाम झालेला दिसून येत आहे.

पर्यावरणातील मानवी बदल, यामुळे पशु-पक्षी यांच्या जीवनात मोठी स्थित्यंतरे होत आहेत. यामुळे निसर्गाचा समतोल ढासळत आहे. त्यामुळे मानवाने वेळीच सावध होवून निसर्गाची हानी थांबवावी. निसर्गाचा ऱ्हास थांबवावा, प्रदूषण कमी करावे म्हणजे पशू-पक्ष्यांचा मानसिक, भावनिक क्षती होणार नाही. पक्ष्यांना अभय मिळेल ते निसर्गाचा समतोल आहेत. त्याचे भान सर्वांना बाळगणे गरजेचे आहे.

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(खंड पहिला)

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कोपरगावचा इतिहास हा ग्रंथ इतिहास संशोधनाच्या क्षेत्रात ॲनल्स, स्थानिक इतिहासलेखन या प्रवाहाशी संबंधित हा ग्रंथ आहे. कोपरगावचे स्थलकालमहात्म्य, कोपरगावचे भूषण असलेल्या कर्तृत्वसंपन्न व्यक्तींचा वेध, त्यांचे कार्य, विविध प्रशासकीय पैलू, आर्थिक सामाजिक, सांस्कृतिक, शैक्षणिक स्थित्यंतराचा ओघवता आलेख या ग्रंथात आहे.

ग्रामनामव्युत्पत्ती, शुक्राचार्य, पौराणिक कथा, यादव कालीन मंदिर स्थापत्य, पेशवेकालीन कोपरगावची कुळकथा, राघोबादादा व आंनदीबाईचा वाडा, बेट, कोकमठाण, संवत्सर, परगणे कुंभारी या ठिकाणांचे स्थान महात्म्य, आंनदीबाईचे ग्रंथालय तसेच कोपरगाव तालुक्याचे स्वातंत्र्य आंदोलनातील योगदान इत्यादी. ऐतिहासिक मुद्द्यांचा सविस्तर कालपट कोपरगावचा इतिहास या ग्रंथातून डॉ. कान्हू लक्ष्मण गिरमकर यांनी उलगडून दाखवला आहे. सामान्य वाचक-अभ्यासक या सर्वांनाच तो उपयुक्त ठरेल आणि स्थानिक इतिहास लेखनात आपले आगळेवेगळे स्थान निर्माण करेल अशी आशा वाटते.

- डॉ. दिपक देशपांडे,
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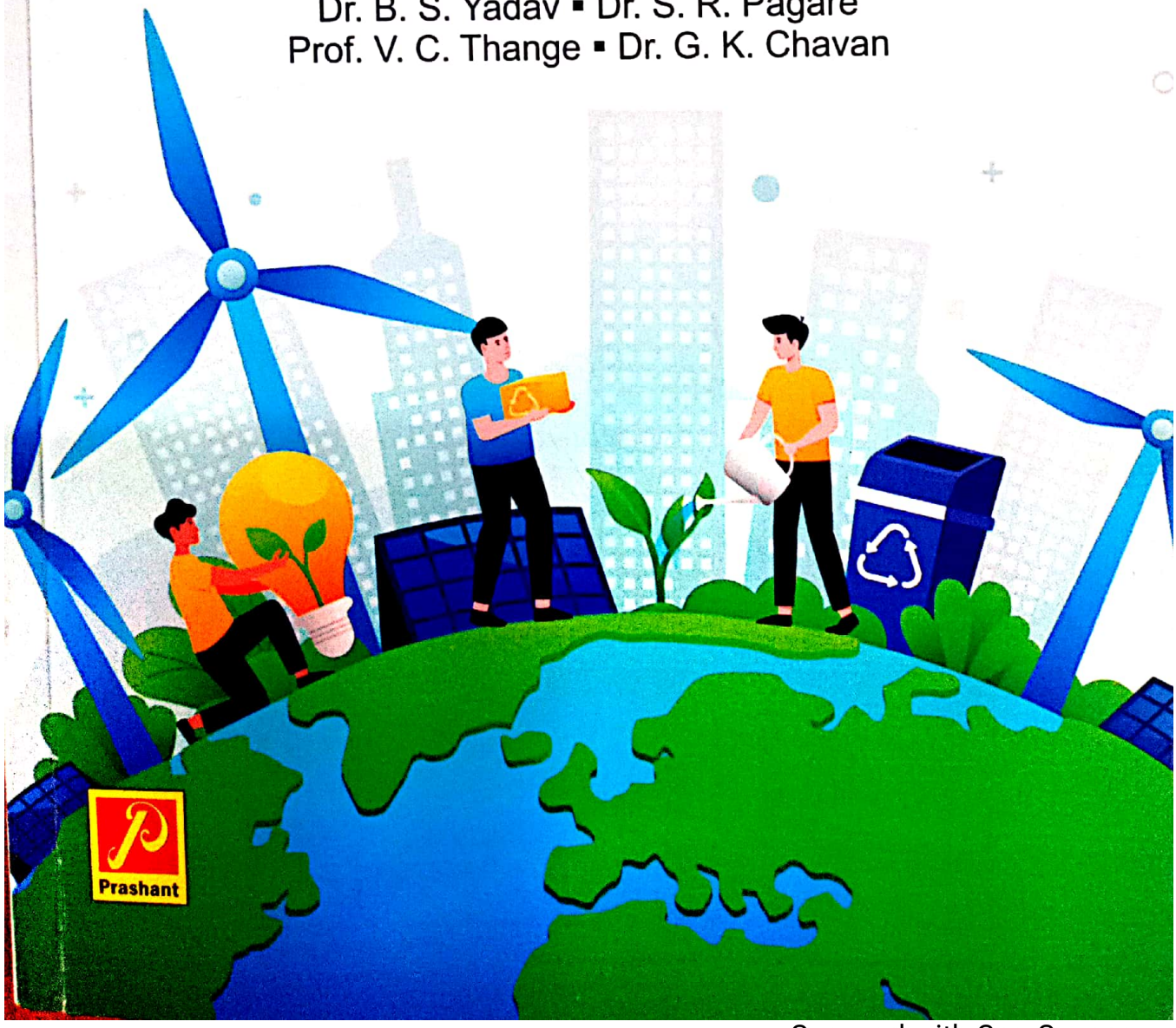

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E - Waste and Solutions

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Introduction:

In today's age of technology, e-waste has become a major crisis for the entire world. Man has become so advanced that it has become difficult to live life without his machine. No matter how small the task in daily life, you have to rely on the machine for it. The demand for electronic and electrical goods to meet these daily needs of human beings is increasing. This is the biggest reason for e-waste generation. The population of India is growing so the needs of this population are also increasing. Which is also increasing e-waste? E-waste is basically an electronic item that you use for your convenience but now that it is broken you can't use it. Globally, about 75 million tons of e-waste is generated every year. E-waste is mostly generated in the form of computers, TVs, monitors, cell phones, VCRs, CD players, fax machines, Printers etc. If this e-waste is not disposed of properly, it can emit mercury, beryllium, cadmium, and lead endanger the environment.

Where does e-waste come from-?

E-waste is generated from many places. This e-waste is divided into three parts.

1. **Gray e-waste -** includes mobile phones, computers, scanners, printers, etc.
2. **White e-waste -** includes washing machines and air conditioners.
3. **Brown e-waste -** includes television, cameras, etc.

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The main causes of e-waste generation

1. **Growing population:** The population is constantly growing. As a result, the demand for everything has increased significantly. Everyone needs many electronic items today. From this we can conclude that the amount of e-waste has also increased significantly due to the growing population.
2. **Modern Technology:** The 21st century is the century of technology. Technology is growing rapidly. This new technology is bringing new products and equipment to the market. People no longer want to use damaged electronic items. Behind all this is the hand of a large multinational company. These companies are very powerful. These companies have the potential to transform the entire market of the country. The standard of living of people all over the world has improved. Middle class societies always look for new technologies in the market due to good economic conditions. That's why companies are increasing their quality so that they get more sales. But if this situation is not considered, the problem of big e-waste is going to arise.
3. **Human Ideology-** Today, the average person around the world spends more money on a particular company's brand name, increasing sales of computers, printers, and everything else. In a few days, something new is changing in each of these items. Then people tend to buy those new things. This economic power makes people feel the need to use new items instead of old ones and this old stuff is later converted into e-waste.
4. **Computer development:** There are more than 1.4 billion personal computers in the world today. In developed

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countries like USA, England, Germany, France, the average usage of personal computer is 2-3 years. In the United States alone, there are more than 500 million computers. The problem is that not only developed countries but also developing countries have sold a lot of this technology, so their graph has increased a lot in developing countries as well. Looking at the year 2020, computer sales and internet usage in developing countries have increased by more than 600%. This sudden increase has also increased the e-waste generated by them. One thing that is clear from this is that it is growing so much in the name of the development of the computer industry, if it is not considered e-waste, it could be a big threat in the future.

India and e-waste problem -

India has become the fifth largest e-waste producer in the world. About 75% of e-waste comes from computer equipment alone, 10% from telecommunications, 08% from medical devices and 07% from annual devices. In India, government and public sector companies together generate more than 80% of electronic waste. E-waste for personal use is only 19%. Mumbai is the number one e-waste generating city in India. It is followed by New Delhi, Bangalore and Chennai. Maharashtra is at the forefront of e-waste generating states in India. The highest concentration of lead is found in electronic waste. These pollutants cause groundwater contamination, air pollution and soil acidification. Etc. creates environmental problems.

Impact of e-waste on the environment-

1. **Effect of e-waste on soil-** The greatest impact of e-waste is on the soil. Toxic heavy metals and chemicals emitted from e-waste are mixed into the soil. Crops grown in these soils are exposed to harmful chemicals through the food chain. These chemicals are not biodegradable, which means they stay in the environment for a long time, which greatly increases the risk. These chemicals have very bad effects on humans and other animals, causing damage to the brain, heart, liver, kidneys and bones. The biggest consequence of this is that children are born with disabilities.
2. **E-Waste Effect on Water -** When this e-waste comes

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in contact with water, its lead, barium, mercury, lithium are mixed in the water. If this e-waste is not disposed of properly, it reaches small ponds through streams and gullies that carry water. These chemicals have a direct effect on the local people living near the lake. E-waste takes the form of water pollution which can lead to many diseases.

Measures for e-waste disposal -

» A lot of e-waste in daily use is like recycling but it is necessary to find the right recycler. But if you recycle e-waste, it will reduce pollution and it is safe for your environment.

» You can use e-waste management at the national level by following the laws and regulations made by the government. Since e-waste is a major threat to the environment, many communities have made arrangements to keep unnecessary electronics in special places so that it can be properly controlled.

» We can donate electronic products. Which will prevent large-scale pollution. Because what you use is very important to someone else.

» Many unused electronic items can be sold to the needy at a lower price or donated to them. In addition, many companies exchange new products with manufacturers. They are given to a convenient recycler or renewal company if possible.

» If managed properly by e-waste recycling method, e-waste can also become a secondary source of raw material for us and has many other benefits. We can reap financial benefits from this recovered material. The process of recycling e-waste requires human labor, which can provide employment to many people.

Measures for e-waste management -

Do not store a locked mobile phone. Instead send it to organizations where it can be reused. Everyone should always support green engineering. When buying electronic goods buy from shoppers who will take them back to recycle if they break down. Keep an eye on the quality of the hardware we buy so that e-waste can be greatly reduced.

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Conclusion-

The problem of e-waste is a global problem. To solve this problem, the use of electronic items should be reduced, which means that the waste generated from them will also be reduced automatically. This e-waste can be reduced through public participation. In some countries, mobile companies as well as computer manufacturers were asked to take the initiative. The second stage is reuse. E-waste collection companies have been set up in some cities. These companies operate under the direction of the Ministry of Environment in that country.

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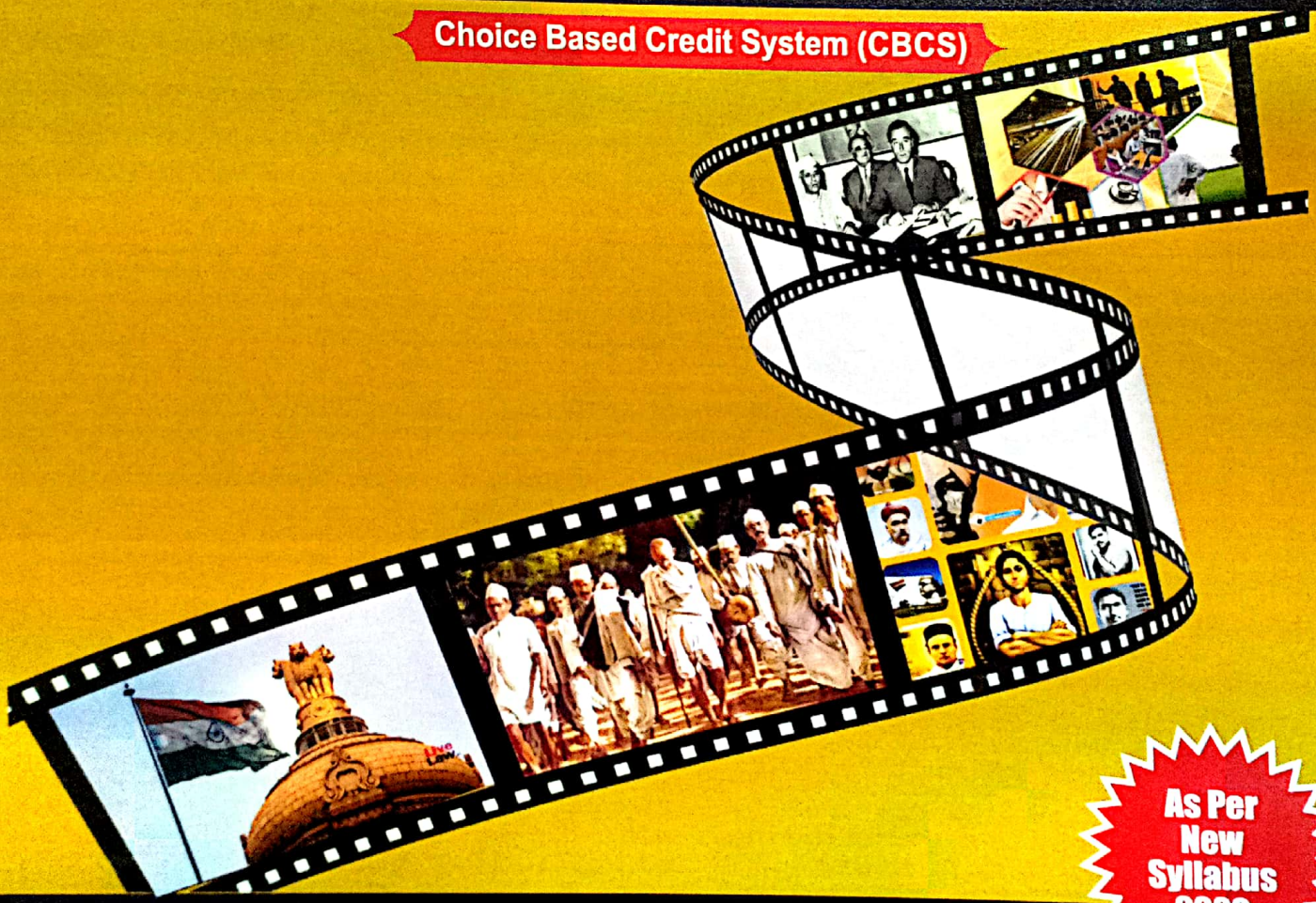

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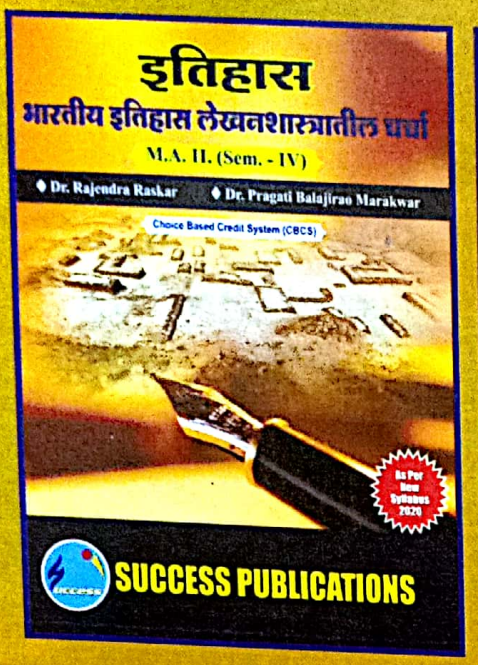

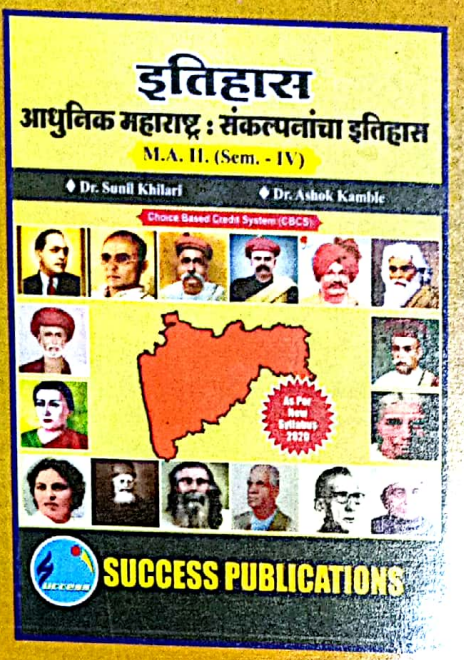

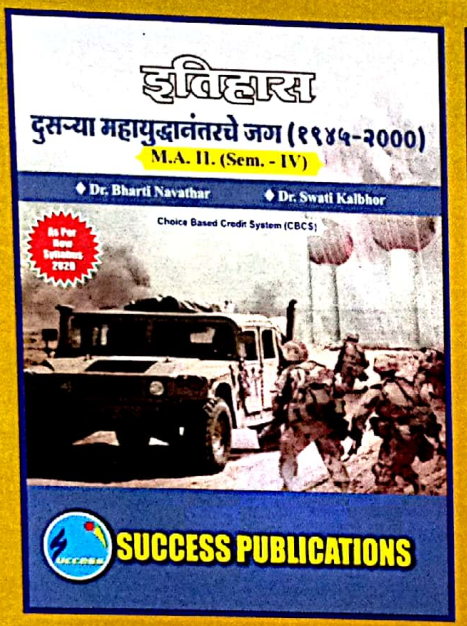

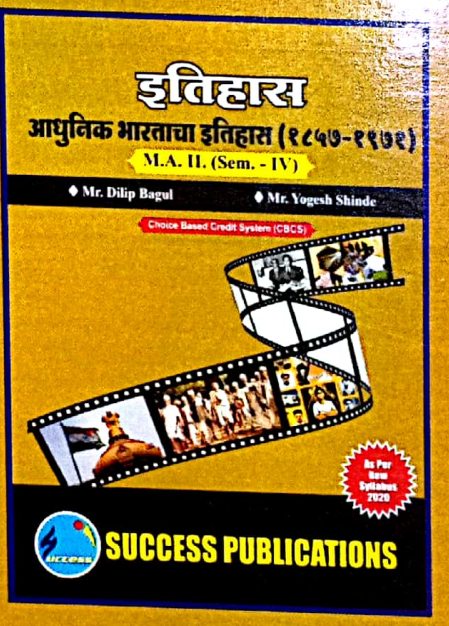

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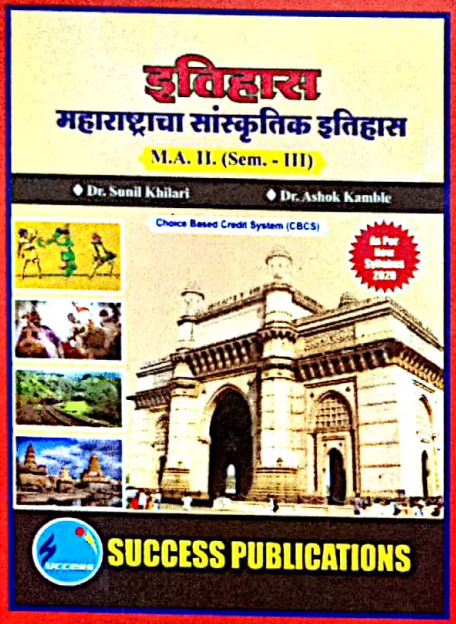

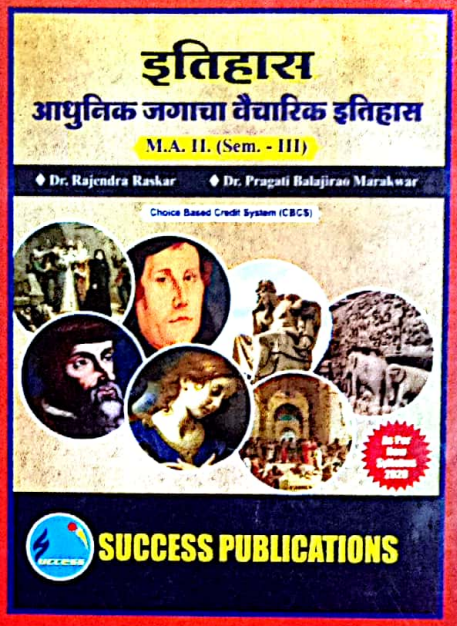

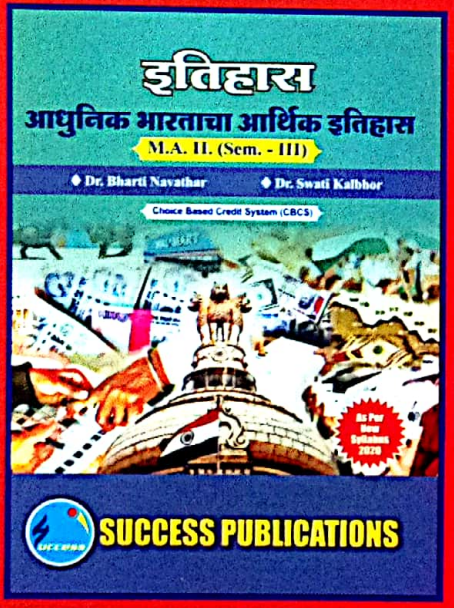

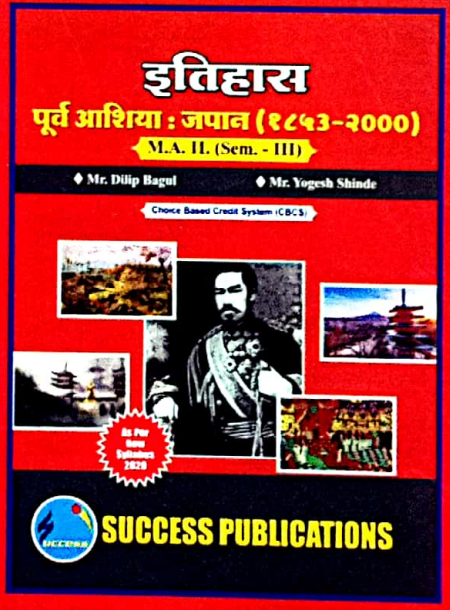

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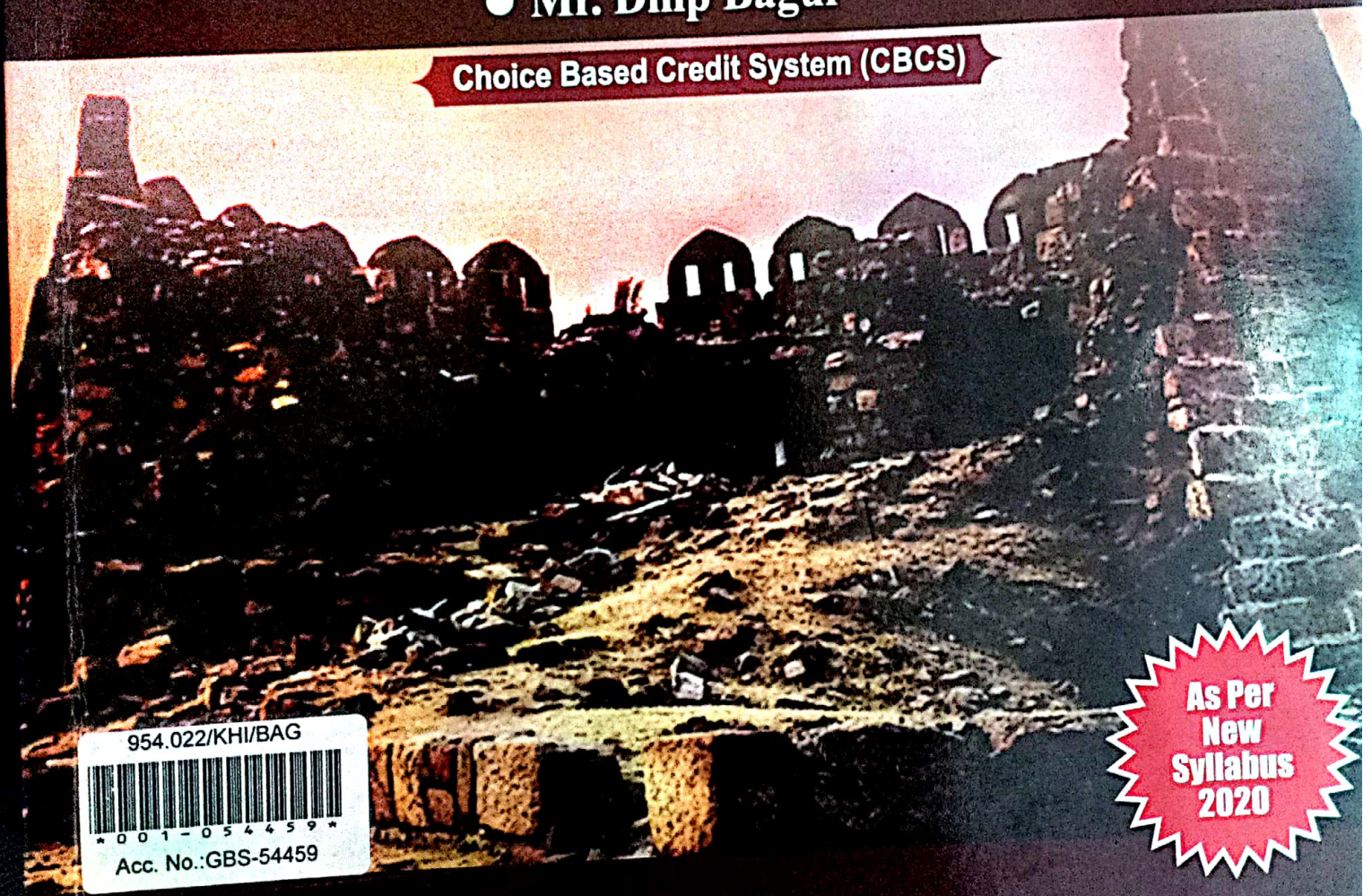

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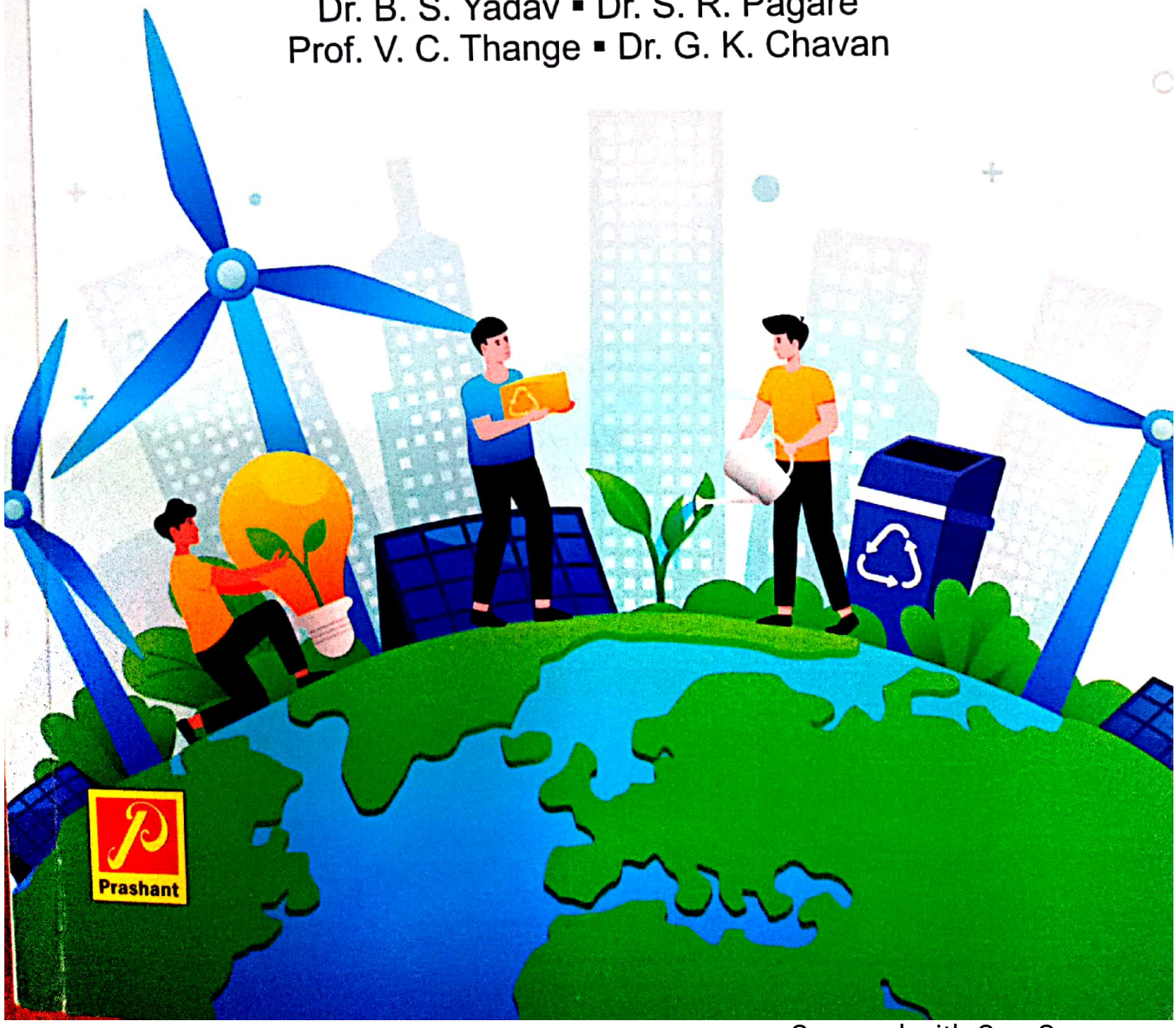

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E - Waste and Solutions

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Introduction:

In today's age of technology, e-waste has become a major crisis for the entire world. Man has become so advanced that it has become difficult to live life without his machine. No matter how small the task in daily life, you have to rely on the machine for it. The demand for electronic and electrical goods to meet these daily needs of human beings is increasing. This is the biggest reason for e-waste generation. The population of India is growing so the needs of this population are also increasing. Which is also increasing e-waste? E-waste is basically an electronic item that you use for your convenience but now that it is broken you can't use it. Globally, about 75 million tons of e-waste is generated every year. E-waste is mostly generated in the form of computers, TVs, monitors, cell phones, VCRs, CD players, fax machines, Printers etc. If this e-waste is not disposed of properly, it can emit mercury, beryllium, cadmium, and lead endanger the environment.

Where does e-waste come from-?

E-waste is generated from many places. This e-waste is divided into three parts.

1. **Gray e-waste -** includes mobile phones, computers, scanners, printers, etc.
2. **White e-waste -** includes washing machines and air conditioners.
3. **Brown e-waste -** includes television, cameras, etc.

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The main causes of e-waste generation

1. **Growing population:** The population is constantly growing. As a result, the demand for everything has increased significantly. Everyone needs many electronic items today. From this we can conclude that the amount of e-waste has also increased significantly due to the growing population.
2. **Modern Technology:** The 21st century is the century of technology. Technology is growing rapidly. This new technology is bringing new products and equipment to the market. People no longer want to use damaged electronic items. Behind all this is the hand of a large multinational company. These companies are very powerful. These companies have the potential to transform the entire market of the country. The standard of living of people all over the world has improved. Middle class societies always look for new technologies in the market due to good economic conditions. That's why companies are increasing their quality so that they get more sales. But if this situation is not considered, the problem of big e-waste is going to arise.
3. **Human Ideology-** Today, the average person around the world spends more money on a particular company's brand name, increasing sales of computers, printers, and everything else. In a few days, something new is changing in each of these items. Then people tend to buy those new things. This economic power makes people feel the need to use new items instead of old ones and this old stuff is later converted into e-waste.
4. **Computer development:** There are more than 1.4 billion personal computers in the world today. In developed

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countries like USA, England, Germany, France, the average usage of personal computer is 2-3 years. In the United States alone, there are more than 500 million computers. The problem is that not only developed countries but also developing countries have sold a lot of this technology, so their graph has increased a lot in developing countries as well. Looking at the year 2020, computer sales and internet usage in developing countries have increased by more than 600%. This sudden increase has also increased the e-waste generated by them. One thing that is clear from this is that it is growing so much in the name of the development of the computer industry, if it is not considered e-waste, it could be a big threat in the future.

India and e-waste problem -

India has become the fifth largest e-waste producer in the world. About 75% of e-waste comes from computer equipment alone, 10% from telecommunications, 08% from medical devices and 07% from annual devices. In India, government and public sector companies together generate more than 80% of electronic waste. E-waste for personal use is only 19%. Mumbai is the number one e-waste generating city in India. It is followed by New Delhi, Bangalore and Chennai. Maharashtra is at the forefront of e-waste generating states in India. The highest concentration of lead is found in electronic waste. These pollutants cause groundwater contamination, air pollution and soil acidification. Etc. creates environmental problems.

Impact of e-waste on the environment-

1. **Effect of e-waste on soil-** The greatest impact of e-waste is on the soil. Toxic heavy metals and chemicals emitted from e-waste are mixed into the soil. Crops grown in these soils are exposed to harmful chemicals through the food chain. These chemicals are not biodegradable, which means they stay in the environment for a long time, which greatly increases the risk. These chemicals have very bad effects on humans and other animals, causing damage to the brain, heart, liver, kidneys and bones. The biggest consequence of this is that children are born with disabilities.
2. **E-Waste Effect on Water -** When this e-waste comes

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in contact with water, its lead, barium, mercury, lithium are mixed in the water. If this e-waste is not disposed of properly, it reaches small ponds through streams and gullies that carry water. These chemicals have a direct effect on the local people living near the lake. E-waste takes the form of water pollution which can lead to many diseases.

Measures for e-waste disposal -

» A lot of e-waste in daily use is like recycling but it is necessary to find the right recycler. But if you recycle e-waste, it will reduce pollution and it is safe for your environment.

» You can use e-waste management at the national level by following the laws and regulations made by the government. Since e-waste is a major threat to the environment, many communities have made arrangements to keep unnecessary electronics in special places so that it can be properly controlled.

» We can donate electronic products. Which will prevent large-scale pollution. Because what you use is very important to someone else.

» Many unused electronic items can be sold to the needy at a lower price or donated to them. In addition, many companies exchange new products with manufacturers. They are given to a convenient recycler or renewal company if possible.

» If managed properly by e-waste recycling method, e-waste can also become a secondary source of raw material for us and has many other benefits. We can reap financial benefits from this recovered material. The process of recycling e-waste requires human labor, which can provide employment to many people.

Measures for e-waste management -

Do not store a locked mobile phone. Instead send it to organizations where it can be reused. Everyone should always support green engineering. When buying electronic goods buy from shoppers who will take them back to recycle if they break down. Keep an eye on the quality of the hardware we buy so that e-waste can be greatly reduced.

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Conclusion-

The problem of e-waste is a global problem. To solve this problem, the use of electronic items should be reduced, which means that the waste generated from them will also be reduced automatically. This e-waste can be reduced through public participation. In some countries, mobile companies as well as computer manufacturers were asked to take the initiative. The second stage is reuse. E-waste collection companies have been set up in some cities. These companies operate under the direction of the Ministry of Environment in that country.

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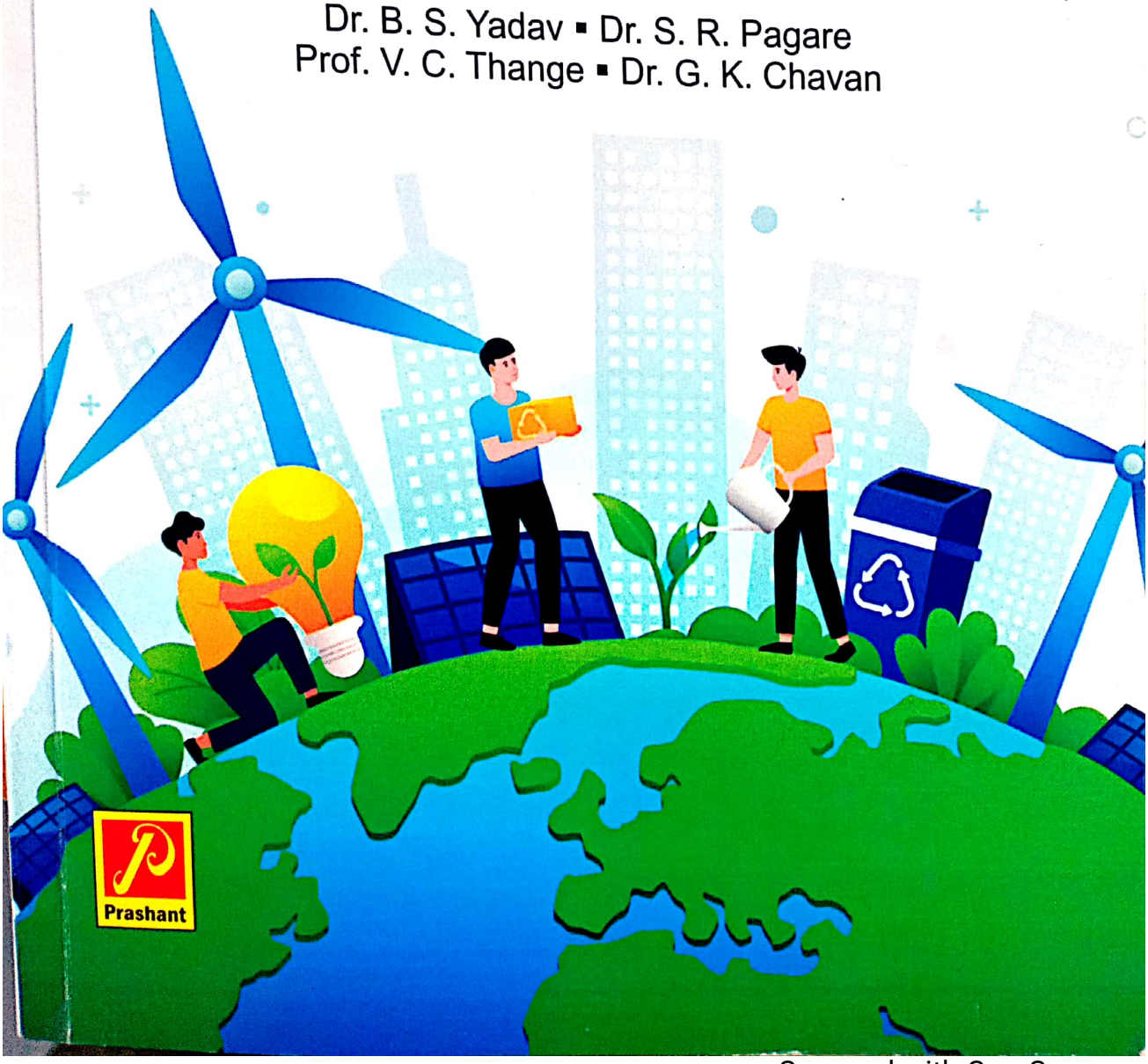

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Deforestation : An Environmental Problem

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Introduction:

The use of Forest Resources is very important for maintaining the balance of the environment. It is almost impossible to balance the environment without vegetation. In the last three or four decades, uncontrolled deforestation by human beings has adversely affected the environment around the world. Deforestation has created serious environmental problems such as global warming, rising levels of carbon dioxide, soil erosion, droughts, floods, depletion of wildlife, depletion of ozone, desertification, and declining groundwater levels. In this present article took review about the deforestation and its effects on the environment.

Concept of Deforestation:

The Food and Agriculture Organization of the United Nations defines deforestation as follows. "Deforestation is the conversion of forest area into other uses". E.g.- Migrant farmland or Land under crops.

Deforestation has become a very serious environmental problem. Due to large and uncontrolled Deforestation by human beings on earth, the balance of the Environment is deteriorating day by day. Due to migratory farming, deforestation, natural disasters and use of forest land for agriculture, deforestation has taken place on a large scale. Considering global deforestation, huge deforestation is taking place to meet the various needs of the world's growing population in terms of forest resources. Forest management is well developed to prevent deforestation in both developed and developing countries. Nevertheless, deforestation is on the rise. Europe, North Asia, and the northeastern part of North America had dense forests. But at present only dense forest is found in certain areas.

There are currently millions of square kilometers in the world every year. The forests of the region are being destroyed. Most of these

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are tropical rainforests. Since the 1980s, 2 lakh sq. Km. The forests of the region were burned. As a result, deforestation has taken place on a huge scale, but it has cost Rs. 760 crore every year. Tons of carbon dioxide were thrown into the atmosphere. Considering the continent of deforestation, South America has the highest rate of deforestation, followed by Asia and Africa. In all three continents, wood is used extensively for fuel. As a result, the forest area is declining. At the same time, a large amount of forest is being cut down for industrial use. However, deforestation is not very common in Europe at present. On the other hand, the rate of afforestation has increased tremendously.

Causes and Consequences of Deforestation:

The massive deforestation that has taken place on earth and is still taking place on a large scale is due to various reasons. But the main reason for deforestation is the indiscriminate deforestation done by thoughtless human beings in general to meet their various needs. There are also many other factors that contribute to deforestation. E.g. Natural disasters, floods, overgrazing etc. The major causes of deforestation in general are - population growth, agricultural extension, migrant farming, development of infrastructure like roads, railways and power supply, construction of dams, growth of industries and colonies, acid rain, natural disasters, overgrazing,fFuel wood realization, government policies.etc.

Deforestation causes many environmental problems. The nature of some of these environmental problems is very serious, and if the process of deforestation continues, it will be difficult for human beings to live on earth for some time. Forest conservation program is being implemented in recent times. But even that has not had much effect. In general, deforestation has caused many environmental problems in the world. Of which-soil erosion, flooding of rivers, decrease in groundwater level, decrease in rainfall, decrease in humidity, increase in average earth temperature, desertification, depletion of wildlife, depletion of storage capacity of dams, shortage of fuel, scarcity of fodder, shortage of basic tribal needs, scarcity of forestry, the balance of the environment is shaky.

Remediability on Deforestation:

The importance of trees is mentioned in every scripture, but still in the last few years there has been a lot of deforestation. The government

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has now taken steps to conserve forests and how many areas are covered by forests based on modern technology. Is there a deforestation? Are wildlife being hunted? This will be closely monitored. The livelihood of the forest dwellers depends on it. A number of initiatives have been launched by the government, including the 'Van Dhan Yojana', to provide a good market for their handicrafts, herbs and other products. 'Paryavaran Seva Yojna' to inculcate the seeds of environmental conservation in the students of the state at an early age and to create an environmentally sensitive future generation. Planting and cultivating trees in Israel to preserve the memory of revolutionaries, love of relatives, pride of patriots, respect for scholars. If one tree is cut down, 10 trees should be planted in that place. Everyone should celebrate World forest day by planting at least one tree.

Countries that have Imposed Legal sanctions on loggers have shown good results. Therefore, other nations should try to do the same, The World Bank has suggested. It has also been suggested that strict enforcement of the law and efforts to strengthen the legal system to curb the illegal timber trade could be beneficial. Poverty and exploitation lead to illegal logging, a fact worth noting. This is because of the widespread use of lumber as a fuel. In some countries, e.g. In Indonesia and New Guinea, laws have been enacted to prevent illegal logging. But it would be wrong to assume that deforestation is the only cause of poverty; This is because in many western nations there is a competition for deforestation for various reasons. The "Lacey Act" was enacted in the United States a few years ago. Due to this law, the timber coming into the factory must be legal. The shocking fact is that this law is indirectly helping many large-scale illegal logging. This is because the companies that were prosecuted under this law in the United States included reputed companies like Gibson Guitar. Penalties in this regard have been tightened in the legal system in England, China, and Japan, recognizing the importance of illegal logging. It is hoped that other countries will follow suit.

Conclusion:

For the purpose of industrialization and urbanization people destroyed forest rapidly and it is serious for the balance of environment. For the betterment of the society, biology is more important than ecology. We can enjoy ecology only when there is bio-diversity is

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present. Which provide us protection from global warming and provide oxygen for alive us. In order for the actual ecological balance to be maintained, at least 33% of the total land area in each country must be under forest. But deforestation has led to an over-depreciation of the forest area, which seems to be eroding the Ecological balance. But now we need to be careful in time, otherwise one day we will bring our own destruction.

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LOCAL SELF GOVERNMENT





Dr. Vilas Awari

Local Self Government

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MODERN INDIAN POLITICAL THINKERS

DR. VILAS AWARI



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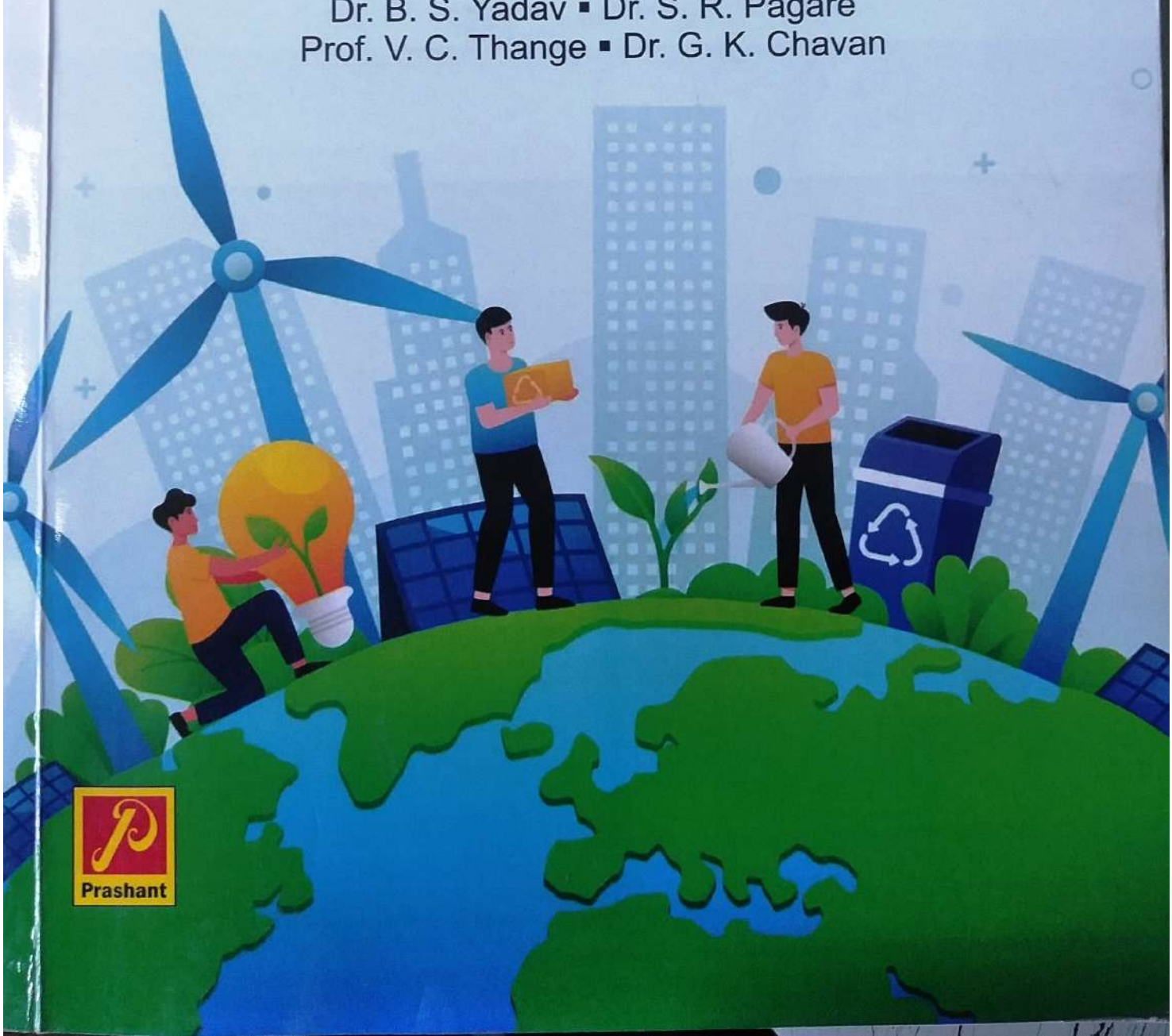

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Human Rights and Environment

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Introduction:

A Human Rights, in general, the rights of human beings. If the environment does not exist then human will not exist because all humans depend on the environment which gives right to live, food, water, sanitation, and air, a land so it shows that human rights are the rights of human living in an environment or indirectly human right are environment rights. Life, culture, society are fundamental parts of human and if environment destroyed then it also destroy our culture, society. Human rights and environmental law created separately but they have a very close relation. Not only human rights but civil, political, social, economic rights all play an effective role in a sound environment. As they progress and development of the world increase, day by day because of science and technology, industries, nuclear power deteriorate the environment. Now environment right urged as major human rights and government, a non-government organization both at national and international levels put all their efforts to protect the environment.

Definition of Environment Laws

It is the collection of various rules and regulations, the agreement that governs how a particular human interaction with the environment. Its purpose is to protect the environment and provide directions for how humans use natural resources. It keeps checking on pollution, forest protection, animals, and marine life.

It deals with three areas

Right to clean and safe environment- Mostly all the organization support this idea of providing a clean and safe environment. These are interpreted in various ways by various countries because they are very general in meaning.

The right to act to protect the environment- To act positively by taking part in various schemes related to the environment is its aim.

This right is under threat in many nations.

Right to information participate in decision-making- Every country citizens participate in decision making for making rules in their own ways according to their own culture but there are some commonalities also.

Role of International Conventions in Environment Law

There were various conventions occurred at international level when the need arises to protect the environment such as:-

Stockholm Declaration (1972)-

First relation between environment and human rights established in 1972 on the international level held in Stockholm. Principle 1 of Stockholm Declaration stated, "Man has the fundamental right to freedom, equality and adequate conditions of life, in an environment of a quality that permits a life of dignity and well-being, and he bears a solemn responsibility to protect and improve the environment for present and future generations". After this United Nation Environment Programme (UNEP) set up.

Rio Declaration (1992)

In Rio de Janerio an environment conference held at a global level known as the United Nations Conference on Environment and Development (UNCED) or the Earth Summit. It focuses on three agreements:

Principle 1 stated that 'Human beings are at the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature' Principle 4 says 'In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it.

Principle 10 deal with public participation in decision making and access to justice in environmental matters.

World Summit on Sustainable Development (2002)

It was held in Johannesburg. Its main idea is to achieve sustainable development then respect for human right and environment is essential. Its main focuses on the rule of law, gender equality, democratic society, good governance and public participation in decision making for environment protection.

United Nation General Assembly Summit (2010)

In this conference, safe clean drinking water and sanitation became the part of human rights. It declared that the right to safe and clean drinking water and sanitation as a human right that is essential for the full enjoyment of life and all human rights."

Indian Laws Relating to Environment and Human Rights

Environment and Constitution of India:

The protect and improve the environment is a constitutional mandate. It is a commitment for a country wedded to the ideas of a welfare State. The Indian Constitution contains specific provisions for environment protection under the chapters of Directive Principles of State Policy and Fundamental Duties. The absence of a specific provision in the Constitution recognizing the fundamental right to clean and wholesome environment has been set off by judicial activism in the recent times.

In our India chapter on fundamental duties of Indian Constitution imposed duties on citizens to protect the environment.

Article 48A– it comes under the Directive Principle of State Policy. It says that "the State shall endeavor to protect and improve the environment and to safeguard the forests and wildlife of the country". This Article imposed a duty on the State to protect the environment from pollution by adopting various measures.

Article 51A (g) – It states that "It shall be the duty of every citizen of India to protect and improve the natural environment including forests, lakes, rivers and wildlife and to have compassion for living creatures". This article is similar to Article 48A, the only difference is it is the fundamental duty of citizens whereas Article 48A is the duty of the State to protect the environment.

Part 3 of the Indian Constitution give fundamental right which is essential for the development of human being and without which human is alone. Right to the environment is also necessary for the development of human being. Article 21- It states that "No person shall be deprived of his life or personal liberty except according to the procedure established by law." This Article interpreted in various cases by judiciary for protection of the environment. In M.C. Mehta vs. Union of India, Supreme Court stated that the right to live includes living in a pollution-free environment. And it is also free from diseases.

Article 49-A:

The Article states: "The State shall endeavor to protect and improve the environment and to safeguard the forests and wildlife of the country." The said amendment imposed a responsibility on every citizen in the form of Fundamental Duty.

Article 253:

Article 253 states that 'Parliament has power to make any law for the whole or any part of the country for implementing any treaty, agreement or convention with any other country. In simple words this Article suggests that in the wake of Stockholm Conference of 1972, Parliament has the power to legislate on all matters linked to the preservation of natural environment. Parliament's use of Article 253 to enact Air Act and Environment Act confirms this view. These Acts were enacted to implement the decisions reached at Stockholm Conference.

Environment and Citizens:

The Constitution of India has made a double provision:

(i) A directive to the State for protection and improvement of environment.

(ii) Imposing on every citizen in the form of fundamental duty to help in the preservation of natural environment. This is the testimony of Government's awareness of a problem of worldwide concern. Since protection of environment is now a fundamental duty of every citizen, it is natural that every individual should do it as personal obligation, merely by regulating the mode of his natural life. The citizen has simply to develop a habitual love for pollution.

Conclusion:

Connecting human rights and environment is a valuable sourcebook that explores the uncharted territory that lies between environmental and human rights legislation. Human beings can ensure fundamental equality and adequate conditions of life in an environment that permits a life of dignity and well-being. There is an urgent need to formulate laws keeping in mind the fact that those who pollute or destroy the natural environment are not just committing a crime against nature, but are violating human rights as well. Indeed, health has seemed to be the subject that bridges gaps between the two fields of environmental

protection and human rights. The advancement of the relationship between human rights and environment would enable incorporation of human rights principles within an environmental scope, such as antidiscrimination standards, the need for social participation and the protection of vulnerable groups.

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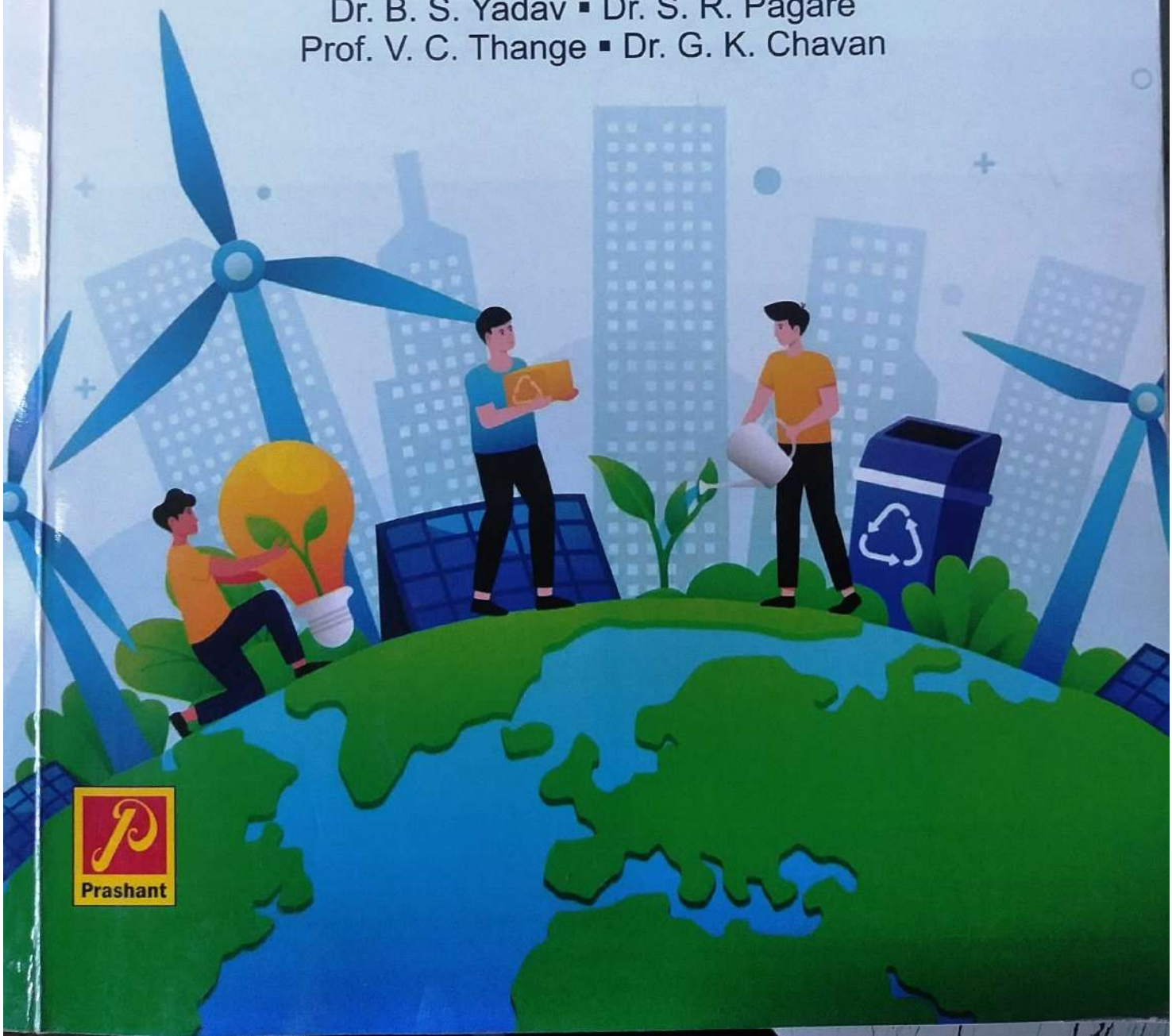

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Introduction:

The central discussion was to explore the interrelationships between the human–nature relationship and its impact on human health. In questioning the causal relationship, this paper addresses existing research on potential adverse and beneficial impacts in relation to humanity's degree of relationship to nature and lifestyle choices. The paper also acknowledged current gaps and limitations of this link relative to the different types of health (physical, mental, and social), as characterized by the World Health Organization in 1948. Most of these relate to research at the inter sect of nature-based parameters and human health being in its relative infancy. It has also been highlighted that the reorientation of health toward a well-being perspective brings its own challenges to the already complex research base in relation to its concept, measurement, and strategic framework. For a deeper sense of understanding and causal directions to be identified requires further attention to the complexities of these aspects' interlink ages, processes, and relations.

Human–Nature Relationship

It is beyond the scope of this paper to review the various connections at the inter sect of humanity and the natural environment. Instead, I summarize key concepts and approaches from those four research fields outlined below, which have paid most attention to studying this research area. I then summarize areas of convergence between these connections in an attempt to describe the human–nature relationship, which will serve as background to this review.

It is anticipated that through drawing on these different fields of knowledge, a deeper level of understanding can be brought to the growing issue of humanity's relationship with nature and its impact on health. This is because examining the human–nature relationship from a single disciplinary perspective could lead to partial findings that

neglect other important sources as well as the complexities that exist between interlink ages, causal directions, processes, and relations.

Impacts of the Human–Nature Relationship on Health

During the past four decades, researchers, health practitioners, and environmentalists alike have begun to explore the potential link between the human–nature relationship and its impact people's health. This in part owes to the increasing evidence accumulating in research literature centering on the relationships between the following areas: chronic diseases and urbanization, nature connectedness and happiness, health implications of contemporary society's lifestyle choices as well as the adverse impacts of environmental quality on the health of humans and non-humans alike.

Such health-related effects that have been alluded to include chronic diseases, social isolation, emotional well-being as well as other psychiatric disorders (e.g., attention deficit disorders and anxiety) and associated physical symptoms. Reasons for these proposed links have been suggested to stem from various behavioral patterns (e.g., unhealthy diets and indoor lifestyles) associated with

Consumerism, urbanization, and anthropogenic polluting activities. Further, these suggested links have been inferred, by some, to be visible in other species (e.g., insects, mice, and amphibians) as a consequence to living in unnatural habitats or enclosures. Nonetheless, research within this field remains speculative with few counter examples (e.g., some species of wildlife adapting to urban environments), requiring further empirical analysis.

With a growing trend in the number of chronic diseases and psychiatric disorders, costs to the U. K.'s National Health Service (NHS) could rise as the use of prescriptive drugs and medical interventions increases. However, this anticipated trend is considered to be both undesirable and expensive to the already overwhelmed health-care system. In concurrence are the associated impacts on health equity, equating to further productivity and tax losses every year in addition to a growing gap in health inequalities

Furthermore, population growth in urbanized areas is expected to impact future accessibility to and overall loss of natural spaces. Not only would this have a direct detrimental effect on the health of both humans and non-humans but equally the functioning and

integrity of ecosystem services that sustain our economic productivity. Thereby, costs of sustaining our human-engineered components of social–ecological systems could rise, having an indirect impact on our economic growth and associated pathways connecting to health. As such, researchers have highlighted the importance of implementing all characteristics when accounting ecosystem services, particularly the inclusion of natural and health-related capital, as well as their intervening mechanisms. This is an area, which at present remains difficult to synthesize owing to fragmented studies from a host of disciplines that are more conceptually rather than empirically based

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Conclusion

One of the imperatives for this article is to review existing theoretical and research literature on the many ways that humans are linked with the natural environment within various disciplines. Although widely discussed across the main four research fields – evolutionary psychology, environmentalism, evolutionary biology, and social economics – there has been comparatively little discussion of convergence between them on defining the human–nature relationship. This paper therefore attempts to redefine the human–nature relationship to bring further understanding of humanity's relationship with the natural environment from an interdisciplinary perspective. The paper also highlights important complex debates both within and across these disciplines.

Finally, a developing conceptual model of human and ecosystem health that is inclusive of the human-centered perspective is proposed. It is based on an interdisciplinary outlook at the intersection of the human–nature relationship and human health, addressing the limitations identified in existing models. To achieve this, it combines theoretical concepts and methodological approaches from those research fields examined in this review, bringing a greater depth to data collected. In attempting this, a balance between both rigorous scientific analysis as well as collaborative participatory research will be required, adopting a pragmatic outlook. In this way, an interdisciplinary approach can facilitate a deeper understanding of the complexities involved for attaining optimal health at the human–environmental interface.

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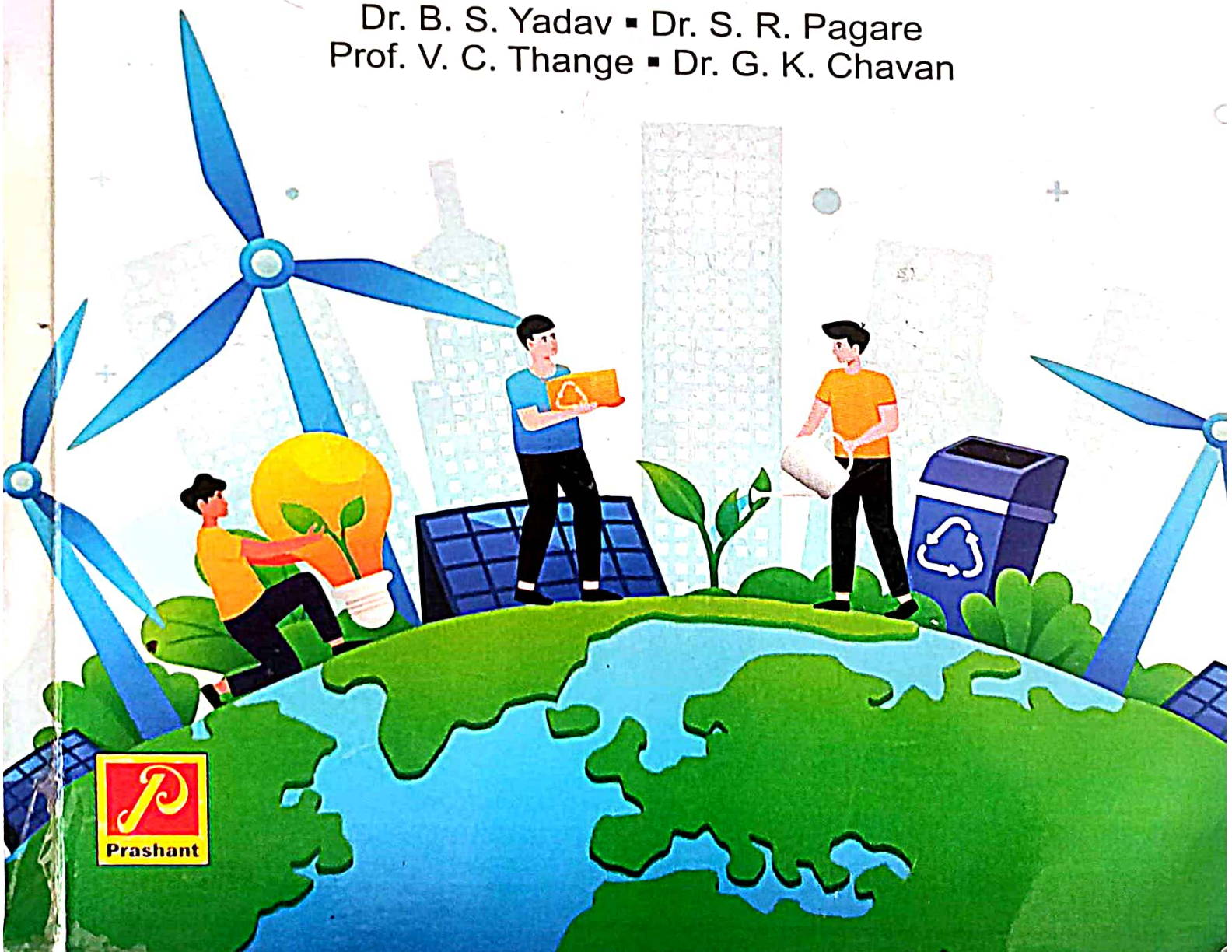

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Environmental Impact on Agriculture

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Abstract:

The relationship between humans and the environment is studied in Ecology. The environment is made up of natural and biological elements and affects the life and behavior of all living things, including humans. Economics studies economic activities by human beings. The use of natural resources by man to meet the demands of ever-increasing population is causing many environmental problems. Overpopulation has put a strain on the agricultural sector. The twentieth century has seen radical changes in the agri-business industry. Agricultural art is an industry in the hands of professional specialists. Although this shows an increase in production, it has created many environmental problems; hence, agro- environment is the important concern which needs to be studied.

Introduction:

Around the 1960's, independent subject ecology emerged. The interrelationships between humans and the environment are studied in the environment studies. The environment is made up of natural and biological elements and affects the life and behavior of all living things, including humans.

The concept of environment is not limited to natural and biological factors, but also includes the socio-cultural, economic, political and intellectual works of human beings and the consequences of that works. Ecology is the study of the perception of the earth's environment and the impact that human life has on the environment.

Environment tries to coordinate all the physical, biological and chemical elements of the environment. It includes all the natural and chemical elements of the environment. The growing population put a huge strain on resource wealth and led to its overuse. Therefore, citizens and scholars should be aware that this resource will be destroyed in the near future. Also the productivity of land has decreased. Soil

erosion is the most important problem in the agricultural environment. Environmentalists estimate that ozone depleted by one percent, while crop yields decreased by one percent. Due to the increasing population, man has used natural resources indiscriminately to meet the increasing demands for products, which is causing many environmental problems.

Key words: Environment, economic environment, agricultural environment

Objectives of the Research study

» To study the meaning of an Environment

» To study the component of agro-ecosystems

Agricultural Environment:

Agriculture is one of the oldest occupations of human beings. By deforestation due to population growth, human beings have permanently acquired forest resources and agro-environment. Various crops, horticulture, raw material products have been instrumental in the development of agriculture, which in turn has created agro-ecosystems. Humans began to use chemical fertilizers, pesticides, insecticides, herbicides, and irrigation freely to increase production without paying much attention to the basic elements of the natural environment on the strength of intelligence. Climate uncertainty disrupts agricultural ecosystems.

The productivity of the agricultural ecosystem is also found to be different. The overpopulation has put a strain on the agricultural sector. Today's agriculture has become a commodity manufacturing process. The 20th century has seen drastically changes in agribusiness. Agricultural art has become an industry in the hands of specialized professionals. Although this has led to an increase in production, it has caused a number of environmental problems.

Agricultural Development and Environment

Agriculture development and environment are closely related and agricultural development adversely affects the quality of environment. The impact of agricultural development on environment is further divided into two parts.

1. Agriculture and environment in historical times
2. Modern agriculture and environment

1. Agriculture and environment in historical times:

In ancient times, humans were a group of living beings in a biological society. Humans have direct good relations with other living beings in the biological society. Humans have been blessed with more things than any other living thing.

i) It is a close factor in social organizations.

ii) Humans have more efficiency and quicker intelligence than any other living thing.

iii) Humans made many discoveries on the strength of intellect.

iv) Human beings has made effective use of the knowledge of the environment.

He tried to develop agriculture by making gentle use of human knowledge and intellect. Initially human life was balanced with the environment. Humans used to cultivate according to the available environment. In ancient times agriculture was in a very primitive state so the balance of the environment was undisturbed. As a result, the balance of the environment was disturbed. Due to the growing population, the pressure on the agricultural sector increased and the agricultural sector was used to meet the needs of the growing population. As a result, agricultural development began to have an adverse effect on the environment.

2. Modern agriculture and environment:

In the modern agricultural system, humans have made huge use of new technologies to increase agricultural production, which has disturbed the ecological balance and adversely affected the agricultural sector. The major agricultural factors affecting the agro-environment and their effects are as under:

Pesticides and Insecticides:

In modern agriculture, various pesticides and insecticides are used to protect crops from various diseases and pests and insects, thus protecting crops from diseases and pests. However, it has many adverse effects on the environment. Pesticides and insecticides also affect the plant life.

Chemical Fertilizers:

Human farms are increasingly using chemical fertilizers to increase crop yields in the soil. Chemical fertilizers are being used to

make the soil nitrogen sufficient for the crops However it adversely affects the flora and fauna of the soil, thus reducing soil fertility and polluting the water by flowing into surface and groundwater with chemical fertilizers and rainwater.

One cropping method:

In modern agriculture, farmers are frequently cultivating crops in the same soil from which the economic benefits will be higher. Therefore, soil fertility decreases and its productivity decreases. Over time, such soil becomes unusable in crop production. Such crops are frequently grown in the same soil but this reduces the fertility of the soil and reduces its productivity. Over time, such land becomes unusable for crop production. Crop rotation is required to maintain soil fertility.

Irrigation:

Irrigation is being used extensively in modern agriculture, which is also adversely affecting the quality of the agro-environment. Irrigation promotes proper growth of crops and increases productivity, but when there is excessive irrigation, problems such as weeding and alkaline soils in the region become serious over time. In India, at present, about 9.38 million hectares of land has become saline.

Conclusion:

The study of the interrelationships between humans and environment is Ecology. The study of the environment on Earth and the impact of human life on the environment is the study of human economic activity in ecology. Due to the growing population, man has used natural resources to meet the increasing demand for products. This has created many environmental problems. Humans have started using chemical fertilizers, pesticides, irrigation freely to increase production without giving much importance to the basic idea of natural environment on the power of intelligence. Agricultural development and environment are closely linked and agricultural development adversely affects the quality of environment. In historical times, human beings have tried to achieve agricultural development by making effective use of their knowledge of environment. In modern times, the balance of the environment has been disturbed due to the huge increase in agricultural production using new technologies. As a result, it has adversely affected the agricultural sector.

In short, agricultural development is causing the unnecessary

changes in the environment, which are becoming extremely dangerous to human life and human existence.

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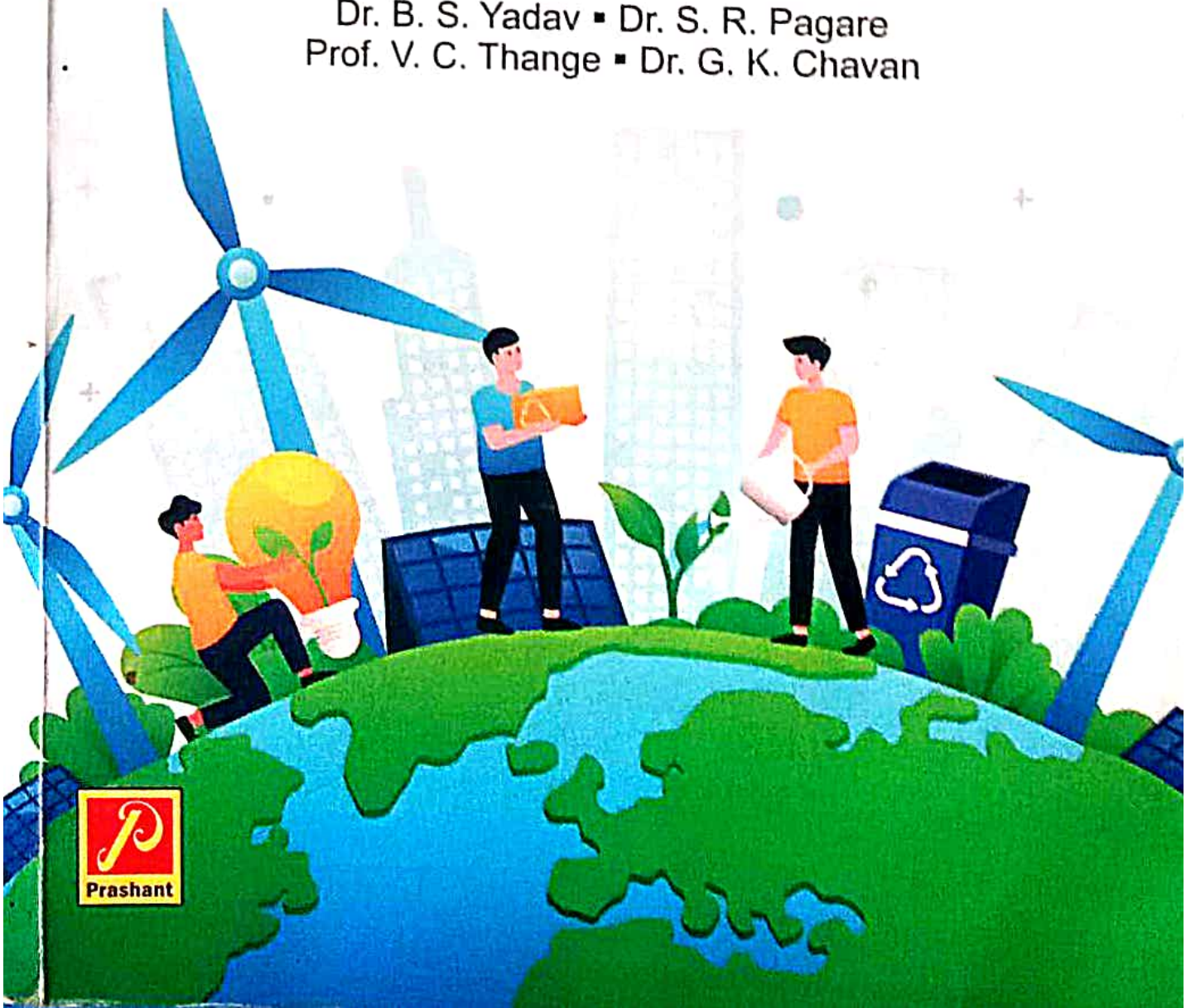

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Environment and Human Health

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Abstract:

Although the environment is generally defined as the environment around a human being, the environment is the geological view of the factors that directly or indirectly affect the habitat of all living things. The relationship between humans and the environment dates back to human creation. Natural disasters cause environmental disturbances from time to time. And it has been corrected. According to the laws of nature, the balance of the environment has been maintained as nature has the ability to balance the environment, but for the last four or five years, human intervention in the environment has been increasing and there is a need for environmental studies.

There are two types of factors in the human environment: natural factors and human factors.

Natural Factors:

These elements are created by nature. But only nature can make a big difference. The elements such as landforms, climate, natural plants, animals, minerals, etc. are natural elements and the environment containing these elements is called natural environment.

Human Factors:

These elements are man-made and man has made these elements by making some changes in the natural element to meet his needs. For example- Many occupations, animal husbandry, agriculture, fishing, mining, manufacturing, etc. occupations, transportation, transportation facilities, colonies, etc. are man-made.

The basic human needs like air, water, food, clothing, shelter etc. are met by many industries and businesses in the environment. Increasing human intervention in the natural environment has led to a gradual decline in the quality of the environment, which in turn has affected the quality of human needs.

The various human activities that are being carried out day by

day have adverse effects on the environment and the various types of pollutants that cause direct and indirect effects on human health.

A) Animal Husbandry Business:

There has been a huge increase in this business in recent times and many viral diseases are being transmitted to humans through the use of various animal products as well as various products derived from them and the incidence of such new diseases has been increasing in recent times.

Diseases such as bird flu, Nipah virus, etc. appear to have been transmitted to humans from cows, hens, pigs and some other animals. Due to increasing consumption of meat and neglect of daily hygiene and other reasons, the incidence of such epidemics is increasing and if precautionary measures are not taken in time, human beings may face many deadly diseases. Adulteration of animal shelters, animal feed, animal medicines, animal products, is also having adverse effects on human health.

B) Agriculture:

The basic human needs of food and clothing are met through a number of legal products derived from agribusiness. Also, agribusiness is the main source of raw material for many industries. The business is under increasing pressure to meet the growing needs of a growing population, and a number of researches and measures are being taken to increase agricultural production, with a number of adverse effects on the environment and human health.

For example: Many types of pesticides, chemical fertilizers, modern seeds, irrigation etc. are being used extensively to increase the production of agricultural commodities. Due to the presence of many chemicals, pesticide residues, fruits, vegetables, various grains, agricultural irrigation, the wetlands are producing and growing mosquitoes, flies and many other germs, leading to the spread of many diseases and epidemics. Topical drugs used in agriculture cause a variety of pollutants and poisons, which in turn have adverse effects on human health.

C) Mining:

Minerals and power tools are extracted from this business. And as they are used, many pollutants are created, polluting the air, water, sound, etc., which is adversely affecting human health.

D) Manufacturing:

The factory produces finished goods by processing many types of raw materials. Due to the use of mineral oil, natural gas, coal, thermal and subsoil as power tools and some processing of products Carbon dioxide, sulfur dioxide, etc Many gases such as air pollution, water pollution due to sewage, waste pollution due to waste materials, noise pollution due to use of machine tools, such various pollutants are prevalent and adversely affect human health.

Respiratory system, digestive system, nervous system as well as various senses For example, many disorders related to eyes, ears, nose, etc., diseases such as tuberculosis, typhoid fever, jaundice, cold, asthma, brain disorders as well as disorders of eyes, ears, etc. cause serious problems in human health.

E) Transportation and Communication:

Abundant transport facilities are becoming available due to the types of flows like railways, roads, water, air, water transport etc. However, the types of fuels used in coal, gas, diesel, petrol, etc. and the carbon-dioxide, carbon dioxide, sulfur dioxide, methane, etc. produced from the combustion of such fuels cause huge air pollution. Noise pollution is caused by the noise of vehicles. It also causes a lot of pollution by spilling fuel in the vehicle.

The respiratory system, nervous system, digestive system and the senses like eyes, ears, nose, etc. are adversely affected and serious health problems arise. Noise pollution, for example, causes deafness, insomnia, brain disorders, dementia and nervous system disorders, such as TB, asthma, etc., while fuel-producing water causes diseases of the digestive system, such as jaundice.

Although recent biological research has provided a cure for many ailments, increasing human intervention in the environment and the incidence of many old ailments are increasing day by day, adding to some new ailments. This shows how closely the environment is related to human health and how and to what extent the quality of human health depends on the quality of the environment.

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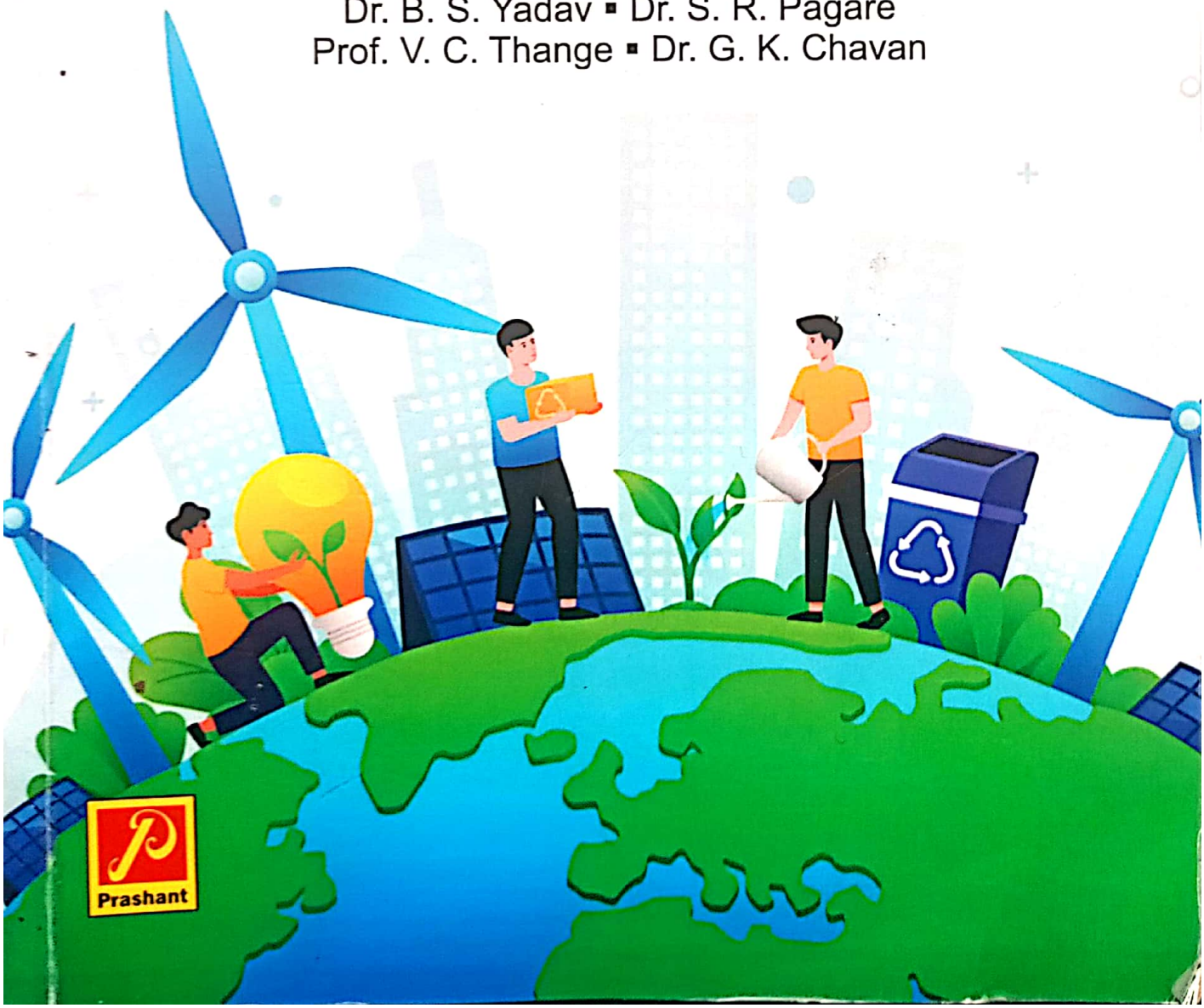

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Agricultural Environment and Agro-Ecosystem

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Introduction:

Agricultural environment is a unique situation created in the agricultural sector due to natural and human activities. Different regions have different agro-environments. This is because the availability of natural elements in different regions and human activities vary. Agricultural development and environment are closely linked and agricultural development has a huge adverse effect on environmental quality. The impact of agricultural development on environmental quality is further divided into two parts. The first one is historical agriculture and environment and the second is modern agriculture and environment.

Agricultural Environment:

"Agro-environment demands a range of interconnected skills that deliver a systematic approach to farming operations, taking account of factors such as the strengths and weaknesses of a farm's operating area, how it maintains the ecosystem balance, and the markets in which it sells its produce."

Meaning of Agro-ecosystem:

"Agro-ecosystem is the basic unit of study in agro-ecology, and is somewhat arbitrarily defined as a spatially and functionally coherent unit of agricultural activity, and includes the living and nonliving components involved in that unit as well as their interactions."

Methodology of the study:

The present study conducted on the "Agricultural Environment and Agro-Ecosystem" is based on secondary data. The data has been furnished from the related books, research papers, and articles. Some data has furnished from the websites, as well as from news papers.

Objectives:

The study seeks to obtain the following objectives,

1. To study the agricultural environment.

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2. To study the historical and modern agricultural environment.
3. To know the Agro-ecosystem.
4. To study biological components of Agro-ecosystem
5. To examine the factors affecting Agro-ecosystem

Historical Agriculture and Environment:

In ancient times man was a successful ecologist. At that time, human beings were a group of organisms in a biological society and had direct and good relations with other organisms in the biological society. Also, in those days humans were not very different from other living beings, but they were endowed with many other things. He was getting the benefits. The blessings bestowed on human beings are as follows.

1) He was a close and influential factor in social organization.
2) Humans have more efficiency and quicker intelligence than other living beings.
3) Man on the strength of his intellect, invented various tools and fire and acquired common sense earlier than other animals.
4) Since man has keen knowledge of environment, he used it effectively. He was fully aware of the resources of food and water. He also knows how to use plants for food, medicine and construction.

He tried to develop agriculture by gradually using the knowledge and intellect acquired by human beings. But in the early days there was a very ecological balance in the way of human life. At that time the wastewater was reduced. Outbreaks appear to be exacerbated during this time. Human lifespan was plentiful. As a result, the situation was very precarious. So the balance of the environment was disturbed. There was balance. Humans used to cultivate according to the available environment. Agriculture in ancient times was working at primary stage, therefore the balance of environment was retained.

But about 10,000 years ago, humans began to use plants and animals on a large scale for a variety of purposes. He also started using various metals and power tools. This gave impetus to agriculture and other development. But this development has not adversely affected the quality of the environment. The two main reasons are as follows.

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1) Early human technology was very limited.

2) Human existence on earth was very scattered.

Also their number was very low. The above factors have not adversely affected the quality of the environment in ancient times. But since man changed his life on the hunter and started farming on a large scale and he became aware of agronomy to a great extent, agricultural development has gained momentum. Gradually, agricultural techniques and weapons improved and this had a favorable effect on agricultural development. But this led to various adverse effects on the quality of the environment.

Also, with the growing population putting pressure on agriculture, the agricultural sector was being used to the maximum to meet the needs of the growing population. This led to a decrease in soil fertility. Also, agricultural development began to have an adverse effect on the environment.

Modern Agriculture and Environment:

In modern agricultural system, human beings have made huge increase in agricultural production by using new techniques on a large scale. But it also upset the balance of the environment. As a result, it had an adverse effect on the agricultural ecosystem. The major agricultural systems and their effects on the agricultural ecosystem or the environment are as follows.

1) Pesticides and Insecticides: In modern agriculture various pesticides and insecticides are used to protect crops from various diseases and pests. This protects the crop from diseases and pests. But there are many adverse effects on the environment. Soil pollution occurs when pesticides and insecticides are mixed into soil and water. Drug spraying also causes some air pollution. Similarly, pesticides and insecticides affect plant life.

2) Chemical Fertilizers: Humans are using chemical fertilizers on a large scale to increase the production of food grains, fruits, vegetables and other crops from the soil. Chemical fertilizers are being used to make the soil nitrogen available to the crops in sufficient quantity. But in places where intensive farming is being done and chemical fertilizers are being used extensively, they are having adverse effects on the soil flora and fauna. This reduces soil fertility and adversely affects the recycling process. Chemical fertilizers also pollute the surface water

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and surface water with rainwater. As a result, it is difficult for crops to get pure water.

3) Monoculture: In modern agriculture, farmers are frequently cultivating the same crop which yields higher yields per hectare and which gives higher economic benefits. But this one crop association reduces the fertility of the soil and reduces its productivity. Over time, such lands become unusable for crop production. Also, crop diseases are more likely to be caused by a single crop. But according to the ecological principle, crop rotation is necessary to maintain ecological balance. In many parts of the world, however, the balance of ecosystems is found to be disturbed by one crop.

4) Irrigation: Irrigation is being used extensively in modern agriculture. But this is adversely affecting the quality of the environment. In fact, in arid regions where rainfall is low, irrigation is essential. This is because irrigation helps in proper growth of crops. However, when there is over-irrigation, problems such as water logging and alkaline soils in the region become serious over time. In countries like India, Pakistan, Egypt, excessive irrigation has created a large amount of saline soils.

All the above techniques are essential for modern agricultural development. But when they are misused, it has a very adverse effect on agricultural land. Many countries in the world are using the above techniques and tractors, electric and other machinery in modern farming methods. But it is having an adverse effect on the agricultural environment. In many countries of the world, the green revolution has benefited from temporary increase in production. But where the green revolution has been going on for a long time, the fertility of the land has started declining and the production has started declining. In short, agricultural development is causing unnecessary changes in the environment which are becoming very dangerous for human life and human existence.

Agro ecosystem:

Agro ecosystem is an important type of man-made ecosystem. Agricultural ecosystems are very different from natural ecosystems as well as semi-natural ecosystems. In general, agricultural ecosystems are considered to be different from natural and semi-natural ecosystems due to the following factors.

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1) The energy required by natural ecosystems comes from solar energy. But the energy required by the agricultural ecosystem comes from solar energy as well as fuel combustion (processing energy), labor and animals, chemical fertilizers, pesticides, pesticides and irrigation water. Such energy is called supporting energy. That is, the agricultural ecosystem requires two types of energy, solar energy and auxiliary energy.
2) As a result of human management, the practice of monoculture in agriculture reduces the biodiversity in the agricultural ecosystem. In contrast, biodiversity is found more in natural ecosystems.
3) In agricultural ecosystems, the selection of effective or useful crop plants and animals is artificial. Farmers select crop plants and animals that are beneficial to them. Such a choice does not exist in natural ecosystems. There, plants and animals develop according to nature.
4) Agricultural ecosystems evolve faster than natural ecosystems. But it is not universal.
5) Nutritional structure (energy exchange stratification) in agricultural ecosystem is very simple and easy.
6) Climate change has a greater impact on agricultural ecosystems than natural ecosystems.
7) The natural balance in agricultural ecosystems does not deteriorate much.
8) The duration of agricultural ecosystems is very short. The duration of agricultural ecosystems is usually 3 two 4 months or 1 year. That is, agricultural ecosystems are temporary. But the duration of natural ecosystems is very long. i.e. 50 years. Some natural ecosystems are permanent.
9) Agricultural ecosystems are more productive than natural ecosystems.
10) The pressure of herbivores in agricultural ecosystems is less than that of herbivores in natural ecosystems.
11) Succession of agricultural ecosystems can be hindered by humans.

The planning and management of the agricultural ecosystem is

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based on how solar energy and other energy will be converted into food. When solar energy and other energy are converted into food, the following processes take place.

1) While converting solar energy and other energy into food products, auxiliary energy is used for maintenance and maximum solar energy is converted into actual food grains.
2) Food crops and livestock are selected according to heredity to get good yield in specific available energy.

Biological components of agricultural ecosystems:

The following biological components are mainly found in agricultural ecosystems.

1) Producers: In agricultural ecosystems, the main crop plants and the grass growing in them are the producers. These producers make their own food through photosynthesis.

2) Consumers:

i) **Primary predators:** Primary predators in agricultural ecosystems include various insects, rats, rabbits, birds and humans.
ii) **Secondary predators:** It mainly consists of earthworms, arthropods (cockroaches, flies, spiders etc.) and nematodes.
iii) **Tertiary predators:** These mainly include some mammals, wild animals and birds like hawks.

3) Decomposers: Decomposers in agricultural ecosystems include various bacteria and fungi. The functions of disintegrators are very important in the agricultural ecosystem. The above growers, predators and decomposers are found in general agricultural ecosystems. However, there are some differences in certain agricultural ecosystems.

Factors affecting the agricultural ecosystem:

Productivity of each agricultural ecosystem is found to be different. The main reason for this is that different environmental factors (inorganic and biological factors) affect the agricultural ecosystem. Depending on the availability of these components and the interaction between them, agro ecosystems and their productivity vary. The major environmental factors affecting the agricultural ecosystem are such as Sunlight, Temperature, Humidity, Nutrients, Rainfall, Minerals and Interaction.

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Conclusion:

Agriculture in ancient times was working at primary stage, therefore the balance of environment was retained. However, human started using various metals and power tools. This gave impetus to agriculture and other development. But this development has not adversely affected the quality of the environment. The two main reasons are such as early human technology was very limited and human existence on earth was very scattered. In the modern times, agricultural development is causing unnecessary changes in the environment which are becoming very dangerous for human life and human existence.

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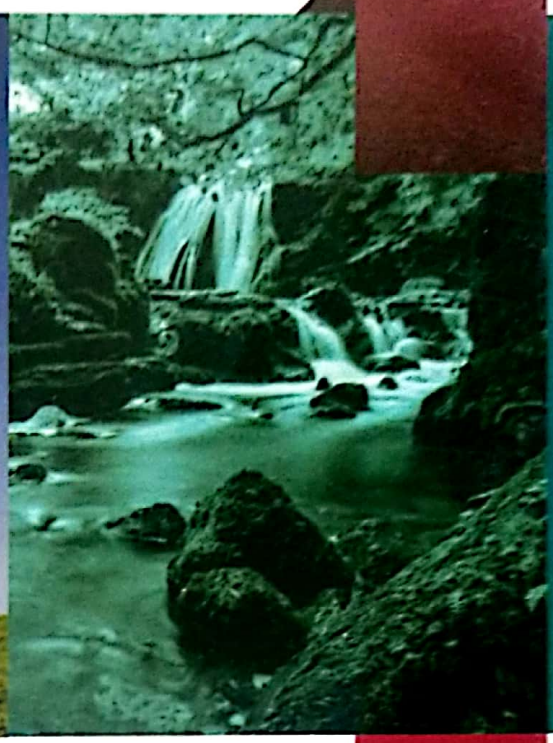

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या पुस्तकातील कोणताही मजकूर, कोणत्याही स्वरूपात वा माध्यमात पुर्नप्रकाशित अथवा संग्रहित करण्यासाठी लेखक/प्रकाशक दोघांचीही लेखी पूर्वपरवानगी घेणे बंधनकारक आहे.

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पृथ्वीची निर्मिती झाल्यानंतर काही कालावधीनंतर येथे सजीव सृष्टीची निर्मिती झाली. या सजीवांच्या उत्क्रांतीमधूनच मानवाची देखील निर्मिती झाली आहे. पृथ्वीवरील सर्व सजीवांना अन्न, हवा, पाणी, सूर्यप्रकाश, हे घटकांची गरज असून हे घटक सजीवांना त्यांच्या सभोवतालच्या परिसरातून मिळतात. पर्यावरण ही संकल्पनाच बहुव्यापक, बहुसमावेशक व बरीच गुंतागुंतीची आहे. पर्यावरण एक किंवा अनेक सजीवांचे बनलेले असते. तसेच ते एक किंवा अनेक घटकांनी मिळून बनलेले असते. पर्यावरण ही संकल्पना स्थल व कालसापेक्ष आहे. कारण भूपृष्ठावर सर्वत्र सारखेच पर्यावरण नसते. अलीकडे पर्यावरण ही बहुचर्चित संकल्पना बनली असून ती अध्ययनाचा, संशोधनाचा व चिंतेचा एक प्रमुख विषय ठरत आहे.

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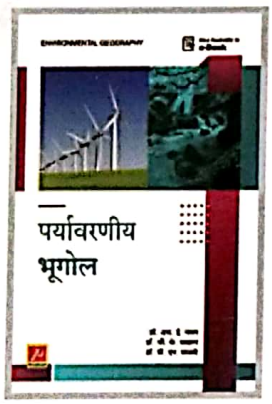







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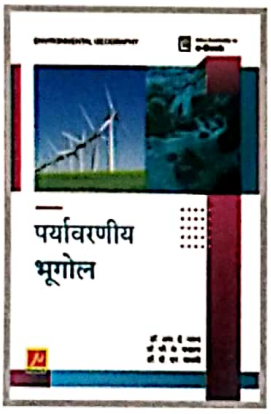
मानवाच्या आर्थिक क्रिया आणि मानवाच्या सभोवतालची परिस्थिती यांचा सविस्तर अभ्यास आर्थिक भूगोल या शाखेमध्ये केला जातो. मानव हा घटक पर्यावरणाची निर्मिती तर संसाधने ही पर्यावरणाची वैशिष्ट्ये आहेत. अर्थशास्त्रातील उत्पादन, उपभोग, विनिमय आणि वितरण या घटकांवर प्राकृतिक पर्यावरणाचा सतत परिणाम होत असतो. वस्तू उत्पादन, वस्तूंचा उपभोग आणि त्या निर्मित वस्तूंचा विनिमय याबरोबरच आर्थिक-सामाजिक आणि बौद्धिक गरजांच्या पुर्ततेसाठी आवश्यक असलेल्या वेगवेगळ्या प्रकारच्या सेवा सुविधा अशा सर्वांचा समावेश मानवी आर्थिक क्रियांमध्ये केला जातो. प्रस्तुत पुस्तकात आर्थिक भूगोलाचा परिचय, अभ्यास पद्धती, विविध शास्त्रांशी असलेले संबंध, विविध आर्थिक क्रिया, जगातील संसाधने, भारतीय अर्थव्यवस्था, शेती, वाहतूक, व्यापार, उद्योगधंदे, कारखानदारी, प्रादेशिक विकास, ग्रामीण विकास या विविध मुद्द्यांचे सर्वांगिण विवेचन केले आहे.









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SANDEEP ROUT

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Title of the Book
Agriculture and Forestry: Current Trends, Perspectives, Issues - I

Analysis of Work done on Temporal Changes in Agriculture Land Use Pattern in India from 1985 to 2010

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Abstract:
Agricultural land use is one of the fundamental natural resources. It forms the basis for all geological, ecological, human and economical actions. Land is a significant input in agricultural sector, but yield agricultural crops mostly depend upon fertility of the land for raising different crops. Cropping pattern is the necessary feature of the farming ground use. Cropping pattern means the proportion of region beneath a variety of crops at a peak of time. The cropping pattern of India progressively modifying since 1950-51 from food grain crops to non food grain crops. During 1950-51 the share of cereals and pulses in total cultivated area was 61.10 percent and 15.60 percent, which got reduced to 52.63 percent and 12.86 percent respectively during 2003-04. On this basis the past work regarding cropping pattern its helps in identifying the theoretical and methodological issues applicable to the future study. This accumulated a short review of the important research work on the area of cropping pattern in various places in India.

Keywords: Cropping Pattern, Land Use, Temporal Change, Value Crops.

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Introduction

Cropping pattern connotes the crop-mix developed in an exacting region in an agricultural year. Cropping sample determines the production join in an exacting area. Cropping sample refers to acceptance of scrupulous category of crops by the farmers in a exacting area. It is expressed at macro level, i.e. district, taluka or village level. A transform in cropping sample implies a change in proportion of region beneath diverse crops. It has momentous bearing on widening the geographical inequalities in income allocation. Introduction of new agricultural technologies has influenced the crop-mix which is extra renowned in agriculturally developed regions. A vibrant transform has been witnessed in agricultural partition in our nation, mainly during the post-green revolution stage. The technological development in crop varieties and other yield rising factors of production influenced the farmers' performance which has reflected in the changing cropping pattern from cultivation of squat significance crops to elevated significance crops in the majority of the regions. These views are reflected in various works done by various scholars in the field of Temporal Changes in cropping sample and soil utilize model in India.

Objectives

The present paper work is the review of various scholars work on the issue of cropping pattern from 1985 to 2010 in India. This wide objectives can be broken into the following most important components.

Temporal Change in Land use pattern

An effort to study the biological implications of soil utilize lively in Uttar Pradesh. They reported that, there was a constant increase in uncultivated land in all the area despite approximately a constant net cultivate region. The cultivable desecrate land was declining constantly, except hilly area. (Pandey and Tiwari,1987)

The *silvipastural* scheme for improvement of waste lands of dry areas in Rajasthan using time series data of sixteen years from 1970-71 to 1986-87. The compound growth rate reveals that the area under forest, grazing land, cultivable waste land, gross cropped area, region sown

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additional than formerly registered a significant positive growth for the duration of the stage of investigation. The growth rate of forest was maximum (4.16 percent) followed by doubled cropped area (4.10 percent). The increasing of unproductive land is negative. They suggested that the ground utilize preparation for the improvement of dry areas of Rajasthan which envisaged that the in proportion region beneath crops should reduce from 44.98 percent to 33 percentage of total area. (Pal and Mruthyunjaya,1990)

The significance of forest land utilize in Andhra Pradesh and reported that, the increase in percentage of forest land in the state during the period 1963-64 to1978-79 was insignificant. The non cultivable land shows increased by 14.9 percent of the total area in 1963-64 to 16.4 percent in 1978-79. The percentage of cultivable waste land decreased by 1.8 percent and arable land shows decreased by 0.1 percent for the same period. (Ramanaiah,1990)

The land utilize pattern in the challenging areas of the entire agro- climatic zone in Uttar-Pradesh in the year 1988-89. He reported that, the hilly area had maximum region beneath jungle, everlasting pastures, grazing ground, hierarchy of crops and groves, non cultivable wastelands and soil below non agricultural uses. He also reported that, the region sown additional on one occasion and the entirety cropped region had been found the uppermost in the eastern area and the buck in the enormous areas. He suggested that the slopes of the mountainous areas of the region could be effectively urbanized for the cultivated area of controlled fruits. (Singh,1990)

The dynamic land utilize and cropping pattern method in Tawa command area of Hoshangabad district in Madhya Pradesh. They assessed the impact of the scheme on cropping prototype and ground utilize in the region throughout the pre project period for 1972-73 to 1974-75 and post project period for 1975-76 to 1979-80.They observed that the decline in the woodland area as a result of prohibited felling of hierarchy for household purposes. They also stated that, fallow land increased since the construction of the project. (Shrivastava,1991)

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Study about prototype of soil operation in Punjab for the period of 1966-67 to 1987-88. The learning indicate that the reported region for soil operation still continuous whereas the region beneath afforest, region not accessible for farming, net sown area increased for the duration of the investigation. Due to strengthening of cultivation, disgusting cropped area, cropping intensity is increased. They also reported that the Punjab agriculture had occurred extreme changes due to green revolution. (Singh and Kaur,1991)

Study of various soil operation samples in Himachal Pradesh in the period of 1966-67 to 1986-87. They reported that present had been no standardized tendency in the changes in the soil employ program. The region beneath jungle increased while the other categories had shown decreased. They have projected the soil make use of sample in 2000 on the basis of compound growth rate calculation. The projection shows that the area under all categories increased except the current fallow land. (Vaidya and Sikka,1991)

The dynamics of soil utilize in dissimilar states of our country. This study indicates that the general declining tendency in the region beneath enduring pastures, grazing domain, unproductive and barren manor. The region beneath non agricultural uses, cultivable wastes, and fallow land shows a positive growth in the majority of state in India. With regards to area under forest, negative growth rate was indicated in the state of Assam, Bihar, Haryana, Himachal Pradesh, Madhya Pradesh, Maharashtra and Tripura while Jammu and Kashmir and Odisha observed negative enlargement time for region position to non agricultural uses. The annual rate of increase in area under non agricultural uses was very high in Gujarat, Tamil Nadu, Rajasthan, Uttar Pradesh, Maharashtra, Karnataka and Madhya Pradesh. Increasing trend was experiential in the region beneath everlasting grazing soil and grazing soil in Bihar, Maharashtra, Mizoram and Uttar Pradesh. Correspondingly decreasing trend was indicated in the region beneath assorted ranking crops in Andhra Pradesh, Gujarat, Haryana, Kerala, Odisha, Punjab Tripura and Uttar Pradesh. (Sharma and Pandey,1992)

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The changing outline of farming in Odisha and observed that the changes in cropping sample for the time of 1950-51 to 1990-91.He statement with the intention of present was regular increase in the proportion of the netting region sown at the expend of ground below categories such as region un accessible for farming, further uncultivable land without fallow land. He also stated to nearby was a regular descend in the distribute of region below rice and other cereals which has been turn for production of pulses and oilseeds, the proportion of which has constantly increased. (Mishra,1994)

An agricultural growth in Himachal Pradesh for the time 1972-73 to 1980-81. The study indicates that the net area sown stay put constant, even as the area under tree-plant increased from 21 percent to 27 percent for the duration of the learning stage. (Negi,1994)

A study about dynamic land use in Dharwad District of Karnataka state for the period of 1979 to 1991. He reported that the increase charge of region under woodland, fallow land, net sown area, total cultivated area, and doubled cropped area were significant and positive. He also stated that the improvement in the management practices was the main cause intended for the increase of double cropped area. (Nagbhushan,1994)

A soil make use of sample in Tamil Nadu for the time of 1960-61 to 1988-89. The study reveals to the whole farming region of Tamil Nadu had decreased from 7.32 to 6.44 million hectors all through the learning stage and double cropped area decreased from 1.32 to0.90 million hectors Over the year total cropped area had been continuously decreasing at the same period area under current fallow, other fallow, and lands under non farming make use of had been growing day by year. (Padmanabhan and Chinnadurai,1994)

A soil use proportions in Bijapur region in Karnataka for the time starting 1971-72 to 1992-93.The study shows that no transform in the jungle area in study area. The increase charge of region more than once and soil position to non agricultural uses were positive and important in study area. The increase charge of region under crops like Jowar, Bajara and maize were positive and important. (Managoli,1997)

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Soil use sample in dry region of Karnataka so as to present was reduce in the region below non agricultural uses, cultivable waste, current fallow land in zone first and area below cultivable squander land and net sown area. The positive growth was occurred in infertile and unproductive soil, current fallow land and other fallow land. (Prashantkumar,2003)

The soil use pattern in India for the year of 1950-51 to 1997-9 is the forest land had improved from 40.08 million hectors to 68.65 million hectors in the study period. They also statement to present be a considerable increase in area under non agricultural uses from 9.36 million hectors to 12.3 million hectors in the period of investigation. It also indicates that net sown area is greater than before throughout the learning stage. (Goswami and Challa, 2004)

In the dynamic of soil use model in Kollam district of Kerala. The study reveals that here was a considerable increase in the current fallow. He statement that in attendance was an adverse relationship between rainfall and fallow land, unproductive and barren territory, land under mixed hierarchy crops and orchard and cultivable waste recorded a significant negative growth. (Sreeja,2004)

On purpose the territory utilize active in Mandya district. He reported that the area under fallow, current fallow, cultivable waste and land under mixed tree crop indicate positive increasing. (Harish,2006)

The revise statement that the opportunity for widespread agriculture was very restricted since the area under agricultural uses had already reached the highest level. The area under non agricultural uses had increased crop time to time. This certainly reduces the volume of cultivable land. Transform in cropping sample were also necessary to make the most competent use of land. (Ramappa and Naidu,2009)

Conclusion

The 18 scholars were studied about agriculture land use pattern in 25 years upto year of 2010. This work was based on the agricultural land use in various regions in India. The common conditions in

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above study it is, a) Transformation of crops, b) same methodology, c) Positive negative changes in agriculture pattern, d) the analysis regarding the increase or decrease the land under the various corps in selected study regions, e) crop ranking methods. In India study on agriculture land use was done in Uttar Pradesh, Rajasthan, Andhra Pradesh, Madhya Pradesh, Panjab, Himachal Pradesh, Odisha, Karnataka, Tamilnadu, and Kerala. But in the year of 1992 Sharma and Pandey was worked on 16 states of India. The most of scholars was work on micro level study and only two scholars was work on the macro level study regarding agricultural cropping pattern.

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Booklet-2

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CURRENT MAJOR ISSUES IN INDIA (BOOKLET-2)

Edited by: Dr. Dilipkumar A. Ode & Mr. Jigeshkumar D. Chauhan

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A BRIEF REVIEW OF COMMON HEALTH PROBLEMS IN INDIA: AN ARTICLE

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Though India's healthcare sector is one of the fastest growing in the world, lack of availability is still a major concern for the country's tremendous population. Apart from accessibility, cost is a major deterrent to addressing health issues, both in terms of timely and quality care. In fact, as per the report by National Survey Office, only 19.1% of Indians living in urban India have some form of health insurance or coverage. This leaves a majority of the population without coverage and depleting savings to tackle health problems and meet medical costs.

To add to that, about 9.1% of urban India are likely to develop common health problems with a major cause being infections, making up 25.4% of hospitalized cases. Other major health problems that urban India is susceptible to include cardiovascular diseases making up 21.9% of the cases with endocrine or metabolic illnesses such as diabetes and thyroid dysfunction, cancer, etc. making up for 20.8%. Such health problems have dire consequences if left undiagnosed or untreated.

This article is present on the secondary data and various newspapers articles regarding various health problems in our surroundings.

Some of the Common Health Problems in India

1. **Cancer: -** In a report published by the WHO, of India's 1.3 billion population, 1 in 10 Indians will develop cancer. Among the many health problems in India, cancer cases have shown to follow an increasing trend in the country. For instance, breast cancer has increased between 1.4% and 2.8% annually with greater prevalence in urban India.

Regardless of the type, oncology treatments are heavy on the pocket with costs typically starting at a few lakhs, Rs.5 lakhs and upward.

2. **Infertility: -** As per findings published in late 2019, around 14% of Indian couples were affected by infertility, with a higher prevalence in the urban population of India. In fact, data shows that 1 in 6 urban couples were affected and this number was set to rise by 10% in 2020. While environmental toxins, STIs, lifestyle diseases and infections causing health issues can result in infertility, in vitro fertilization (IVF) serves as a potent and viable solution. However, this treatment isn't covered by most health insurance policies and couples have to bear the cost out of pocket. The average price for IVF ranges between Rs.1 lakh and Rs.2.5 lakh, making it a hefty expense.
3. **Congenital abnormalities: -** A result of genetics or exposure to toxic, congenital abnormalities or malformations differ in severity based on its type. In urban India, such health problems are the third-most common cause of mortality amongst new-borns and for those that survive, treatment through surgery is the solution. For instance, cleft lip and cleft palate are types of malformations that can be addressed with plastic surgery.

The average cost of these procedures is around Rs.1.8 lakh onwards, depending on the complexity.

4. **Cataract: -** Cataract is the most common cause for visual impairment worldwide and is responsible for blindness in 17.7 million Indians. While there are a few types of cataract, this illness issue can be treated with proper care from an ophthalmology specialist.

The average cost for surgery and treatment is around Rs.55,000 and there are other such procedures that can cost Rs.1.2 lakh onwards.

Current Major Issues in India

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5. **Hearing loss:** - Findings indicated that there is a high prevalence of hearing loss or hearing impairment in India. In Delhi alone, 26.1% of the urban residents were afflicted by some degree of hearing impairments, of which 51% had profound hearing loss.

Among the solutions is using a hearing aid, which can cost anywhere from Rs.24,990 to Rs.2.7 lakh for a unit. Given the impact that health issues like deafness can have on quality of life, it is worthwhile to invest in a remedy.

6. **Diabetes:** - With over 75 million diabetics in the world, one of six diabetics are from India. This fact is especially important to residents of urban India as the prevalence of diabetes is six times higher for them. Diabetes can also lead to other health problems and complications related to the heart, kidneys, and more, which is why getting treatment at the earliest is key. This illness is typically treated by endocrinologists, ophthalmologists and nutritionists and one solution is the use of insulin pumps. With the Digital Health EMI Network Card, you can own the insulin pump from MEDTRON partners on EMIs.
7. **Heart disease:** - Of all the health problems in India, heart disease is among the deadliest. Around 55 million people in India have some form of cardiovascular diseases due to sedentary lifestyle and diet. Treatment for any cardiac ailment can be availed at a Cardiology Centre or specialist with the average cost of heart care ranging between Rs.1.5 lakh to Rs.4.5 lakh at private hospitals.
8. **Infectious diseases:** - Among the more common health issues in India, diseases like COVID-19, dengue, and malaria are at the top of list. According to the WHO, the highest number of dengue cases occur in the monsoons in India. So, should you get infected, the appropriate response is to seek medical management at health centres closest to you.

You'll find that seeking treatment for such diseases, while necessary, isn't cheap. In fact, in 2019, the cost for availing dengue treatment in Hyderabad was anywhere between Rs. 5,000 and Rs.5 lakhs.

9. **Hair Loss:** - Hair loss or baldness can affect anyone, be it men, women or children. The causes range across a whole list of factors with stress being among the main ones. A report in mid-2018 found that this is among the many prevalent health problems in India as many Indian men face issues of baldness as early as in their 20s. The impact of this is felt on both an emotional and physical level, and treatment generally includes hair transplants.

The average cost of hair transplantation surgeries can range from Rs.30,000 to Rs.1.35 lakh based on the treatment administered.

10. **Obesity:** - Of the many health problems faced by urban India, obesity is the lifestyle disease that serves as a gateway to other illnesses. In fact, as per findings, India will have the second-most number of obese children by 2030, 27 million in number, with its prevalence tripling in adults by 2040. This is a major for concern and the ideal approach to tackling obesity or being overweight is to opt for weight-loss or slimming programs.

❖ REFERENCE:-

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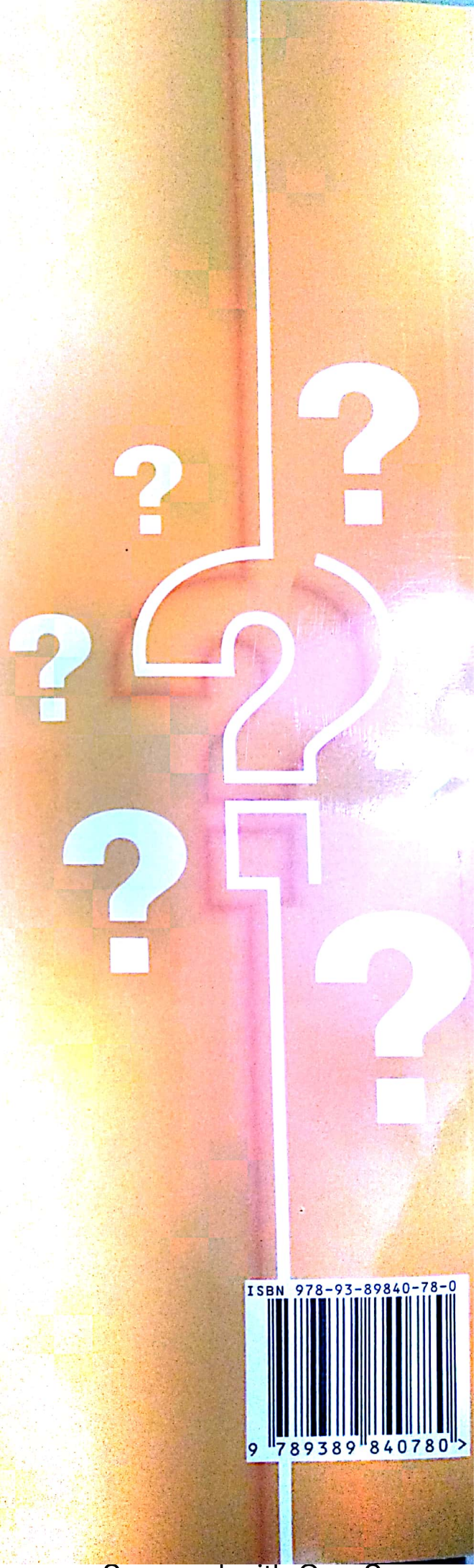

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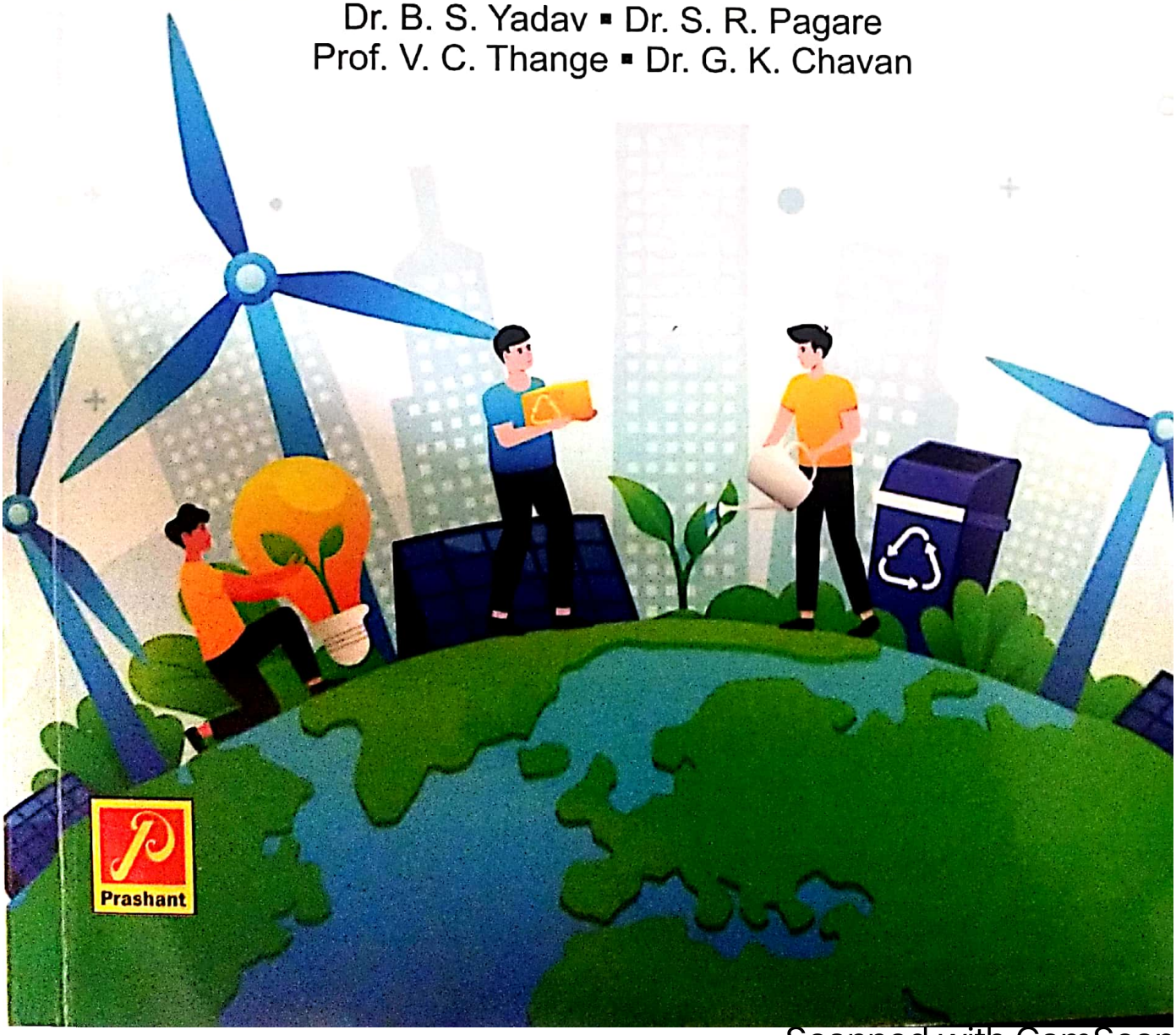

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Protection of Environment for Sustainable Development: A Discussion

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Abstract:

The protection of environment is needed for sustainable development. The Industrial pollution, degradation of forests, depletion of ozone layer, the green house gases results in global warming and climate which will have an adverse impact on environment and human health. There is a need for conservation of Biodiversity, protection of wetlands and prevention of environmental pollution, promotion of ecological balance enables sustainable development. There are several provisions provided in Indian Constitution for Protection of environment. There are certain legislations enacted viz. Environment Protection Act, Wildlife Preservation Act, Biodiversity Conservation Act, water and Air pollution prevention Acts etc The Judiciary playing a vital role in protection of Environment. Through Judicial Activism the Supreme Court can issue directions under writ Jurisdiction under Article 32 of Indian Constitution. The United Nation Organisation passed several UN conventions like Ramsar Convention on protection of wetlands, and UN convention on Biodiversity etc. World Environment Day is being celebrated across the world on 5th June every year.

Present paper focuses on the various environmental protection policies in surrounding countries and its history and future with the role for conservation our environment.

Keywords: Environment, Protection, Ozone layer, Global Warming.

Introduction:

Global warming is the term used to describe a gradual increase in the average temperature of the Earth's atmosphere and its oceans, a change that is believed to be permanently changing the Earth's climate. Even though it is an ongoing debate, it is proved by the scientists that the planet is warming. Global warming is for real The average global temperatures are higher than they have ever been during the past

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millennium, and the levels of CO in the atmosphere have e crossed all previous records. The climate is changing. The earth is warming up, and there is now overwhelming scientific consensus that it is happening, and human-induced. With global warming on the increase and species and their habitats on the decrease, chances for ecosystems to adapt naturally are diminishing. Many are agreed that climate change may be one of the greatest threats facing the planet. Recent years show increasing temperatures in various regions, and increasing extremities in weather patterns. Climate Change resulting from increased green house gases concentrations has the potential to harm societies and eco-systems. In particular, agriculture, forestry, water resources, human health, costal settlements and natural eco-systems will need to adapt to a changing climate or face diminishing functions. The changing climate patterns, and especially increased frequency and severity of extreme events, will increase vulnerability to the natural disasters, both slower on set ones such as drought and rapid onset disaster such as flood and cyclones.

Forest Conservation:

The role of forests in the national economy and in ecology was emphasized in the 1988 National Forest Policy, which focused on ensuring environmental stability, restoring the ecological balance, and preserving the remaining forests. Other objectives of the policy were meeting the need for fuelwood, fodder, and small timber for rural and tribal people while recognizing the need to actively involve local people in the management of forest resources. Also in 1988, the Forest Conservation Act of 1980 was amended to facilitate stricter conservation measures. The 2009 Indian national forest policy document emphasizes the need to combine India's effort at forest conservation with sustainable forest management. India defines forest management as one where the economic needs of local communities are not ignored; rather forests are sustained while meeting nation's economic needs and local issues through scientific forestry.

Protection of Wetlands:

Wetlands are complex ecosystems and encompass a wide range of inland, coastal and marine habitats. They share the characteristics of both wet and dry environments and show immense diversity based on their genesis, geographical location, hydrological regimes and substrate factors. They include flood plains, swamps, marshes, fishponds, tidal

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marshes natural and man-made wetlands. Among the most productive life support, wetlands have immense socio-economic and ecological importance for mankind. They are crucial to the survival of natural biodiversity. They provide suitable habitats for endangered and rare species of birds and animals, endemic plants, insects besides sustaining migratory birds. India has a wealth of wetland ecosystems distributed in different geographical regions. India is also a signatory to the Ramsar Convention on Wetlands and the Convention of Biological Diversity; Apart from government regulation, development of better monitoring methods is needed to increase the knowledge of the physical and biological characteristics of each wetland resource, and to gain, from this knowledge, a better understanding of wetland dynamics and their controlling processes.

India being one of the mega diverse nations of the world should strive to conserve the ecological character of these ecosystems along with the biodiversity of the flora and fauna associated with these ecosystems. The Convention on Wetlands, signed in Ramsar, Iran, in 1971, is an intergovernmental treaty which provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. There are presently 158 Contracting Parties to the Convention, with 1758 wetland sites, total 161 million hectares, designated for inclusion in the Ramsar List of Wetlands of International Importance. Governments which have joined the Convention are expressing their willingness to make a commitment for helping to reverse that history of wetland loss and degradation. In addition, many wetlands are international systems lying across the boundaries of two or more countries, or are part of river basins that include more than one country.

Conservation of Biodiversity:

Conservation of Biodiversity is the need of the hour. The Biological Diversity Act, 2002 is a federal legislation enacted by the Parliament of India for preservation of biological diversity in India, and provides mechanism for equitable sharing of benefits arising out of use of traditional biological resources and knowledge. The Act was enacted to meet the obligations under Convention on Biological Diversity (CBD), to which India is a party. The National Biodiversity Authority (NBA) was established in 2003 to implement India's

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Biological Diversity Act 2002. The NBA is a Statutory, Autonomous Body and it performs facilitative, regulatory and advisory function for the Government of India on issues of conservation, sustainable use of biological resources and fair and equitable sharing of benefits arising out of the use of biological resources.

Wildlife Conservation:

Wildlife conservation is the practice of protecting endangered plant and animal species and their habitats. Among the goals of wildlife conservation are to ensure that nature will be around for future generations to enjoy and to recognize the importance of wildlife and wilderness lands to humans. Many nations have government agencies dedicated to wildlife conservation, which help to implement policies designed to protect wildlife. Numerous independent non-profit organizations also promote various wildlife conservation causes. Wildlife conservation has become an increasingly important practice due to the negative effects of human activity on wildlife. Wildlife Conservation Act 2002 was enacted to protect wildlife in India.

The main objective of Project Tiger is to ensure a viable population of tiger in India for scientific, economic, aesthetic, cultural and ecological values and to preserve for all time, areas of biological importance as a natural heritage for the benefit, education and enjoyment of the people. Project Elephant (PE), a centrally sponsored scheme, was launched in February 1992 to provide financial and technical support to major elephant bearing States in the country for protection of elephants, their habitats and corridors.

Ozone Depletion:

Ozone depletion describes two distinct but related phenomena observed since the late 1970s: a steady decline of about 4% per decade in the total volume of ozone in Earth's stratosphere (the ozone layer), and a much larger springtime decrease in stratospheric ozone over Earth's polar regions. The latter phenomenon is referred to as the ozone hole. In addition to these well-known stratospheric phenomena, there are also springtime polar tropospheric ozone depletion events. The details of polar ozone hole formation differ from that of mid-latitude thinning, but the most important process in both is catalytic destruction of ozone by atomic halogens. The main source of these halogen atoms in the stratosphere is photo dissociation of man-made halocarbon

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refrigerants.

These compounds are transported into the stratosphere after being emitted at the surface. Both types of ozone depletion were observed to increase as emissions of halo-carbons increased. CFCs and other contributory substances are referred to as ozone-depleting substances (ODS). This is used to protect the ozone layer which protect humans from ultra-violet rays of Sun.

Environmental Impact Assessment

An environmental impact assessment (EIA) is an assessment of the possible impacts that a proposed project may have on the environment, consisting of the environmental, social and economic aspects. The purpose of the assessment is to ensure that decision makers consider the environmental impacts when deciding whether or not to proceed with a project. The International Association for Impact Assessment (IAIA) defines an environmental impact assessment as "the process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made." EIAs are unique in that they do not require adherence to a predetermined environmental outcome, but rather they require decision ¬makers to account for environmental values in their decisions and to justify those decisions in light of detailed environmental studies and public comments on the potential environmental impacts.

Environment and Indian Constitution

The Indian Constitution guarantees justice, liberty and equality to all citizens of the country. In Maneka Gandhi's case the court gave a new dimension to Article 21. It held that the right to 'live' is not merely confined to physical existence but it include within its ambit the right to live with human dignity. The same view was reflected by Court in Francis Coralie V. Union Territory of Delhi said that the right to live is not restricted to mere animal existence. Article 21 also constitute right to get pollution free water and air. Article 48 of Directive Principles of State Policy directs that the State to take steps to organize agriculture and animal husbandary on modern and scientific lines. Again Article 48-A requires the State to take steps to protect and improve the environment and to safeguard the forests and wildlife of the country. In M.C. Mehta (II) V. Union of India, the Supreme Court, relying on Article 48-A gave

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direction to Central and State Governments and various local bodies and Boards under the various statutes to take appropriate steps for the prevention and control of pollution of water. Article 51-A says that it shall be the duty of every citizen of India to protect and impove the natural environment including forests, lakes, rivers and wildlife, and to have compassion for living.

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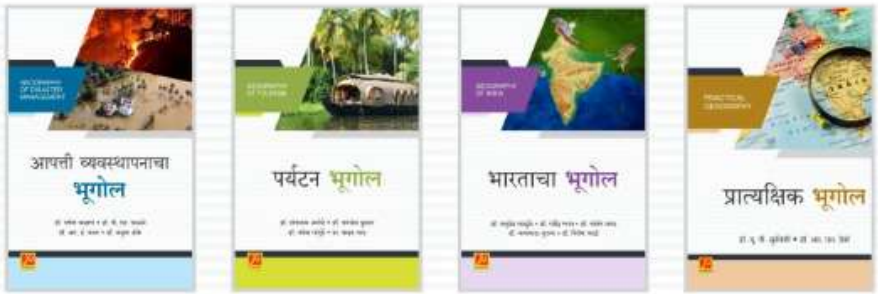
भारत हा जगातील सर्वात जास्त भौगोलिक विविधता असणारा देश आहे. भारत हा उत्तरेकडील हिमालयाच्या हिमाच्छादित पर्वतराजीपासून दक्षिणेस हिंदी महासागराच्या किनाऱ्यापर्यंत विस्तीर्ण अशा भुभागावर पसरलेला आहे. भारताच्या विस्तृतपणामुळे व नैसर्गिक विविधतेमुळे भारताच्या हवामानाला एक वेगळेच वैशिष्टे व विविधता प्राप्त झाली आहे. जगातील विविध प्रकारच्या हवामानाचे अविष्कार भारतात आढळतात. भारताचे प्रमुख पाच प्राकृतिक विभाग आहेत. भारतीय उपखंड हे जगातील चार प्रमुख धर्मांचे जन्मस्थान आहे. सद्य:स्थितीत भारत हा सामाजिक, आर्थिक व तांत्रिक क्षेत्रात आघाडीवर आहे.

सदरील पुस्तकात भारताची ऐतिहासिक पार्श्वभूमी, भारताचा प्राकृतिक विभाग, हवामान, नदीप्रणाली, मृदा, वनसंपदा, विविध धर्म, धर्माचे प्रकार, भाषा भाषाकुळे, भारतातील आदिवासी जमाती, जीवन पद्धती, त्यांचे वितरण, भारतातील रस्ते लोहमार्ग हवाईमार्ग, दळणवळण, खनिजसंपत्ती व त्यांचे वितरण, भारतातील शेती व तिचे प्रकार, समस्या इत्यादी विविधांगी बाबींचा सखोल परामर्श घेतलेला असून नकाशे व आकृत्यांचा आवश्यक तेथे समावेश केलेला आहे.



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Effective Sustainable Economic Development for Tourism

Dr. S.R. Pagare
Faculty of Commerce, K.J. Somaiya College of Arts, Commerce and Science, Kopargaon Maharashtra

Abstract :- Tourism is now one of the world's largest industries and one of its fastest growing economic sectors. For many countries tourism is seen as a main instrument for regional development, as it stimulates new economic activities. Tourism may have a positive economic impact on the balance of payments, on employment, on gross income and production, but it may also have negative effects, particularly on the environment. Unplanned and uncontrolled tourism growth can result in such a deterioration of the environment that tourist growth can be compromised. The environment, being the major source of tourist product, should therefore be protected in order to have further growth of tourism and economic development in the future. This is especially true with regard to tourism based on the natural environment as well as on historical-cultural heritage.

Sustainable tourism has three interconnected aspects: environmental, socio- cultural, and economic. Sustainability implies permanence, so sustainable tourism includes optimum use of resources, including biological diversity; minimization of ecological, cultural and social impacts; and maximization of benefits for conservation and local communities. It also refers to the management structures that are needed to achieve this.

The paper provides a theoretical framework for sustainable tourism.

Introduction :- Defining sustainability and sustainable tourism development : Sustainability is one of the key-words of the 1990s. Sustainability and sustainable development were given impetus and made popular by the Brundtland report [World Commission on Environment and Development, 1987].

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It defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". Both an equity dimension (intragenerational and intergenerational) and a social/psychological dimension are clearly outlined by this definition.

The Brundtland report also highlighted the "essential needs of the world's poor, to which overriding priority should be given", and "the idea of limitations imposed by the state of technology and social organisation on the environment's ability to meet present and future needs".

The Brundtland report stimulated debate both on the environmental consequences of industrialization and on the effects of present actions for future generations. Moreover, the report reactivated interest in the physical or ecological constraints of economic growth. As a result, sustainability and sustainable development began to appear in a range of contexts and to figure as an explicit goal in many domestic and international policy-oriented institutions.

For instance, at an international level, the Rio Conference [United Nations Conference on Environment and Development, 1992] marked the beginning of a worldwide commitment which recognised the principle that the right to development must be exercised in such a way that satisfies social and environmental needs of current and future generations, in an equitable manner. This acknowledges a commitment that signifies the adoption of certain rules of resource and environmental management for the compatibility of economies with their environments. In the same direction, at a supranational setting, the European Community in its Fifth Environmental Action Programme [Commission of the European Communities, 1992] described the defiance of the 1990s in terms of the exigency of a far-sighted, cohesive and effective approach to achieve sustainable development.

But if the concepts sustainability and sustainable development have been progressively accepted by domestic and international policy agendas and seem more and more helpful in providing new and fresh dimensions for the decision-

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making process and the basic economic problems of scarcity, economists have been generally slow in providing adequate responses to many important issues [HOWARTH, 1997].

A number of implications and limitations of these concepts have not been discussed in as much length as it would be desirable, especially when the general paradigm of sustainability has been applied not only on a world scale, in the wider context of global environmental resources, but even at smaller territorial levels, both national, regional and local [NIJKAMP, 1993]. A clear interpretation of the notion of sustainability is lacking in many analysis of sustainable policies, since this may depend on underlying subjective or ideological views [CREACO, 2001]. The difficulties in defining sustainability at the various levels at which it could be achieved, together with the related incomprehension of how sustainability at different decision-making levels is related, have frequently led environmental policies which use such a new conceptual framework to rest on insecure and unstable theoretical foundations.

On the other hand, if there are many interpretations of sustainable development, nevertheless, there is a broad consensus that, at a minimum, sustainable development does capture two central and basic ideas :

- That development has an economic, a social and an environmental dimension, so that development will only be possible if a sound balance is made between the different components that contribute to the general function of natural environments – the function of life support;

- That the current generation has a moral obligation towards future generations to leave sufficient social, environmental and economic resources for them to enjoy levels of well-being at least as high as our own.

If the core features of sustainability (ecology, economy, and equity) be considered as the tips of a triangle then it is the relationship between ecology and economy, and economy and equity respectively that represent the key points in the sustainable development issue. In this systems approach, thus, sustainability is

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viewed as an "exercise in the conditional optimization and fine-tuning of all elements of the developmental system so that system, as a whole, keeps its bearings without one of its elements surging forward to the detriment of the others".

Objectives of environmentally sustainable development :-

1] Economic objectives :-

- Growth,
- Equity
- Efficiency

2] Social Objectives :-

- Empowerment,
- Participation,
- Social mobility,
- Cultural Identity Industrial development.

In analyzing the details of the concept of sustainability, many issues have emerged as points of controversy and departures for adherents to different views of environmental ideologies. On the whole, "four basic world views can be distinguished, ranging from support for a market and technology- driven growth process which is environmentally damaging, through a position favoring managed resource conservation and growth, to 'eco-preservationist' positions which explicitly reject economic growth". This world view encompasses different ethical values and policy strategies and, consequently, range from the extreme resource preservationist paradigm to the extreme resource exploitation stance. Interpretations of sustainable development can be correspondingly distinguished as ranging from very strong to very weak.

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Main elements of the sustainable development spectrum :

Sustainability positions	Defining features
Very weak	Anthropocentric and utilitarian; growth oriented and resource exploitative; economic growth ethic in material value term; natural resources utilised at economically optimal rates through unfettered market mechanisms operating to satisfy individual consumer choice; infinite substitution possible between natural and human- made capital; continued well-being assured through economic growth and technical innovation; instrumental value in nature.
Weak	Anthropocentric and utilitarian; resource conservationist; growth is managed and modified; concern for distribution of development costs and benefits through intra- and inter-generational equity; rejection of infinite substitution between natural and human-made capital with recognition of some aspects of natural world as critical capital; human-made plus natural capital constant or rising through time; decoupling of negative environmental impacts from economic growth; instrumental value in nature.
Strong	Eco-system perspective; resource preservationist; recognises primary value of maintaining the functional integrity of eco- systems over and above secondary value through human resource utilization; interests of the collective given more weight than those of the individual consumer; decoupling important but alongside a belief in a steady-state economy as a consequence of following the constant natural assets rule; zero economic and human population growth; instrumental and intrinsic value in nature.
Very strong	Bioethical and ecocentric; extreme preservationist position; nature's rights or intrinsic value in nature encompassing non-human living organisms and even abiotic elements under a literal interpretation of the anti-economic growth and reduced human population.

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As regards the benefit side, the prevailing literature classifies the socio-economic effects on the national and regional economy as follows :

- **Balance of payments :** for many nations, tourism is often the main source of foreign exchange earnings, although some reductions of the net benefits of the balance of payments can be expected because of the actions of foreign tourist operators;
- **Regional development :** tourism frequently spreads economic activities more across the internal border of the particular country;
- **Diversification of the economy :** because of its multi-faceted nature, tourism may foster the buildup of solid economic development;
- **Income levels :** the income effects of tourism may give rise to wide variations in income multiplier;
- **State revenue :** the State earns revenues due to tax collections, although it has been acknowledged that significant expenditures for building and construction activities may also be required;
- **Employment opportunities :** in most countries tourism is an important source of employment, especially for the unskilled and semi-unskilled labour-force.

Obviously, these effects will vary from one country to another according to a wide set of circumstances, such as the tourism lifecycle, local tourist promotion strategies and the utilisation of adequate information systems and marketing strategies. Moreover, given the multi-activity and multi-sectoral nature of tourism, the tourist product shows a stark contrast to the traditional private goods model. Pure public goods or some sort of mixed goods possibility, perhaps an impure public good, perhaps a private good with some characteristics, usually occur in tourist market. This mixture of goods cannot be encapsulated by a market system[3]. Thus, it should not surprise us that appropriate measures for a sound economic evaluation of tourism benefits will not be feasible for most policies.

In all cases, the extent to which these positive effects will manifest themselves has to be considered in the light of the pressure of tourism businesses on the natural, cultural and socio-economic environments of tourism destinations. Such

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adverse environmental impacts are caused by over-consumption of resources, pollution and waste generated by development of tourism infrastructure and facilities, transport, and tourism activities themselves. Several of these impacts are, for all intents and purposes, irreversible and uncertain, while in many circumstances the social costs are not charged to the tourist and do not involve marketed goods with prices per unit[4]. This is especially true with regard to tourism based on the natural environment as well as on historical-cultural heritage.

Towards sustainable tourism policy :- The principle of sustainable tourism was proposed as early as 1988 by the World Tourism Organisation, with sustainable tourism "envisaged as leading to management of all resources in such a way that economic, social and aesthetic needs can be fulfilled while maintaining cultural integrity, essential ecological processes, and biological diversity and life support systems". Recalling previous declarations on tourism, such as the Manila Declaration on world tourism, the Hague Declaration and the Tourism Bill of rights and tourist Code, the Charter for sustainable tourism approved during the World Conference on sustainable tourism, held in Lanzarote in 1995, underlined the need to develop a kind of tourism that meets both economic expectations and environmental requirements, and respects not only the social and physical structure of its destination, but also the local population.

But what does such a way of understanding tourism development entail? Which are the major consequences of the adoption of a view aimed at ensuring the sustainable use of resources in tourism based on the diversity of opportunities offered by the local economy? From this perspective, it is useful to underline the principal aspects of sustainability when this is referred to the tourism sector.

The concept of sustainability has a twin valence: on one hand there is the ecological aspect, that is the conservation of the natural equilibrium of all the components of the natural environment (flora, fauna, water resources, etc.); on the other hand there is the anthropological aspect, which could be expressed by the persistence of enjoyment of this environment in spite of growing tourist flows.

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It is obvious, at least for the economist, that there is a strong relationship between the two characteristics (ecological and anthropological) of sustainability in tourist enterprise. In fact, the degradation of the weaker components of the natural environment, especially if it is irreversible, provokes, first of all, a slowdown in the development of tourist activity, with substantial consequences at a social and economic level. Such a situation of backwardness and impoverishment will subsequently result in a loss of interest in conservation and good use of natural and environmental resources, which are of great interest to tourists. Added to this there is also a substantial loss even in the financial profitability of the different commercial activities concerned.

For this sake it is worthwhile underlining how this interaction between environmental deterioration and economic profitability can be considered as the point which lies at the root of the well-known phenomenon of the life cycle of tourist businesses. In fact, this cycle starts off in areas of great value both in culture and in landscape, when the territory is characterized by environmental high quality. As natural, cultural and environmental resources are assaulted by tourist exploitation, sooner or later the territory concerned passes form "luxury tourism" to "cheap tourism", appealing to the masses. The short-sightedness of the public authorities and of private operators induces us to assert that the loss in quality – both of the client-tourist and of the natural environment – may be compensated by the quantity, by growth in the number of tourists, hotels, complexes to host tourists and entertainment places in general.

Very soon the unsustainability of such a strategy oriented towards tourism for the masses, emerges in both its economic and environmental negative consequences. The elasticity of the demand for tourist services – when faced with a reduction in prices – beyond a certain level of decadence of these services and of environmental quality – shows a value which is inferior to the unit and shows a declining trend, with a consequential reduction in the profitability of the commercial tourist enterprises, in general. At the same time, the congestion created by the influx of a greater number of tourists determines a degradation in the environment, in the landscape, in the flora and fauna while transport and restaurant services reach levels

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which are incompatible with an efficient running of the businesses from an economic point of view. When such a situation reaches drastic limits, the whole region – from an initial situation of a sort of "heavenly isolated paradise" which justified "luxury tourism" – is hit by phenomena of tourist desertification, with serious situations of environmental deterioration, which are frequently irreversible, which are linked with bankruptcy and the flight of the more qualified tourist operators.

Relationships between tourism activities and technological innovations : Any "ecological scenario" one may assume for the coming decades it is extremely probable that each country will have to face phenomena both of scarcity of certain natural resources (natural and forest resources) and above all, air and water pollution. This means that such problems will no longer be on a national scale but on a world wide scale. At this point a crucial question crops up: will scientists and those involved in technology have enough common sense and motivations to solve the problems that the ecological scenario now offers in an urgent and undelayable manner. A historical analysis of technological changes does not reply to the worrying question if scientific progress should proceed in a completely independent manner with respect to the economic sphere – and only subsequently it could become a source of productive innovations – or if the casual process is actually moving in the opposite direction. In the sense that the autonomous evolution of the production of goods and services – to satisfy the necessities of mankind, expressed on the market through prices – is prosaically the real driving force of scientific and technological discoveries.

However, whatever the most probable interpretation of its role may have been in the past, it now seems ever more evident that, in the present situation, public opinion and economic agents put their trust especially in science to gain a tranquillizing solution for the emerging scarcity of natural and environmental resources. The performances of science – especially in the last decades – seem to be reassuring as far as its capability of overcoming the challenge that such emerging scarcities present. There is, however, an evident risk: that technological solutions, imposed at an international level, in the name of presumed cultural primates and arrogant political imperialisms – may lack in flexibility and the promptness

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necessary to be able to face situations which differ greatly on a world wide scale.

The general trust in the capability of the scientific community to overcome the scarcity of natural resources – above all if it is capable of overcoming the national and scientific perspectives - points out, however, the risk that at the end one meets another limit, the only one which it is really impossible to overcome for the survival of mankind: the lacking cultural and ethical capability of respect for the poor and those who are "different", their dignity and their right to a creative and decent survival.

Conclusion :- Tourism, as a world-wide phenomenon, touches the highest and deepest aspirations of all people and it is also an important element of socio-economic and political development in many countries. Governments, other public authorities, public and private decision-makers whose activities are related to tourism, and tourists themselves, consider it a priority to protect and reinforce the human dignity of both local community and tourists. Because of this all these agents have registered a growing concern in sustainability as a guiding principle to allow the integration of economic development with environmental and social aspects within tourism policy and strategy. But the incorporation of sustainability in tourism development is not a self-evident issue but a politically contested one, if the different interpretations of the concept which have been identified are taken into account. These differing, sometimes conflicting, interpretations are not accidental, but rather the outcome of particular ideologies, varied disciplinary backgrounds, value systems and vested interests. Despite the wide range of varying definitions, at its core tourism sustainability lies: strong emphasis to three simple concerns:

- the need to avoid the uncontrolled destructive degradation of the environment and the loss of local identity, while respecting the fragile balance that characterizes many tourist destinations, in particular environmentally sensitive areas;
- the need to actively pursue and strengthen the quality of life and equity between present generations;

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- the exigency not to reduce the opportunities offered to future generations

If the core elements of tourism sustainability - ecology, economy, and equity - are to be taken into consideration for balanced strategies, there are many gaps in our knowledge that need to be filled if we are to be successful in controlling tourism in a way that puts this important economic sector onto a sustainable development path. Several analyses have emphasised this point. Nevertheless,

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Developments in Entrepreneurship Development

Dr. S.R. Pagare
Faculty of Commerce, K.J. Somaiya College of Arts, Commerce and Science, Kopargaon

Abstract :- Entrepreneurship acts as a catalyst for the economic prosperity of a nation as it leads to generation of employment, contribution in national income, rural development, industrialization, technological development, export promotion etc. In India, various initiatives have been taken by the government from time to time for entrepreneurship development in the country. However, literature reveals that entrepreneurs face a number of problems which obstruct the growth of entrepreneurship. To meet these challenges, a need was felt by government to initiate a new set of policy reforms in India which has led to a remarkable improvement in recent years. Therefore, an attempt has been made to study the implications of the recent policy reforms of entrepreneurship in India which has made India a hotspot destination for start-ups. The study found that most of these recent reforms are focusing on skills development measures giving birth to technology enabled start-ups. Hence, it is suggested that a proper supervision and monitoring mechanism should be set to analyze the outcome and effectiveness of these initiatives on periodic basis and entrepreneurship development at grass root level should be targeted so as to provide self-employment opportunities to technology-deficient section of the society.

Keywords :- Entrepreneurship Development, Policy Reforms, Self-employment, Start-ups, Skill Development.

Introduction :- Entrepreneurship plays a significant role in the economic development of a country. The developed countries like USA, Russia and Japan supports the fact that entrepreneurship is the cause for the economic development in their country. Entrepreneurship is the most powerful weapon in the hands of one to fight against poverty and unemployment. It is widely accepted by every, big or small country, that well motivated entrepreneurs are must for accelerating the process of economic development [1]. Entrepreneurship acts as a catalyst for the economic prosperity of a nation as it leads to generation of employment, contribution in national income, rural development, industrialization, technological development, export promotion etc.

Entrepreneurship in India :- In India, entrepreneurship can prove as one stop solution for addressing the major problems like unemployment and poverty. Considering these benefits, various initiatives have been taken by the government from time to time for entrepreneurship

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development in the country such as Industrial Policies and Five Year Plans specifically focusing on the growth of small scale sector, setting up of Special Economic Zones (SEZs), setting up of Entrepreneurship Institutions, organizing Entrepreneurship Development Programmes (EDPs) and various Government Programmes and Schemes for the promotion of entrepreneurship like Pradhan Mantri Employment Generation Programme, Credit Guarantee Scheme, Credit Linked Capital Subsidy Scheme for Technology Up-gradation, National Manufacturing Competitiveness Programme, Micro and Small Enterprises Cluster Development Programme, Technology Centre Systems Programme, Rajiv Gandhi Udyami Mitra Yojana, Khadi Reform Development Programme, Market Development Assistance Scheme etc.

In spite of several initiatives taken by the government, entrepreneurs still face certain problems like lack of availability of finance, technical knowledge, managerial skills, availability of resources and infrastructure, awareness about entrepreneurship schemes and regulatory framework, market linkage etc. which obstruct the growth and development of entrepreneurship in the country. According to the research study conducted by NCAER (1993), lack of training and finance are the major problems faced by Small Scale Industries (SSIs) besides procedural hassles, administrative hurdles, lack of infrastructure and counseling. Vasper also found that there are many barriers affecting entrepreneurship and identified lack of seed capital as one of the major barriers. According to World Bank, India ranked 142nd among 189 nations in terms of ease of doing business. According to EY G20 Entrepreneurship Barometer, although India's rank is 11th while China ranked 3rd in terms of access to funding; India ranked last as far as education and training is concerned.

To meet these challenges, a need was felt by government to initiate a new set of policy reforms in India which has led to a remarkable improvement in recent years. India has evolved to become the 3rd largest base of technology start- ups in the world. Therefore, the main objective is to study the implications of the recent policy reforms of entrepreneurship in India which has made India a hotspot destination for start-ups.

Recent Policy ReformsFor Entrepreneurship Development :

A. **Ministry of Skill Development and Entrepreneurship (MSDE) :-** It came into existence as Department of Skill Development and Entrepreneurship on 31st July 2014 and later was created as Ministry on 10th November 2014. It is responsible for co-ordination of all skill development efforts across the country, removal of disconnect between demand and supply of skilled manpower, building the vocational and technical training framework, skill up- gradation, building of new skills and innovative thinking. It is aided by following

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functional arms :

- **National Skill Development Agency (NSDA) :-** is an autonomous body which coordinates and harmonizes the skill development efforts of the Government and the private sector to achieve the skilling targets of the 12th Plan and beyond, and attempts to bridge the social, regional, gender and economic divide. It acts as a nodal agency for State Skill Development Missions. The main functions of NSDA is to evaluate existing skill development schemes, create and maintain a national data base related to skill, ensure that the skilling needs of the disadvantaged and the marginalized groups are taken care of etc.

- **National Skill Development Corporation (NSDC) :-** is a one of its kind, Public Private Partnership in India which acts as a catalyst in skill development by providing funding to enterprises, companies and organisations that provide skill training. NSDC with 160 training partners and 1722 training centres has so far trained around 35 lakh persons across India. NSDC has taken few initiatives such as 'Innovations for Skills Marketplace' and 'Innovations for Skills Challenge'. 'Udaan' a special industry initiative for Jammu & Kashmir implemented by NSDC which aims to provide skills training and enhance the employability of unemployed youth of J&K.

- **National Skill Development Fund (NSDF) :-** was set up for raising funds both from Government and Non-Government sectors for skill development in the country. The fund is contributed by various Government sources, and other donors/ contributors to enhance, stimulate and develop the skills of Indian youth by various sector specific programs. Till 31st March 2015, NSDF has released Rs. 2333 crore to NSDC towards skill development programmes.

- **Sector Skill Councils (SSCs) :-** are industry led bodies which are responsible for defining the skilling needs, concept, processes, certification, and accreditation of their respective industry sectors. The SSCs shall prescribe the National Occupational Standards (NOSs) and Qualification Packs (QPs) for the job roles relevant to their industry, and shall work with the NSDA to ensure that these are in accordance with the National Skill Qualification Framework (NSQF).

B. **National Policy on Skill Development and Entrepreneurship 2015 :-** It aims to provide an umbrella framework to all skilling activities being carried out within the country, to align them to common standards and link the skilling with demand centres. This policy links the

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skills development to improved employability and productivity.

C. **National Skill Development Mission :-** It was launched on 15th July 2015 on the occasion of World Youth Skills Day. The Mission has been developed to create convergence across sectors and States in terms of skill training activities to achieve the vision of 'Skilled India'.

D. **Entrepreneurship Development Scheme :-** It is currently being developed by MSDE. The scheme is being designed around various elements like entrepreneurship education curriculum, web and mobile based networking platform, entrepreneurship hubs (e- hubs) network, international linkages, national entrepreneurship day, promotion of entrepreneurship among women and minority sections, social entrepreneurship etc.

E. **Pradhan Mantri Kaushal Vikas Yojana (PMKVY) :-** It is the flagship outcome-based skill training scheme of the MSDE that aims to offer 24 lakh Indian youth meaningful, industry relevant, skill based training. The objective of this skill certification and reward scheme is to enable and mobilize a large number of Indian youth to take up outcome based skill training and become employable and earn their livelihood. The skill card will also be given to those certified under PMKVY which will act as authenticate skill certification.

F. **Make in India :-** It is an initiative of the Government of India launched on 25th September 2014 to encourage multi-national, as well as domestic, companies to manufacture their products in India. The major objective behind the initiative is to focus on job creation and skill enhancement in 25 sectors of the economy. The initiative also aims at high quality standards and minimizing the impact on the environment. The initiative hopes to attract capital and technological investment in India.

G. **'Start-Up India' Initiative :-** It aims to encourage entrepreneurship among the youth of India. The 'Start-up India: Stand up India' promotes bank financing for start-ups and offer incentives to enhance entrepreneurship and job creation. Prime Minister, Narendra Modi said that, "Each of the 1.25 lakh bank branches should encourage at least one Dalit or Adivasi entrepreneur and at least one woman entrepreneur". This initiative will provide a new dimension to entrepreneurship and help in setting up of a network of start-ups in the country.

H. **MUDRA Bank :-** Micro Units Development Refinance Agency (MUDRA) Bank has been set up on 8th April 2015 for development of micro units to encourage entrepreneurship in India and provide the funding to the non-corporate small business sector. MUDRA Bank

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provides refinance to Banks, MFIs, and NBFCs etc. for loans to micro units having loan requirement from Rs 50000 to Rs. 10 lakh. Under MUDRA Yojana, MUDRA Bank has launched three products named Shishu, Kishor and Tarun to signify the stage of growth and funding needs of entrepreneurs. Rs. 20000 crore has been allotted to MUDRA Bank for the SME sector which will enhance credit facility to boost the growth of small businesses and manufacturing units.

I. **ATAL Innovation Mission (AIM) :-** It also called as AIM Platform was established through 2015 budget within National Institution for Transforming India (NITI) to provide innovation promotion platform involving academicians, and drawing upon national and international experiences to foster a culture of innovation, research and development. The 2015 budget has earmarked Rs.150 crores for the AIM Platform.

J. **Self-Employment and Talent Utilization (SETU) :-** It is a Techno-Financial, Incubation and Facilitation Programme to support all aspects of start-up businesses, and other self-employment activities, particularly in technology-driven areas. An amount of Rs.1000 crore is being set up initially in NITI Aayog for SETU. It also aims to create around 100,000 jobs through start-ups.

Conclusion :- The recent policy reforms clearly reveal that government is leveraging on skill development for ensuring sustainable entrepreneurship development in the country. However, a proper supervision and monitoring mechanism should be set to analyze the outcome of these initiatives on periodic basis and to avoid the overlapping of activities performed by the newly established government agencies and programmes. According to survey, 59 percent of citizens still feel that corruption and delays prevent the growth of entrepreneurship in India while only 14 percent felt funding as the main problem. Thus, the effectiveness of the recent policy reforms needs to be checked by analyzing the benefits entailed by the entrepreneurs on regular basis to ensure that these initiatives deliver maximum results unlikely the previous reforms. Today, Start-up sector is witnessing unusual dynamism with focus mainly on e-commerce and financial services sector which led to huge growth of technology enabled start-ups in the year 2019. Therefore, the 'Start-up India' mission of government should go beyond digital or technology start-ups and enable entrepreneurship in manufacturing sector to ally with Make- in-India drive and particularly at grass root level so as to provide self-employment opportunities to technology- deficient section of the society.

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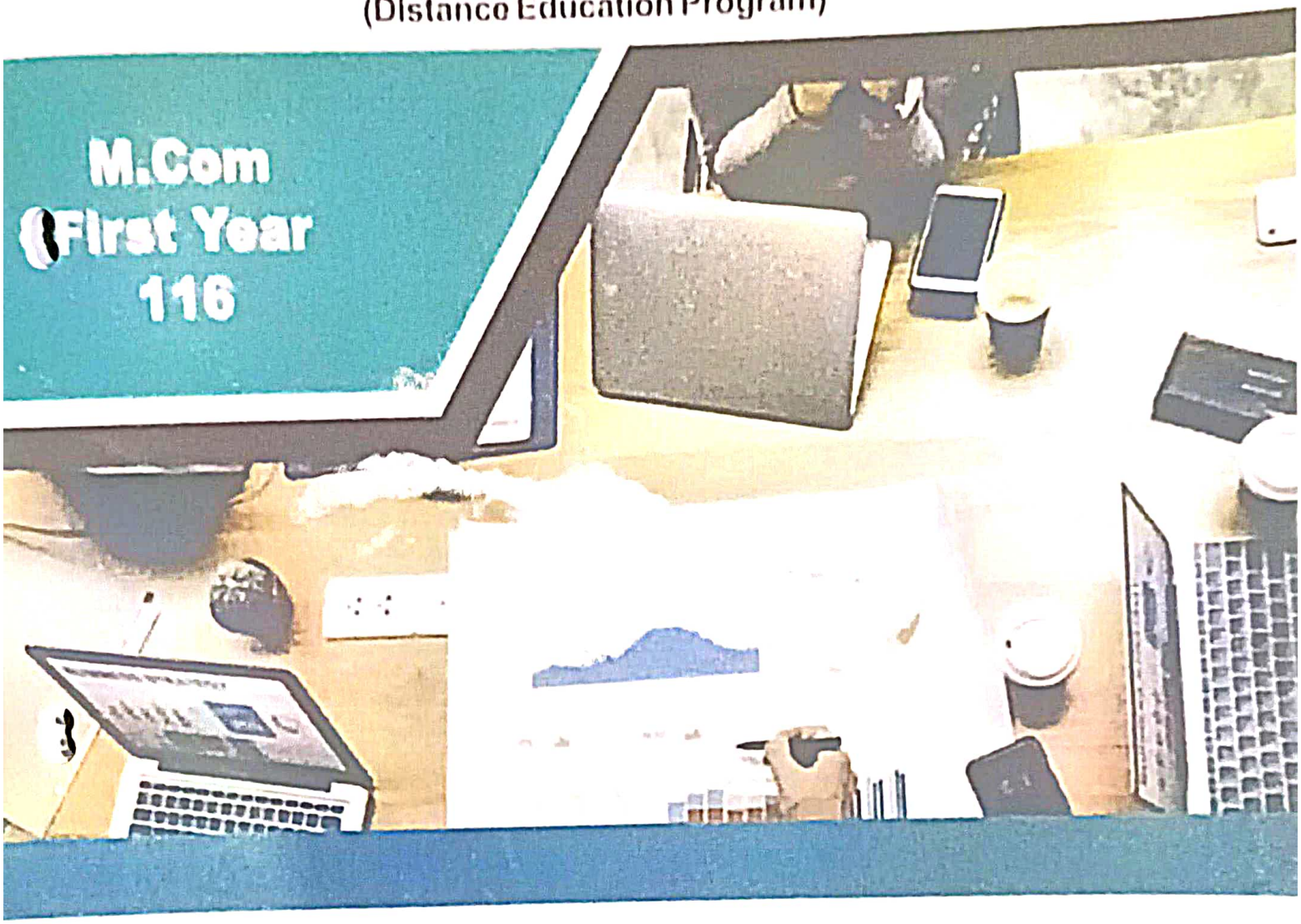

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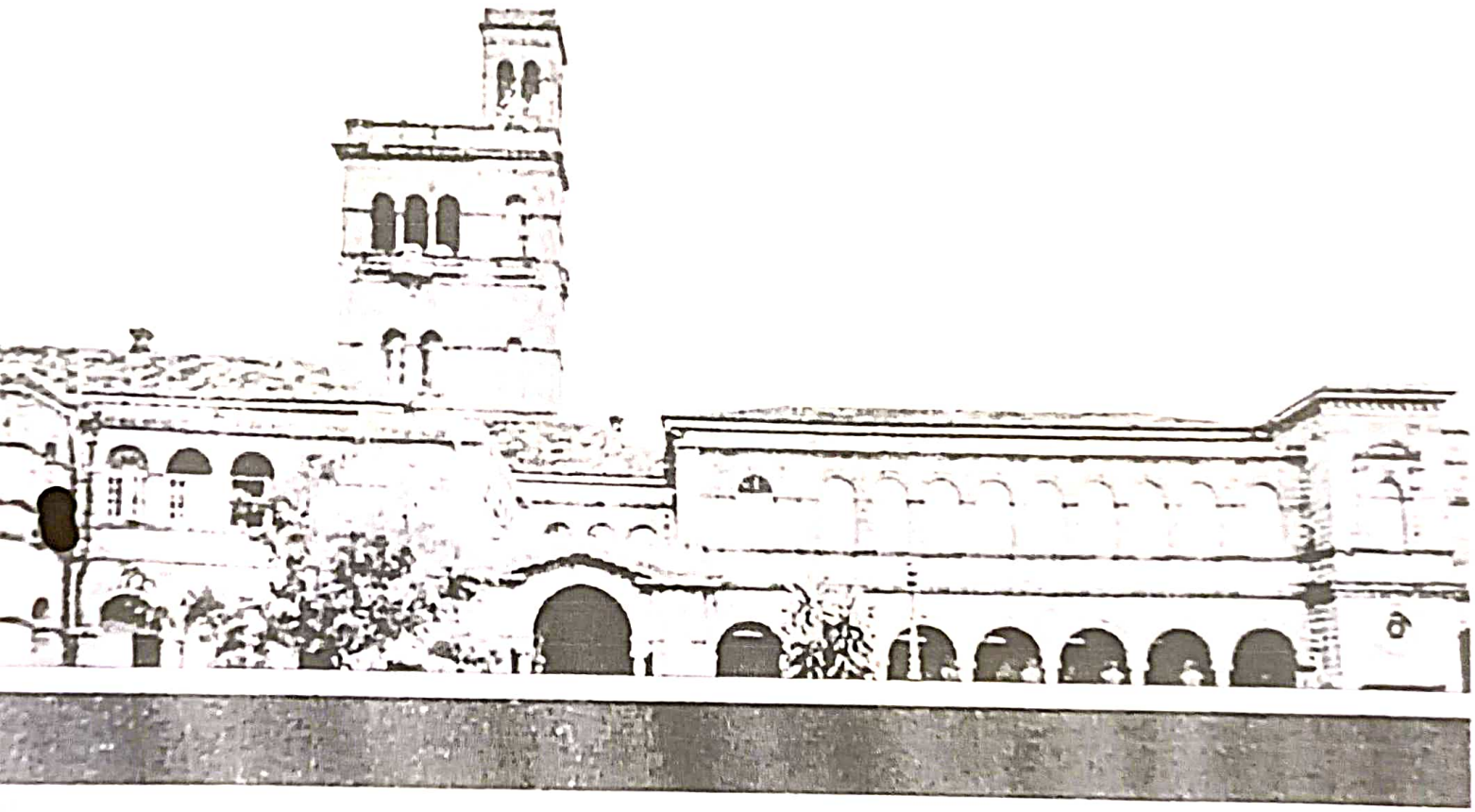

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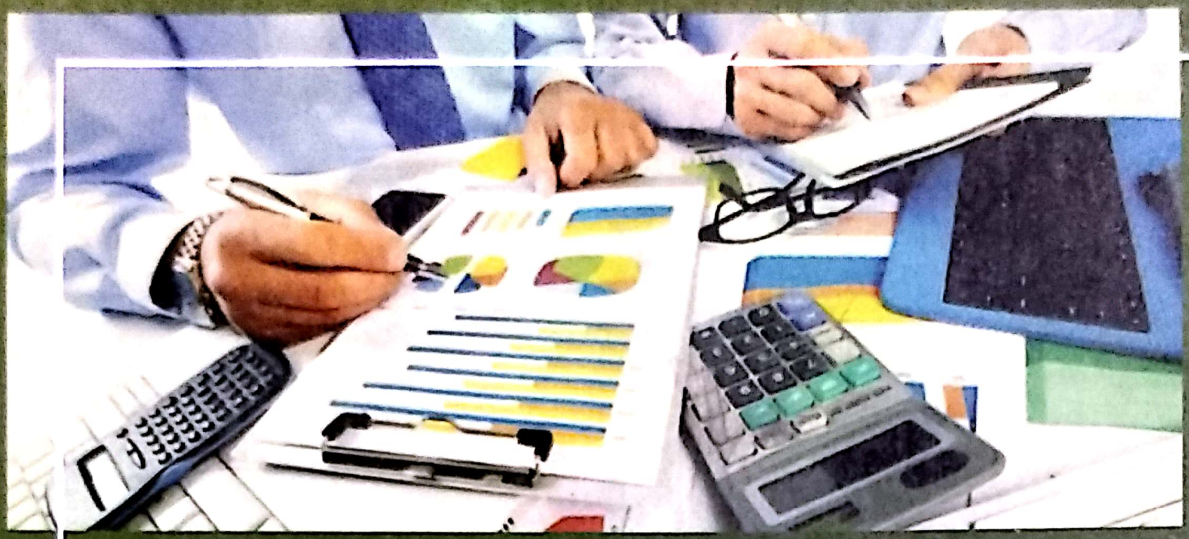

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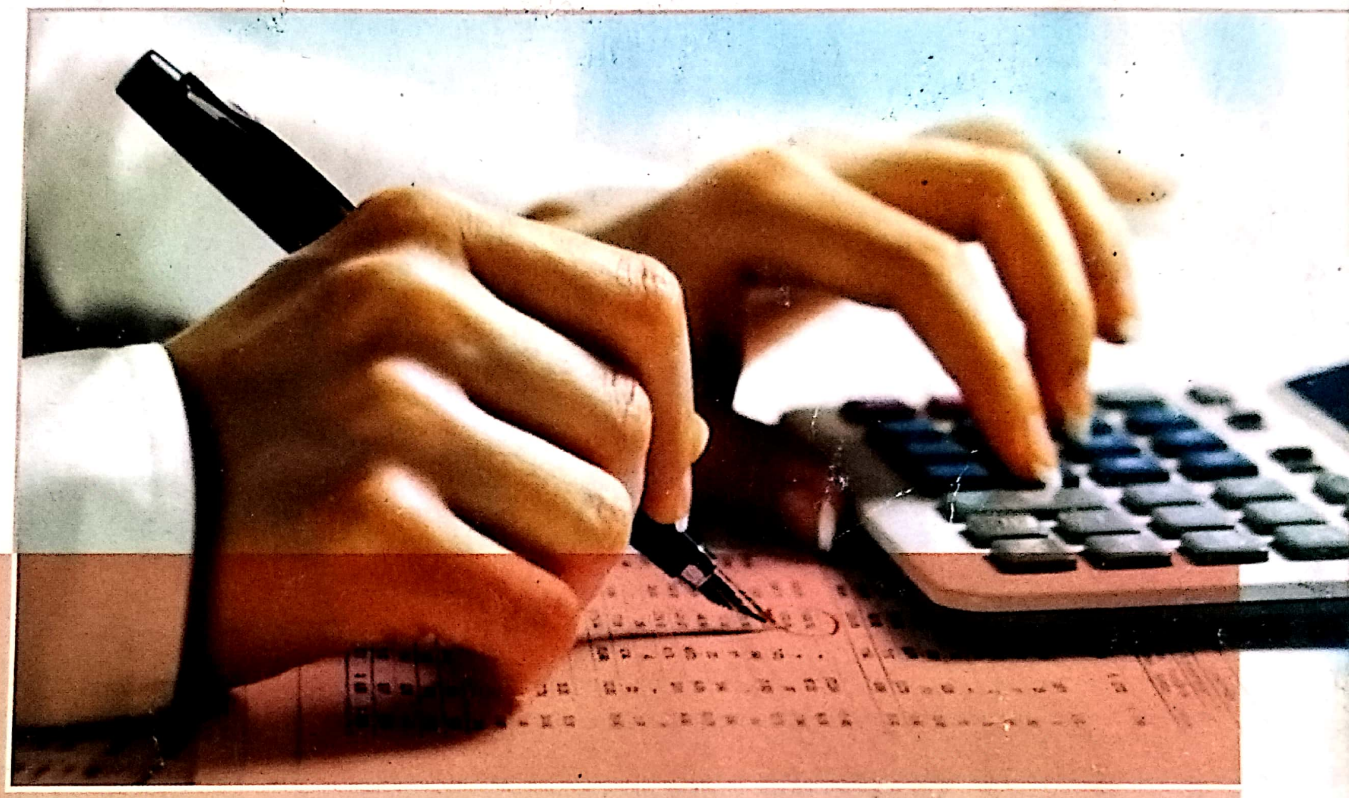

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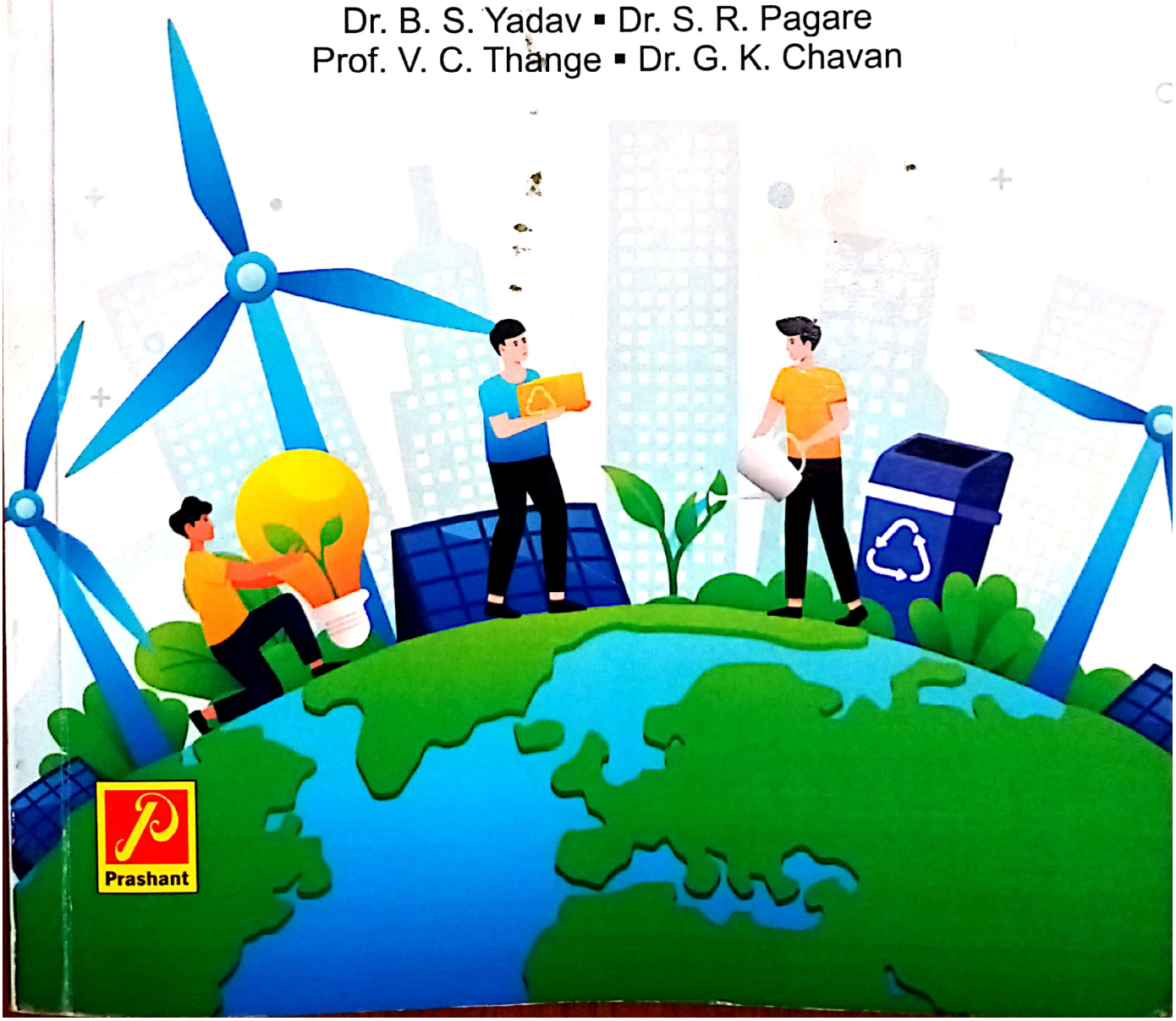

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The Importance of Non-Conventional Energy Sources Like Sonochemical and Microwave Irradiation used in Organic Synthesis

- Dr. Satish Bhaskarrao Kale
Head, Department of Chemistry
K. J. Somaiya College, Kopargaon, Dist: Ahmednagar

Abstract:

Thermal process of irradiation with UV, Microwave or Ultasound can be employed to bring about the chemical reaction, to find more environmentally benign alternatives by using non-conventional energy sources.

Keywords:

Nonconventional Energy, Microwave and Ultrasonic Irradiation, Organic Reactions.

Introduction (Microwave) :

Microwave activation as a non-conventional energy source has become a very popular and useful technology in organic chemistry. The number of annual publications on microwave assisted synthesis is growing rapidly. Most of the publications describe important accelerations for wide range of organic reactions. The combination of solvent free conditions and microwave irradiation leads to large reduction in reaction times.

Generally microwaves have wavelengths between 1cm and 1m (frequencies of 30GHz to 300Hz), to avoid any interference with these systems the frequency of radiation that can be emitted by house hold and industrial microwave oven is regulated, most appliances operate at a fixed frequency of 2.45 GHz.

The reaction vessel for microwave induced small-scale organic reactions is a loosely covered, tall beaker and the capacity of the beaker should be much greater than the volume of the reaction mixture. The polystyrene and teflon containers are transparent to microwaves and can be used.[1,2]

In the microwave induced organic reactions, the reactions can be carried out in a solvent medium or on a solid support in which solvent is not used. For reactions in solvent medium, the choice of solvent is

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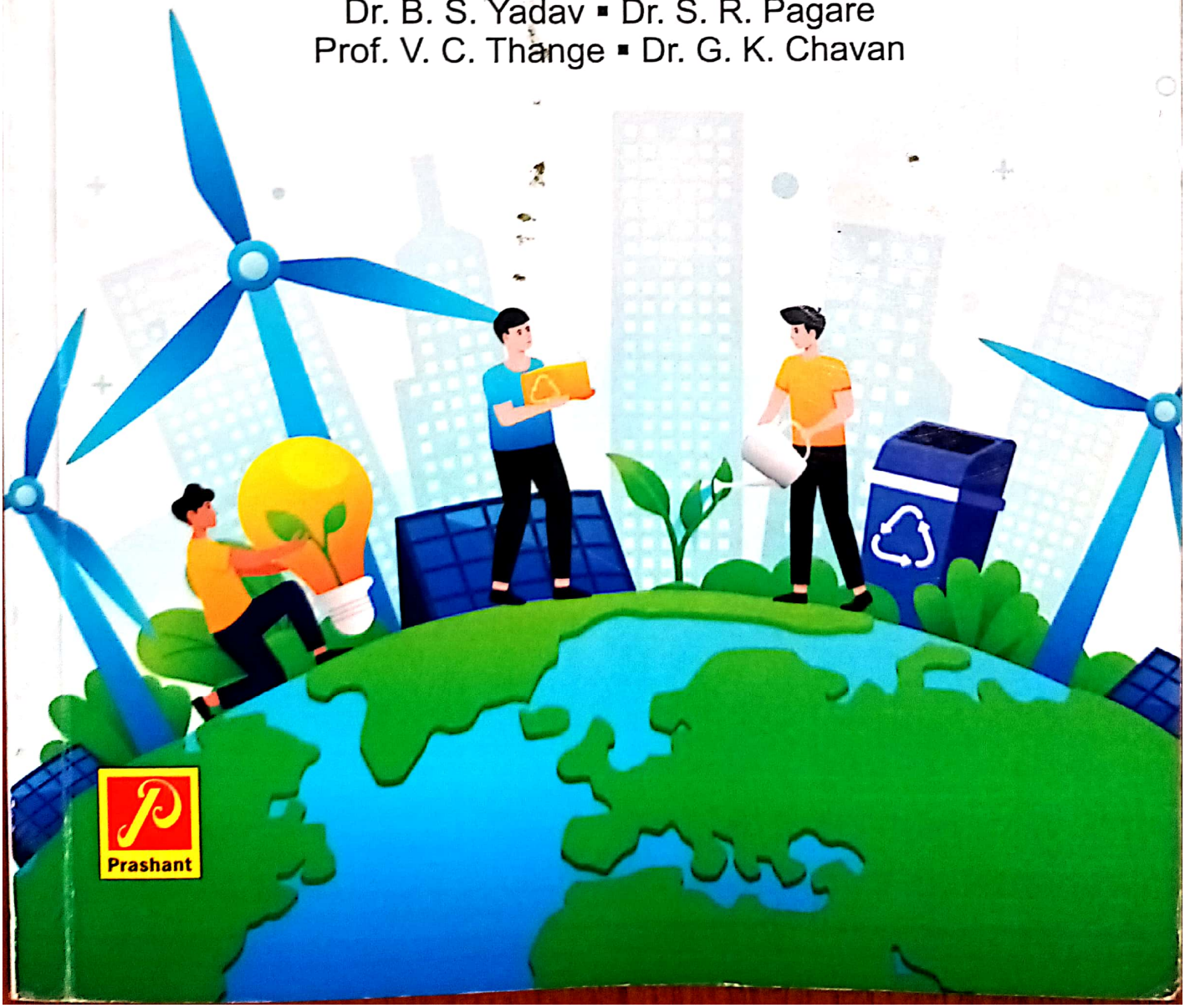

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A Review on Microwave Assisted Organic Synthesis : A cleaner, Economic and Environment Friendly Technology

- Dr. Navnath R. Dalvi
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Abstract:

In view of environmentally benign syntheses, green chemistry, the utility and application of microwave irradiation method for organic syntheses have a great importance. The survey of thedifferent reactions and the versatility of microwave irradiation technique have been explored in terms of its synthetic utility for biologically active heterocycles in synthetic organic chemistry and explored as aCleaner, Economic and Environment Friendly Technology.

Microwave irradiation is one of the leading non-conventional energy sources whose popularity and synthetic utility in organic chemistry have increased considerably in recent years[6]. A remarkable device for generating fixed frequency microwaves, the magnetron[7], was designed by Randall and Booth at the University of Birmingham as part of the development of RADAR during the Second World War. Even in the early days, it was recognized that microwave heat water in a dramatic fashion, and domestic and commercial appliances for heating and cooking foodstuffs began to appear in 1950's. In 1955 Tappan introduced first kitchen microwave oven but it is widespread domestic use occurred during the 1970's and 1980,s. A query started haunting the chemists that if microwave ovens are good enough for the kitchen, they should be equally good for speeding up chemical reactions in the laboratory[8]. This idea led researchers to investigate the mechanisms of dielectric heating and to identify the advantages of the technique for chemical synthesis.

The first recorded application of microwave (μυ) energy in organic synthesis is the aqueous emulsion polymerization of butyl acrylate, acrylic acid and methacrylic acid using pulsed electromagnetic radiation[9] but the start of explosion of activity in the application of microwave heating in organic synthesis was ignited in 1986 by the pioneering papers by, Gedye et al[10] and Giguere at al[11]. In 1989 appeared

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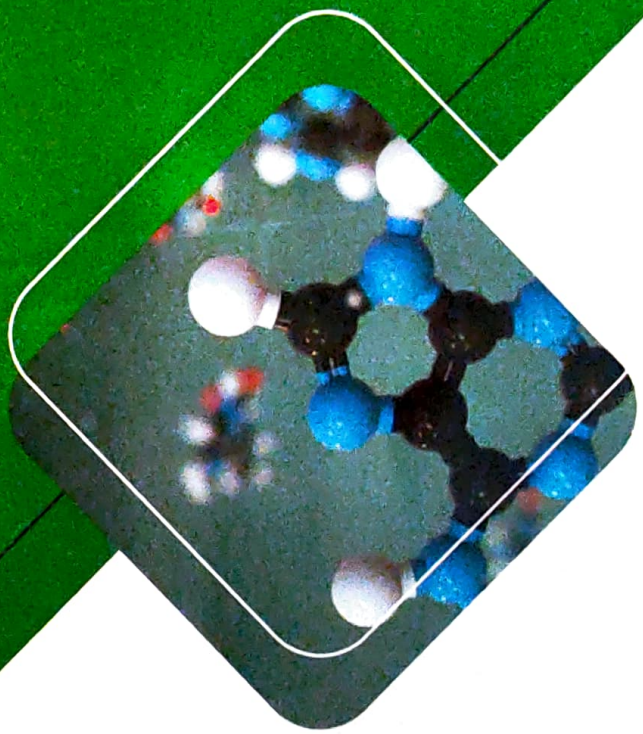

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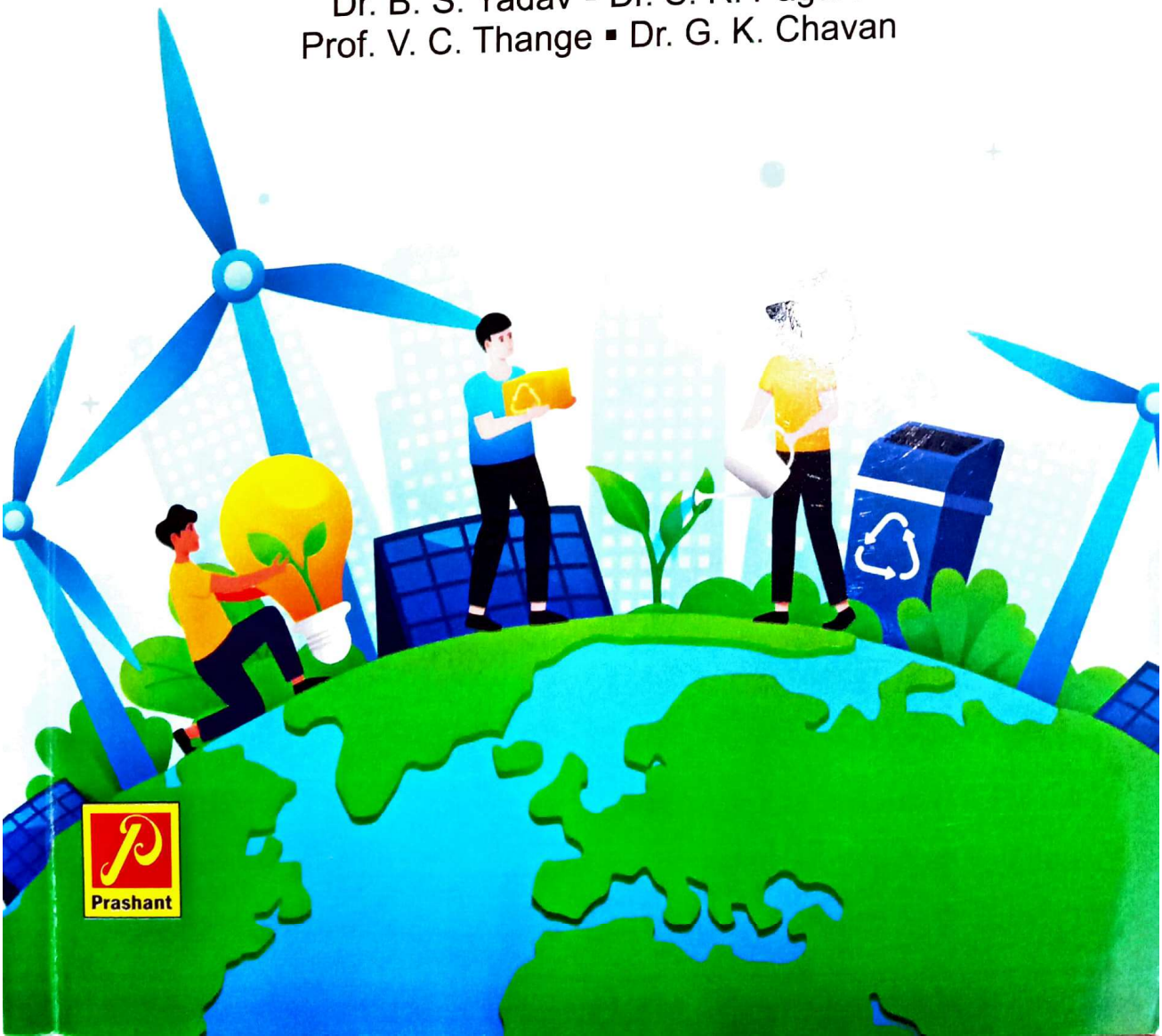

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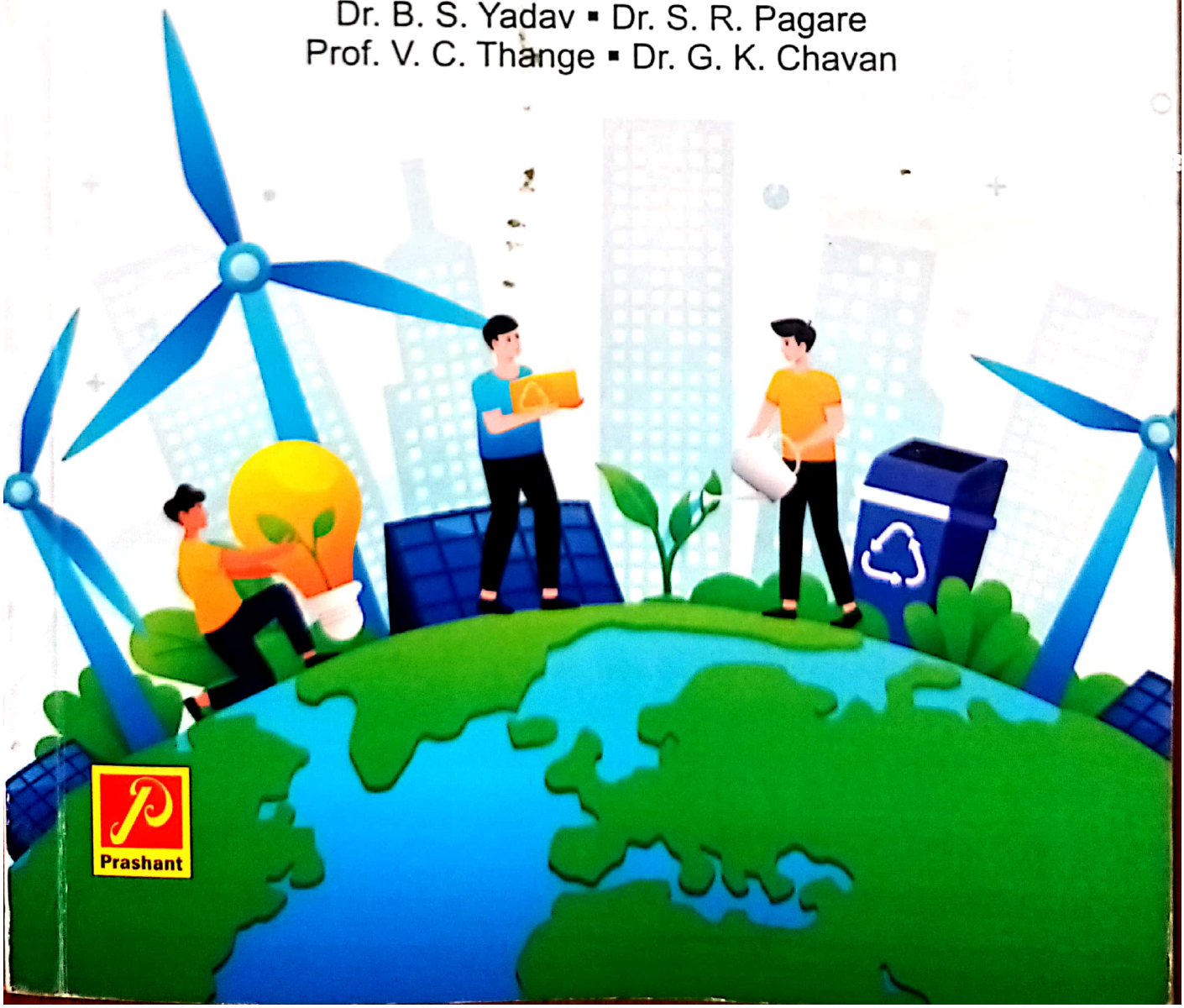

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Green Chemistry Approach Towards Envoirmental Pollution

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Abstract:

Environment basically consists of three important systems such as air, water and soil. The environmental studies involve the interrelations among social, economical, biological, physical and chemical factors with the surroundings. In this current report we focused on the environmental pollution issue; its causes, hazardous effects and applying green chemistry to day to day life to control environmental pollution.

Keywords: Systems, surroundings, pollution, interactions, green chemistry.

Introduction:

Environment stands for everything that's surrounding us. Environment is a complex system that includes air, water, soil and climate around us. It is nothing but the natures life support system. Environment has definite composition of each systems in it; it get disturbed due to the introduction of some foreign matter as a result of man-induced activities or natural disasters. This results in environmental degradation.[1] This degradation of environment is called as pollution. Environmental pollution is the release of chemical waste that causes detrimental effects on the environment. Human activities have an adverse effect on the environment by polluting the water we drink, the air we breathe, and the soil in which plants grow. Environmental pollution develops a hazardous situation, and causes significant wide-ranging damage to the regional environment, human health and living organisms.[2] The environmental pollution is occurred due to the different type of pollutants such as dust, fumes, smoke, carbon dioxide, nitrogen oxides , particulate matter, carbon monoxide, hydrocarbons and other organic compounds.[3] The change in climate and the effects of global planetary warming affect on multiple ecosystems, which results the problems such as food safety issues, ice and iceberg

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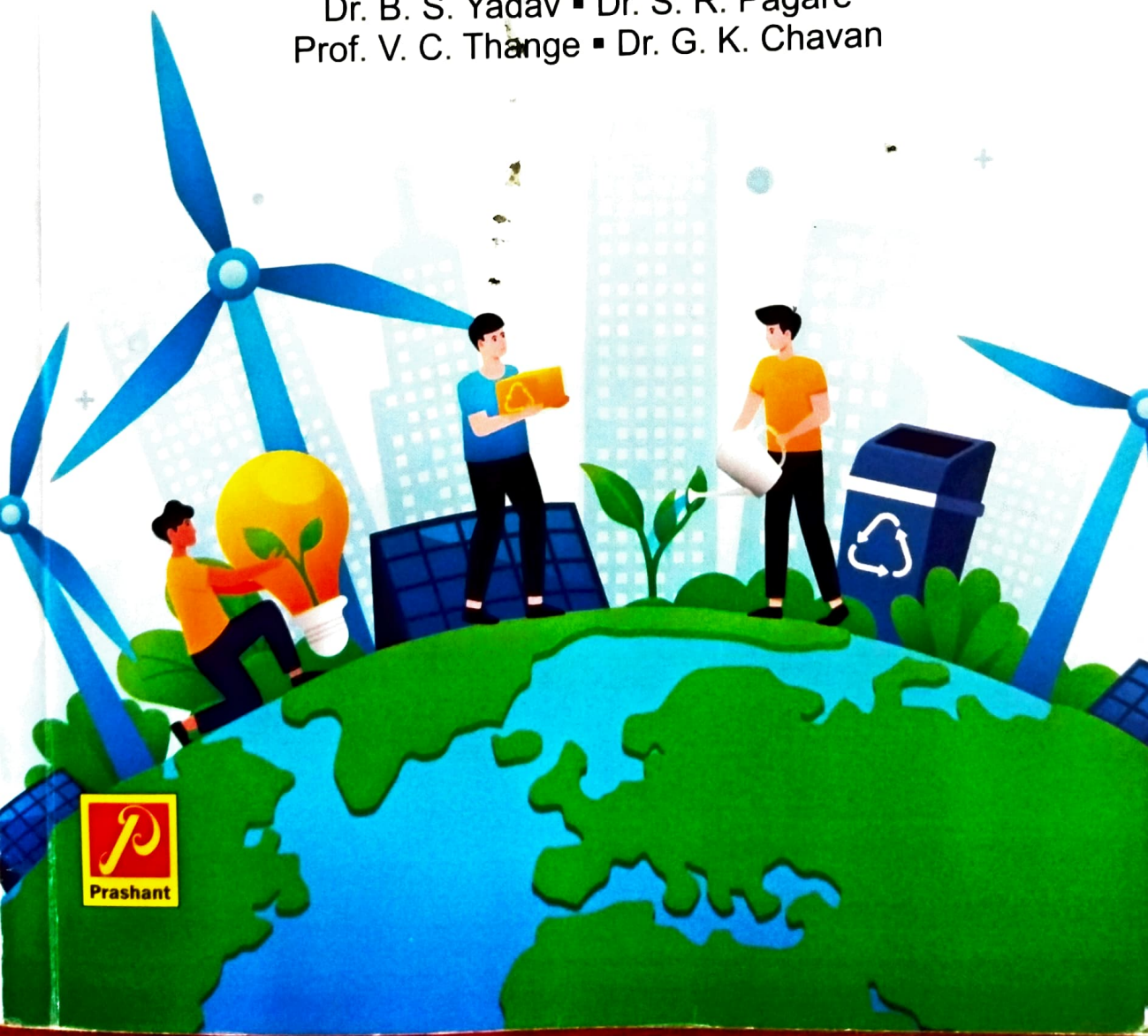

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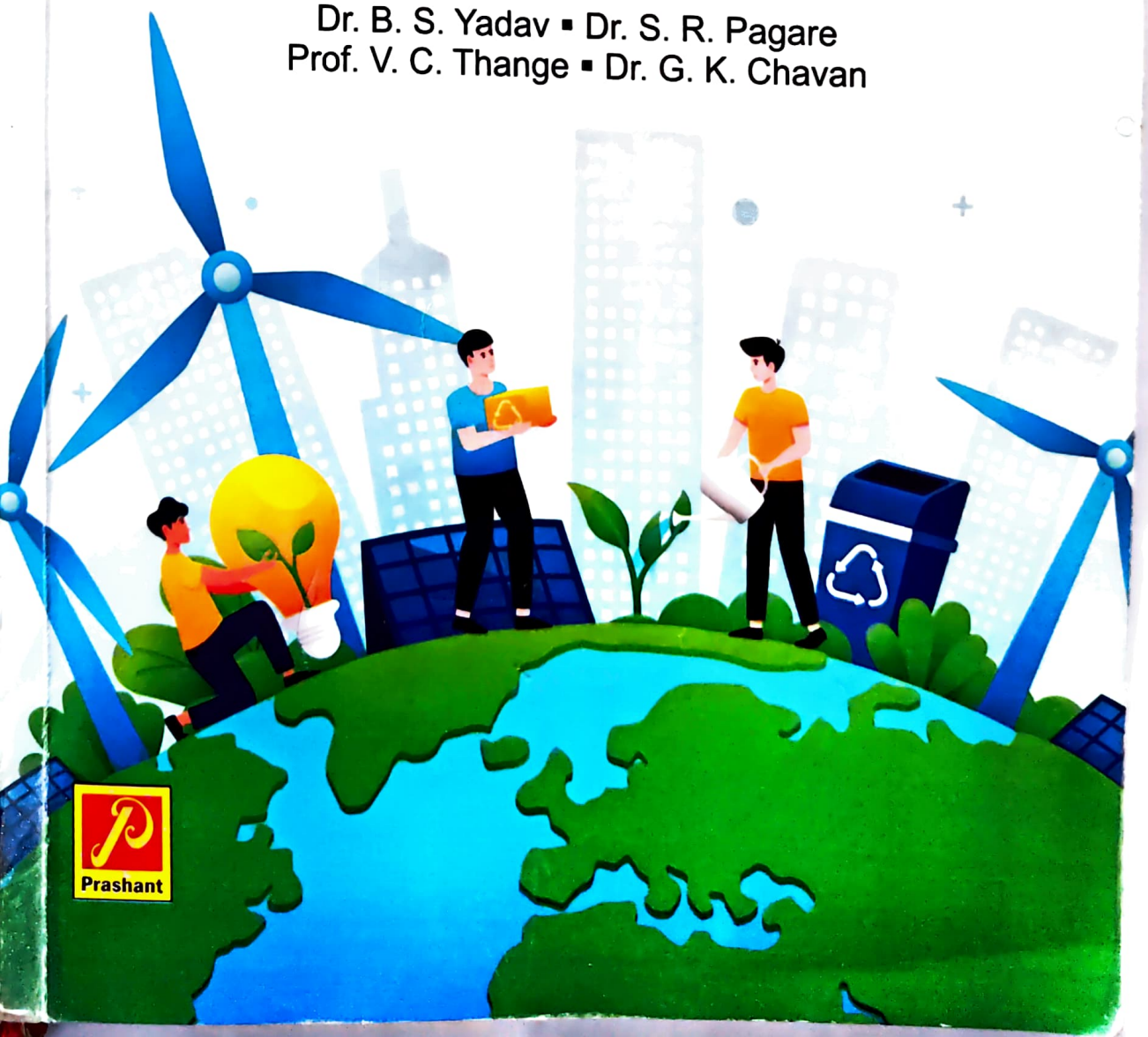

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- Editors -

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Study of Environmental Impact Assessment

- Dr. B. B. Bhosale
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Introduction:

Environmental Impact Assessment is an effective management tool used for decision making related to developmental projects and programs. It may be defined as, an endorsed process used to predict the environmental consequences of any developmental project. Environmental Impact Assessment, thus ensures that the prospective problems are anticipate and addressed at an early stage in the planning and design of project.

EIA is purposeful to identify the environmental, social and economic impacts of a proposed development prior to decision making. Hence, using Environmental Impact Assessment, it is possible to appear at the following:

- The more environmentally suitable option at an early stage.
- The Best Practicable Environmental Option.
- Alternative processes.

The project managers can then put-forth these problems in order to minimize environmental impacts in concurrence with their project planning. This results in the possibility of the project planning stages running smoother.

The Environmental Assessment is conducted by the Developer although the task is often carried out by Environmental Consultants. Environmental Assessment is carried out in order to produce an environmental report. The Environmental Statement must include:

- Description of the Project including location, design, scale, size etc.
- Description of significant effects
- Reducing measures
- Non-technical summary with respect to the prospect of the planning of the project.

Types of Impact Assessments:

EIA could enclose the following types of impact assessments:

- » Assessment of Climate Impact
- » Assessment of Demographic Impact
- » Assessment of Ecological Impact
- » Assessment of Economic and Fiscal Impact
- » Assessment of Environmental Auditing
- » Assessment of Health Impact
- » Assessment of Social Impact
- » Assessment of Strategic Impact
- » Environmental Management Systems
- » Evaluation of Project
- » Public Consultation
- » Public Participation
- » Risk Assessment
- » Technology Assessment

The Process of Environmental Impact Assessment:

There are the two important and distinct stages in Environmental Impact Assessment -

i. Preliminary Assessment: Carried out in the before planning.

ii. Detailed Assessment: Carried out during planning of project until the project plan is completed and is reported officially as an Environmental Impact Statement.

The principal elements of an Environmental Impact Assessment are the following:

- » Scoping: identify key issues and concerns of interested parties.
- » Screening: deciding whether an Environmental Impact Assessment is required based on information collected.
- » Identifying and evaluating substitutes: listing substitute sites and techniques and the impacts of each.
- » Reducing measures dealing with uncertainty: reviewing proposed action to prevent or minimize the potential adverse effects of the project.
- » Reporting of the findings in the Environmental Impact Assessment.

Scoping:

Scoping is used to recognize the key issues of concern at an early stage in the planning process. Scoping should be carried out at an early stage in order to aid site selection and recognize any possible substitutes. The scoping process should include all interested parties such as the supporter and planning or environmental agencies and members of the public. The results of scoping will regulate the scope, depth and terms of reference to be addressed within the Environmental Statement. The major objectives of the scoping are:

- » To identify the main issues and concerns of the interested parties
- » To identify who is apprehensive?
- » To identify what their concerns are?
- » To identify why they concerned are?
- » To identify what is the threshold of concern where change becomes unacceptable.

When unproductive scoping occurs, delays are caused by additional time being required to assess unknown impacts. Once the site for growth has been selected the scoping angle changes. There will be a reduction in the number of issues and growth in attention to detail. Scoping should be an ongoing exercise throughout the course of the project.

Screening:

Screening is decide whether an Environmental Assessment is essential. There are two slants, referred to as schedules.

Schedule-I: Environmental Assessments are required in every case. Schedule-I projects range from "a combined works for the early melting of cast-iron and steel", to "a thermal power station or other combustion installation with a heat output of 300 MW or extra.

Schedule-II: Environmental Assessments are required if the project is likely to give upswing to significant environmental effects by virtue of factors of their nature, size or location. The list of Schedule-II projects is bigger than that of Schedule-I. It covers projects from "a holiday village" to "peat extraction" and "pig rearing" to "a shipyard".

Screening is a comprehensive and clear method of decision making it is practical, quick and easy to use.

Substitutes:

This includes both substitute sites and another techniques. This search must be sincere, well documented and carried out beforehand a choice has been made. It is usually the case that substitute sites are available as well as practical although this is not always the case. Some projects are site specific such as mining. The abstraction can only occur where the mineral is sited. In such cases an EIA is senseless although other measures such as scale, qualifying measures and traffic management are addressed.

Qualifying Measures to Deal with Uncertainty:

This reviews the action taken to prevent, avoid or minimize the actual or potential adverse effects of a project. The measure could include the abandoning or modifying of a proposal, substitution of techniques using best available technology not involving unnecessary costs. This would include the various pollution decline techniques that would be required to reduce emissions to the allowed limits.

If the uncertainties are excessive, with the possibility of serious concerns and no qualifying measures, then the development plan is disallowed. If there are uncertainties that might be reduced by further studies then the applications delayed until further studies are carried out.

Environmental Reports:

The Environmental Impact Assessment is the process essential to produce the Environmental Statement. The environmental impact statement is a complete document that reports the findings of the Environmental Impact Assessment. This is the final stage of the Environmental Impact Assessment process and is now often required by law before any new project can proceed.

The Benefits of Environmental Impact Assessment:

There are many benefits offered by effective Environmental Impact Assessment-

- » Compact cost and time of project implementation.
- » Price saving modifications in design of project.
- » Improved project recognition.
- » Escaping influences and damages of laws and regulations.
- » Improved performance of project.
- » Escaping waste treatment up expenses.

» The benefits to local communities from taking part in environmental impact assessments include:
» Conservation of biodiversity
» Improved community skills, knowledge and superiority
» Improved local environment
» Improved health of human
» Less struggles over natural resource use
» Reduced resource use

Important Points to Remember while Steering an Effective Environmental Impact Assessment:

» Keep environmental assessment in perception. Distinguish that, it is a general tool to improve the decision making process rather than it is not the decision-making process itself.
» Keep the assessment simple and concentrate on relevant factors and data.
» Emphasis on time and effort on the most applicable matters.
» Modify each assessment to the specific needs of the project. Each project has a exceptional set of environmental, economic and social characteristics. The values and significances of the target population and the magnitude of their participation and support will also diverge from project to project.
» Be ingenious. There is no standard format available for interpreting the information gathered.
» Be prepared for inexact and suggestive data which call for speculation and extrapolation.
» Circumvent secrecy, Open dialogs among all stakeholders throughout the assessment process not only produces better results, but also increases the project's credibility and builds trust and acceptance on the part of the broader community.
» Pursue outside help and information in situations which require more knowledge than is available in the project management and environmental assessment teams.

Guidelines for Preparing an Environmental Assessment Report:

- » Avoid terminology, especially in summary or executive reports.
- » Technical information should be expressed in basic language which clarifies its application to the project.
- » Be as concise as possible.
- » Report on all significant matters. No information should be in a weak position. This is especially true where ideas differ as to the extent of potential environmental impact or the merits of the project. However, it is not necessary to include all the information collected.
- » Examine significant details in better depth.
- » Provide a motivation for excluding topics from further consideration.
- » Ensure that, the report contains a complete assessment of how project activities affect both the exhaustion of local resources and the production of surplus material.
- » Justification for all community and project related activities.
- » Offer a community profile that designates and examines the key social, cultural, economic political and physical features of the community.
- » Designate any impact on neighboring communities.
- » Don't forget to mention opportunities for environmental enhancement. A report does not have to be limited to negative aspects. Many community projects will have environmentally beneficial aspects as well.
- » Describe the impact of the project on the local population. Outline the role of the target community in the assessment process.
- » Provide an assessment of basic alternatives, if necessary. This should include the cost of abandoning the project as well as the cost of various alternatives.
- » Embrace applicable material whether in written, oral or visual form: This might include baseline studies, interviews or records of public meetings.

» Try to recommend conclusions that can be defended by the environmental assessment team. The techniques and ideas presented here should help achieve this aim.

» State the consequences and impacts of the project for different social groups.

» Lastly, make assured that communities are furnished with copies of the final environmental assessment report.

Monitoring Environmental Impact:

Monitoring environmental impact provides project managers and communities serious information on project performance and should be given the same attention as social or economic monitoring. The monitoring of environmental impacts can be built into the overall project monitoring process. To assess the effectiveness of environmental monitoring, the two basic questions should be answered as given below:

» Does the project perform to be having any important environmental impacts other than those predicted during the design phase?

» Do the various actions proposed for dealing with impacts seem to be having the desired effect?

Projects that produce new mechanisms are continually assessed as they change. Since most community projects start small and grow larger, especially the successful ones.

In meeting monitoring and evaluation objectives, any of the following simple techniques can be employed by communities:

» Interviews

» Group Discussions

» Questionnaires

» Observations

» Scientific testing Maps, drawings or any other visual techniques that can accurately depict changes

» Before-and-after images captured by audio-visual equipment

Finally, not only can monitoring and evaluation be used to evaluate environmental impact, it can also examine the community's contribution in the process. Any of the following criteria can be integrated into the objectives of any evaluation of project:

- » Performance of Project System.
- » Human Resource Development.
- » Sustainability of Environmental.
- » Usage and advantage.
- » Conversion of community insolences towards environmental issues. Even though this may prove difficult to define and measure, it is still a sincere focus for evaluation.

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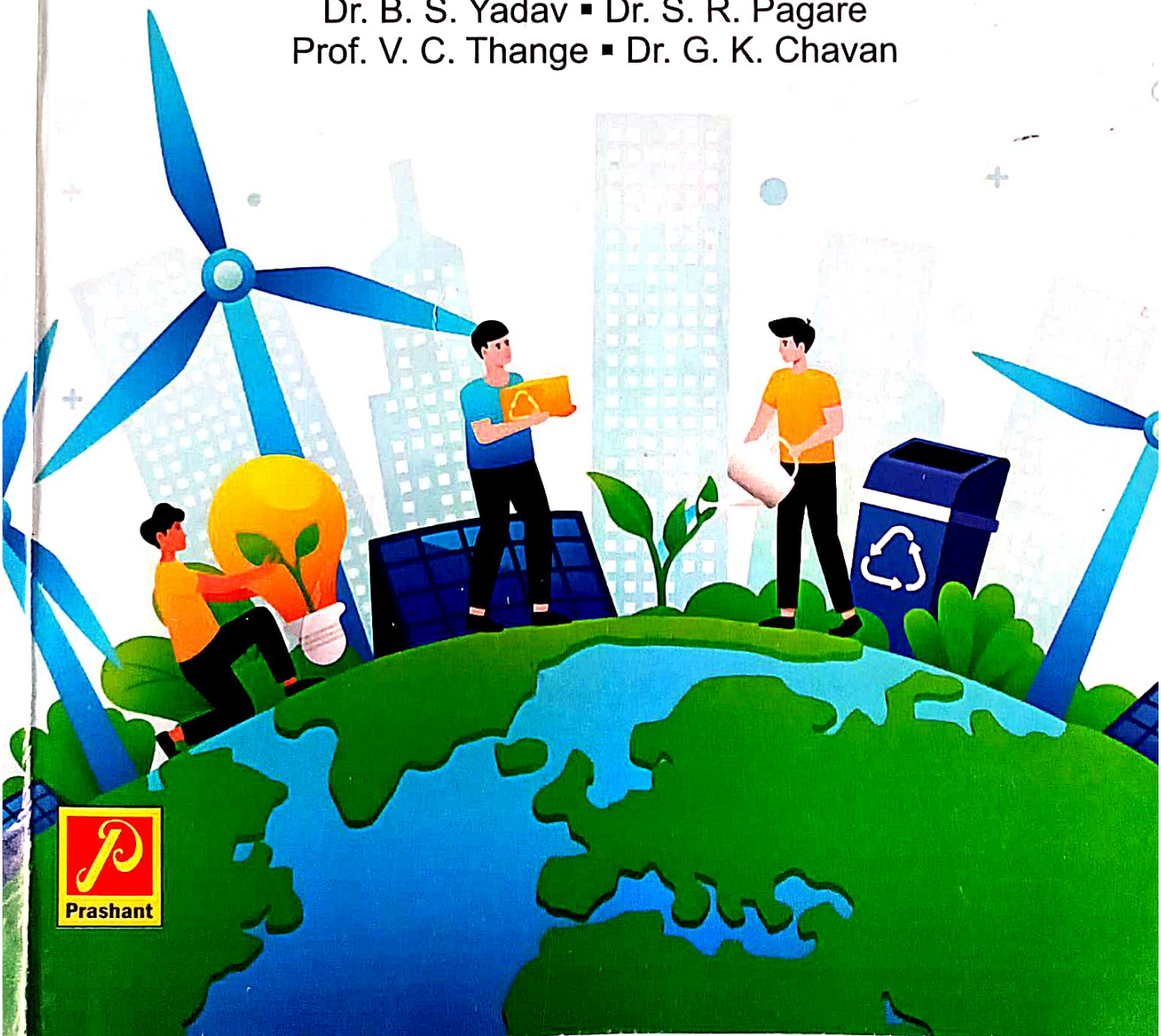

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Water and Soil Conservation Through Simple Techniques- A Case Study

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Abstract:

Water is important to our life, but it cannot be produced by technology. Same is the problem with soil in Maharashtra and India, there is very little area free from the hazard of soil loss. It is probable that out of 304.9 million hectares of reported area, 148 million hectares is in essential of conservation measures. Severe loss occurs in the sub-humid and per-humid areas due to high rainfall and improper management of land and water. If erosion is granted to continue at its immediate rate, it is possible that all work will be the improvement of soil rather than the conservation and management of soil and water. Hence it is essential to acquire techniques to conserve water which will conserve soil spontaneously. It is also important that technology to conserve the soil and water should be easily acquired and economically possible.

This article presents one such case study where a huge amount of rainwater is tried to conserve. Under the Forestry Department, some measures have been accepted to conserve the water resources, but it has been found that a large quantity of water runs off in smaller durations without undertaking in the ground. This results not only in water loss but also soil loss on a large scale. Hence it is organized to take such measures which will direct this extra excess to groundwater storage. These measures will be accepted by local people and also will be economically weak. The most important feature of our project is that if such technologies are established and accepted at larger scale in different areas, it will prevent such areas from water supply by tanker.

Keywords: Water and Soil Conservation, Hill to Valley approach, Continuous contour trenches, Watershed development.

Introduction:

In unkindness of sufficient rainfall, peoples are to depend on the tankers for their local water supply in summers in most of the areas.

This is mainly due to large excess which is responsible for water loss as well as soil loss of the land. A raindrop, when flowing along the slope, transfers the loose soil along it. In this case the topmost layer of soil is lost fastly. Due to high intensity rainfall, it is estimated that more than 100 tons of soil is lost. The watershed management through soil and water conservation means suggests, the sensible use of all the resources i.e. land, water, flora in an area for providing an answer to relieve drought, moderate overflows, prevent soil erosion, improve water availability and increase food, fodder, fuel and fibre on sustained basis. Watershed to achieve maximum production with minimum danger to the natural resources and for the well-being of people. The management should be carried out on the watershed basis. The duty of watershed management includes the treatment of land by using most suitable biological and engineering measures in such a manner that the management work must be economically and socially acceptable. If we take steps to encourage each drop of rainfall to enter the ground at the point where it comes to earth, it will result in addition of one drop to our useful water supply and subtraction of one drop from a potential flood. It is the management of each raindrop falling on the ground. This is possible by water and soil conservation techniques adopted in the area as per its geography.

A variety of important soil moisture and water conservation technologies must be approve to decrease the cost of irrigation, elongate it throughout and promote supportable small-scale irrigation on a watershed basis. These technologies are essential especially in drought-prone areas. Even though drought is a purely natural disaster caused by the failure of (monsoon) rain, it can be decreased by careful development and process. During good rainy years, excess rainwater should be stored in the soil and also underground using suitable soil moisture conservation measures and water gathering structures on a watershed basis. This stored water can subsequently be used for irrigation.

Water and Soil Conservation:

The problem of conserving soil and moisture is also of very great importance in the wide regions of low and unsettled rainfall, forming parts of Maharashtra. These tracts are categorised by small, ill-distributed and highly eroding rains, swelling topography, high

wind velocity and generally shallow soils. The period of heavy downpours from August to October is the period of the heaviest corrosion these regions. Agricultural land in the main part of the country suffers from loss. Apart from dropping the yields through the loss of nutrients, erosion shatters the soil resources itself every year. For example, in Maharashtra over 70 per cent of the cultivated land has been affected by erosion in varying degrees and 32 per cent of the land having been highly eroded is no longer cultivable. It is possible to give work through watershed development through water and soil measures to the huge majority of the villagers during their enforced use due to solo crop farming. Thus by having soil and land management along with water management thus developing the watersheds, overall development of farmland areas is possible.

Application:

The monsoon water and groundwater being additional, their management is a continuous process. The hill to valley approach to implementing soil and water conservation measures could be successfully handled only through the watershed idea. Efforts have been made through NGOs and Government Departments to improve the water condition in villages, to advance the Rural India by Watershed Management Programs, to take in groundwater drop and recover its levels, to trap the rainwater wherever it drops. The measures taken for water and soil conservation also helped to give employment to the unemployed through watershed development programs, to conserve forest and to harvest the rainwater, to help the rural poor to make the water flow for them, and to minimize the opposing effect of want on crop production.

The independent monsoon and groundwater management is a double profit. During lack years one can depend upon the guaranteed availability of ground water. The more water accessible during unpredicted downpour in a less period can be used to saturate groundwater reservoirs adequately instead of allowing it to be lost by excess. Thus the conjunctive management would provide the maximum utilization of surface water as well as groundwater which is the aim of watershed management.

Methodology:

» By surveillance and conversation with local village people.

» By personal meetings of the local village people.
» Through community recording of the areas for developing the social relationship with the local people.
» By technical study including outline studies giving land use details.

Area Selected to Study:

Area selected for study is tehsil Rahata in village Rui, Dist-Ahmednagar. It is a very small residential and agricultural village with only 30 households and 300 people living there. The total area is 50 hectares and annual rainfall there is 5000mm. The area consists of one natural pond which fulfils the domestic water needs of the resident and agriculture up to the month of March. People in the area have to face the problems of water scarcity in the summer as pond goes dry and people have to raise the water from the only bore well available nearly 4 kms. This area located in medium slope on upstream of the residential locality. So some measure to take conserve the water resources, but it has been found that a large quantity of water flows off in smaller duration without entering in the ground. This results not only in water loss but also soil loss on a large scale. Hence it is planned to take such conservation measures which will direct this extra flows off to groundwater storage. This measures will be adopted by local people and also will be economically weak.

» Staggered Line Trenches
» Loose boulder structures
» Earthen bunds
» Terraced bunds

Water Availability In The Area:

Catchment Area: 5 Ha

Available Water: 40000 CM.

Proposed Works In The Area:

» Construction of nonstop contour trenches on upstream side of the hill
» Constructing 60 cm high bund on the downstream edge of pond which is available on downstream of the residential locality for rainwater conservation
» Plantation of grass for muroom strata for first 3 to 4 years and Continuous Contour Trenches there afterwards

» Provision of biological bunds in form of century plant plantation as bank of pond

» Provision of percolation pits with a depth of more than 10 ft. in the roadside drains at suitable distance from each other

» Constructing loose rock structures on the gullies on upstream of current pond

» Constructing contour trenches in front of the current houses and recommending a plantation on the downstream side of the trenches.

Conclusion:

Alongside with the actions taken by the Social Forestry Department, if we accept the biological as well as technical measures for rainwater harvesting, it will definitely improve to the ground water storage. The work will be implemented with the help of local people with the economical help of the Government; hence it will be economically viable.

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Effect of Noise Pollution on Environmental Ecosystem

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Introduction:

Noise is the unwanted or excessive sound and sound pollution is the offensive sounds that unreasonably affects our daily activities. It has impact effect on human health, animals, birds and environmental quality. It has a huge impact on animals and birds too. Very large noise levels may be cause deafness among animals. Noise pollution also affects breeding practices, foraging, stress levels, among animals and birds. Noise is mainly produced by many industrial facilities and some other workplaces, but it also comes from highway, railway, and airplane traffic and from outdoor construction places.

Key words: Intensity, loudness, decibel, pitch.

Theoretical Aspects:

When intensity of sound exceeds the limit of audible range, it turned in to noise. The audible range of sound for human being is between 20Hz to 20KHz, so it is called audible sound. The sound level below 20Hz is called infrasonic sound and above 20KHz is called ultrasonic sound. Intensity of noise is measured in decibel unit which is in the scale of logarithmic. Perception of loudness for human conforms to a logarithmic scale. Intensity is the main characteristic of noise and other characteristics are loudness, pitch, quality etc. The common human ear can detect sound which lies between 0 dB to 140 dB (called as threshold of hearing), with sounds in the range 120dB and 140 dB gives pain full sensation called threshold of pain. In the library, sound pressure level is 35dB and in moving bus it is 35dB, while in a moving train it is about 85dB. Similarly, sound produced at the construction side is very high as 105dB. Noise generated by source is the characteristic of distance that decreases with distance. Amplitude of noise mainly changes with time; hence noise measurement data being presented as time-averaged values to represent complete noise range.

Pollution due to noise is very danger which is invisible, but it

causes serious problems on both land and inside the sea. Noise is unwanted signal in the environment called disturbing sound that causes harmful effect on the health of humans as well as on other organisms. Health problems related to human, animal, bird and all other species present on land and in the ocean being affected by noise pollution. Noise produced from vehicle traffic and rock concerts have more loudness that can cause listening loss, stress, and high B.P. Noise generated from ships engine and human activities in the ocean is harmful to whales and dolphins that depend on echolocation to survive.

Effects of Noise Pollution on Humans and Wildlife:

Noise is extra than a measly annoyance. At convinced levels and extents of revelation, it can cause bodily injury to the eardrum and the delicate hair cells of the internal part of ear and result in momentary or lasting listening damage, called noise-induced hearing loss. Hearing loss does not actually take place at sound pressure level under 80 dBA (eight-hour open levels are good and should be below 85 dBA), but some people frequently unprotected to more than 105 dBA will have permanent hearing loss to some degree. With listening loss, unnecessary noise can cause increasing of blood pressure and pulse rates. These all-cause tetchiness, nervousness, and mental weakness, and affect to sleep, regeneration, and individual communication. Small children living near to large noise pollution areas may suffer from tension and have other many problems, like weakening in remembrance and attention span. Therefore, it is necessary and important to keep noise pollution within limit at the working place and in the communal.

Noise contamination also influence wildlife. A most of animals, such as insects, frogs, birds, and paddles, depend on sound for a different of reasons. Large sound can restrict animal's ability to appeal a mate, communicate to each other, navigate, searching of food, or avoid killers and thus can even be a factual threat to defenseless organisms. The marine animals seriously suffer from noise pollution, mostly those trust on echo sounding, particularly whales and dolphins. Presently most of the world's seas are polluted with disordered sounds from ships, seismic tests, and oil drills. At present most of largest and harmful sounds in the sea are generated by naval sonar equipment. The noise generated by sonar devices can travel hundreds of miles through the water and is related with mass stranding's of whales and dolphins.

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Sound pollution affect birds and animals' ability of living. Many researchers have done studies on noise pollution and reported that noise pollution has physiological and behavioral impacts on animals and birds. Manmade noise also affects breeding, scavenging, and stress between wildlife. These have been highlighted by number of studies largely concentrated in Europe and North America. According to Dr. Khanna observations noise can damage the nervous system of animals, increase their heart rate and stress levels.

In 2014 few researchers from the University of Exeter noticed that how large sound affected the existence of European eels. They experimentally proved that when eels were 0pened to boat sound, they were getting disturbed and trapped by enemy. Furthermore, some had loss navigation performance and raised their levels of stress. Few animals and birds have made adjustment to noisier environments; hence they may travel to a more peaceful place and after some duration they will come back to their original place. It was observed that health and growth of zebra finches were affected by high noise levels. Researchers at the Max Planck Institute for Ornithology in Seewiesen found that traffic noise overwhelms regular glucocorticoid profiles in the blood, possibly to stop undesirable effects of chronically raised levels on the organism. A scientist Henrik Brumm from Max Planck center for Ornithology in Seewiesen has studied the effect of noise on stress hormone levels, health, and reproductive system in zebra finches.

Also, they observed that breeding of birds in continuous road traffic noise had higher of corticosterone in their blood as compared to when they were breeding in a peaceful environment. This was interesting since stress often results in higher levels of corticosterone, a hormone involved in metabolism regulation throughout stressful involvements. The author, Sue Anne Zollinger predicted that when breeding of birds is in peaceful surroundings, that time their baseline corticosterone remained low during the breeding season. Thus, one can say that, traffic noise without all the other troubles of an urban environment, changes the physiology of birds and has bad effect on their growth. It was seen that chicks whose parents were exposed to traffic noise were smaller than chicks from parents that bred in peaceful environment.

Comment of Biological Experts on Noise Pollution Effect:

Some biological experts' privilege that different kinds of animals and birds trust on sounds for searching necessary habitat and mates, to live away from hunters, defensive descendants, and founding territories. However, the human created noise pollution hampers animal conversation by troubleshooting their vital communication signals. Also, experts comment that noise produced by various activities in the town, like running vehicle, bursting of explosives, and blasting at building sites, can produce various difficulties for animals and birds. Due to this reason panic situation is created into animals which suddenly increase their blood pressure, and also inhibit with the mating calls of some birds and animals. Large sound can affect their reproductive system and social behavior. They get panic and go away from the noise. In this condition, their body secrets adrenaline hormones which result in to sudden increase in blood pressure. This can cause cardiac attack and death due to shock.

Large sound from loudspeakers and other instruments at the time of weddings, festivals, and political marches produce noise pollution, which can result in severe health problems. However, human created noise pollution is not only harmful to humans, but it also has contrary effects on wildlife as well.

Research published in Global Change Biology indicates that, 31 species were affected severely by deafening noises. The scientist Dr. Hansjoerg Kunc, from the School of Biological Sciences at Queen's University, said that, there are many important recommendations to consider the protection of wildlife. Many researchers working in this area proved that human created sound is disrupting animals and birds from hearing and understanding each other clearly.

Our environment is such that it has become problematic to discharge the noise. Even electrical devices at home have a continuous hum or beeping sound. Due to large, lack of urban planning increases the exposure to undesirable sounds. Thus, it is necessary to understand noise pollution and control it in time.

Sources of Noise Pollution:

There are two types of basic sources of noise pollution

A) Man created Noise:

This is related to the noise produced due to man-made events. It

may be from construction work, noise from the air, driving vehicle, noise in the home, noise from pubs and bars. This noise is ranging from 30 dB upto140 dB, hence this noise is enormously harmful to humans.

B) Environmental Noise:

Environmental Noise related with noise coming from a range of environmental activities. This may be due to the mating call of animals to the sound of thunderstorms that frequently go up to 140 dB.

1. **Industrialization:** Major of the industries use big machines which are capable of producing a large amount of noise. Alone from that, different equipment like compressors, generators, exhaust fans, grinding mills also contributes in producing large sound. Therefore, workers in these factories and industries wearing earplugs to reduce the effect of noise. However, even after taking these precautions, wide exposure to high levels of noise might damage their hearing abilities in the long run.
2. **Poor Urban Planning:** In most of the developing countries, poor town planning also plays a vigorous role. Congested houses, large families sharing little space, fight over parking, frequent fights over basic amenities lead to noise pollution, which may disrupt the environment of society.

   Noise pollution in town may also be produced when residential properties and industrial buildings are in closeness. In this situation, the noise from the nearby industry might hamper the basic well-being of the persons living in residential properties. It doesn't just affect their sleep and rest but also has contrary effect on the development and well-being of children.
3. **Social Events:** In social events noise reaches to its peak levels. Whether it is marriage, parties, pub, disc or place of worship, people normally disobey rules made by the local administration and generate a nuisance in the area. People play songs on full volume and dance till midnight, which makes the condition of people living nearby attractive worse. In markets, people selling clothes by making a loud noise to attract the attention of people. It affects the hearing

abilities of the individuals who are continuously exposed to these sounds.

4. **Transportation:** A large number of vehicles on roads, airplanes flying over houses, underground trains produce heavy noise, and people find it difficult to get comfortable to that. Due to this high noise person loses the ability to hear properly.
5. **Construction Activities:** Under construction activities such as mining, construction of bridges, dams, buildings, stations, roads, flyovers take place in almost every part of the world. These construction activities take place every day. The noise from construction activities hampers the hearing power of individuals.
6. **Household Chores:** Many people have their gadgets and use them widely in their daily life. Gadgets like TV, mobile, mixer grinder, pressure cooker, vacuum cleaners, washing machine and dryer, cooler, air conditioners are less contributors in the production of noise. Still, it affects the quality of life of your neighborhood in a bad way. This causes adverse effects on the health of the environment and it is fairly severe.
7. **Noise from Air Traffic:** While many find it difficult to believe, air traffic too contributes to significant levels of noise pollution. Noise from a single aircraft may produce sounds of up to 130 dB.
8. **Catering and Nightlife:** When the weather is good, restaurants, bars, and terraces spill outside. Late night parties continue with loud music and unnecessary noise made by the party mongers. These can produce more than 100 dB.
9. **Animals' Sound:** The noise made by animals cannot ignored, particularly a howling or barking dog. These can produce noise around 60-80 dB.

Various Ways to Minimize Noise Pollution:

World Health Organization agrees that awareness of noise pollution is necessary to beat this invisible enemy. To reduce sound pollution governments can help in the following ways:

» Establishing regulations that include preventive and

corrective measures.

- Governments can take actions such as protecting certain areas, parts of the countryside, areas of natural interest, city parks, etc. to safeguard noise management and minimize noise pollution.
- The compulsory separation between residential sectors and sources of noise, like airports, railway station.
- Creating pedestrian areas where traffic is not allowed to enter other than offload goods at certain times.
- Fines for exceeding noise limits.
- Avoiding noise pollution by controlling the sound levels in clubs, bars, parties, and discos.
- Ban on public loudspeakers is another way by which pollution can be controlled.
- Better town planning can help create 'No-Noise' zones, where beeping and industrial noise is not tolerated.
- Replacing old-style blacktop with more efficient options can also help to reduce traffic noise by up to 3 dB.
- Keep checking the surrounding noise levels and limit the sounds that you produce.
- Stay in a green neighborhood full of trees as they are known to reduce the sound levels from 5 to 10 dB.
- Decrease noise in homes by lowering the volume of the radio, music system and the television.
- Avoid very noisy leisure activities and also going to areas that are too noisy.
- Use proper noise absorbents in machines that make too much noise.
- Listening to music with headphones is also a good step forward.
- Use earplugs when you are in a noisy area because it lowers the overall noise of the surroundings.
- Use alternative way of transport such as bicycles or electric vehicles instead of taking the car.
- Get your vehicle checked regularly and lubricate it properly that it doesn't produce high noise.

» In the case of new buildings, you can insulate your home with noise-absorbing materials.

Conclusion:

This paper explores the sources and effects of noise pollution on environment and some ideas for controlling the excessive noise. Industries, highway transport, airports, railways and public address system turns out to be major sources of noise pollution. In our life by knowingly or unknowingly every one of the possibilities for real time control of noise pollution. Suitable action will be taken to reduce the noise levels and controlling pollution. In future, public education, government and NGOs, organizing awareness program can play significant role in controlling the noise pollution. From the technical point of view, it is necessary to take several measures in order to reduce the noise levels.

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ENVIRONMENT AWARENESS

ISSUES AND PERSPECTIVE

- Editors -

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Prashant

ENVIRONMENT AWARENESS: Issues and Perspective

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Air Pollution, Their Sources and Health Effects: A Case Study of Kopargaon

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Abstract:

This study has made a venture to scrutinise the impact of air pollution on health, its causes and level of awareness by conducting a field survey on the youth and persons of Kopargaon, studying and working in different colleges in Kopargaon. The survey broadly aims to capture awareness about air pollution, it causes and its health ramification. Also the study proposes certain answers to contain the environmental abasement. For this, a total number of 419 respondents were surveyed during January 2021 to August 2021. The collected data has been assessed with multiple techniques like descriptive statistics, frequency tables, cross tabulation and chi-square test of independence on sources, effects, and solutions to air pollution. The study reveals that vehicular pollution is identified as the major cause of pollution in Kopargaon followed by industrial pollution and crop burning by neighbouring regions. The survey reveals that more than 60% of the respondents recognized lung infections as the major health effect of air pollution followed by cold & cough, and bronchitis. Finally, the study concludes that a large number of awareness campaigns should be organized involving a greater participation from all sections of the society along with better implementation of present laws.

Keywords: Air pollution, Environmental Degradation, Health, Environmental Awareness.

Introduction:

Air pollution means combination of toxic chemicals or compounds (including those of biological origin) in the air, at levels that pose a health risk. Pollutant elements are Carbon dioxide, Monoxide, Sulphur-Dioxide, etc. Air pollution is a major environmental risk for health and is estimated to cause millions premature deaths worldwide per year. It costs human lives, it reduces people's ability to work, it affects vital products like food, and damages cultural and historical monuments.

Moreover, it reduces the ability of ecosystems to perform functions, societal needs and it costs money in remediation or restoration (UNECE, 2017). Though it is global problem but developing and newly industrialized countries are suffering from severe air pollution in last few decades and paying its major cost. This has been a result of epidemic growing anthropogenic activities such as urbanization and industrialization. The effects of air pollution on health and the rising costs of continued efforts to improve air quality have raised concerns in the society and state as well. The big metro cities, like Delhi, Mumbai around the world that are seeing rapid population and economic growth are experiencing severe levels of air pollution as energy consumption and motor vehicle use have been rapidly increasing. Air pollution will continue to cause problems for mankind.

Temporary regulations and planned controls of emissions will not disinfect our atmosphere, but can only slow the increase of pollutants as the world population grows and energy consumption per capita increases. Human activities influence these gases, not only through combustion processes but also through forest and biomass changes. Moreover, decision makers are faced with difficult choices in their attempts to support continued economic growth and at the same time mitigating the adverse effects of growing prosperity. In this context, the objectives of this paper are (i) to examine the level of awareness of youth of Kopargaon about air pollution, its causes and its health effects and (ii) to suggest appropriate suggestion based on field survey that can be drawn as inputs into the policymaking process. The paper is arranged as follows: section 2 provides the review of selected literature. Section 3 presents data and research methodology. Section 4 discusses various empirical results while section 5 provides concluding remarks.

Review of Literature:

Environmental studies are interdisciplinary in nature. As per economical perspective, it has been popularized by the studies capturing environmental degradation and levels of income in the form of Environmental Kuznets Curve (EKC). The EKC assumes that the relationship between various indicators of environmental degradation and per capita income can be depicted as an inverted-U-shaped curve showing that the environmental pressure increases up to a certain level as income goes up; after that, it decreases. World Bank (1992)

and other scholars have attempted to model the pollution-income relationship and generated smooth inverse-U-shaped pollution-income paths. Others have shown evidences of "inverse-V-shaped" pollution-income path. Some have even observed multiple changes of direction and introduced "N-shaped" of EKC. For instance, Common (1995) points out that irreversible damage may occur before the top of the inverted U-shaped curve is reached, and that the relationship need not hold for all impacts. Several authors (Grossman and Krueger, 1994; Shafik, 1994; Grossman, 1995; Ismail and Ahmed, 2016) find evidence of an N-shaped curve for some indicators. The concept of an N-shaped curve seems to imply that at very high level of income, negative impact of scale of the economic activity dominates the positive impact of the composition and technical effects.

Many researchers (Folinsbee, 1993; Collins and Stevent, 1993; Grunig, et. al, 2014) have shown the health effects on human beings and its causes. These studies highlighted that the particulates from air pollution are implicated in causing or exacerbating respiratory, lung function and changes in airway reactivity and inflammation and systemic cardiovascular diseases. These particulates are thought to be among the leading causes of respiratory morbidity and mortality. Since air pollution causes vast damaging effects on health in various ways, it is important to have the estimates of health damages associated with it. These estimates can provide both an impetus for environmental controls and a means of evaluating the benefits of specific pollution control policies (Cropper et al, 1997). Researchers have suggested various ways to measure health benefits of improved air quality. Alberini and Krupnick (1997) argued that the health benefits of improved air quality are usually obtained by combining epidemiologic evidence linking pollution levels to health outcomes with the value of avoiding such outcomes. Unfortunately, very few original epidemiologic or willingness-to pay studies have been conducted in developing countries, leading analysts to offer recommendations based on extrapolating both concentration-response functions and the value of avoiding illness from U. S. Studies. However, this approach neglects differences between the United States and the target country in pollution levels, cultural factors, baseline health, the age distribution of the population, etc. that might affect perceptions of illness and pollution and behavioural responses.

Gerking and Stanley (1986) conducted a study on the adult residents of St. Louis, Missouri where individuals are viewed as producers of health and good health is desired for both consumption and investment purposes. The study shows that the marginal willingness to pay for the "average" employed person for a 30% reduction in ozone range from $18.45 to $24.48 per year. Bresnahan et al. (1997) argues that people use defensive measures to protect themselves from air pollution. The study indicates that persons who experience smog-related symptoms spend significantly less time outdoors. Many people also report making other behavioural changes to avoid smoggy conditions and adjust daily activities to defend against acute health effects of air pollution.

Gordian et al. (1996) examined the associations between average daily particulate matter less than 10 um in diameter (PM10) and temperature with daily outpatient visits for respiratory disease including asthma, bronchitis, and upper respiratory illness in Anchorage, Alaska. The results show that an increase of 10 ug/m3 in PM10 resulted in a 3-6% increase in visits for asthma and a 1-3% increase in visits for upper respiratory diseases. These findings are consistent with the results of previous studies and provide evidence that the coarse fraction of PM10 may affect the health of working people. Chen, et. al (1998) evaluated the effects of ambient air pollution on respiratory symptoms and diseases of school children. Respiratory health was assessed by evaluation of the children's respiratory symptoms and diseases. The school children in the urban communities had significantly more respiratory symptoms (day or night cough, chronic cough, shortness of breath, and nasal symptoms) and diseases (sinusitis, wheezing or asthma, allergic rhinitis, and bronchitis) when compared with those living in the rural community. An interesting study by Brunekreef, et. al (1997) in Netherland examined health status of children living near roads. The study shows that the association was stronger in children living closest (<300m) to the motorways. Lung function was also associated with the concentration of black smoke, measured inside the schools, as a proxy for diesel exhaust particles. The associations were stronger in girls than in boys. The results indicate that exposure to traffic-related air pollution, in particular diesel exhaust particles, and may lead to reduced lung function in children living near major motorways. Rizwan, et al (2013) assesses change in levels of pollutants

in Kopargaon and their impact on health. It also advocates ways to curb the air pollution. They found vehicular pollution and industrial pollution as a reason towards rising indoor and outdoor pollution in Kopargaon city. The study finds that the increasing level of pollution has been responsible for rising mortality and morbidity. Despite the continuous efforts of controlling the level of pollution in Delhi, air pollution is not abated; strenuous efforts are needed to be done.

It is essential to control for air pollutants due its damaging effects on human health. These effects include premature death as well as increase in the incidence of chronic heart and lung disease. It is important to have the estimates of health damages associated with air pollution since they can provide both an impetus for environmental controls and a means of evaluating the benefits of specific pollution control policies. It is important to examine the level of awareness of youth of Kopargaon about air pollution, its causes and its health effects.

Data and Methodology

This empirical study is based on a sample survey of the Kopargaon city. The data was collected by using a schedule blended with suitable closed and open-ended questions. The respondents were, students in Kopargaon city. The schedule contains two parts: first contains personal information of the respondents and second part contains questions related to various dimensions of environment. The survey captures broad three dimensions, namely air pollution, water pollution, noise pollution and their health effects, causes, etc. The data of the respondents was collected during January 2021 to August 2021. The sample represents a cross-section of youth of different age groups, sex, geography, educational levels; income levels of respondents. The survey was conducted in various educational institutions and bus stops near to colleges and corners of city in Kopargaon. The respondents were resident in 129 localities of Kopargaon.

In the present paper, an analysis of questions related to air pollution has been done. Total number of schedules is 419 and hence selected for the analysis. The analysis has been carried out with the help of descriptive statistics, frequency tables, cross tabulation and chi-square test of independence on sources of air pollution, effects of air pollution, solutions to air pollution, etc. A cross tabulation is a joint frequency distribution of cases based on two or more categorical

variables. Displaying a distribution of cases by their values on two or more variables is known as contingency table analysis and is one of the more commonly used analytic methods in the social sciences. The joint frequency distribution can be analyzed with the Chi-Square ($\chi 2$) to determine whether the variables are statistically independent or if they are associated. Chi-Square ($\chi 2$) tests compare the expected and actual distribution of data across categories. If a dependency between variables does exist, then other indicators of association can be used to describe the degree which the values of one variable predict or vary with those of the other variable. For chi-square analysis, the effect sizes are phi (Φ) or Cramer's V are used.

Empirical Analysis

The present study is based on the primary survey among college students in Kopargaon regarding youth participation in Environmental Sustainability. It is focused on youth perception about air pollution in Kopargaon, its causes, its health impacts and solutions. Descriptive analysis of the survey indicates that the average of respondents is 20-45 years, with minimum age of 17 years and maximum age of 34 years. Average years of education of respondents are 15.94 years, with minimum age of 15 years and maximum age of 20 years. Average years of education of mother and father of respondent are 9.39 and 4.71 years respectively (Table 1).

Table 1: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Age	419	17.00	34	20.45	2.12
Resp_edu	419	15.00	20	15.94	1.31
FE	419	0.00	18	09.39	4.92
ME	419	0.00	11	04.71	3.073

Table 2 indicates frequency of Years of Education of Respondents and Gender Classification of Respondents. It is also revealed by summary statistics that average years of education of 61.6% respondents are 15 years, of 27.2% respondents are 17 years, of 7.9% respondents are 18 years and 3.3 % respondents are 20 years. 164 out of 419 (39.1%) respondents are males and 255 out of 419 respondents are females. It implies that this survey captures the opinion of educated youth who has either completed or presently pursuing education in higher learning

institutions.

Table 2: Frequency Table

Years of Education of Respondents				
	Frequency	Percent	Valid Percent	Cumulative Percent
15	258	61.6	61.6	61.6
17	114	27.2	27.2	88.8
18	33	7.9	7.9	96.7
20	14	3.3	3.3	100
Total	419	100	100	
Gender Classification of Respondents				
	Frequency	Percent	Valid Percent	Cumulative Percent
1.00	164	39.1	39.1	39.1
2.00	255	60.9	60.9	100.0
Total	419	100	100	

Table 3 presents summary of air pollution awareness among respondent youth. The respondents were asked whether they are aware about the air pollution in Kopargaon. Results reveal that 94% respondents were aware about the problem of air pollution. However, 6% respondents were not aware about the problem of air pollution despite their higher education. It implies that majority of educated youth in Kopargaon are aware about air pollution as a problem.

Table 3: Air Pollution Awareness

Air Pollution Awareness	Frequency	Percent
Yes	394	94.0
No	25	6.0
Total	419	100.0

Table 4 presents the results of cross tabulation between gender and air pollution awareness. Results show that 38.1% of respondents having awareness of air pollution are male while 61.9% of respondents are female. Within Gender, 91.5% of males have awareness of air pollution whereas proportion of female respondent is higher and close to 96%. Of total, 35.8% of respondent are male and have awareness of air pollution while, 58.2% of respondent are female and have awareness of air pollution. Results further reveal that 56% of respondents not

having awareness about air pollution are males while 44% are females. Results indicate that female youth are more sensitive and aware compared to male youth about air pollution.

Table 4: Air Pollution Awareness (Air_PI_AW) * Gender

		Gender		Total
		1.00	2.00	
1.00	Count	150	244	394
	%within Air_PI_AW	38.1%	61.9%	100.0%
	% within Gender	91.5%	95.7%	94.0%
	% of Total	35.8%	58.2%	94.0%
2.00	Count	14	11	25
	% within Air_PI_AW	56.0%	44.0%	100.0%
	% within Gender	8.5%	4.3%	6.0%
	% of Total	3.3%	2.6%	6.0%

Concluding Remarks

This study has attempted to analyze the impact of air pollution on health by conducting a field survey on the youth of Kopargaon, studying in different varsities and colleges in Kopargaon. Our respondents have obtained, on an average, 16 years of education. The survey broadly aims to capture awareness about air pollution, it causes and its health effects. Also proposes certain solutions to contain the environmental degradation. For this, a total number of 419 respondents were surveyed during January 2021 to August 2021. The collected data has been assessed with multiple techniques like descriptive statistics, frequency tables, cross tabulation and chi-square test of independence on sources, effects, and solutions to air pollution. The study indicates that proportion of female respondents having awareness about air pollution is fairly higher than proportion of males. However, using Chi-Square tests there is no statistically significant difference about air pollution awareness between the two genders.

Vehicular pollution is identified as the major cause of pollution in Kopargaon by the respondents followed by industrial pollution and crop burning by neighbouring states. The survey reveals that more than 60% of the respondents recognized lung infections as the major health effect of air pollution followed by cold & cough, and bronchitis. However, 10% of total respondents were not aware about any health

effects of air pollution. The survey also gauged on youth participation in environmental improvement activities. It is found that nearly half of the respondents have participated in such type of activities and among them females participation is higher than males. At last, students were inquired to provide solutions towards minimizing the environmental degradation. Amongst the multiple solutions like technology innovation, social and behaviour change of citizens, strict enforcement of laws, and enactment of new environmental laws, one-third of the students proposed for change in social behaviour of citizens while around one-fifth advocated for strict enforcement of existing environmental laws.

The study concludes that a large number of awareness campaigns should be organized involving a greater participation from all sections of the society along with better implementation of present laws

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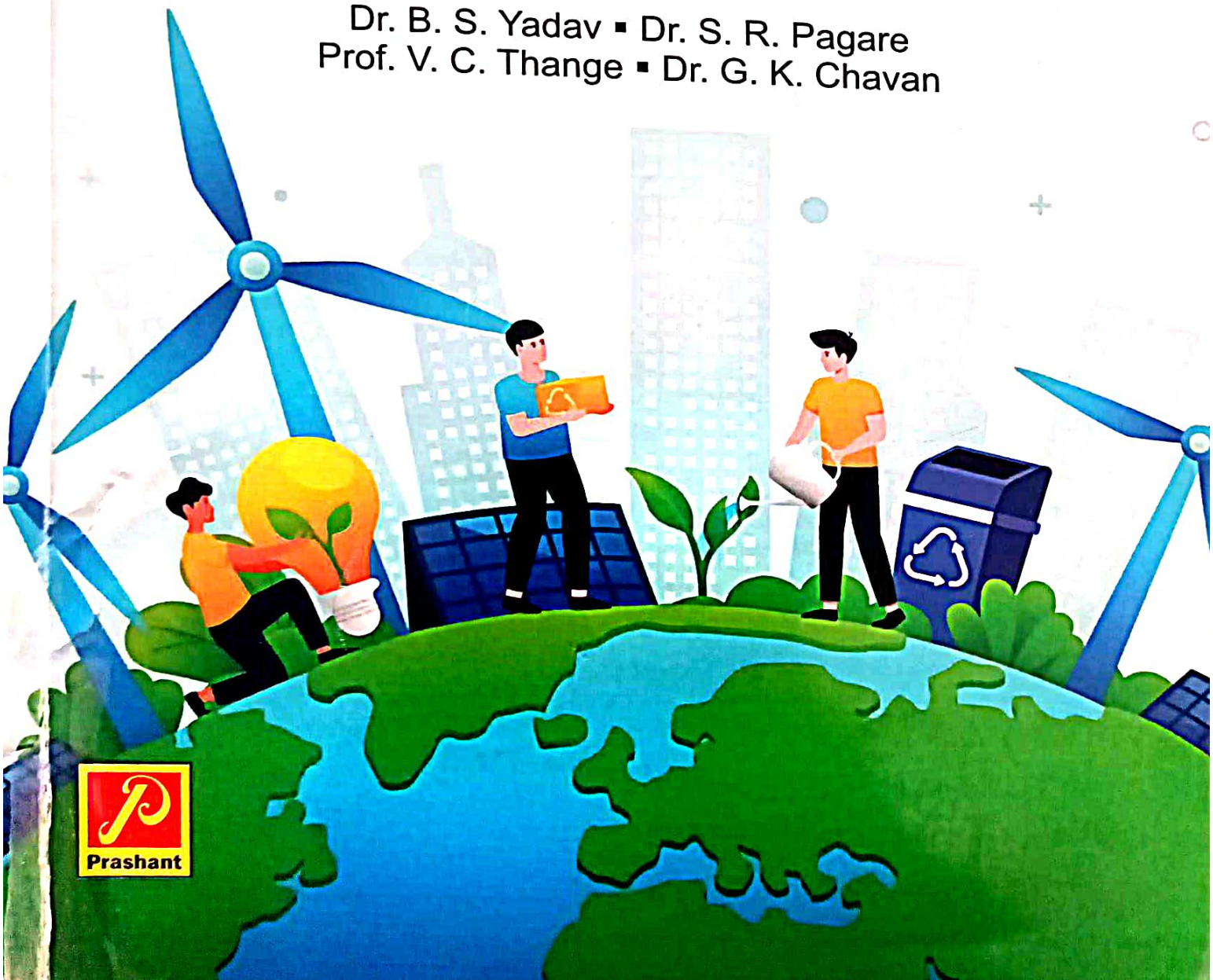

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Some of The Pandemics Occurred So Far History And Preventive Measures Taken To Control Such Pandemics

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Abstract:

In human history pandemic caused by infectious diseases in human beings occurred in regular manner. Major of these pandemic are (based on number of global population affected and number of deaths caused) are plague, cholera, flue, and recently occurring severe acute respiratory syndrome coronavirus. If we look into how these diseases caused we come to conclusion pathogens are responsible for such diseases. These pathogens transmitted in humans through animals in human contact by breeding, hunting and global trade activities. A simple question arises that we are human beings domination this earth are these animals taking their revenge on humans by controlling their population. It was also established that certain public health measures like quarantine, isolation, and border control helps to stop spread of infectious diseases. There is surveillance program globally which focuses on water borne pathogens, vector- borne disease and zoonotic spillovers at animal human interface for detection of emergence of infectious threats. At this 21st century technological advancements are playing vital role for rapid diagnostic testing, contact tracing, biomarkers, vaccines, drug repurposing of infectious diseases. Also we get very important message that every person has to act responsibly for overall society's benefit during such pandemics.

Keywords: Pandemic, Pathogens, Public Health, Coronavirus.

Introduction:

The major causes of spread of infectious diseases leading to pandemic in humans is the modern lifestyle, expanded trades, population explosion, increases interactions in humans and animals, expanded cities, and human interfere with ecosystem etc. [1]. The pandemic is defined as epidemic that spreads globally, epidemic is outbreak that can spread on larger geographical areas. The outbreak chaotic spread and enhancement of number of persons having health

conditions of cases in new and vast geographical area e.g. coronavirus cases [2]. There is tremendous enhancement in zoonotic transmission through cross species in humans from animals. This enhancement is attributed to increased interactions of humans with animals through hunting, animal farming, trading of animal based food, wet markets. The process of cross species transmission involves five different stages [3].

1. Animal infection: pathogens infects animals in natural conditions
2. Evolution of pathogen: Pathogen evolves sometimes with genetic modifications
3. Transmission in humans: virus undergoes few cycle of secondary transmission in human like trial.
4. Existence of disease in humans as well as animals: disease exist in animals but long sequence of secondary to human transmission occurring without involvement of animals
5. Disease occurs exclusively in humans

Thus many of the scientist suggest to have a profound surveillance program on detection of emergence of pathogens having potential for zoonotic transmission. Climate changes also plays major role in transmission of pathogens (Dengue, Zika etc.) by enhancing habitat of common zoonotic disease carrying vectors (misquotes, ticks etc.). The emergence of vector borne pathogens in non-endemic regions resulted in explosive epidemic. For controlling vector borne diseases it is required to control the vector borne zoonotic pathogens. The worst case scenario occurs when certain infectious agents (e.g. Bacillus anthracic, Yersinia pestis, variola virus) can be used as bioweapon causing deaths. Now a days it is need of countries to establish bio warfare division, bioterrorism and bio crime units for protection of population.

In this article we review major pandemics along with their impacts on humans appeared in history. Such major pandemics are plague, cholera, influenza, and most recent coronavirus along with how these diseases controlled in past to guide us on how to control such diseases in future. Infectious diseases are major threat for human health as these virus spreads globally. Thus there is urgent need of global surveillance program for prevention, detection and care

a. Plague

Yersinia pestis bacteria are responsible for plague pandemic. The plague occurred in three major pandemics (now a days we heard a word wave for such stages). These waves are known as plague of Justinian, the Black Death and the third plague. Plague can manifests in 3 forms in humans known as bubonic, septicemia and pneumonic, that depend on path of infection [4]. Out of which bubonic form was observed in most of the cases which caused by bite of an infected flea. Symptoms include fever, chills, headache, body pains, weakness, vomiting and nausea with painful swollen lymph nodes. The most scaring is that it is fatal that is death rate was around 50 to 90 percent in infected persons. Second clinical case which is septicemia plague is rare to observe that can having 10 to 25% of cases and consists of a progressive bloodstream infection in the absence of lymphadenopathy. The death rate of septicemia plague was more compared to bubonic form. Lastly pneumonic plague occurs at the case of bacteria infects the lungs. In the last stage there is rapid death of patient.

Pandemics of plague

1. Justian (541-543)

Justinian pandemic started from Egypt and infection spread whole Eastern Roman Empire along with its neighbors. In only two years 9541-543) this plague killed around 100 million people from Roman Empire most of them are from its capital, Constantinople. The spread of plague was caused by trade and military routes which are highly developed. One of the important note this plague did not affect the less organized barbarian societies outside of Rome borders why is that so. The very large number of deaths caused by plague resulted in weakening the Byzantine Empire. One more strange fact is that with this initial pandemic outbreak occurred every 8 to 12 years for two centuries and then suddenly stopped.

2. Black Death (1347-1351)

It started in East Asia and spread in Central Asia to Europe. Spread was caused by land along with sea trade routes in medieval Silk Road. It was killed around 200 million people. The Y. pestis emerges independently in the two pandemics. It is scarier fact that this plague caused death of around 1/3rd Europe population and waves like plague of Milan (1630), the great plague of London (1665 to 1666) and the

plague of Marseille (1720 to 1722). It was assumed that bacteria may persisted in rodent reservoirs in Europe and re-emerged in regular time intervals in humans [5]. In other assumption climate-driven outbreaks of Y. pestis in Asian rodent reservoirs may result in waves of plague. One stranger thing happened here again that bacteria suddenly extinguished from Europe and this could be due to the extinction of local rodent reservoirs. Since then there was not any treatment for plague so taking preventive measures is the only key to overcome this pandemic.

3. Third Plague (1882-1912)

The cause of third plague may be Black Death wave travelled in Asia through Europe. The third plague pandemic may be originated around the midway of 19th century in the Yunnan region of China, and then reached Canton and spread to Hong Kong. The third plague caused around 15 million deaths worldwide. In the year 1894, Alexandre Yersin discovered that bacteria, Y. pestis, obtained in specimens of plague patients as well as in dead rats in Hong Kong finding actual cause of plague. Then third pandemic reached Japan, Singapore, Taiwan and India via sea routes. And over the following years, plague has become endemic in many countries around the world [6].

b. Cholera

Cholera disease is acute and fatal disease of the gastrointestinal tract which is due to bacteria Vibrio cholerae. This bacteria colonizes the small intestine and produces the cholera toxin which is responsible for a rapid and massive loss of body fluids leading to dehydration, hypovolemic then shock finally resulted into death of patient. V. cholerae is a water-borne pathogen and spread through contaminated water which enters in humans through drinking water as well as food.

Pandemic caused by cholera

Cholera has caused total of seven pandemic. Explained below. Cholera was endemic disease of Asia up to 1817. The first pandemic spread from India to globally [7]. It was assumed that globalization stimulated the spread through technological progress in transportation. The beginning of using steamships as well as railway tracks reduced travel time and enhancing trade. During those time, preventive health strategies were imposed like that of during the Black Death. That is isolation of infected persons in lazarettos. Limitations on travel by port for ships arriving from regions of hotspots i.e. where cholera was

present. Quarantine of persons those come into contact with travelers arrived from infected places. Then 5 major pandemics of cholera of Indian origin that spreads in other continents happened in 19th and 20th centuries. The 2nd and 6th pandemics of cholera, and may be other pandemics, happened because of O1 classical biotype of V.cholerae. When 2nd pandemic reached the British islands around 1854, Dr. John Snow used the first epidemiological methods to trace the source. In his work on time course of the outbreak along with its spread in geographical areas of the city comes to conclusion public pumps used for water supply in these areas are the major source then he claimed water was the source of the contamination. Then He proposed to remove the pump handle in the city areas where the outbreak occurred to stop the spread. The 7th cholera pandemic was the most extensive in the terms of geographic spread and duration it sustained globally [8]. The 7th cholera pandemic began from Indonesia around 1961 and then transformed into endemic globally.

c. Influenza

Influenza pandemic caused by viruses of Orthomyxoviridae family. Influenza viruses can be divided in four types viz. A, B, C, and D. out of which A and B are responsible for outbreaks in tropical regions and seasonal epidemics in temperate regions whereas influenza A viruses are the only ones with a pandemic potential. It is worth to note that influenza a virus caused endemic in variety of species like humans, birds and pigs. It was estimated that seasonal epidemics, influenza virus causes 3 to 5 million cases of severe illness and around 500,000 deaths globally [9]. Most typical symptoms include four/five day's persistent fever, cough, chills, headache, muscle pain, weakness and sometimes upper respiratory tract symptoms. In severe cases particularly in infants, elderly and individuals with chronic conditions such as diabetes mellitus and cardiac or pulmonary diseases.

Influenza pandemic

According to most of people influenza started in 1510. This influenza virus was spread so rapidly that only in four month it spreads globally from Russia [10]. It was estimated that during pandemic, virus appears periodically with period three years resulted to total of one million people globally. In influenza fatality rate was around 0.10 to 0.28% which is comparable less number. The median clinical attack

rate was 60% (interquartile range 45–70%). Attack rates were highest in individuals aged 1–60 years and lower in infants and seniors. After 25 years Spanish flue (A/H1N1 virus) rise again with genetic adaptation from avian influenza virus to a new human host by genetic changes. One of the scarier fact is that before identification, infection spread silently globally. In this new genetically modified case attack rates were around 25 to 33 percent. It was also estimated that this 1918 pandemic spread in minimum of three waves periodically with a period of 9 months. In the 1st wave spring-summer 1918 and caused high morbidity and low mortality it was like dry run of program. The 2nd as well as 3rd wave occurred in summer-fall of 1918 and winter of 1918–1919 resulted for large mortality rates and panic. This 1918–1919 influenza pandemic caused globally

Around 500 million infections with 50 million deaths globally what a large impact. This pandemic affected not only young people but persons from all age groups. This age distribution suggests that the severity of the 1918–1919 influenza pandemic was not primarily due to a hyper- virulent strain but was more likely related to host factors that also better prevent individuals to control the infection. To stop the spread of infections big cities of Western world, health authorities implemented a series of containment strategies. The major of such includes lockdown of schools, churches and theaters and the restriction of public gatherings. Also doctors encouraged the practice of peoples like respiratory hygiene, social distancing etc. But these measures takes place very late because of World War I. During war time travel restrictions and border controls were hard to impose. During war military troop's activities and the poor living conditions of soldiers in the trench warfare in Europe agitated spread. From past century, afterwards 1918 pandemic virus were the responsible for all seasonal influenza and epidemics worldwide. That is influenza a viruses were causing 1957, 1968 and 2009 pandemics and also derived from the founding 1918 virus by gene assortments between human, avian and swine influenza viruses. In a nutshell influenza pandemic depend on the transmissibility and virulence of the strain and on the susceptibility of the population, which can be changes with age and history (past exposure to influenza viruses). The impacts of influenza are not always higher during pandemics than during seasonal epidemic periods.

However, a shift in the age distribution of mortality toward younger age groups distinguishes the impacts of a pandemic from those of seasonal epidemics [11].

Conclusions:

In brevity we can say that time of onset and the pathogen that will cause the next pandemic is cannot be predicted. Hence, pandemic preparedness plans must be such that that non-pharmaceutical interventions should be implemented first to take control transmission of the pathogen. Usually, these interventions should control the spread of an infection by lowering societal and economic disruption. Risks of resurgence can follow once these non-pharmaceutical interventions are lifted. One of the very important technique is rapid testing along with contact tracing and finally isolation of infected individuals are the first response to such cases. One more important fact that is pharmaceutical interventions such as rapid point of care diagnostic test, biomarkers, broad spectrum antimicrobials/antivirals, vaccine development and production should be developed to improve the worldwide response to the pandemic.

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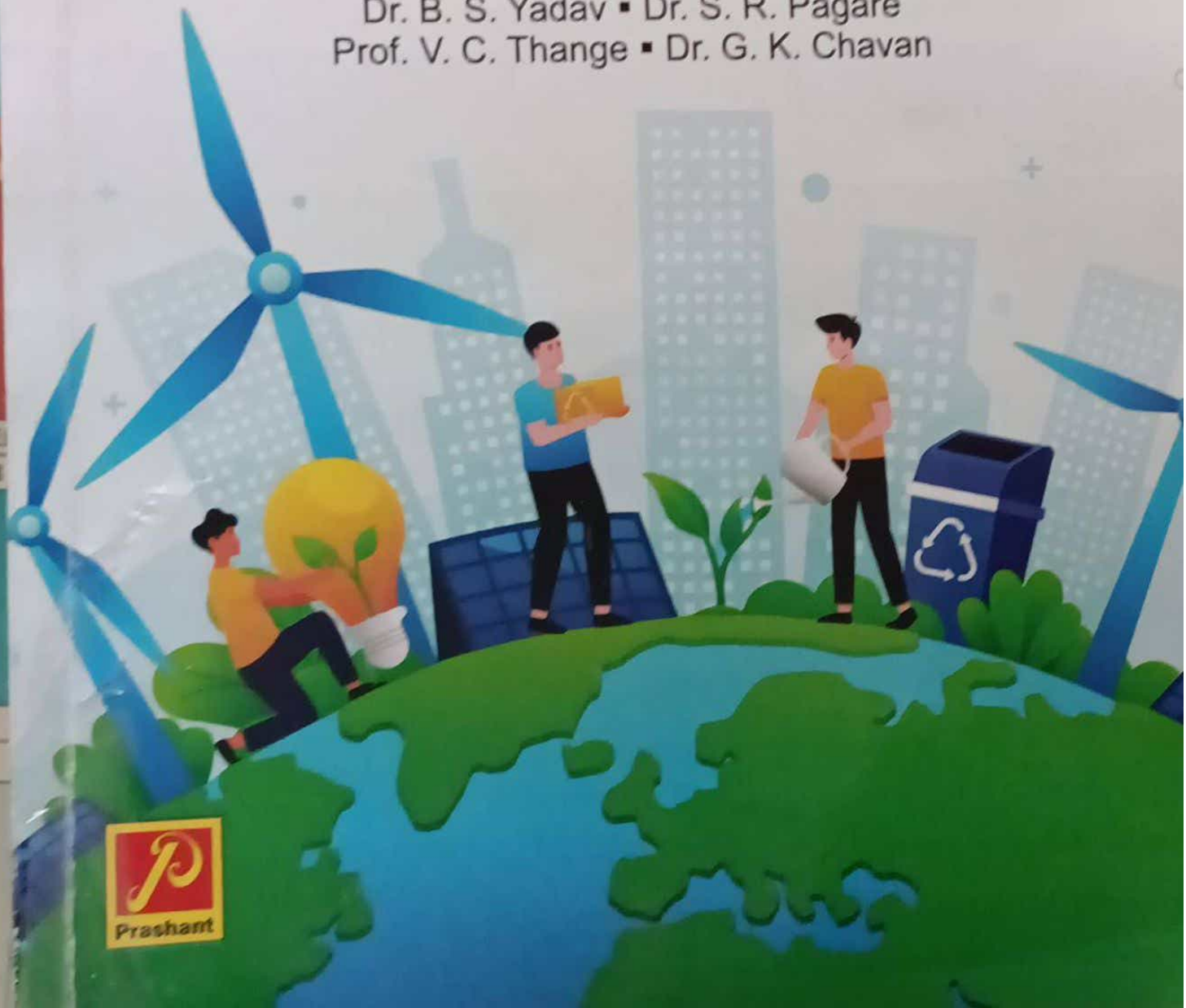

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Renewable Energy Supply and Energy Efficiency Technologies

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Abstract:

The inevitable increase in population and the economic development that must occur in many countries have implications for the environment. This is because energy generation processes (e.g., generation of electricity, heating, cooling, or motive force for transportation vehicles and other uses) are harmful and therefore pollutes the ecosystem. Electricity consumption will comprise an increasing share of global energy demand during the next two decades. It is central to sustainable development and poverty reduction efforts. It has positive effect on all aspects of development; social, economic, and environmental including livelihoods, access to water, agricultural productivity, health, population levels, education and gender related issues. Renewable energy is now considered a more desirable source of fuel than nuclear power due to the absence of risk and disasters. Considering that the major component of greenhouse gases is carbon dioxide, there is a global concern about reducing carbon emissions.

Introduction:

Energy is central to sustainable development and poverty reduction efforts. It affects all aspects of development-social, economic, and environmental-including livelihoods, access to water, agricultural productivity, health, population levels, education, and gender related issues (Umar & Abubakar, 2014). Considering that the major component of greenhouse gases (GHGs) is carbon dioxide, there is a global concern about reducing carbon emissions. In this regard, different policies could be applied to reduce carbon emissions, such as enhancing renewable energy deployment and encouraging technological innovations. In addition, supporting mechanisms, such as feed-in tariffs, renewable portfolio standards and tax policies, are employed by governments to develop renewable energy generation along with implementing energy use efficiency for saving energy.

The World Energy Committee states that there exists no risk-free energy resource and for this reason, while choosing the energy resources, cost factors must be considered with environmental effects. Today, prevention of environment pollution and conservation of environment have a dimension exceeding national borders (Grigoriu, 2008). The risks that result from using of fossil fuels increasingly (petroleum, coal and gas) must be decreased. To decrease such risks and maximize energy productivity, energy resources that emit less harmful gas in the atmosphere (like Carbon-dioxide (CO2) must be preferred in addition to renewable energy. Otherwise, destruction of ecological balance and disasters in future will be inevitable (Keith, 2009). The negative effects of renewable energy resources on environment are lesser than the conventional energy resources. Many countries have started to install facilities that use renewable energy sources for power generation.

The importance of alternative energy sources comes together with climate change challenges associated with the excessive use of fossil fuels. There are three primary motivators that stimulate the growth of renewable energy technologies: energy security, economic impacts and carbon dioxide emission reduction. The term "alternative energy" refers to any form of energy other than the conventional sources of energy, including hydropower. In recent years the focus has been on renewable energy sources. There are so many sources of renewable energy, however is this paper, Solar, Wind, Biomass, and Hydropower and to two significant global trends that should characterize the deployment of renewable technologies over the medium term. First, as renewable electricity technologies scale up, from a total global supply of 1,454 gigawatts (GW) in 2011 to 2,167 GW in 2017, they should also spread out geographically. Second, the more recent years of high fossil fuel energy use has led renewable technologies to become increasingly competitive on a cost basis with their alternatives in a number of countries and circumstances. According to IEA calculations, wind is the most competitive type of renewable energy technology among the growth rate of consumption is strongly increasing over the next decade. Also, renewable energy markets are not easily formed due to cost disadvantages and the subsidizing of fossil fuels.

Renewable Energy Supply Technologies

The renewable energy supply chain (RESC) is defined as "t transformation of raw energy into usable energy and involves a effective set of management principles from the point of acquisitio of energy resources to the point of consumption of usable energy' The renewable energy supply chain is mainly consisting on fiv phases namely procurement, generation, transmission, distribution and demand. These phases cover all processes along the supply chai of renewable energy, from raw materials (input) to the final product (output)[1][2]. Alternatively, the RESC can be divided into three processes as upstream, production, and downstream (see Figure 1) [3]. Its main objectives are to provide a regular and consistent supply of raw materials and to encourage and promote the use of renewable energy technologies. The renewable energy supply is continuously increasing. A large amount of investment has been made during recent years and the advancement of technology has enabled countries to produce renewable energy more cost effectively. It is forecasted that the number of countries producing above 100 megawatts (MW) of renewable energy will increase significantly by 2017 (IEA, 2012d). Due to some negative and irreversible externalities coming with conventional energy production, it is necessary to promote and develop renewable energy supply technologies.

These technologies may not be comparable with conventional fuels in terms of production cost, but they could be comparable if we consider their associated externalities, such as their environmental and social effects. Also, it should be noted that economies of scale could play a key role in reducing the unit production cost. Transmission and distribution costs, as well as technologies, do not differ much among the conventional and renewable energies. Below we present facts about the development of the main renewable energy supply technologies.

1. Hydro Power

Hydroelectric power, is a renewable source of energy that generates power by using a dam or diversion structure to alter the natural flow of a river or other body of water. Hydropower relies on the endless, constantly recharging system of the water cycle to produce electricity, using a fuel—water—that is not reduced or eliminated in the process. There are many types of hydropower facilities, though

they are all powered by the kinetic energy of flowing water as it moves downstream. Hydropower utilizes turbines and generators to convert that kinetic energy into electricity, which is then fed into the electrical grid to power homes, businesses, and industries. Hydro power is currently the largest renewable energy source for power generation around the world.

Hydro electricity generation has had a strong increase over the past 50 years. It was 340 terawatt-hour (TWh) in 1950 and covered about one-third of the global electricity demand. It increased to 1,500 TWh in 1975 and further to 2,994 in 2005. We can compare this to the global consumption of 15,000 TWh of electricity with a global production of 18,306 TWh in 2005 (Ngô and Natowitz, 2009). Currently, hydro power development is difficult due to a large initial fixed investment cost and environmental concerns.

Additionally, hydro power has caused problems for local residents associated with the need to relocate large populations, as well as the construction of dams is permanent with a sunk cost of utilities which cannot be removed. The environment is also influenced by hydro power construction because of large engineering works. On the other hand, hydro power is attractive due to a preexisting supply of water for agriculture, household and industrial use, and hydro power is clean and enables the storage of both water and energy. Also, the stored energy can be used for the application of both base-load and peak time power generation. The largest capacity hydro power plant in the world is the Itaipu Dam installed on the Paraná River and developed jointly by Brazil and Paraguay. The initial capacity was 12.6 GW in 1984, but this has since been increased to 14 GW in 2006 (Ngô and Natowitz, 2009). Many argue that hydro plant construction projects could improve local economies. For example, the US employed thousands of workers to complete the Hoover Dam project, which was constructed during the depression in 1930s (Tester, 2005). Hydro power plays a key role for some countries, such as Norway and Sweden. Based on BP statistics (2012), hydro electricity demand in Norway (122 TWh) constituted almost 64% of the primary energy consumption in 2011, compared to shares of 26% and 8% for oil and natural gas, respectively. Similarly, around 30% of energy consumption in Sweden has been supplied by hydro power (66.5 TWh). China, Brazil and Canada are the top three

hydro electricity producers worldwide, with 694.0, 429.6 and 376 TWh generated, respectively. Figure (1) shows the general trend of worldwide hydro electricity consumption from 1965 to 2011.

2. Wind Power

Wind power or wind energy is the use of wind to provid mechanical power through wind turbines to turn electric generator for electrical power Wind power is a popular sustainable source tha has a much smaller impact on the environment compared to burning fossil fuels.

Wind farms consist of many individual wind turbines, which are connected to the electric power transmission network. Onshore wind is an inexpensive source of electric power, competitive with, or in many places cheaper than, coal or gas plants. Onshore wind farms have a greater visual impact on the landscape than other power stations, as they need to be spread over more land[3][4] and need to be built in rural areas, which can lead to "industrialization of the countryside"[5] and habitat loss.[4] Offshore wind is steadier and stronger than on land and offshore farms have less visual impact, but construction and maintenance costs are significantly higher. Small onshore wind farms can feed some energy into the grid or provide power to isolated off-grid locations. The installed capacity of wind power has increased from 4.8 MW in 1995 to more than 239 GW in 2011. Today, each wind turbine could generate as much electricity as a conventional power plant. Wind energy has made its most significant contributions in China, the US and Germany, where the cumulative installed capacities are 62, 47 and 29 GW, respectively. The worldwide wind installation capacity trend based on the BP (2012) wind capacity installation has increased continuously throughout the last two decades. IEA estimates that the global capacity will increase from 238 GW in 2011 to almost 1,100 GW by 2035, of which 80% will be derived from onshore wind turbines (IEA, 2012e). According to this report, offshore wind capacity is expected to grow fairly quickly from 4 GW in 2011 to 175 GW by 2035 as a result of public support. This target will be achieved if the required investment is made based on the design plan. Estimates indicate that around 980 billion USD is required in the investments between 2010-2020. Tester argued that solar, thermal and photovoltaic energy are produced by capturing a fraction of incident solar. Wind, hydro, wave, ocean thermal, and

biomass energy are also indirectly produced by solar. According to Tester, this competency could improve in the long-term. Since wind turbines are installed on windy sites where the population density tends to be lower, offshore wind turbines are considered a viable alternative for land based turbines, especially in areas with limited land resources or where there is opposition from local residents. The largest offshore wind farm, located in Denmark, includes 80 turbines that produce 2 MW of power. According to Ngô and Natowitz, Denmark exports the majority of power it generates from wind turbines, because the domestic demand is substantially less than the power produced.

Gipe (1995) argued there are crucial limitations to the successful use of wind energy. From a financial sense, these factors include the costs, revenues, and expected returns on investment. Financial targets could be managed by taxes, but other factors such as national energy policy may be important. Costs include both installation and operation expenditures, where revenue is dependent on wind resources, a turbine's performance and the quantity of energy produced. For a wind plant, this value is defined by the purchase power rate or a feed-in tariff. This value is calculated based on the price paid to the utility plus the transmission cost to their house, where the price of wind energy depends on how much energy is demanded by local residents. Therefore, the feasibility and minimum required speed for a wind turbine to be economically viable is related to how much wind energy is worth. Gipe (1995) conducted two case studies in Europe and Great Britain. This study found that wind energy is highly valued in northern Europe with 5.0-6.5 m/s a sufficient wind speed to constitute a feasible energy source, but that the average speed in Great Britain should exceed 7.0 m/s due to an associated tariff risk. Gipe argued that wind turbines could be successful when there is a market for generated power, in which some households sell a part of their wind turbines' excess power generation back to a local utility. An agreement is required between parties to process this transaction, and at this step, feasibility depends on government policy for pricing. Pricing policies have been different in United States and Denmark, which has subsequently affected the installed capacity.

3. Solar Power

During the two last decades, the economic feasibility of solar

power for residential, commercial and industrial consumption ha been investigated by researchers. Industrial countries like Japa and Germany are looking for alternative sources of energy such a solar power due to the limited availability of natural primary energy sources. In early 1990s, Japan started to take advantage of large scale electricity generation by solar photovoltaic (PV), and was soon followed by Germany. Currently, both countries have taken the lead in the manufacture and production of solar power technologies. More recently, China has developed an extensive solar power capacity due to cheap labor and government subsidies, in turn, decreasing the cost of solar power generation. Almost 30 GW of new capacity was installed worldwide in 2011, leading to an increase in the total world capacity to 69 GW. A major part of this new capacity has been due to tariff support policies, the expiration date of some policies and price reductions, all towards the end of the year. Turkey increased its capacity by 1,353% in 2011from 2010. Bulgaria, Italy, Slovakia, and Greece have also increased their capacity over the same time. It is expected that there will be a movement to establish PV production on a mass scale between 2010 and 2020, followed by the integration of PV systems into the power grid thereafter. Similar to wind energy, solar energy is dependent on weather conditions. Variation in weather, including clouds and pollution, could affect solar power generation. There is a major difference between wind and solar power, as solar power has time limitations. Therefore, solar power generation varies by season, location and daytime. Many technologies are used to deploy solar radiation including thermal solar energy, concentrated solar power plants (CSP), solar chimneys or towers and photovoltaic systems (Ngô and Natowitz, 2009).

Photovoltaic technology allows the integration of PV collectors into the building and can turn external walls, windows and roofs into PV collectors. However, some environmental and health concerns can arise from the use of materials in the PV systems (Tester, 2005). Gordon (1987) analyzed the optimal sizing of stand-alone photovoltaic power generation systems in order to design a cost effective alternative for conventional fossil fuel generator in developing countries, where most people live in rural and off-grid areas. Evaluated the benefits of building-integrated PV systems, comparing them to conventional PV

power plants through the aspects of a life cycle analysis, maximizing energy efficiency and CO2 reduction potential. The results show favorable effects for building-integrated PV systems in terms of the energy production and reduction in CO2 emissions. They estimated CO2 yields of 2.6 and 5.4 for conventional PV power plants and building-integrated systems, respectively. These benefits are estimated to increase in the future with the advancement of PV technologies.

4. Geothermal

Geothermal is a type of thermal energy generated and stored within the Earth. It has been used throughout history for bathing, heating and cooking. Geothermal energy is created by radioactive decay, with temperatures reaching 4,000°C at the core of the Earth. While geothermal energy is available worldwide, there is an important factor called the geothermal gradient that indicates whether a region is a favored place for enactment. It measures the rate at which the temperature increases as the depth of the Earth increases. For example, the average geothermal gradient in France is 4°C/100m with a range of 10°C/100m in the Alsace region to 2°C/100m in the Pyrenees Mountains. In Iceland and the volcanic regions, the gradient can reach as high as 30°C/100m (Ngô and Natowitz, 2009).

5. Other Renewable Sources

There are other types of renewable energy sources including biomass, ocean waves and tides. Biomass is defined as living plants and organic waste which are made by plants, human, marine life, and animals. Based on Tester (2005), the main advantage of biomass is availability, as it can be readily found in all places. Many kinds of energy can be produced from biomass: electricity, cooking heat, chemical feedstock, etc. As a feedstock, biomass has a lower sulfur content than coal and a lower emission is produced by combustion. In early 2000, the United States had an installed capacity of 11 GW from biomass including the forest product and agricultural industry, municipal and solid waste industry, and other sources (Ngô and Natowitz, 2009). Extracting energy from the ocean is considered to be an interesting option, due in part to the wide availability of ocean sources. There are six different resources which are available from oceans: offshore wind energy, wave power, marine current energy, ocean thermal energy conversion, tidal power, and osmotic power. The Bay of Fundy has

the largest tidal range in the world that enables it to support a pow station with a capacity of 2 GW or more (Tester, 2005). In this pap we considered hydro, wind, solar and geothermal energy, because their main contribution to renewable power generation.

- **Energy efficiency technologies**

As previously mentioned, there are two main solutions to reducin CO2 emissions and to overcoming the climate change problem replacing fossil fuels with renewable energy sources as much as possibl and through enhancing energy efficiency. We discussed the state of the art methods for technical and economic feasibility of expanding the use renewable energy sources and the possibility of substitution in the first part of this review. In this part that follows, we discuss energy efficiency technologies. Energy efficiency for an electricity network could be considered in different stages, such as the power generation, transmission, distribution and consumption. The different technologies that are currently available include electric vehicles (EV), combined heat and power (CHP), virtual power plants (VPP) and smart grids.

- **Main drivers for using renewable energy technologies**

1. Energy security

Concerns about the security of the energy supply were raised after the Arab oil embargo in 1973. Additional factors included high oil prices, the increasing dependency on oil imports, the depletion of fossil fuels, an increasing competition from emerging economies, political instability in major oil producers and a high impact due to any disruption in energy supply on developed and rapidly developing countries (Bhattacharyya, 2011). The level of insecurity was shown by the risk of supply disruption and estimated costs associated with security improvement. Owen (2004) called the security of energy supplies a key requirement for the economic, environmental and social objectives of sustainable development policies. In his view, the energy security risk could be classified as strategic and domestic system risks. He also defined damage costs and control cost as potential costs imposed by energy insecurity. He argued that the damage cost could be evaluated by potential decreases in GNP, but that it is difficult to estimate how much money is spent as control costs. For example, it's very difficult to estimate how much money has been spent by the United States to control oil security.

2. Economic impacts

The emphases for economic impacts are job creation, industrial innovation and balance of payment. Renewable energy technologies could enable countries with good solar or wind resources to employ these energy sources to meet their domestic demand. Also, renewable energy technologies may even enable these countries to utilize renewable energy sources with long-term export potential. Moreover, the cost of importing fuels can affect economic growth. If these countries could reduce their balance of payment by producing their own renewable energy to replace their dependence on fossil fuels, it could raise the capacity for investment in the other sectors. IEA created a cost-benefit analysis for the investment in low-carbon energy Systems based two scenarios: ETP 2012 6°C (6DS), which assumes business as usual and 2°C (2DS), which targets the reduction of carbon dioxide emissions by 50 percent, using 2005 levels as the benchmark. The results estimate that 103 trillion dollars will be saved during the years 2010-2050 by reducing fossil fuels consumption. This calculation is based on the reduction in fossil fuels purchases (214 Gtoe), although the estimate could increase to 150 trillion dollars if the impact of lower fuel prices is taken into consideration (IEA, 2012c).

3. CO2 emission reduction

Renewable energy technologies could reduce carbon dioxide emissions by replacing fossil fuels in the power generation industry and transportation sector. Life-cycle CO2 emissions for renewable energy technologies are much lower than fossil fuels. The life-cycle balance is also considered to be an important factor in the heat and transportation sectors. Based on an analysis performed by the IEA, renewable power generation enabled countries to save 1.7 Gt of CO2 emissions in 2008, a figure that is more than the total power sector's CO2 emissions in the European region (1.4 Gt) (Ölz, 2011). This analysis shows that hydropower technology constitutes the largest share for saving CO2 emissions with 82 percent, followed by biomass and wind with 8 and 7 percent, respectively.

Summary and Conclusion-

Ongoing concerns about climate change have made renewable energy sources an important component of the world energy consumption portfolio. Renewable energy technologies could reduce carbon dioxide

emissions by replacing fossil fuels in the power generation industry and the transportation sector. Due to negative and irreversible externalities in conventional energy production, it is necessary to develop and promote renewable energy supply technologies. Power generation using renewable energy sources should be increased in order to decrease the unit cost of energy and to make them compatible with a competitive alternative to the conventional energy sources. Two main solutions may be implemented to reduce CO2 emissions and to overcome the problem of climate change: replacing fossil fuels with renewable energy sources as much as possible and enhancing energy efficiency regardless of type. In this review, we considered hydro, wind, solar and geothermal sources, because of their significant contribution to power generated by renewable sources. Renewable energy production and supply is continuously increasing on the global level.

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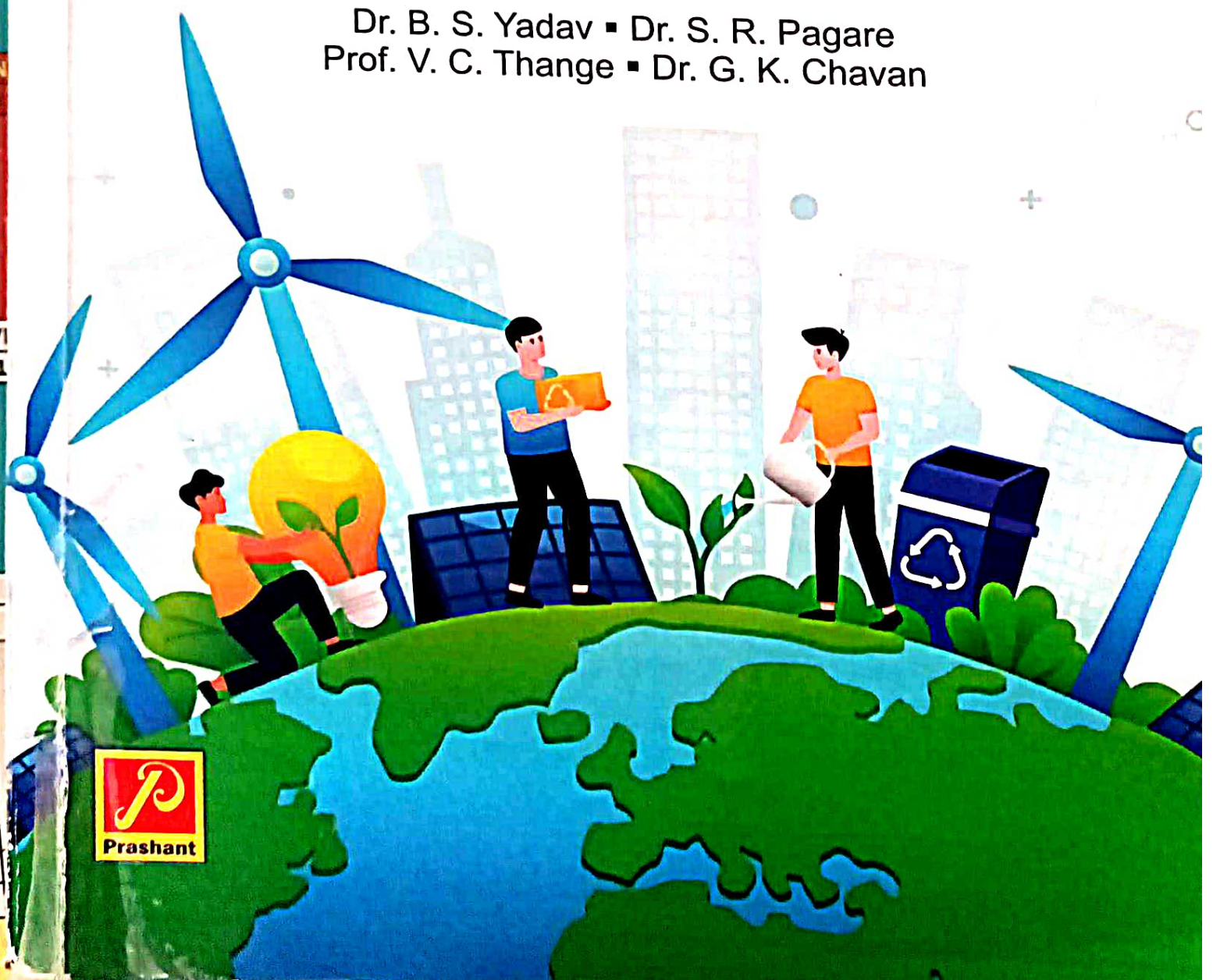

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Analysis of Environmental Impacts of Renewable Energy Resources

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Abstract:

Conventional energy sources based on coal, gas, and oil are very much helpful for the improvement in the economy of a country, but on the other hand, some bad impacts of these resources in the environment have bound us to use these resources within some limit and turned our thinking toward the renewable energy resources. The social, environmental, and economical problems can be omitted by the use of renewable energy sources, because these resources are considered environment-friendly, having no or little emission of exhaust and poisonous gases like carbon dioxide, carbon monoxide, sulfur dioxide, etc. Renewable energy is going to be an important source for power generation shortly because we can use these resources again and again to produce useful energy. Wind power generation is considered as having the lowest water consumption, lowest relative greenhouse gas emission, and most favorable social impacts. It is considered as one of the most sustainable renewable energy sources, followed by hydropower, photovoltaic, and then geothermal. As these resources are considered clean energy resources, they can be helpful for the mitigation of the greenhouse effect and global warming effect. Local employment, better health, job opportunities, job creation, consumer choice, improvement of life standard, social bonds creation, income development, demographic impacts, social bonds creation, and community development can be achieved by the proper usage of the renewable energy system. Along with the outstanding advantages of these resources, some shortcomings also exist such as the variation of output due to seasonal change, which is the common thing for wind and hydroelectric power plants; hence, special design and consideration are required, which are fulfilled by the hardware and software due to the improvement in computer technology.

Keywords: Conventional energy, Environmental energy

resources, wind power, hydropower etc.

Introduction:

The world is fast becoming a global village due to the increasing daily requirement of energy by all populations across the world while the earth in its form cannot change. The need for energy and its related services to satisfy human social and economic development, welfare and health is increasing. All societies call for the services of energy to meet basic human needs such as health, lighting, cooking, space comfort, mobility and communication and serve as generative processes (Edenhofer et al., 2011). Securing energy supply and curbing energy contribution to climate change are the two overriding challenges of the energy sector on the road to a sustainable future (Abbasi & Abbasi, 2010; Kaygusuz, 2012). It is overwhelming to know in today's world that 1.4 billion people lack access to electricity, while 85% of them live in rural areas. As a result of this, the number of rural communities relying on the traditional use of biomass is projected to rise from 2.7 billion today to 2.8 billion in 2030 (Kaygusuz, 2012).

Historically, the first recorded commercial mining of coal occurred in 1,750, near Richmond, Virginia. Momentarily, coal became the most preferred fuel for steam engines due to its more energy carrying capacity than corresponding quantities of biomass-based fuels (firewood and charcoal). It is noteworthy that coal was comparatively cheaper and a much cleaner fuel as well in the past centuries (Abbasi, Premalatha, & Abbasi, 2011). The dominance of fossil fuel-based power generation (Coal, Oil and Gas) and an exponential increase in population for the past decades have led to a growing demand for energy resulting in global challenges associated with rapid growth in carbon dioxide (CO2) emissions (Asumadu-Sarkodie & Owusu, 2016a). A significant climate change has become one of the greatest challenges of the twenty-first century. Its grave impacts may still be avoided if efforts are made to transform current energy systems. Renewable energy sources hold the key potential to displace greenhouse gas emissions from fossil fuel-based power generating and thereby mitigating climate change (Edenhofer et al., 2011).

Sustainable development has become the centre of recent national policies, strategies and development plans of many countries. The United Nations General Assembly proposed a set of global

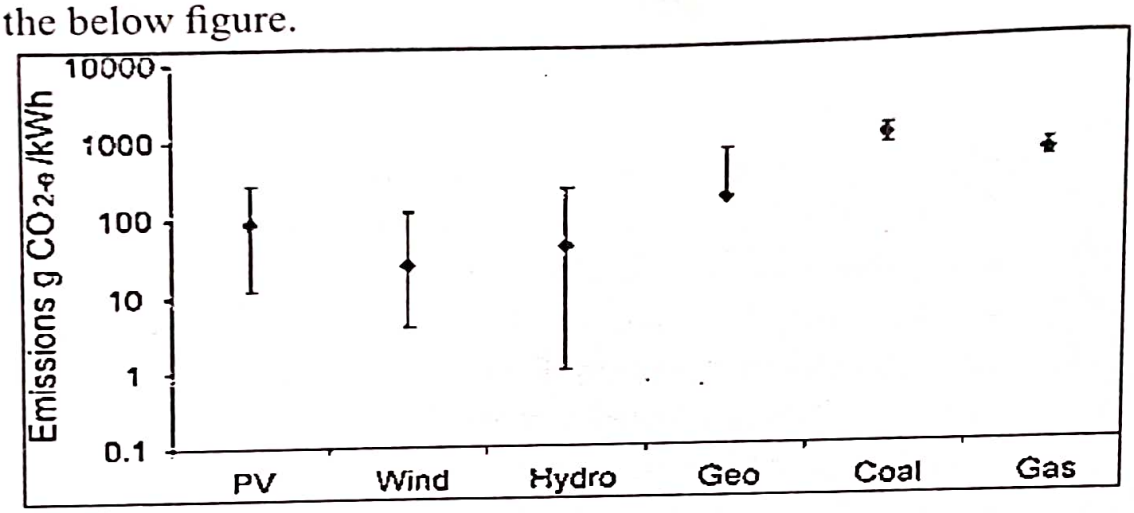
Sustainable Development Goals (SDGs) which included 17 goals and 169 targets at the UN in New York by the Open Working Group. In addition, a preliminary set of 330 indicators was introduced in March 2015 (Lu, Nakicenovic, Visbeck, & Stevance, 2015). The SDGs place greater value and demands on the scientific community than did the Millennium Development Goals. In addressing climate change, renewable energy, food, health and water provision requires a coordinated global monitoring and modelling of many factors which are socially, economically and environmentally oriented (Hák, Janoušková, & Moldan, 2016; Owusu, Asumadu-Sarkodie, & Ameyo, 2016).

Research into alternate sources of energy dated back in the late 90s when the world started receiving shock from oil produces in terms of price hiking (Abbasi et al., 2011). It is evidential in literature that replacing fossil fuel-based energy sources with renewable energy sources, which includes: bioenergy, direct solar energy, geothermal energy, hydropower, wind and ocean energy (tide and wave), would gradually help the world achieve the idea of sustainability. Governments, intergovernmental agencies, interested parties and individuals in the world today look forward to achieving a sustainable future due to the opportunities created in recent decades to replace petroleum-derived materials from fossil fuel-based energy sources with alternatives in renewable energy sources. The recent launch of a set of global SDGs is helping to make sure that climate change for the twenty-first century and its impacts are combated, and a sustainable future is ensured and made as a bequest for future generations (Edenhofer et al., 2011; Lu et al., 2015).

Impacts of Renewable Energy Resources:

Renewable energy projects have also contributed to improving environmental impacts such as reduction of carbon dioxide gas, awakening the community about climate change. The study observed very small impacts on the people living in a particular area, tourism, cost of energy supply, and educational impacts. Significant impacts were observed in the improvement of living standards, social bonds creation, and community development. They also observed that the renewable energy projects are complex to install and are local environmental and condition sensitive. Their forecasting, execution,

and planning require more consideration and knowledge as compared to other projects. The two main aspects of the environment are air and water pollution, normally created by the discharged water from houses, industries, and polluted rain, and discharge of used oils and liquids contains poisonous chemicals and heavy metals like mercury, lead, etc. Along with water pollution, natural resources can be maintained and the greenhouse effect and air pollution can be mitigated by the proper usage of renewable energy sources. Carbon dioxide emission with the generation of electric power using different energy resources is given in the below figure.



Availability and technical limitations:

One of the important assessing factors to generate power from renewable energy sources is the availability and their technical limitation. Each resource has some limitations; photovoltaic cannot generate power only because heat energy from the sun can only be received during the daytime, except cloudy season. For a wind turbine, speed should not increase beyond 25 m/s; otherwise, the turbine will be damaged. Also, the low speed of the wind, that is, <3 m/s, will not be sufficient for the generation of electric power. Geothermal has a good ability to generate power throughout the day for 24 hours, but is geography limited according to the presence of resources. Hydroelectric power plants are easy to start, stop, and operate within minutes; hence, they are considered as one of the highest available, reliable, and flexible renewable energy resources. From an efficiency point of view, hydroelectric is classified at the top of the list, and then wind energy, photovoltaic, and geothermal are the lowest efficient renewable energy resources. Because of the availability of cells in different categories, the

efficiency of photovoltaic is very variable. According to the efficiency, different energy sources are categorized in the table below.

Technique	Efficiency
Photovoltaic	4–22%
Wind	24–54%
Hydro	>90%
Geothermal	10–20%
Coal	32–45%
Gas	45–53%

Conclusion:

Energy is a requirement in our everyday life as a way of improving human development leading to economic growth and productivity. The return-to-renewables will help mitigate climate change in an excellent way but needs to be sustainable to ensure a sustainable future for generations to meet their energy needs. Knowledge regarding the interrelations between sustainable development and renewable energy, in particular, is still limited. The paper aimed to ascertain if renewable energy sources were sustainable and how a shift from fossil fuel-based energy sources to renewable energy sources would help reduce climate change and its impact. Qualitative research was employed by reviewing papers in the scope of the study. Even though, the complete lifecycle of renewable energy sources has no net emissions which will help limit future global greenhouse gas emissions. Nevertheless, the cost, price, political environment and market conditions have become barriers preventing developing, least developed and developed countries to fully utilize their potentials. In this way, a creation of global opportunity through international cooperation that supports least developed and developing countries towards the accessibility of renewable energy, energy efficiency, clean energy technology and research and energy infrastructure investment will reduce the cost of renewable energy, eliminate barriers to energy efficiency (high discount rate) and promote new potentials towards climate change mitigation.

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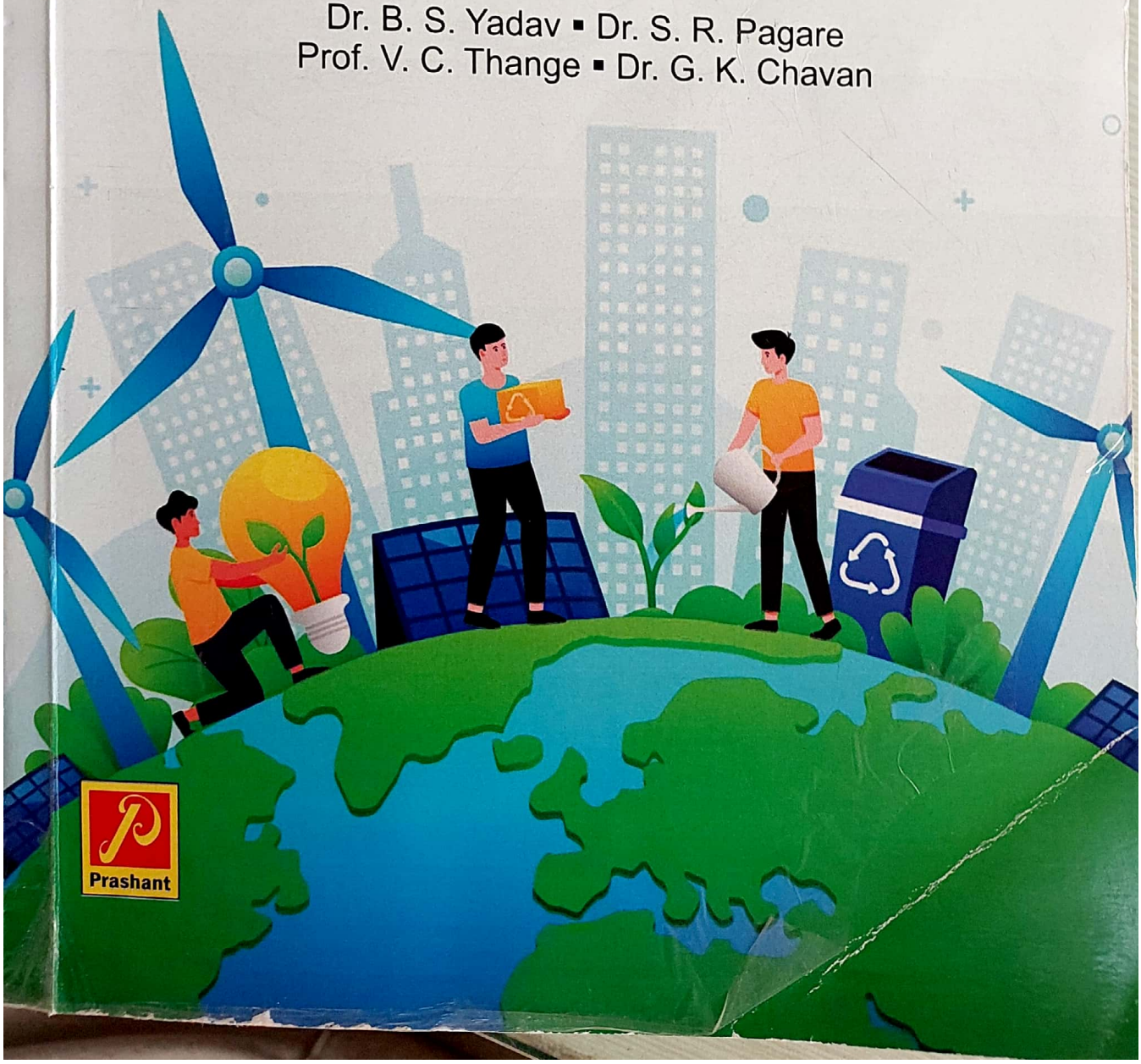

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Solar energy as a source of alternative energy and its environmental impacts

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Introduction:

Energy sources that are more or less continuously made available in a time frame useful to people are called renewable energy. Renewable energy sources are often considered alternative sources because, in general, most industrialized countries do not rely on them as their main energy source. Instead, they tend to rely on the conventional energy sources such as fossil fuels or nuclear power that are non-renewable. Because of the energy crisis in the United States during the 1970s, dwindling supplies of fossil fuels and hazards associated with nuclear power, use of renewable energy sources such as solar energy, hydroelectric, wind, biomass, and geothermal has grown.

Renewable energy comes from the sun or other sources that can theoretically be renewed at least as quickly as they are consumed. If used at a sustainable rate, these sources will be available for consumption for thousands of years or longer. Renewable alternatives derive from wind, water, solar or biomass. Note that wind, water and biomass energy sources are indirect sources of solar energy. One limitation currently associated with most forms of renewable energy is that the energy is not concentrated and not easily portable.

The World's Growing Energy Needs

World energy consumption continues to rise especially in countries like China where the economy is improving. Global demand for energy has tripled in the past 50 years and might triple again in the next 30 years. While much of this growth will come from the rapidly booming economies of China and India, many of the industrialized countries, especially those in Europe, are hoping to meet their energy needs by expanding the use of renewable sources. Although presently only a small percentage, renewable energy is growing very fast, especially wind energy. For example, Germany plans to meet 20% of its electricity and 10% of its overall energy needs with renewable resources by the

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year 2020.

Energy is a key constraint in the rapid economic growth of China and India. In 2003, China surpassed Japan as the world's second largest consumer of oil. However, over 1/3 of this oil is imported. Unlike most Western countries, coal dominates the commercial energy resources of China, accounting for 2/3 of its energy consumption. In 2009 China surpassed the United States as the largest emitter of CO2. In India, the main energy resources are biomass (wood and dung) and coal. Half of India's oil is imported. About 70% of India's electricity is generated by highly polluting coal.

Solar Energy

Solar energy is the ultimate energy source driving life on earth and many human activities. Though only one billionth of the energy that leaves the sun actually reaches the earth's surface, this is more than enough to meet the world's energy requirement. In fact, all other sources of energy, renewable and non-renewable, are actually stored forms of solar energy. The process of directly converting solar energy to heat or electricity is considered a renewable energy source. Solar energy represents an essentially unlimited supply of energy as the sun will long outlast human civilization on earth. The difficulties lie in harnessing the energy. Solar energy has been used for centuries to heat homes and water, and modern technology (photovoltaic cells) has provided a way to produce electricity from sunlight. There are two basic forms of solar energy collectors are passive and active.

Passive and Active Solar Energy

Passive solar energy uses heating and cooling strategies that have been used historically such as natural ventilation, solar heat gain, solar shading and efficient insulation. Passive solar space heating happens when the sun shines through the windows of a building and warms the interior. Building designs that optimize passive solar heating usually have south-facing windows that allow the sun to shine on solar heat-absorbing walls or floors during the winter. The solar energy heats the building by natural radiation and convection and the heat is trapped, absorbed and stored by materials with high thermal mass inside the house. The heat is released at night when needed to warm up the building as it loses heat to the cooler outdoors. Window overhangs or shades block the sun from entering the windows during the summer to keep the building cool.

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Active solar energy systems require the input of some energy to pump a heat-absorbing fluid medium through a collector to store and distribute the energy. Fans or pumps circulate air or heat-absorbing liquids through collectors and then transfer the heated fluid directly to a room or to a heat storage system. The solar collectors are either concentrating or non-concentrating. In the non-concentrating collectors, the surface area that intercepts the solar radiation is the same as the area absorbing the radiation. Flat-plate collectors are the most common type of non-concentrating collectors and are used when temperatures lower than 200°F are sufficient. The collectors absorb and transfer heat to a fluid (water or air) which is then circulated to provide heating to a building. In concentrating collectors the surface area intercepting the solar radiation is greater, sometimes hundreds of times greater, than the absorber area. The collector focuses or concentrates solar energy onto an absorber. The collector usually moves so that it maintains a high degree of concentration on the absorber.

Photovoltaic (PV) Cells

Solar photovoltaic (PV) devices, or solar cells, change sunlight directly into electricity. PV uses semiconducting materials such as silicon to produce electricity from sunlight: when light hits the cells, the material produces free electrons that migrate across the cell, creating an electric current. Small PV cells can power calculators, watches, and other small electronic devices. Arrangements of many solar cells in PV panels and arrangements of multiple PV panels in PV arrays can produce electricity for an entire house. Some PV power plants have large arrays that cover many acres to produce electricity for thousands of homes.

Hundreds of thousands of houses and buildings around the world have PV systems on their roofs. Many multi-megawatt PV power plants have also been built. Covering 4% of the world's desert areas with photovoltaics could supply the equivalent of all of the world's electricity. The Gobi Desert alone could supply almost all of the world's total electricity demand.

Solar Thermal Power Plants

Solar thermal power plants, use concentrating solar collector systems to collect and concentrate sunlight to produce the high temperature heat needed to generate electricity. All solar thermal power systems have solar energy collectors with two main components:

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reflectors (mirrors) that capture and focus sunlight onto a receiver. In most types of systems, a heat-transfer fluid is heated and circulated in the receiver and used to produce steam. The steam is converted into mechanical energy in a turbine, which powers a generator to produce electricity. Solar thermal power systems have tracking systems that keep sunlight focused onto the receiver throughout the day as the sun changes position in the sky.

Environmental Impacts of solar energy

Solar power has minimal impact on the environment, depending on where it is placed. In 2009, one percent of the renewable energy generated in the United States was from solar power (1646 MW) out of the eight percent of the total electricity generation that was from renewable sources. The manufacturing of photovoltaic (PV) cells generates some hazardous waste from the chemicals and solvents used in processing. Often solar arrays are placed on roofs of buildings or over parking lots or integrated into construction in other ways. However, large systems may be placed on land and particularly in deserts where those fragile ecosystems could be damaged if care is not taken. Some solar thermal systems use potentially hazardous fluids (to transfer heat) that require proper handling and disposal. Concentrated solar systems may need to be cleaned regularly with water, which is also needed for cooling the turbine-generator. Using water from underground wells may affect the ecosystem in some arid locations.

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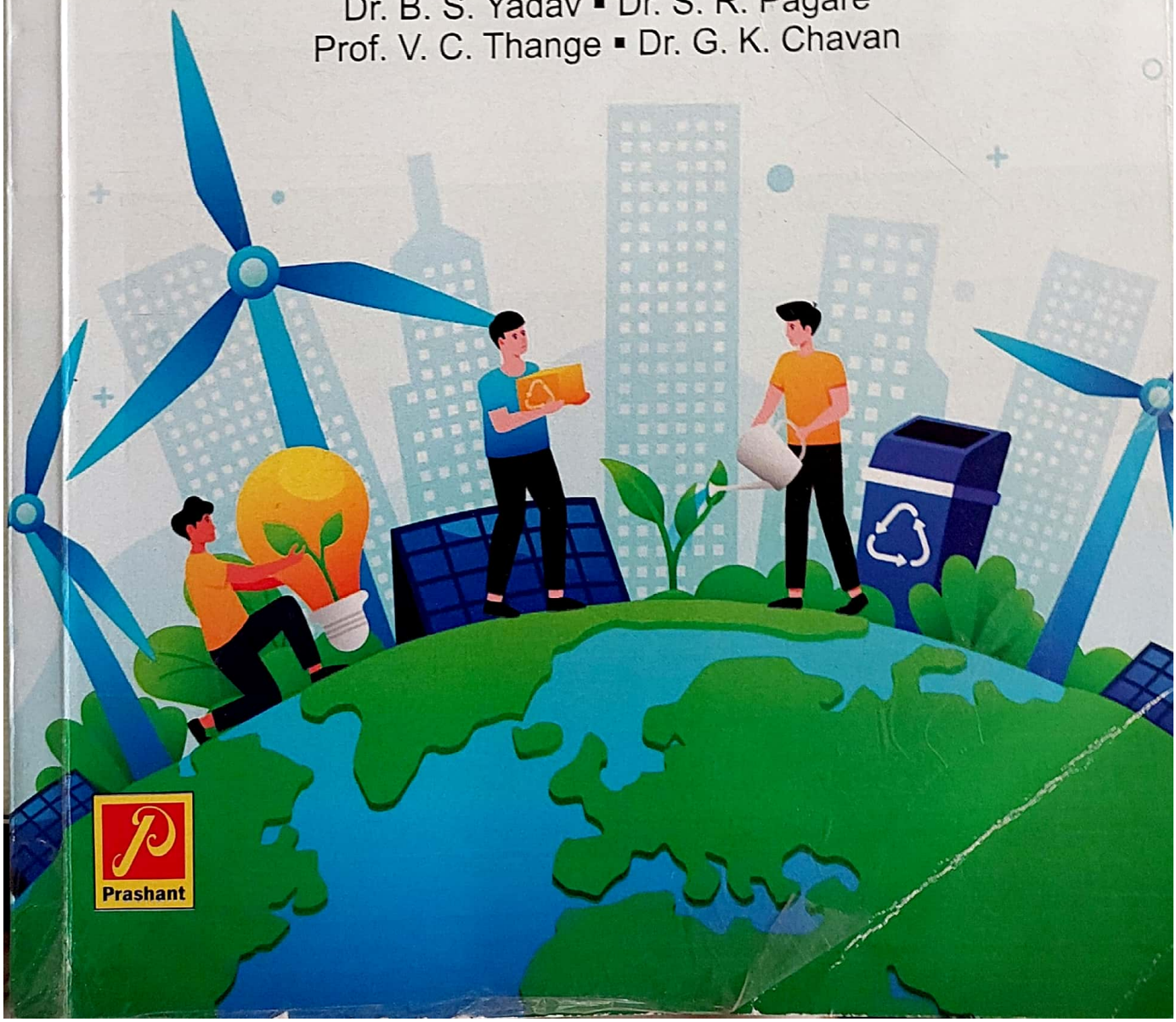

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Applications of Mathematical Models in Environmental Parameters

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Introduction:

Mathematics brings solid science to the debate. It provides confidence in climate change models and it helps to improve existing renewable technologies. Mathematics is also a key in assessing renewables based on observations from the environment. For example, weather data helps to predict efficiency of solar cells.

Throughout nature, animals tend to live together. From the tiniest micro-organisms, to swirling starling flocks, to huge swarms of schooling fish or the giant ocean-crossing blue whale, social living is everywhere. Mathematics helps us to understand why this is true. Using equations and computer simulations, we study how simple rules and mechanisms lead to the complex but coordinated animal groups we see all around us and also why evolution has led to so much collective behavior in the natural world. Maths may guide plans and strategies for how we can preserve wild populations as they perform the tasks needed to survive and reproduce. And the same mathematics inspires new approaches to how businesses and social enterprises may work together in pursuit of common goals.

Mathematics brings solid science to the debate. It provides confidence in climate change models and it helps to improve existing renewable technologies. To establish a sustainable energy mix through clever energy storage and smart distribution, mathematical models help communities to plan for their future – because one way to solve the energy challenge is to think small community energy projects build on mathematics for renewables to provide clean and sustainable electricity and heat for a city, a town or a region.

The obtained solutions of modeled equations are useful for understanding the mechanism of the complicated non-linear physical phenomenon which is related to propagation of plasma waves in depressive medium. It is noted that the existence of soliton solutions

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depends essentially on the coefficients of models i.e. on specific non-linear and depressive features of the medium. The obtained soliton solutions and travelling wave solutions of modeled partial differential equations with arbitrary parameters may be significant to explain some physical and natural phenomena. The results obtained in Mathematical modelling, may be found various applications in areas such as plasma physics, fluid dynamics, solid state physics, atmospheric science, engineering signal processing. The Mathematical models and its solutions play an important role in prevention of natural disasters, eco-logical ravage and damage to manmade structures due to better understanding of steep waves, travelling waves, dynamics of tsunami, strong internal waves in sea, rips, tidal currents and storm surges.

There are different ways Mathematics can saves the environment depletions.

Designing better climate models and weather forecasts

Accurate weather forecasts predict when and where extreme weather may strike, whilst climate projections are key to identifying weather patterns changing on a longer time scale. Our ability to predict weather and climate has advanced in leaps and bounds in the last few decades, thanks to Mathematics. Modern weather forecasts rely on computers to solve the complex equations that simulate the atmosphere's behavior – from global processes that influence the flow of the jet stream down to local rain clouds.

Mathematicians play an important role in this process, working with a set of equations that describe the atmosphere, taking into account temperature, pressure and humidity. Global Circulation Models (GCMs) describe the interactions between oceans and atmosphere to look at what the average conditions could be in decades to come.

Making better computers

The computers used to model weather and climate get more powerful every year – but sheer processing power isn't everything. Maths makes these computers far more effective both through contributing to technological improvements in areas like quantum computing, and by rethinking the algorithms used in computer programs. For instance, new research allows the computer to automatically zoom its attention in on areas where the weather is particularly interesting, such as around storms. Optimizing computers performance can also reduce their

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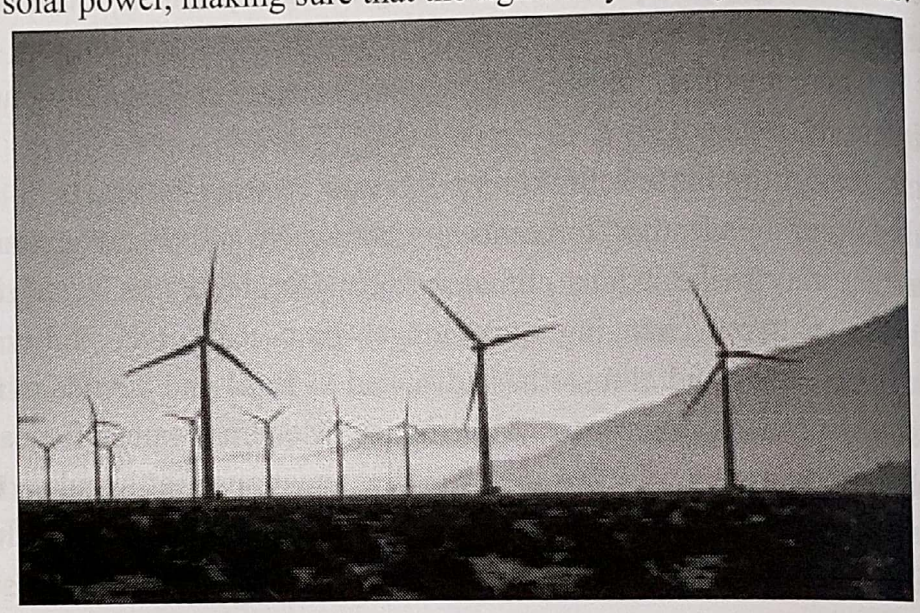
energy demand.

Making the most of renewable energy sources

Renewable energy sources lie at the heart of a low-carbon world. By choosing optimal locations for wind or solar farms and designing the most effective layouts for tidal and wind turbine arrays, Mathematicians ensure that these technologies harvest the maximum energy as efficiently as possible.

Mathematicians and Mathematical models contribute to research into energy supply and demand that ensures networks incorporate higher proportions of weather-dependent energy sources such as wind or solar power, making sure that the lights stay on in years to come.



Optimizing the layout of wind turbines enables them to harvest more energy

Preparing for change

The effects of climate change will be felt on many levels, and knowledge is key to safeguarding human health and livelihoods as we adapt to changing circumstances. Mathematicians use their understanding of probability and uncertainty to advise policymakers on the likelihood of heatwaves, floods or other changes in weather patterns, and help them to plan accordingly. Businesses also need detailed information on how climate change might affect them. The food industry for example is highly dependent on agriculture, and could use advance warning of an upcoming drought for instance to prepare themselves for smaller yields. Mathematicians try to predict

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who might be at risk so they can prepare for the future.

Moreover, Mathematical simulations are a valuable tool for estimating the possible consequences of specific actions, by playing out different scenarios. This too can help policymakers choose one course of action over others. By presenting the hard numbers, Mathematicians with an environmental conscience can seek to influence the ways businesses operate.

Making sense of 'big data'

Collecting billions of pieces of data in environments, from ice sheets to cities, can deliver precious insights into our planet's physical processes, human behavior and everything in between. Climate scientists rebuild the history of our planet's atmospheric composition by analyzing the tiny bubbles trapped in ice records, in order to anticipate the scope of future changes. But without the statistical methods that mathematicians bring to analyses this data and assess its reliability, the information has less value.

Mathematical modelling is key to the development of new technologies

New technologies are key to a low carbon future. Carbon capture and storage (CCS), for instance, could safely lock away greenhouse gases emitted by fossil fuel-fired power stations, and is likely to play a key role in averting dangerous levels of global warming. Detailed mathematical models make this research possible by using sophisticated logistics methods, network analysis, statistical modelling and many other mathematical tools.

The waves which is smaller in size travels with slowly and has high frequencies, is called wave dissipation in water waves. Appositely if the size of wave is larger or long then it travels speedily. A tsunami is a wave occurs in ocean which is very long, arises due to earthquake underwater or by a large landslide or by a submarine volcanic eruption. Shallow water wave theory gives various adequate model wave equations of waves in different water storages like ocean, canals of water, beaches and mostly in in the interior of sea. So the places where solitary waves observed attract the much attention of related researchers like oceanographers, engineers and geophysicists. The Partial Differential Equations (PDEs) that describes water waves in shallow water are called shallow water wave equations.

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Using the shallow water wave equations by modifying and adding some inputs further many researchers related to solitary wave theory different types of water wave model equations are investigated and obtain their solutions by different methods. These water wave models play an important role in atmospheric science and in oceanography. Most of these modeled wave equations are integrable and they have different types of travelling and solitary waves.

Making Maths accessible to everyone

Crucially, Maths can't save the planet on its own. Many of the global challenges we face are multi-disciplinary: overcoming them requires mathematicians to collaborate with scientists and engineers in different fields. And although the basic science behind climate change is well understood, convincing the general public and decision makers to take action to reduce carbon emissions is very much a work in progress. With their firm grasp of concepts such uncertainty and probability, Mathematicians are uniquely placed to communicate the science, data and forecasts, and ensure that this information is meaningful to the people who need it.

For Maths to have a real impact on our planet's fate, mathematicians therefore need to communicate the importance of their work clearly and effectively, knowing when to swap complicated equations for persuasive story-telling, pictures, games or genuine interaction. Opening up Mathematics up for the world to understand might just be the best way that we can come to our planet's rescue.

Atmospheric dispersion modeling

The basic technology for analyzing air pollution is through the use of a variety of mathematical models for predicting the transport of air pollutants in the lower atmosphere. The principal methodologies are:

- Point source dispersion, used for simple industrial sources.
- Line source dispersion, used for airport and roadway air dispersion modeling Area source dispersion, used for forest fires or dust storms
- Photochemical models, used to analyze reactive pollutants such as form smog

The point source problem is the best understood, since it involves simpler mathematics and has been studied for a long period of time,

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dating back to about the year 1900. It uses a Gaussian dispersion model to forecast the air pollution isopleths, with consideration given to wind velocity, stack height, emission rate, stability class (a measure of atmospheric turbulence). This model has been extensively validated and calibrated with experimental data for all sorts of atmospheric conditions.

Uses of Mathematical environmental models

- To gain better understanding of and glean insight into environmental processes and their influence on the fate and transport of pollutants in the environment.
- To determine short and long term chemical concentrations in the various compartments of the ecosphere for use in regularity, enforcement, and in the assessment of exposures, impacts, and risks of existing as well as proposed chemicals.
- To predict future environmental concentrations of pollutants under various waste loadings and/or management alternatives.
- To satisfy regulatory and statutory requirements relating to environmental emissions, discharges, transfers, and releases of controlled pollutants.
- To use hypothesis testing relating to processes, pollution control alternatives, etc.
- To implement in the design, operation, and optimization of reactors, processes, pollution control alternatives, etc.
- To simulate complex systems at real, compressed, or expanded time horizons that may be too dangerous, too expensive, or too elaborate to study under real conditions. To generate data for post–processing, such as statistical analysis, visualization analysis, and animation, for better understanding, communication, and dissemination of scientific information.
- To use environmental impact assessment of proposed new activities that is currently nonexistent.

In environmental systems, nonlinearities and spatial and temporal lags prevail. However, all too often these system features are moved to the sidelines of scientific investigations. As a consequence, the

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presence of nonlinearities and spatial and temporal lags significantly reduces the ability of these investigations to provide insights that are necessary to make proper decisions about the management of complex ecological–economic systems. New modeling approaches are required to effectively identify, collect, and relate the information that is relevant for understanding those systems, to make consensus building an integral part of the modeling process, and to guide management decisions.

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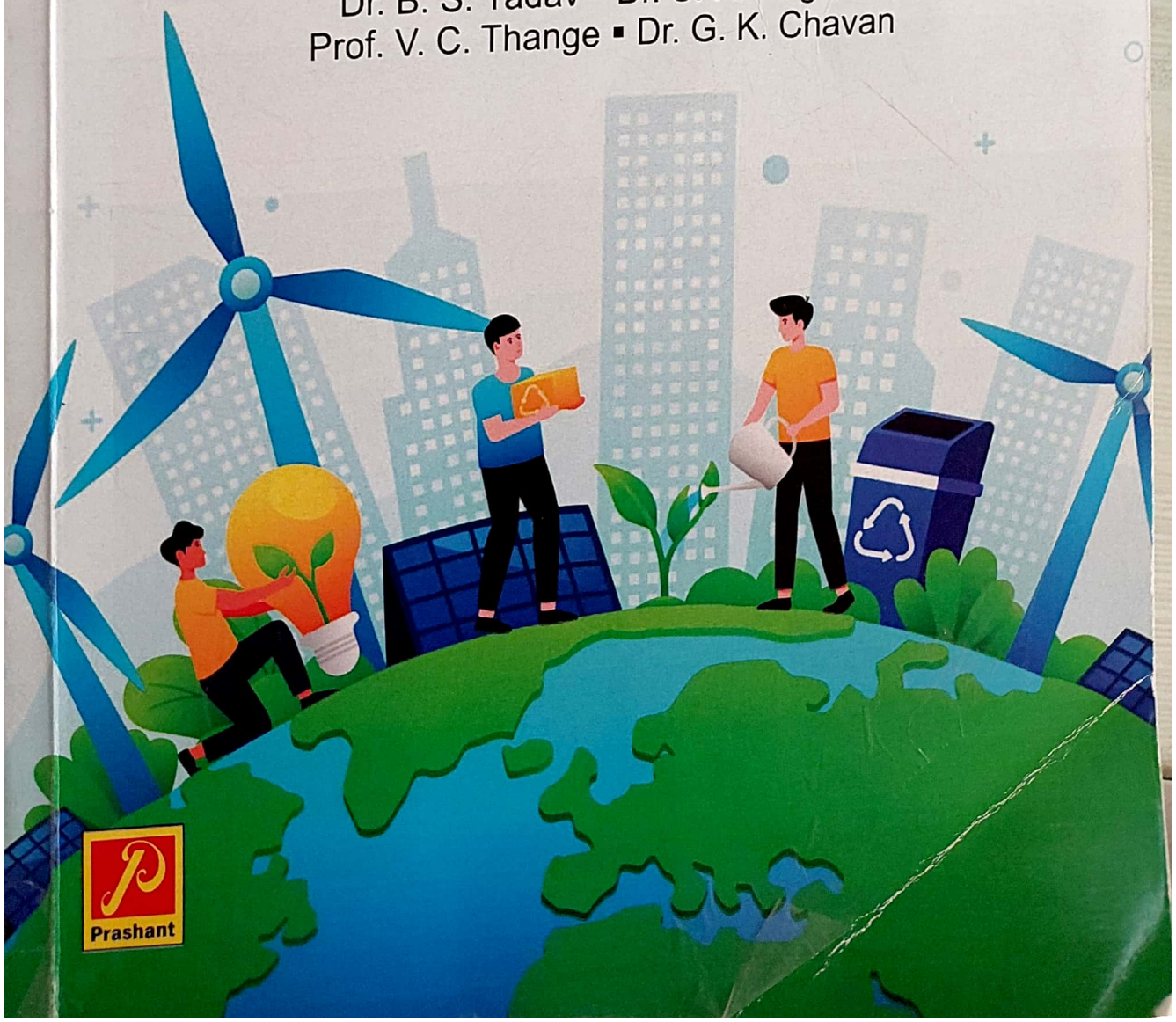

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Impacts of Coal Burning on the Environment and Human Health

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Introduction:

Energy is the ability of a system to do work. A system has done work if it has exerted a force on another system over some distance. When this happens, energy is transferred from one system to another. At least some of the energy is also transformed from one type to another during this process. One can keep track of how much energy transfers into or out of a system. There are two categories that all energy falls into: kinetic and potential. Kinetic energy refers to types of energy associated with motion. For example, a rock rolling down a hill, the wind blowing through trees, water flowing over a dam, and a cyclist riding a bicycle are just a few examples of kinetic energy. Potential energy is energy possessed by an object or system due to its position in space relative to another object or system and forces between the two. Examples include a rock poised at the top of a hill and water stored behind a dam. Some forms of energy are part kinetic and part potential energy. Chemical energy describes the potential of a chemical substance to undergo a chemical reaction and transform other chemical substances; hence it is a form of potential energy. Examples include energy stored in the food you eat and the gasoline that you put in your car.

Living organisms need energy to perform life-sustaining "work" in order to survive. For nearly all living systems on Earth, the sun is the ultimate source of that energy. Over time, we humans have developed an understanding of energy that has allowed us to harness it for uses well beyond basic survival. The development and evolution of human society is largely attributed to our relationship with energy.

Fossil Fuels

Fossil fuels is the term given to energy sources with a high hydrocarbon content found in the Earth's crust that formed in the geologic past and can be burned to release their energy. They were

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formed from prehistoric plants and animals that lived hundreds of millions of years ago (100–500 million years ago). When these ancient living organisms died they were quickly buried and subjected to immense pressure from overlying earth materials including layers of mud, rock, sand, and sometimes surface water bodies such as oceans and lakes.

During the millions of years that passed, the dead plants and animals slowly decomposed in anaerobic (very low to no oxygen) conditions and their chemical energy became concentrated. The organic compounds that once made up tissues of these organisms were chemically changed under high pressures and temperatures. While some fossil fuels may be in the process of formation today, the amount of time required for usable quantities to form is measured in millions of years, so these fuels will never be available for us. Thus for all practical purposes we consider fossil fuels to be finite and non-renewable.

Fossil Fuel Types and Formation

There are three main types of fossil fuels – natural gas, oil, and coal – and the specific type formed depends on the combination of organic matter that was present, how long it was buried and what temperature and pressure conditions existed when they were decomposing. Oil and natural gas were created from organisms that lived in water and were buried under ocean or river sediments. Long after the great prehistoric seas and rivers vanished, heat, pressure, and bacteria combined to compress and transform the organic material under layers of silt or shale rock. In most areas, a thick liquid called oil formed first, but in deeper, hot regions underground, the transformation process continued until natural gas was formed. Over time, some of this oil and natural gas began working its way upward through the earth's crust until they ran into rock formations called "cap rocks" that are dense enough to prevent them from seeping to the surface. It is from under these cap rocks that most oil and natural gas is retrieved today.

Coal

Coal is a fossil fuel that formed from the remains of trees, ferns, and other plants that lived 300 to 400 million years ago. In some areas, such as portions of what is now the eastern United States, coal was formed from swamps covered by sea water. The sea water contained a large amount of sulfur, and as the seas dried up, the sulfur was left

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behind in the coal. Scientists are working on ways to take the sulfur out of coal because when coal burns, the sulfur is released in to the atmosphere as an air pollutant. Some coal deposits, however, were formed from freshwater swamps which had very little sulfur in them. These coal deposits, located largely in the western part of the United States, have much less sulfur in them.

Coal is a combustible black or brownish-black sedimentary rock with a high amount of carbon and hydrocarbons. Coal is classified into four main types, or ranks depending on the types and amounts of carbon present and on the amount of heat energy the coal can produce, including anthracite, bituminous, subbituminous, and lignite. For us to use the potential energy stored in coal, it first must be mined from the ground. This process in itself uses a great deal of resources and has its own environmental impacts. Coal then typically undergoes processing to make it suitable for use in coal-fired power plants. Finally, the processed coal is burned in these power plants, and the kinetic energy released from its combustion is harnessed for electricity generation or other purposes.

Coal Mining and Processing, and Electricity Generation

There are two primary methods of coal mining: strip mining and underground mining. Strip-, or surface-, mining uses large machines to remove the soil and layers of rock known as overburden to expose coal seams. It is typically used when the coal is less than 200 feet underground. Mountaintop removal is a form of surface mining where the tops of mountains are blasted with dynamite and removed to access coal seams. After the mining is finished, the disturbed area can be re-covered with topsoil, and the area is replanted. However, the topography of the mountain is permanently altered.

Underground mining, sometimes called deep mining, is used when the coal is several hundred feet below the surface. Some underground mines are thousands of feet deep, and extend for miles. Miners ride elevators down deep mine shafts and travel on small trains in long tunnels to get to the coal. The miners use large machines that dig out the coal.Once mined, coal may go to a preparation plant located near the mining site where it is cleaned and processed to remove impurities such as rocks and dirt, ash, sulfur, and other unwanted materials. This process increases the amount of energy that can be obtained from a unit

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of coal, known as its heating value.

Finally, the mined and processed coal must be transported. Transportation can be more expensive than mining the coal. Nearly 70% of coal delivered in the United States is transported, for at least part of its trip, by train. Coal can also be transported by barge, ship, or truck. Coal can also be crushed, mixed with water, and sent through a slurry pipeline. Sometimes, coal-fired electric power plants are built near coal mines to lower transportation costs.

Once at the power plant, coal is first pulverized into a fine powder then mixed with hot air and blown into a furnace, allowing for the most complete combustion and maximum heat possible. Purified water, pumped through pipes inside a boiler, is turned into steam by the heat from the combustion of coal. The high pressure of the steam pushing against a series of giant turbine blades turns the turbine shaft. The turbine shaft is connected to the shaft of the generator, where magnets spin within wire coils to produce electricity. After doing its work in the turbine, the steam is drawn into a condenser, a large chamber in the basement of the power plant. In this important step, millions of gallons of cool water from a nearby source (such as a river or lake) are pumped through a network of tubes running through the condenser. The cool water in the tubes converts the steam back into water that can be used over and over again in the plant. The cooling water is returned to its source without any contamination except at a higher temperature than when first extracted from the river or lake.

Effect of coal mining

A majority of the coal mined in the United States (about 66%) is from surface, or strip mines which leave highly visible impacts at the surface. Strip mining operations generally involve removing soils, rock, and other material to access shallow deposits of coal and therefore leave permanent scars on the landscape. It also involves the destruction of substantial amounts of forests and other ecosystems, destroying natural habitats and threatening biodiversity.

Mountaintop removal, the extreme form of strip mining, has affected large areas of the Appalachian Mountains in West Virginia and Kentucky. The tops of mountains are removed using a combination of explosives and mining equipment and the material is deposited into nearby valleys. This technique not only alters the landscape but affects

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the health and quality of nearby streams by depositing rocks, dirt, and pollutants that can harm aquatic wildlife. While mountaintop removal mining has existed since the 1970s, its use became more widespread and controversial beginning in the 1990s. U.S. laws require that dust and water runoff from areas affected by coal mining operations be controlled, and that the area be reclaimed, and returned to close to its original condition.

One of the largest environmental impacts of underground mining may be the methane gas that must be vented out of mines to make the mines a safe place to work. Methane is a greenhouse gas, meaning that it enhances the greenhouse effect naturally occurring in our atmosphere, and contributes to global warming and global climate change. Its global warming potential, or relative capacity to produce the greenhouse effect, is higher than that of carbon dioxide (see chapter 7). Other impacts of underground mining include ground collapse above mine tunnels and draining of acidic water from abandoned mines into nearby streams. Acidic water lowers the pH (resulting in increased acidity), which is detrimental to aquatic organisms. This acid mine drainage is an environmental impact associated with both underground mining and strip mining.

Burning coal produces emissions that also impact human health. Emissions such as sulfur dioxide (SO2), nitrogen oxides (NOx) and particulates contribute to respiratory illnesses. Particulates also contribute to a condition among coal miners and other coal workers known as coal workers' pneumoconiosis (CWP) or black lung disease, which results from long exposure to coal dust. Inhaled coal dust progressively builds up in the lungs and is unable to be removed by the body; this leads to inflammation, fibrosis, and in worse cases, tissue death (necrosis).

Coal is the largest source of mercury and also a source of other heavy metals, many of which have been linked to both neurological and developmental problems in humans and other animals. Mercury concentrations in the air usually are low and of little direct concern. However, when mercury enters water, either directly or through deposition from the air, biological processes transform it into methylmercury, a highly toxic chemical that accumulates in fish and the animals (including humans) that eat fish.

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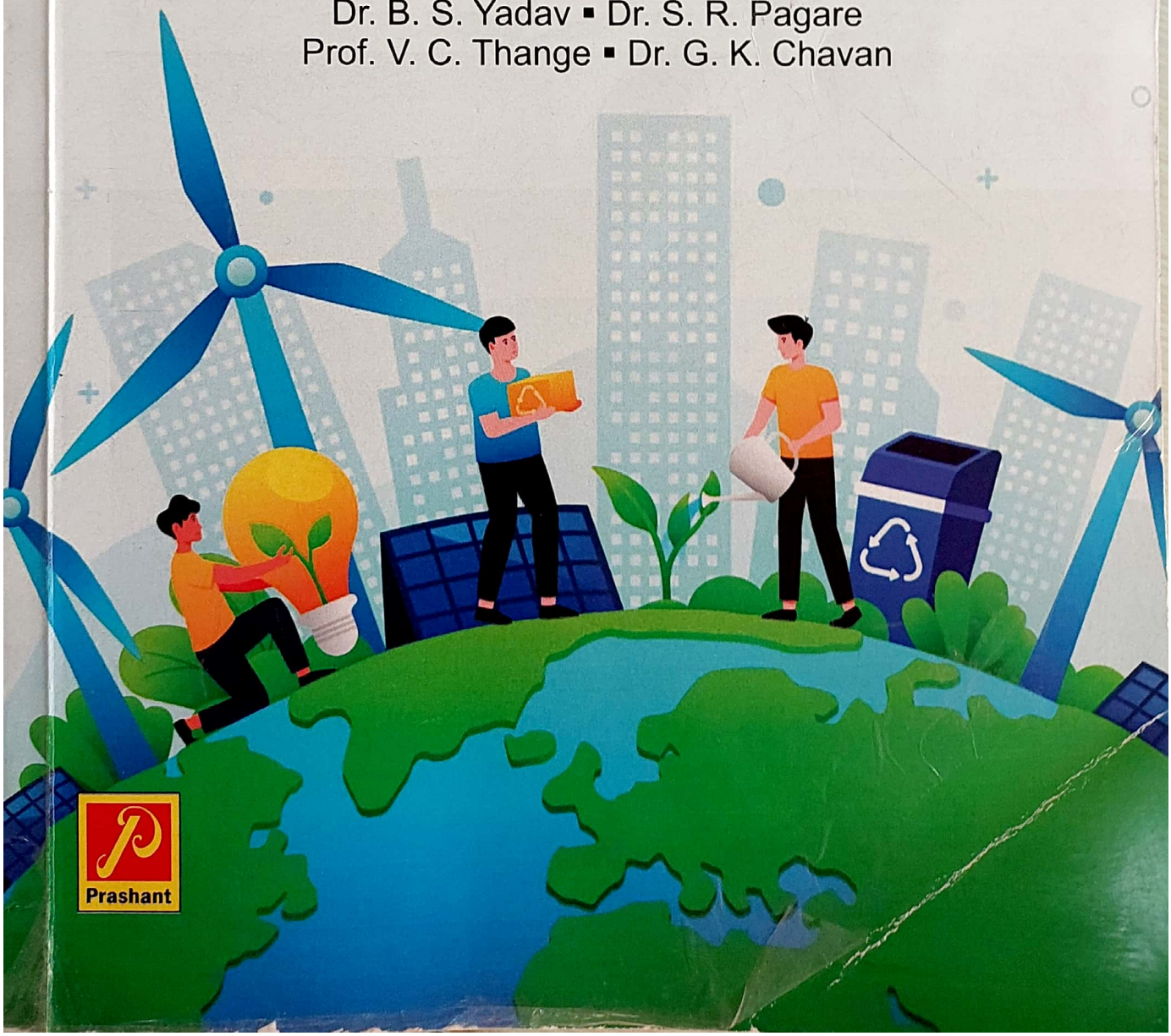

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Social Issues in Environmental Science

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Introduction:

The term sustainable was development and introduced by the World Commission on Environment and Development (The Brundtland Commission), in its seminal report of 1987, Our Common Future. The concept has terrifically worked out in creating public awareness for sustaining the planet with better management. The sustainable development has been defined as "meeting the need of the present generation without compromising the needs of future generation". The concept precisely emphasizes upon using the earth resources judiciously and compensating for it in some sense e.g. if cut few trees to support our lives, we should also implant some new ones at some site. This would result in. maintaining the earths fine balance between resource consumption and resource generation. Two terms are important to understand this concept sustainable and development.

Sustainable

The literal meaning of sustainability is "that can be maintained" or "keep goal continuously". In ecological sense it refers to "conservation of ecological balance by avoiding depletion of natural resources". Hence, we can understand it as something, which has got to do with longevity (long life) of a resource, commodity, species, ecosystem, earth etc.

Development

The literal meaning of development is "the act or instance of growth/advancement". So the growth can be of many types viz., growth of education, growth of industry, growth of population, growth of forests and many other. But what type of growth are we addressing to? Here we are addressing to one of the most sensitive issue of growing concern 'about improving the well-being of human beings. This could be achieved only through compromising with some of our comforts and luxuries.

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In the context of economical and technical development the world always had been better today than yesteryears and will always be better tomorrow than today. But the condition of environment will always be poorer than before. Hence, the concept of sustainable development raises certain questions for the present generations to answer. What is our present? Are we happy with our present? Prospective changes of the magnitude described above raises fundamental questions about the kind of world we will bequeath to our children and about the nature and goals of development. The present in which we live is important as it shapes our future. Nothing much can be done to recover the damages imposed on nature in the past. But if we shape our surroundings based on environmental ethics and economically exploit our present environment we would lend a healthier tomorrow to our children.

Urban Problems Related to Energy

Big cities and towns have always influenced education, religion, commerce, communication and politics, which have in turn influenced culture and society in various proportions. Initially only a very limited section of the society lived in cities and towns while the chief occupation of major population had been fishing, hunting, agriculture and cattle rearing. However' Industrial Revolution lead to expansion of cities and town both in size and power. In developing nations, especially a large segment of society from villages moved to cities for occupational support (occupational migration). This exactly was the cause of rapid expansion of cities' and formation of metropolitans like Delhi, Bombay, Chennai, Bangalore, Calcutta and others. This ultimately brought into picture the concept of urbanization and industrializations, which provided many benefits to society, especially to the rich, but also introduced some evils in it. Here evils referred to were the increasing demand on energy resources; whose consumption in turn lead to multitude problems of pollution, resource shortage, diseases and waste disposal. Some of the major urban problems related to energy are as under

i) Electricity

Electricity from various sources is a major requirement of expanding cities, towns and villages. Each and every activity of mans life is now someway related to electricity consumption. Housing gadgets like mixer-grinder, T.V., computer, music systems, geysers,

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fans, lights, A.C.s, microwave, water lifting pump, warm blowers, coolers, etc. form the essential components of a house. This all together has led to an electricity energy crunch.

ii) Fossil fuels (petroleum, natural gas and coal)

Fossil fuels have always been under a great threat from times immemorial. In the absence of technological advancements these have served mankind for several years. In this quest for energy the coal reserves have suffered a lot. With rise in technical know how man started generating power from nuclear sources, hydroelectric power, wind power etc. But still these contribute a little. We still depend on thermal power a lot.

(a) **Petrol and Diesel:** Transport and communication has brought the petroleum rereserves of the world under a great threat. The rise in number of vehicle per year is immense. To understand the gravity of the problem a glance of metropolitan roads and lanes is enough. Even the roads and lanes of big cities, small cities and towns are loaded with two wheelers.

(b) **Natural Gas:** The common usage of natural gas is in the form of Liquid Petroleuoleum Gas (LPG). There is a terrific rise in the usage of LPG driven household commodities with the expanding population. Earlier the LPG usage was only limited to kitchen for cooking. The advent of technology introduced a numerous household items making its use like gas geysers, gas heaters, gas fans, gas lanterns etc. In a way it is serving as a substitute of electricity, which is other reason for increasing pressure on oil wells/reserves.

iii) Fuel wood

Fuel wood being used for the ignition of fire is chiefly responsible for the destruction of impoverished forestlands. Though fuel wood collection to support family daily chores is allowed in certain parts of the forest generally the outskirts but the greed and dearth compels women to penetrate deep into the forest. Generally the big cities are characterised by the absence of forestland at the fringes. But whatever degraded forest is available serve as a source of fuel wood even in and around urban centres e.g. Dehradun is a well developed city, but in its fringes we can still see women and children carrying loads of fuel

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wood.

Water Conservation

We could save as much as half of the water we now use for domestic purposes without great sacrifice or serious changes in our lifestyles. Simple steps, such as taking shorter showers, stopping leaks, and washing cars, dishes, and clothes as efficiently as possible, can go a long way toward forestalling the water shortages that many authorities predict. Isn't it better to adapt to more conservative uses now when we have a choice than to be forced to do it by scarcity in the future?

Rain Water Harvesting

Water is commonly taken for granted as nature's gift. Often it is used wastefully in agriculture, but industry and people pollute and poison available water supplies at an alarming rate. Water problems arise from increasing demands generated by rapid population growth; urbanization, industrialization and irrigation for additional food production. In many areas excessive pumping of groundwater not only brings down water quality, but also depletes it this affects' sustainability. The 'capacity of irrigation tanks numbering about five lakh in the country is shrinking due to situation and encroachment. Scarcity is noticed even in high rainfall areas like Cherrapunji (Assam), Western Ghats and Kerala. This is due to improper management and poor conservation of rainwater.

India's water potential is substantial but the scarcity is felt everywhere even for drinking. This is because the country's water policy and management is not very specific and implementation is poor. Total rain in the country is about 400 M hm (million hectare meters). The runoff in the rivers is estimated at 186 M ha. Further the utilizable groundwater is calculated as 40 M hm. However, the utilizable quantity is about 110-115 M hm (70 M hm from surface and 40 M hm from groundwater). To meet the relentless increase in demand for water for various purposes and to achieve the goal of optimal use and to get the maximum benefits, it is necessary to make water resource development holistic through a comprehensive integrated river basin planning and management. This can be done only if a wide range of disciplines are involved. Wastage of water due to leakage in pipes and unattended repairs results in about 30-40 per cent water resource lost.

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Resettlement and Rehabilitation of People

"Land for land" is a better policy than cash settlement. Even in implementing this policy, the land is not given in the command area in most cases, forestland is either cleared on waste fallow land given without any provision for developing the land or for the supply of necessary inputs; a village is broken up and families dispersed; villagers are usually left to buy private land, take loans from the government, which puts poor villagers at a disadvantage- land prices in neighboring villages shoot up steeply if the government takes up resettlement; the villagers are resettled in distant places, sometimes in a totally alien environment and culture, thus creating insurmountable adjustment problems. Oustees from Pong dam in Himachal Pradesh were settled in Anupgarh in Rajasthan, bordering on Pakistan. The people were generally left to fend for themselves. Arrangements for drinking water, dispensaries, schools, village roads or drainage of the rehabilitation sites are only completed years later. In the case of the Ukai Dam in Gujarat, resettlement work was undertaken by the 'Ukai Nav Nirman Samity. Even so, out of a total of 18,500 affected families, only 3500 families could be resettled.

Rehabilitation Problem

Involuntary displacement of human population is always traumatic. Irrespective of the causes leading to such migrations the degree of suffering experienced by such people simply cannot be quantified in money values, and even in words it can be described only inadequately. But, unfortunately, ousting of people likely to be submerged under irrigation or hydel power dams is a classic case where hardships are imposed on people in spite of the 'pro-people' laws and policies proclaimed by the Government. Below is a critique of the Tehri Dam Rehabilitation.

Compensatory Land

The project authorities commenced the Scheme by allocating 2767 acre of land in the Dehra Dun area, which was already reeling under severe pressure from tourism, limestone quarrying and urban expansion.

Rehabilitation should be collective

In the villages, almost each' family depends on the other. The social and moral obligations towards each other bind them into one

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cohesive whole. The authorities are rehabilitating individual families and not the village as a whole

Lack of Public Relations

The majority of populace to be displaced consists of advises, tribal, scheduled castes that have a unique lifestyle. The traumatic experience of shifting to new areas and new occupations involving drastic changes in their lifestyle weighs heavily on these people. The absence of any public relation efforts has further aggravated the situation.

Global Warming and the Greenhouse Effect

In the late 1900's researchers realized that the world may be getting warmer. The last two decades of the 1900's witnessed some warm and cool years. However, not enough evidences were available to support the theory of global warming. But this a well-known fact that accumulation of several green house gases can lead to a rise in temperature (global warming). If a global warming phenomenon sets in this would result in major changes in world's climate. The increase in temperature might lead melting of snow on poles, which would terrifically add, to ocean waters. Hence the level of seas, and oceans would rise, this would largely affect the coastal areas. These would submerge under coastal Waters due to expansion of seas and oceans. Besides the Temperate climate pattern would shift northward and present temperate regions would become hot & dry.

The Greenhouse Effect is a natural phenomenon that plays a central role, in determining the earth's climate. The hot surface of the sun radiates heat and light energy. Several gases in the atmosphere are transparent to light but absorb infrared radiation. These allow sunlight to pass through the atmosphere and be absorbed by the earth's surface. This energy ,is again radiated as heat energy, which is absorbed by the gases. As the effect is similar in nature to what happens in a' botanical greenhouse (the glass panes allows the light energy to enter inside but diminishes the loss of heat), these gases are called greenhouse gases and the resultant warming from their increase is called the greenhouse effect. Anthropogenic activities add to the phenomenon accelerating greenhouse gas building process. Global increase of greenhouse gases in the atmosphere viz., carbon dioxide, nitrous oxide, methane and chlorofluorocarbons are now well documented. In addition to all these changes, troposphere and stratospheric chemistry are being modified due

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to the addition of these gases as well as emission of carbon monoxide, nitrogen oxides and other compound. The United State Environmental Protection Agency, Office of Policy, Planning and Evaluation in 1989 have documented the increase of the different green house gases.

The Environment Protection Act, 1986

An Act to provide for the protection and improvement of environment and for matters connected therewith. Whereas decisions were taken at the United Nations Conference on the Human Environment held at Stokholm in June 1972, in which India participated, to take appropriate steps for the protection and improvement of human environment; Short Title, Extent and Commencement 1. This Act may be called the Environment (Protection) Act, 1986. 2. It extends to the whole of India. 3. It shall come into force on such date as the Central Government may, by notification in the Official Gazette, appoint and different dates may be appointed for different provisions of this Act and for different areas. The Act clearly states and explain each and every term very precisely like environment, environmental pollutants, environmental pollution, handling, hazardous substance, occupier, prescribed.

Air Pollution Act, 1981

An Act to provide for the prevention, control and abatement of air pollution, for the establishment, with a view to carrying out the aforesaid purposes, of Boards, for conferring on and assigning to such Boards powers and functions relating thereto and for matters' connected therewith. Whereas decisions were taken at the United Nations Conference on the Human Environment hold in Stockholm in June, 1972, in which India participated, to take appropriate steps for the preservation of the natural resources of the earth which, among other things, include the preservation of the quality of air and control of air pollution and whereas it is considered necessary to implement the decisions aforesaid in so far as they relate to the preservation of the quality of air and control of air pollution.

Water Pollution Act, 1974

An Act to provide for the prevention and control of water pollution and the maintaining or restoring of wholesomeness of water, for the establishment, with a view to carrying out the purposes aforesaid, of Boards for the prevention and control of water pollution, for conferring

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on and assigning to such Board powers and functions relating thereto and for matters connected therewith. Whereas it is expedient to provide for the prevention and control of water pollution and the maintaining or restoring of wholesomeness of water, for the establishment, with a view to carrying out the purposes aforesaid, of Boards for the prevention and control of water pollution and for conferring on and assigning to such Boards powers and functions relating thereto.

The Wildlife (Protection) Act, 1972

An Act to provide for the protection of wild animals and birds and for matters connected therewith or ancillary or incidental thereto. Short title, extent and commencement 1 This Act may be called the Wild Life (Protection) Act, 1972 2 It extends, in the first instance, to the whole of the States of Andhra Pradesh, Bihar, Gujarat, Haryana, Himachal Pradesh, Madhya Pradesh, Manipur, Punjab, Rajasthan, Uttar Pradesh and West Bengal and to all the Union territories; and it shall also extend to such other State as may adopt this Act by resolution passed in that behalf in pursuance of CI. (1) of Art. 252 of the Constitution. It shall come into force in a State of Union territory to which it extends, or may become extended in future, on such date as the Central Government may, by notification, appoint, and different dates may be appointed for different provisions of this Act or for different States or Union territories.

Forest Conservation Act

India's Forest Policies Development of forest is guided by the policies adopted by a nation to manage them. Scientific forestry was adopted in India since over a century back. Country's first forest policy was enunciated in 1894. After the Independence Indian Republic therefore formulated her National Forest Policy in 1952. The National Commission on Agriculture established in 1970 went into the forestry situation in the country and suggested a need for a new forest policy, in their Report of 1976. The Constitution of the Independent India placed forests under the State List of the Seventh Schedule in 1950. The States were vested with the administration of the forests. The Constitution has recognized the importance of protection 216 ENVIRONMENTAL SCIENCE of forests and their improvement. It is stipulated in Article 48-A, that the State shall endeavourer to protect and improve the environment and to safeguard the forests and wildlife of the country.

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Removal of Pollutants from Waste Water Using Dunaliella Algae

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Abstract:

The toxicity and biosorption of heavy metals by the green unicellular flagellate sp. were investigated. We found that Dunaliella algae are able to biologically remove heavy metals from wastewater at concentration (about 85 mg/L). The Dunaliella cells were first immersed for seven days in wastewater samples collected from different sources in Jeddah, KSA, and their growth rates were monitored determined visibly at wavelength of 560 nm. It was observed that at the initial stage (0–12 hours) the adsorption rate was so rapid that 74% of the metal was biologically adsorbed. The maximum biosorption capacity of live Dunaliella was estimated to be 0.79 mg lead per 75 alga cells. Other elements were adsorbed at relatively lower rates Both toxicity and biosorption are very important in developing Dunaliella for the treatment of wastewater containing heavy metals. Dunaliella algae could be used as phytoemediators to decrease toxicity of heavy metal from polluted wastewater for human health.

Keywords: Waste water; Heavy metal pollution; removal; adsorption; Dunaliella algae.

Introduction:

The presence of heavy metals in the environment is of major concern because of their toxicity, bioaccumulating tendency, and threat to human life and the environment (Igwe & Abia, 2006). As human populations have expanded, Earth's atmosphere and natural waters have become dumps for agricultural and industrial wastes. Heavy metals are among the conservative pollutants that are nonbiodegradable (El-Nady & Atta, 1996; Walter et al., 2011). As a result of this, their concentrations often exceed the permissible levels normally found in soil, water ways and sediments (Bhatnagar & Kumari, 2011). Hence, they find their way up the food pyramid. When they accumulate in the environment and in food chains, they can profoundly disrupt biological

processes (Hassan & Basahi, 2013, Hassan et al., 2013; 2014).

The chemistry and toxicology of these heavy metals are complex and interesting (Hassan et al., 2014). Metals can be toxic to microbial population at sufficiently high concentrations. However, some metals such as silver, mercury, cadmium and copper are markedly more toxic even at very low levels (Puranik & Paknikar, 1997)

Remediation methods of the last half century have been largely unsuccessful2. Adsorptive removal of heavy metals from aqueous effluents which have received much attention in recent year is usually achieved by using activated carbon or activated alumina (Abdel-Raouf et al., 2012; Igwe & Abia, 2005, Igwe et al., 2005a;b; 2006) . Many other biosorbents of algal, fungal and bacteria biomass have been utilized (Mclean & Beveridge, 2001; Fedrickson et al., 2000; Vijayaraghan et al., 2005).

Bio-treatment with algae is particularly attractive because of their photosynthetic capabilities, converting solar energy into useful biomasses and incorporating nutrients such as nitrogen and phosphorus causing eutrophication (De la Nou & Basseres, 1989; De la Nou & De Pauw, 1988). Moreover, compared to physical and chemical treatment processes, algae based treatment can potentially achieve nutrient removal in a less expensive and ecologically safer way with the added benefits of resource recovery. Recently, Bhatnagar and Kumari (2013) stated that algae are significantly efficient in treating more than one problem at a time, which is not possible by conventional process of chemical treatment. The phycoremediation shows advantage over other chemical methods as the removal of algal mass from the treated effluents is easy and economic (De la Nou & De Pauw, 1988; Igwe & Abia, 2006; Bhatnagar & Kumari, 2013).

The aim of this study was to examine the possibility to biologically purify wastewater from heavy metals using the green unicellular flagellate Dunaliella sp.

Materials and Methods:

A pure culture of Dunaliella sp. was supplied by Department of Botany and Microbiology, Alexandria University. The algae were centrifuged (5000 rpm for 20 min) and then stored in liquid medium for 7 d at 20 °C under light (60 W white fluorescent lamp) (Vijayaraghan et al., 2005). Algae were grown in a standard growth medium (Ting et

al., 1989, Chen 2005) with little modifications (Table 1).

Heavy Metal Sorption and Analysis

100 ml of wastewater was added to 250 ml flask containing 10 mg L-1Dunaliella cells and were shaked at 25°C for 48 h. At the designed period of 12, 24, 36, 48, 60, 72, 84, 96, 108 and 120 h, 10 ml of the solution were collected for analysis.

Dunaliella in the solutions was removed by filtration and the filtrates were analyzed to determine the concentration of the remaining metal ions.

Concentrations of heavy metals (Cd, Pb, Ni, Cr, Zn and Cu) in water samples were determined before and after inoculating with algae using Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES) (Hassan & Basahi, 2013; Al- Dhaibani et al., 2013). All safety rules were applied (COST, 2008).

Data analysis

The sorption of metals onto microbial surface is described by the following model (Chen, 2005);

$1/q = 1/(qmax\ bc) + 1/qmax$

where c is the final metal concentration (mg L^{-1}), q is the metal uptake (mg/10^5 cells), *b* is the sorption binding constant (L/mg), qmax is the saturation capacity (mg/10^5 cells), from the slope and intercept of a *1/q vs 1/c* linear plot such that *qmax*

=intercept"1 and =intercept/slope.

Statistical analysis

Each treatment was made in 10 replicates to ensure statistical validity. One –way ANOVA was applied to log- transformed data (to ensure they were normally distributed) using STATGRAPHICS statistical Package (STAT. 4). The differences between means were analyzed by Student T- Test at the $P<0.05$ significance level.

Results and Discussion

The analyses of heavy metal concentrations in wastewater samples are presented in Table 2.

Zinc (Zn) was found the most abundant element in wastewater (179.12 mg L^{-1}), while Ni was less abundant (19.14 mg L^{-1}). Other elements showed relatively high concentrations 34.87, 53.97, 62.17 and 80.25 mg L^{-1}, for Cr, Pb, Cu and Cd,

Table 1: Composition of growth medium

Constituents	Concentration (gL^{-1})
EDTA	0.10
K_2HPO_4	0.50
$NaNO_3$	3.10
NaCl	1.20
$NaHCO_3$	19.90
K_2SO_4	1.20
$FeSO_4 \cdot 7H_2O$	0.05
$MgSO_4 \cdot 7H_2O$	0.30
$CaCl_2 \cdot 2H_2O$	0.08

Table 2: Mean (+SD) heavy metal concentration ($mg\ L^{-1}$) in wastewater. (n = 10)

Element	Concentration
Cd	80.25 ± 6.76
Pb	53.97 ± 3.27
Ni	19.14 ±1.72
Cr	34.87 ± 4.98
Zn	179.12 ± 21.25
Cu	62.17 ± 7.04

respectively. The concentrations recorded are higher than those recommended by WHO[24]. Moreover levels recorded in our study were much higher that that recorded in wastewater in other semi- arid regions of the world such as Iran (Mansouri, & Ebrahimour, 2011; Qishlaqi et al., 2008), India (Shama et al., 2006; Vijayaraghan, 2005) and Jordan (Al-Khashman, O.A. (2013).

Figure 1 indicated that Dunaliella has removed 95% of Zn and Cd after 108 hours, and 90% of Cu after 60 hours of incubation. Moreover, 93% of Pb, Ni and Cr were removed after 36 hours of

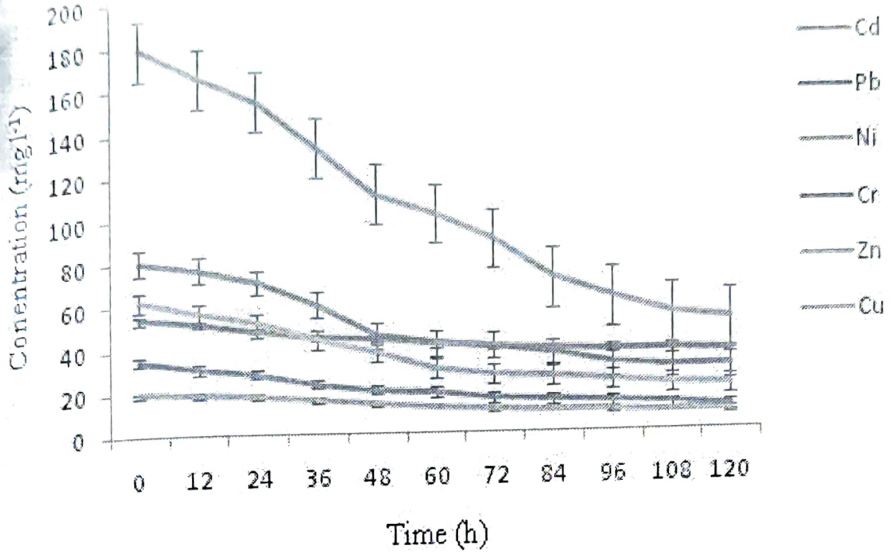

Fig. 1: The effect of Dunaliella on heavy removal (at 25 °C, n = 10 ± 3)

incubation. This indicates that biosorption efficiency towards Pb, Cr and Ni is higher than other elements (Puranik & Paknikar, 2011).

The dependence of heavy metals biosorption by Dunaliella on time is shown in Fig.2. Generally, it is reported that the uptake of metal ions can be divided into two stages: rapid and slow stage (Walterv et al., 2011). In the 'rapid' stage, the metal ions are adsorbed onto the surface of microorganism. In the 'slow' stage, the metal ions transport across the cell membrane into the cytoplasm.

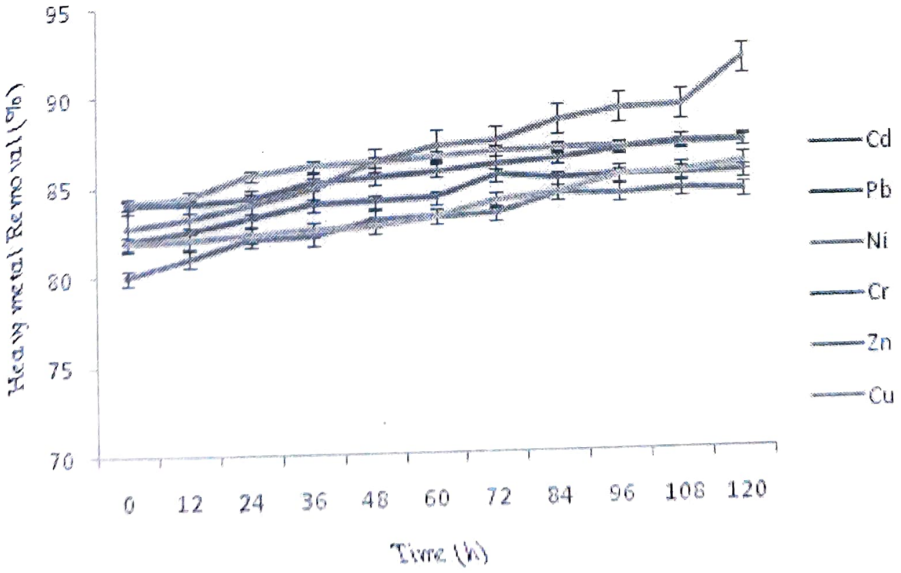

Fig. 2: Time-dependence of heavy metal biosorption (n = 10 ± 3)

It was reported that lead phosphate precipitated on the cell wall and inside the cell of cyanobacteria (Anabaena cylindrical). Their results confirmed a very fast uptake in the cell envelope and then a longer uptake period inside the cell envelope and then a longer uptake period inside the cell (Sa'idi, 2010).

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ENVIRONMENT AWARENESS

ISSUES AND PERSPECTIVE

- Editors -

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Earth's Oxygen Levels Can Affect Its Climate

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Earth has a surprising new player in the climate game: oxygen. Even though oxygen is not a heat-trapping greenhouse gas, its concentration in our atmosphere can affect how much sunlight reaches the ground, and new models suggest that effect has altered climate in the past.

Oxygen currently makes up about 21 percent of the gases in the planet's atmosphere, but that level hasn't been steady over Earth's history. For the first couple of billion years, there was little oxygen in the atmosphere. Then, about 2.5 billion years ago, oxygen started getting added to the atmosphere by photosynthetic cyanobacteria. "Oxygen is produced as a waste product of photosynthesis. It is consumed through respiration," explains University of Michigan climate scientist Chris Paulsen, lead author of the study published today in Science.

That waste product sparked a mass extinction known as the Great Oxygenation Event. But over time, new forms of life evolved that use or expel oxygen in respiration, and atmospheric oxygen levels continued to increase. "The production and burial of plant matter over long periods causes oxygen levels to rise," explains Poulsen. Levels can fall again when that trapped ancient organic matter becomes exposed on land, and elements such as iron react with oxygen from the atmosphere, a reaction called oxidative weathering. As a result of these processes, atmospheric oxygen levels have varied from a low of 10 percent to a high of 35 percent over the last 540 million years or so.

Poulsen and his colleagues were studying the climate and plants of the late Paleozoic, and during a meeting they started talking about whether oxygen levels might somehow have affected climate in the past. Studies have shown that atmospheric carbon dioxide has been the main climate driver through deep time, so most thought oxygen's role has been negligible.

But computer models based on carbon data have not been able to

explain everything in the record. For example, the Cenomanian, an age in the late Cretaceous, was marked by high carbon dioxide and soaring temperatures, but models of this time usually spit out polar temperatures and precipitation rates that are too low when compared with data taken from the paleogeologic record. So Poulsen began modifying a climate model to test the oxygen idea, and the results showed that changes in oxygen concentration did indeed have an impact through a series of feedbacks.

"Reducing oxygen levels thins the atmosphere, allowing more sunlight to reach Earth's surface," explains Poulsen. More sunlight lets more moisture evaporate from the planet's surface, which increases humidity. Because water vapor is a greenhouse gas, more heat gets trapped near Earth's surface, and temperatures rise. The increased humidity and temperature also leads to increases in precipitation. By contrast, when oxygen concentrations are higher, the atmosphere gets thicker and scatters more sunlight. As a result, there is less water vapor to trap heat.

Adding in oxygen's affects during other time periods could lead to more accurate models of the planet's past, the researchers say. But Poulsen cautions that the study has no effect on what is known about Earth's current climate. The planet's climate is changing today because levels of greenhouse gases such as carbon dioxide and methane are rising dramatically oxygen isn't a factor.

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Sevin and Endotaf Pesticides Impact on Nitrogen Fixing Soil Blue-green Algae Calothrix javanica, Calothrix marchica and Cylindrospermum musicola: An Environmental Assay

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Biological nitrogen fixation (BNF), a microbiological process that converts atmospheric nitrogen into a plant useable form, offers an economically attractive and ecologically sound means of reducing external inputs and improving internal resources (Rashid et al., 2016). Blue-green algae are unique in reducing the atmospheric nitrogen by the process "Biological nitrogen fixation" (Tiwari et al., 2001). The cyanobacteria contain nitrogenase and fix atmospheric nitrogen for which these are used as biofertilizer to maintain and improve soil status (Ahmed, 2001).

The major actions of blue-green algae include make soil porous, excretion of phytohormones, vitamins, amino acids, improve the water holding capacity of soil through their characteristic jelly structure and increase in biomass of soil after their death and decomposition (Rodriguez et al., 2006; Wilson, 2006; Saadatnia and Riahi, 2009). Blue- green algae can contribute to about 20–30 kg N ha-1 as well as the organic matter to the soil, quite significant for the economically weak farmers unable to invest for costly chemical nitrogen fertilizer (Issa et al., 2014).

Many heterocystous and non-heterocystous blue-green algae are known to fix nitrogen. The most common nitrogen fixing species belongs to genera like Nostoc, Aulosira, Anabaena, Calothrix, Cylindrospermum, Microchaete, Scytonema, Tolypothrix, Fischerella, Hapalosiphon etc. Such forms hold promise for maize, rice, mungbean, tomato and sugarcane and wheat crops by fixing nitrogen (Gafur and Parvin, 2008). In recent years, the practice of utilizing blue-green algae as an efficient source of biofertilizer for various crops have been advocated and adopted in India. Because they can control the nitrogen deficiency in plants, improve the aeration of soil, water holding

capacity and add vitamin B12 (Abdel-Raouf et al., 2012 and Chitto et al., 2020).

In agriculture, introduction of fertilizer responsive crop varieties has necessitated the use of enormous amounts of pesticides during production and storage. One of the problem that has been noticed under field conditions is the destruction of blue-green algal populations by pesticide application intended to control the insects and pests of the various agricultural crops because of their long persistence in the environment (Dai et al., 2008 and Shen et al., 2005).

Therefore, pesticides used in routine applications in crop fields have important ecological effects in addition to those usually intended (Rajendran et al., 2006; Islam et al., 2007).

Depending on the type, biological property and concentration of pesticides and the blue- green algal strains, their effect could be inhibitory, selective or even stimulatory (Roger and Kulasooriya, 1980). Blue-green algal abundance, biomass, short regeneration, water holding capacity, mineralizing capacity and more importantly nitrogen fixing have enormous potential to abate the negative effects of pesticides (Gupta and Baruah, 2015; Singh et al., 2018). By considering all these issues, the present study was carried to assess the influence of Sevin (carbaryl, 50%) and Endotaf (endosulfan, 35%) pesticides on nitrogen fixing soil blue-green algae, Calothrix javanica, Calothrix marchica and Cylindrospermum musicola.

Pesticides Used

Impact of commonly used pesticides Sevin (carbaryl, 50%) and Endotaf (endosulfan, 35%) belonging to carbamate and organochlorine group was studied on the nitrogen fixation of soil blue-green algae, Calothrix javanica, Calothrix marchica and Cylindrospermum musicola. These pesticides are generally used to control sucking, lepidopterous and nematode pests and mites that occurred in maize, wheat, sugarcane, cotton, onion, vegetable and oil yielding crops. Stock solutions of Sevin and Endotaf pesticides were prepared freshly for experiments in the sterilized media and added to the BG-11 (Rippka et al., 1979) culture media to obtain the desired concentrations of 2.5, 5, 10, 20, 50, 100, 250 and 500 ppm. Experiments were conducted by inoculating equal amounts of actively growing unialgal isolates of Calothrix javanica, Calothrix marchica and Cylindrospermum musicola into cotton

stoppered conical flasks. Total nitrogen fixed by each studied alga at each concentration of four pesticides was estimated by conventional Micro- kjeldahl method (Jackson, 1958) after 28 days of harvesting in the laboratory cultures.

Impact on Biological Nitrogen Fixation (BNF)

The selected blue-green algal species for the present investigation i.e. Cylindrospermum musicola belonged to family Nostocaceae while Calothrix javanica and Calothrix marchica belonged to family Rivulariaceae. In laboratory cultures, the total nitrogen fixed by selected blue-green algae was estimated at each ppm concentration of Sevin (carbaryl, 50%) and Endotaf (endosulfan, 35%) pesticides with the untreated control and results recorded in the Table- 3.1 and Fig.- 3.1 and 3.2.

Table- 3.1: Total nitrogen (%) fixed by Calothrix javanica, Calothrix marchica and Cylindrospermum musicola at different concentrations of Sevin (carbaryl, 50%) and Endotaf (endosulfan, 35%) pesticides.

Concentrations of pesticides (ppm)	Total Nitrogen (%) fixed by Blue-green algal Species		
	Calothrix javanica	Calothrix marchica	Cylindrospermum musicola
0.00 (Control)	5.15%	4.24%	4.64%
Sevin 2.5	5.28 (+2.5)	4.29 (+1.1)	4.79 (+3.2)
5	5.59 (+8.5)	5.52 (+6.6)	4.92 (+6.0)
10	5.67 (+1.0)	4.65 (+9.6)	4.00 (-13.8)
20	5.36 (+4.0)	4.38 (+3.3)	3.77 (-18.7)
50	4.82 (-6.4)	3.89 (-8.2)	2.56 (-44.8)
100	3.52 (-31.6)	2.80 (-33.9)	1.76 (-62.0)
250	1.97 (-61.7)	1.68 (-60.3)	0.93 (-79.9)
500	0.93 (-81.9)	0.84 (-80.1)	--
Endotaf 2.5	5.24 (+1.7)	4.42 (+4.2)	4.74 (+2.1)
5	5.41 (+5.0)	4.31 (+1.6)	3.26 (-29.7)
10	5.00 (-2.9)	3.94 (-7.0)	2.42 (-47.8)
20	4.32 (-16.1)	3.10 (-26.8)	1.92 (-58.6)
50	3.56 (-30.8)	2.76 (-34.9)	1.00 (-78.4)

100	2.10 (-59.2)	1.82 (-57.0)	0.20 (-95.6)
250	1.27 (-75.3)	1.00 (-76.4)	--
500	0.24 (-95.3)	0.17 (-96.0)	--

Values represents mean of three replicates; figures in parenthesis show percent increase (+) or decrease (-) as compared to total nitrogen content (%) in the untreated control.

Fig.- 3.1- Nitogen fixed (%) by Blue-green algae at different concentrations (ppm) of Sevin pesticide

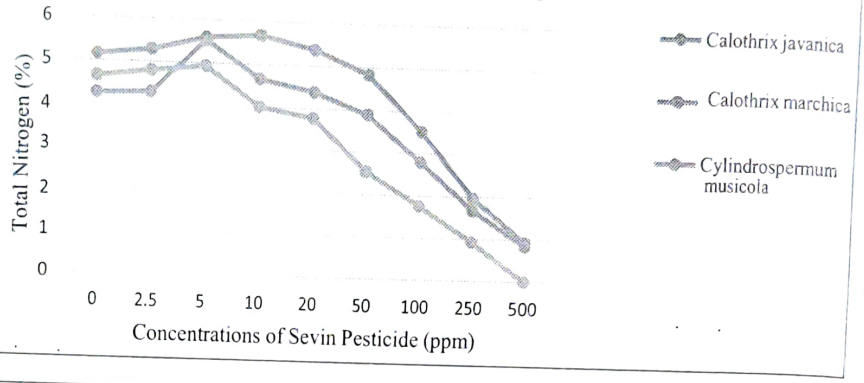
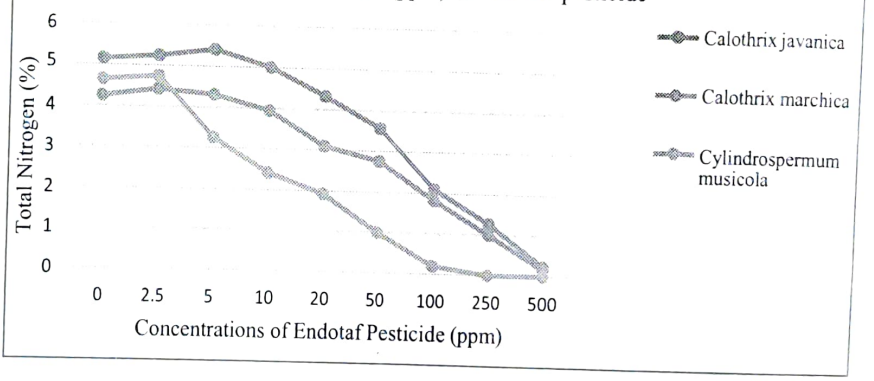


Fig.- 3.2- Nitogen fixed (%) by Blue-green algae at different concentrations (ppm) of Endotaf pesticide



In the presence of Sevin, Calothrix javanica while in Calothrix marchica showed increased nitrogen fixation upto 20 ppm, while with Endotaf upto 5 ppm dose level as compared to the untreated control. On the other hand, total nitrogen content was consistently decreased with the increasing concentrations of pesticides from 50 ppm of Sevin and 10 ppm of Endotaf over the control in both the studied species of Calothrix. At the higher concentration, 500 ppm with Sevin, 81.9% reduction in total nitrogen content was observed in Calothrix javanica while in Calothrix marchica, 80.1% decrease over the untreated control was recorded. On the other hand, in Cylindrospermum musicola growth

and nitrogen fixation was ceased at this concentration with Sevin and Endotaf pesticides. In the presence of Sevin, nitrogen fixation by Cylindrospermum musicola was consistently decrease at 10 ppm concentration than the control.

To the contrary with Endotaf at 500 ppm concentration, 95.3% reduction in total nitrogen content was observed in Calothrix javanica while in Calothrix marchica, 96.0% decrease was recorded than the untreated control. In the Cylindrospermum musicola, the pesticide tolerance range was found to be upto 2.5 ppm with Endotaf, where increased nitrogen fixation over the control was observed. In the presence of Endotaf at 100 ppm dose level, total nitrogen content was decreased by 95.6% in Cylindrospermum musicola than the untreated control. Further increase in pesticides concentration resulted into ceasing of growth and nitrogen fixation in Cylindrospermum musicola.

The results obtained in laboratory cultures indicate a progressive decrease in the nitrogen content of all the tested blue-green algae with increasing concentrations of the Sevin and Endotaf pesticides. However, nitrogen fixation of most of the blue-green algae also increased at the lower doses of pesticides viz. 10 ppm of carbamate, Sevin and 2.5 ppm of organochlorine, Endotaf. The blue-green algae Calothrix javanica and Calothrix marchica were emerged as most compatible and tolerant to the increasing Sevin and Endotaf pesticides doses as compared to Cylindrospermum musicola.

To the contrary, Cylindrospermum musicola was found to be the highly susceptible as even at 10 ppm of Sevin and 2.5 ppm of Endotaf. At this concentration i.e. 10 ppm of Sevin, total nitrogen content was reduced by 13.8% and at 5 ppm dose level, 29.7% reduction in total nitrogen content was recorded with Endotaf pesticide in the Cylindrospermum musicola. This finding is supported by Singh (1973) who concluded that, Cylindropermum sp. appears to affect severely by the Benzene Hexachloride, Lindane, Diazinon and Endrin pesticides.

The reduction in total nitrogen content of the pesticide-adapted blue-green algal strains of Calothrix javanica, Calothrix marchica and Cylindrospermum musicola may occurred due to the inhibition of some stage(s) during the process of nitrogen fixation in the presence of higher concentrations of pesticides. Further stimulatory effect of Sevin at lower concentrations on nitrogen fixation of Calothrix

javanica, Calothrix marchica and Cylindrospermum musicola under culture conditions may be due to the presence of nutrients in media that minimizes the toxicity of carbofuran (Kar and Singh, 1978 a; Sharama and Gaur, 1981).

DaSilva et al., 1975 reported a stimulatory effect on nitrogen fixation in most studied blue-green algal forms while a general pattern of gradual decline occurred with increasing dose level of eight widely hitherto used pesticides. Increased nitrogen fixation in the presence of doses of Furadan (Kar and Singh, 1978 b) 2, 4- D (Das and Singh, 1977), Sevin (Adhikary et al., 1984), Rogor (Pattnaik and Prakash Rao, 1982) and Endosulfan (Adhikary, 1989) by the blue-green algae was reported by the earlier workers.

Similarly, Grant et al., 1983 noted a 3 and 10-fold increase in the nitrogen fixing capability of rice field cyanobacteria when Perthane was used at lower concentrations. Shivaprakasha and Shivappa Shetty, 1986 and Shivaram and Shivappa Shetty, 1988 observed that nitrogen fixation by the isolates of Anabaena variabilis, Calothrix sp., Cylindrospermum musicola, Hapalosiphon welwitschii, Nostoc sps. were favoured at lower concentrations of the pesticides Rogor, Dithane M-45, and 2,4- D sodium salt in pure culture whereas higher concentrations gave an adverse effect. Satyendra Kumar et al., 2000 found that, Endosulfan at 12 ppm proved lethal for Anabaena sp. while extreme fragmentation and subsequent death occurred in Spirulina platensis at 8 ppm.

Kiran et al., 2006 found lower concentrations of Monocrotophos and Butachlor caused stimulation of growth and nitrogen fixation and partial or complete inhibition at higher concentrations in Anabaena sp. and Westiellopsis prolifica. Islam et al., 2007 revealed that, nitrogen fixation in Nostoc and Anabaena isolates was increased after the application of Furadan at concentration up to 50 ppm. The blue-green algal isolates were more tolerant to Furadan and Sevin and the effects of both pesticides were stimulatory at field dose on the growth and nitrogen fixation.

Das, 2008 reported a pesticide concentration dependent reduction in nitrogen content of the Anabaena variabilis, Nostoc muscorum, Calothrix parietina and Westiellopsis prolifica with organophosphate pesticide, Rogor. These inhibitory effects on nitrogen fixation may be

attributed to the lethal effects of endosulfan on the growth and nitrogen fixing capacity of cyanobacteria Abdel-Raouf and El-Shafey, 2009. In the same manner, Ibraheem, 2002 and Abdel-Raouf, 2003 reported that application of popular insecticides, Larvin, Sevin, Sumi-alpha and Dursban inhibited the nitrogenase activities of cyanobacteria. Furthermore, inhibition of chlorophyll synthesis by pesticides in Anabaena flos-aquae, Tolypothrix scytonemoides and Tolypothrix ceylonica has been reported earlier by Rajendran et al., 2007 will be possible cause of reduction in total nitrogen content at higher dose level of studied pesticides.

From the results obtained in the experiments, in general it was seen that higher levels of pesticides application i.e. more than 50 ppm of Sevin, and even 10 ppm of Endotaf, adversely affected the occurrence and survivability of blue-green algae in the laboratory culture which are responsible for nitrogen fixation.

Conclusion

It was concluded that, in laboratory culture the carbamate pesticide, Sevin was less toxic than organochlorine, Endotaf to the blue-green algae, Calothrix javanica, Calothrix marchica and Cylindrospermum musicola. Further, a progressive decline in the nitrogen content of the studied blue-green algae occurs with increasing concentrations of Sevin and Endotaf pesticides. However, Calothrix javanica and Calothrix marchica were always more tolerant than the Cylindrospermum musicola to increasing Sevin (carbaryl, 50%) and Endotaf (endosulfan, 35%) pesticides doses. Among the studied pesticides treatment Endotaf (endosulfan, 35%) was found to be highly toxic to the Calothrix javanica, Calothrix marchica and Cylindrospermum musicola. In general, it was seen that the sensitiveness of soil blue-green algae to the studied pesticide application was found to be more in sheathless heterocystous forms than the ensheathed heterocystous forms.

Article in Brief

The effect of two commonly used pesticides Sevin (carbaryl, 50%) and Endotaf (endosulfan, 35%) belonging to carbamate and organochlorine group was studied on the nitrogen fixation of soil blue-green algae. Stock solutions of these pesticides were prepared freshly for experiments in the sterilized media and added to the BG-11 culture media to obtain the desired concentrations of 2.5, 5, 10, 20, 50, 100,

250 and 500 ppm. Experiments were conducted by inoculating equal amounts of actively growing unialgal isolates of Calothrix javanica, Calothrix marchica and Cylindrospermum musicola into cotton stoppered conical flasks. Total nitrogen fixed by each blue-green alga at each concentration of four pesticides was estimated by conventional Micro- kjeldahl method in the laboratory cultures. The results indicated a progressive decrease in the nitrogen fixation of tested blue-green algae with increasing concentrations of Sevin and Endotaf pesticides. However, nitrogen fixed by the studied blue-green algae also increased at the lower doses of pesticides viz. 10 ppm of carbamate, Sevin and 2.5 ppm of organochlorine, Endotaf. The consequences of the results showed that Calothrix javanica and Calothrix marchica were emerged as most compatible and tolerant blue-green algae to the increasing pesticide doses. On the other hand, Cylindrospermum musicola was found to be highly susceptible as even at 10 ppm of Sevin, and at 2.5 ppm of Endotaf. Among the two pesticides treatments, Endotaf was found to be highly toxic to all the tested blue-green algae. It was concluded that in general the sensitiveness of soil blue-green algae to studied pesticide application was found to be more in sheathless heterocystous forms than the ensheathed heterocystous forms.

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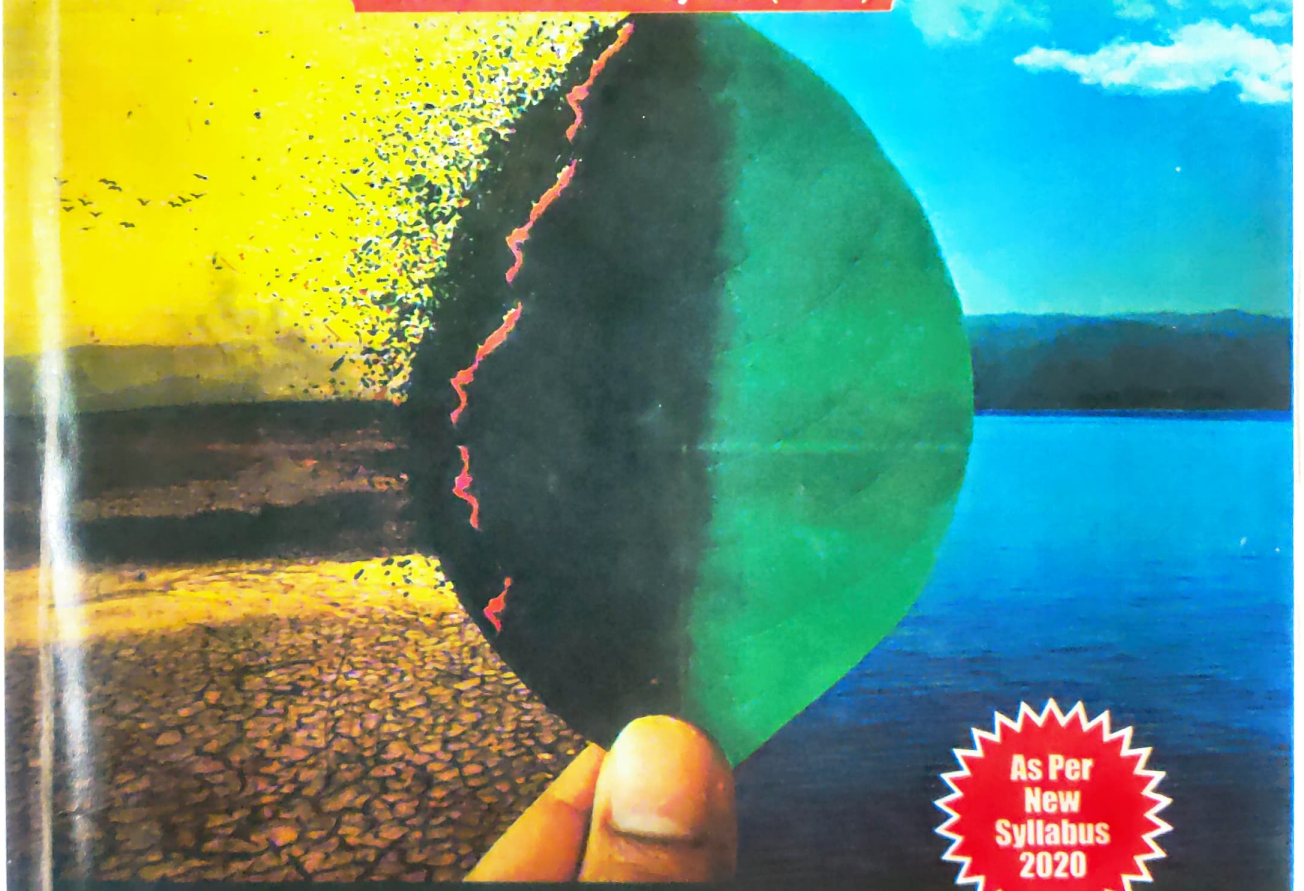

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Syllabus

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All Faculties - Second Year Semester III and IV

Unit No.	Topic	Lectures
	Semester-III	Total-30 (2 Credit)
1	**Introduction to environmental studies** **1.1** Multidisciplinary nature of environmental studies; **1.2** Scope and importance of environmental studies **1.3** Concept of sustainability and sustainable development.	**02**
2	**Ecosystems** **2.1** What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem: food chains, food webs and Ecological succession. **2.2** Case studies of the following ecosystems : **a)** Forest ecosystem **b)** Grassland ecosystem **c)** Desert ecosystem **d)** Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)	**08**
3	**Natural Resources : Renewable and Non-renewable Resources** **3.1** Land resources and land use change; Land degradation, soil erosion and desertification. **3.2** Deforestation: Causes and impacts due to mining, dam building on environment, forests, Biodiversity and tribal populations **3.3** Water: Use and over-exploitation of surface and ground water, floods, droughts conflicts over water (international & inter-state). **3.4** Energy resources : Renewable and non-renewable energy sources, use of alternate energy sources, growing energy needs, case studies	**10**

4	**Biodiversity and its conservation** 4.1 Levels of biological diversity : genetic, species and ecosystem diversity; Biogeographic zones of India; Biodiversity patterns and global biodiversity hot spots 4.2 India as a mega-biodiversity nation; Endangered and endemic species of India 4.3 Threats to biodiversity: Habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions; Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity. 4.4 Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.	10
	Semester- IV	
5	**Environmental Pollution** 5.1 Environmental pollution: types, causes, effects and controls; Air, water, soil and noise pollution 5.2 Nuclear hazards and human health risks 5.3 Solid waste management: Control measures of urban and industrial waste. 5.4 Pollution case studies:-	10
6	**Environmental Policies & Practices** 6.1 Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture 6.2 Environment Laws: Environment Protection Act; Air (Prevention & Control of Pollution) Act; Water (Prevention and control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act. International agreements: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD). 6.3 Nature reserves, tribal populations and rights and human wildlife conflicts in Indian context.	09
7	**Human Communities and Environment** 7.1 Human population growth: Impacts on environment, human health and welfare	06

	7.2 Resettlement and rehabilitation of project affected persons; case studies **7.3** Disaster management: floods, Earthquake, cyclones and landslides. **7.4** Environmental movements: Chipko, Silent Valley, Bishnois of Rajasthan. **7.5** Environmental ethics: Role of Indian and other religions and cultures in environmental conservation. **7.6** Environmental communication and public Awareness- Case studies (e.g. CNG vehicles in Delhi).	
8	**Field Work-** **8.1** Visit to an area to document environmental assets: river/ forest/ flora/ fauna **8.2** Visit to a local polluted site- Urban/Rural/Industrial/Agricultural. **8.3** Study of common plants, insects, birds and basic principles of identification. **8.4** Study of simple ecosystems- pond, river, Delhi Ridge, etc.	**05**

ENVIRONMENT AWARENESS

ISSUES AND PERSPECTIVE

- Editors -

Dr. B. S. Yadav ▪ Dr. S. R. Pagare
Prof. V. C. Thange ▪ Dr. G. K. Chavan



ENVIRONMENT AWARENESS: Issues and Perspective

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Biodiversity Conservation - Needs and Methods

- Dr. B. S. Gaikwad
Department of Botany
K. J. Somaiya College, Kopargaon, Dist: Ahmednagar

Area Biodiversity refers to the variety of plants and animals of the world. Biodiversity is the degree of variety in nature. It is the totality of genes, species WTS in a region. It indicates all inherited variations of living organisms living in it can be defined as the variety and variability of life. It can be observed at gene maries level and ecosystem level.

Biodiversity is the biological diversity which includes the variety of the whole species present on earth. s ecosystems in which they are present.Biodiversity is necessary for our existence as well as valuable in its own right. Biodiversity include fundamental things. Biodiversity also includes various other important things and services.

Main threats to our biodiversity

- Degradation, fragmentation and loss of habitat
- Spreading of invasive species
- Unsustainable use of natural resources
- Change of Climate
- Inappropriate fire regimes
- Changes within aquatic environment and water flows

Why should Conserve Biodiversity?

Human should conserve biodiversity because of its benefit for example services and biological resources which are essential to live our life on earth. However, it also provides spiritual benefits as well as social benefit.

Significance of Biodiversity Biodiversity is the wealth of the Nation.

- It comprises all plants, animals and microbes.It supplies food.
- It supplies oxygen for our breathing.
- It maintains a balance of oxygen and carbon dioxide.
- It supplies drugs.
- It brings rain.

» It maintains climate.

» It enriches resources.

A biological resource means any product that is harvested from nature is the part of biological resources. These resources come under several categories such as medicine, food, wood products, fibers etc. For Medicinal field human population is dependent on plants. It is true that in the developed country, many of our medicines are produced by chemicals in pharmaceutical companies, but the original formulas come from plants Fibers which is used for ropes, clothing, webbing, netting, sacking, and other materials are obtained by plants mainly for example cotton plants, Agave plants (sisal), flax plants (linen), Corchorus plants (jute), bamboo, palms and Agave plants.

Value of Biodiversity

Biodiversity is useful to man in several ways. It provides food, useful products and goods to improve the social value.

1. Consumptive Use Value

The consumption of biodiversity products is called consumptive use. The following are the products harvested from the biodiversity and consumed.

i) Food ii) Drugs iii) Fuel

i) Food:

The biodiversity provides food for man and his pets. Plants are consumed by animals as food. It is the consumptive value of biodiversity. The plants form the food for animals. The plants and animals form food for man. Whatever we eat, is the product of biodiversity. The following food items are supplied by biodiversity: Rice, Corn, Fruits, Cereals, Wheat, Fish, Egg, Milk, Meat, Vegetables.

ii) Drugs:

Many drugs are obtained from plants. They are called herbal medicines. Sidha, Ayurveda and Unani are concerned with herbal medicines. Penicillin, an antibiotic is obtained, from fungus. Quinine is obtained from Chinchona tree. It is used to treat malaria. Morphine, a pain killer, is obtainedfrom poppy

iii) Fuels:

» Fire wood is a fuel.

» Coal and petroleum are the fossil fuels. Fossil fuels are formed by the death and decay of the plants and animals.

» Gobar gas is obtained from cow dung.

2. Productive Use value:

The marketable items of Biodiversity form productive use value.

Agriculture produces food products. It creates green revolution. Fish is a protein food. It is produced by Aquaculture. It creates blue Cow produces milk. It is called dairy. It creates white revolution. Poultry produces eggs and broiler. Silkworms produces silk. - Sericulture Honeybee produces honey - Apiculture. Pearl oyster produces pearl - Pearl culture Wild plants supply drugs such as quinine, morphine, etc. Pesticides are extracted from plants. Eg. Neem tree. Antibiotics are synthesized by microbes. Eg. Penicillin from fungus. Microbes form biofertilizers. Eg.

Rhizobium. Cotton is obtained from cotton plants. Paper is manufactured from wood. Sugar is obtained from sugarcane. Fruits and vegetable are obtained from plants. Rose and other flowers are obtained from plants. Rice is obtained from paddy. Biotechnology and genetic engineering are appliedtoenhanceproduction

3. SocialValue

Social value of biodiversity refers to religious and cultural importance.

» Trees are worshiped as God. Eg. Banyan tree, Peepal tree, Neem tree, etc.

» Flowers, Tulsi, 'Punkan'leaves, etc. are used in poojas.

» Lime fruit, banana fruit and many other fruits are given to God.

» Sandal obtained from trees is used as a cosmetic in poojas. Banyan seedlings are planted in marriage tents with an anticipation that the life fourish like a banyan.

» Goats, chicks, pigs, etc. are sacrificed to God.

» Cobra is worshiped as a God.

» Skins are used to make shoes, belts, bags, purses, etc.

» Tribal people collect honey from the forests and the mountains.

» Hunting in the forests is the main occupation of tribals.

» Herbs, shrubs, climbers and their roots are used as ayurvedic medicines.

» Domesticated animals are allowed to graze on grasslands.

» Trees on the road sides give shadow to passengers.

4. Ethical Value

Ethical value of biodiversity is the use of plant and animal species in a right way simply means the moral use of plants and animals.It is the existence value.Dinosaurs, the biggest animals of the world, become extinct long ago. We could see them zaphics only. We are unfortunate to see them. Hence, there is an urge in human mind to save diversity.

Biodiversity rich natural areas are often known as heritage centres. The World Heritage Convention has taken attempts to protect such centres.

5. Aesthetic Value

The use of plants and animals in beautifying the surrounding is said to be their aesthetic value.

Biodiversity includes attractive species of plants, animals and birds, which give a natural beauty to the habitat. Examples

Ornamental plants are grown in hanging baskets in rooms and home gardens to beautify the surrounding.

Beautiful birds are reared in small cabinets.

Ornamental fishes having various colours are grown in glass containers to enhance the beauty of the indoor environment.

Zoos and Museum harbouring different species of animals and birds attract many people and children.

Trees with attractive flowers and dense vegetation on hills increase the touristic value of the regions.

Parks in cities and towns are visited by thousands of people every day because of their aesthetic value given by attractive flowers and plants.

Tulsi plants are placed at door steps of houses. It is an example of aesthetic value of biodiversity. Most of the time in human history, conservation means protecting nature for the spiritual gifts it provides, and protecting sacred places in the local landscape. The biodiversity effects on cultural development can be shown by heterogeneity of the world's mythology, folk dances and folk art which contribute to the richness of literature and global arts. In different landscapes, different cultures are present which influenced our language, diet, occupation and various types of activity.Uniqueness of each habitat is presented by their animals and plants that why each country and state have their

flagship animals as well as plants. Even during traveling, motivation of the peoples is to see biological diversity, different cultural and landscape. Ecotourism is travel with the aim to view, support and sustain the local cultures and its natural ecosystem. Support from ecotourism can be very helpful to reduce habitat destruction as well as to preserve endangered species.

6. Optional Value

In cyclone-prone areas, dense vegetation is grown to reduce the speed of wind so that van escape from direct effects of the cyclones. The effects of Tsunami are reduced by growing trees in the coastal areas. Genetically engineered animals and microbes give many valuable products. Genetically engineered plants meet some specific needs of people reducing the use of fertilizers.

Medicinal plants are grown and sent to faraway places to get an income.

Some poisonous plants are grown along the margin of farms to prevent the entry of in the farm.

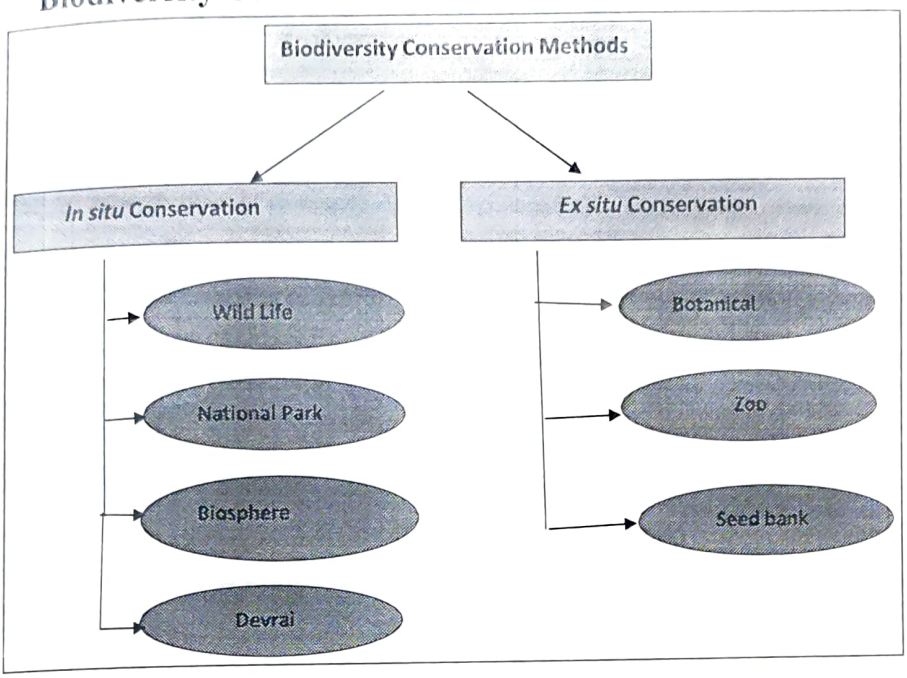
7. Ecosystem Services

Ecosystem services means processes provided by the nature to support human life. For example Pollination, decomposition of waste, water purification, renewal of soil fertility and moderation of floods. Ecosystem processes are often overlooked, and are not generally valued as part of the economy until they cease to function. When economic value is assigned to these services, it becomes very high. For example, insect pollinators help produce many commercially important fruits.

Similarly in other ecosystem service water purification just involves filtering of rain water by soil and by microbes that can break down nutrients and contaminants, and reduce metal ions, slowing their spread into the environment. Wetland and riparian plants absorb nitrogen, and trap sediments that decrease water quality.

But human construction and development will disrupt natural environments.

Biodiversity Conservation Methods:



In-situ Conservation:

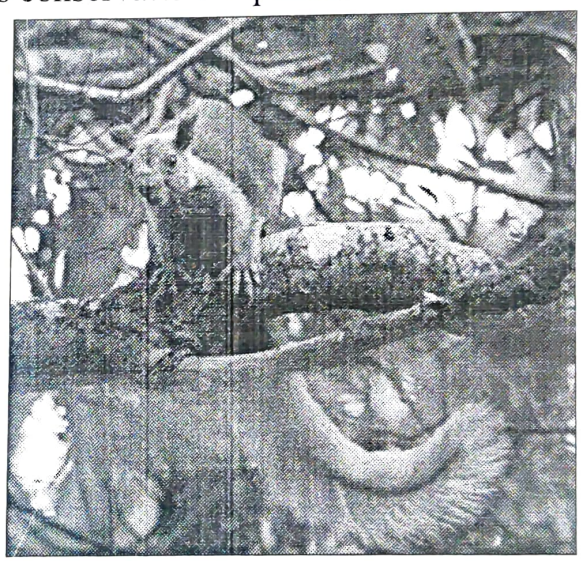
In-situ conservation is on-site conservation or the conservation of genetic resources in natural habitat of plant or animal species, such as forest genetic resources natural populations of tree species. It is the process of protecting an endangered plant or animal species in its natural habitat, either by protecting or cleaning up the habitat itself or by defending the species from predators. It is applied to conservation of agricultural biodiversity in agro-ecosystems by farmers, especially those using unconventional farming practices. In-situ conservation is being done by declaring area as protected area.

a) Wild life:

"Wild" animals are those that live independently of man and characteristically resist his interference with aggression or avoidance. "Wildness" in itself, of course, exists only in the mind of man; it is not a property of nature.

The mounting pressure of the rapidly-increasing global populations of human and their domestic animals and plants is one of the major causes of our declining wildlife rescurces. One highly disturbing aspect of the ever-growing human population is that such growth occurs at the expense of the world's wildlife storehouse. During the course of natural evolution, some existing species become

extinct and others are evolved. The natural turnover rates for various groups of plants and animals. Birds, about 8,600 species exist today; the natural turnover rate is about 1 per 230 years. Mammals, about 4,200 species exist today; the natural turnover rate is about 1 per 140 years. As against these fairly low natural rates, during the last three decades alone some 95 species of birds and 37 of mammals have become extinct. Today some 200 species of birds and 100 of mammals are facing serious threats of extinction. he wild life institute of India has also emphasised to new protected areas in different parts of the country to ensure the representation of maximum wild life habitats. The institute has suggested to increase national parks upto 147 and wild life sancturies upto 519, so that total land area will be covered 5.06%. towards conservation of plants.



Bhimashankar Wildlife Sactury, Bhimashankar, Pune

These should be efforts potential economic and scientific value. Measures should be undertaken for rehabilitative strategies for rare, threatened and endangered plant and animal species. In order to derive maximum benefit from in-situ conservation, incentive to grow domesticated economically important biota and develop herbal drug industry by providing wastelands of the country. For in-situ conservation there is need of comprehensive National Biological Inventory.

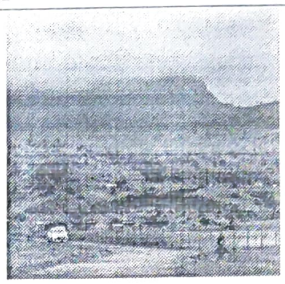
b) National Parks:

A national park is an area which is strictly reserved for the betterment of the wildlife and where activities like forestry, grazing on cultivation are not permitted. In these parks, even private ownership rights are not allowed. Their boundaries are well marked and

circurrscribed. They are usually small reserves spreading in an area of 100 sq. km. to 500 sq. km. In national parks, the emphasis is on the preservation of a single plant or animal species.



Ex.: Kaziranga National Park,Assam



Kalasubai- Harishchandra gad Sanctuary



Rehakuri Black buck Sanctuary,Karjat,Ahmednagar

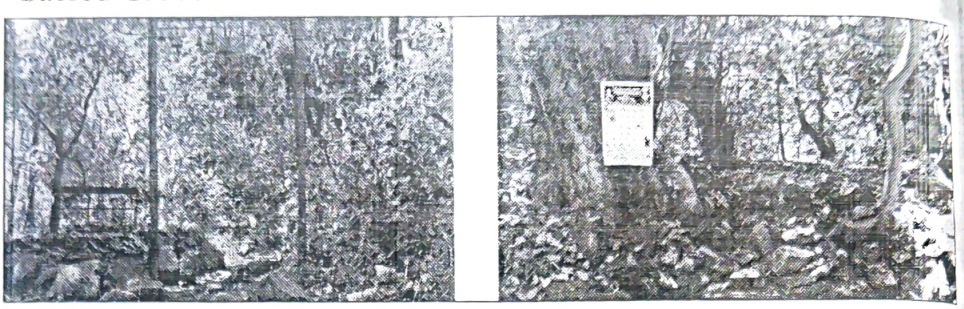
c) Biosphere Reserves:

Biosphere Reserve (BR) is an international designation made by UNESCO for representative parts of natural and cultural landscapes extending over large area of India and some additional sites are under consideration, Function

terrestrial or coastal/marine ecosystems or a combination thereof. The idea of 'biosphere reserves' was initiated by UNESCO in 1973 - 74 under its Man and Biosphere (MAB) programme. The MAB, launched in 1970 by UNESCO is a broad based ecological programme aimed to develop within the natural and social sciences a basis for the rational use and conservation of the resources of the biosphere and for the improvement of the relationship between man and the environment, to predict the consequences of today's actions on tomorrow s world and thereby to increase man's ability to manage efficiently the natural resources of the biosphere reserve. The Indian National Man and Biosphere (MAB) committee identifies and recommends potential sites for designation as Biosphere Reserves, following the UNESCO's guidelines and criteria. By April 2008, 15 biosphere reserves have been established in

d) Devrai

The word 'Devrai' is a compound of 'Dev' meaning 'God' and 'Rai' meaning 'Forest'. Many traditional societies revere and worship nature and consider certain plants and animals sacred. The forest patches are also considered a sacred forest by locals so they are called "Sacred Grove"



This sacred grove is an attempt to share with you some of the traditional Indian biodiversity conservation practices. Faith and taboo play an important role in guarding the forest against human invasion. Sacred Groves are forest patches traditionally protected by native communities due to religious significance so that, nature is allowed to sustain itself. These groves are a rich source of fruit-bearing trees and small water bodies and act as habitat for several birds and reptiles. These sacred grove can range in size from a cluster of trees to hundreds of hectares.

Groves are often associated with temples, shrines, or burial grounds. Some of the deities to whom these groves are dedicated are God Shiva, Maruti, Vaghoba, Vira, Bhairoba, Khandoba, and Shirkai.

The tribal communities Dhangar, Mahadeo Koli, and the agro-pastoral community Maratha worship the deities and look after the groves. They are forest-dependent communities while Maratha carries out agricultural practices. Resource extraction in the groves is limited by a variety of rules to placate the deity which has resulted in the development of relict patches of a climax forest.

In Maharashtra, sacred groves are found in tribal as well as non-tribal areas. Maharashtra has about 4,000 such groves, scattered in the wildlife regions.

Bhimashankar wildlife sanctuary is located in the northern Western Ghats in Pune and Thane districts include about 14 sacred groves, including a large grove surrounding a Shiva temple, which is

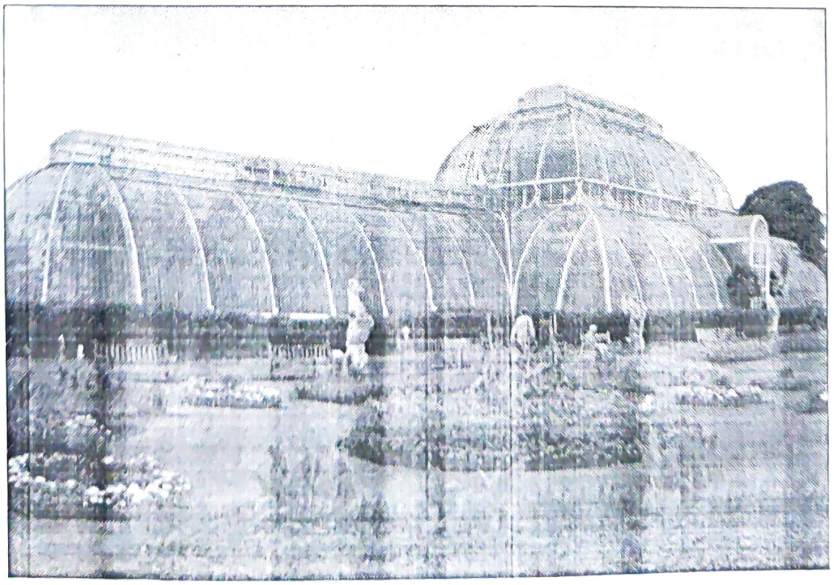
one of the twelve Jyotirlingams in India.

Ex-situ Conservation :

Ex-situ conservation means literally, "off-site conservation". It is the process protecting an endangered species of plant or animal outside its natural habitat, Ex. by removing part of the population from a threatened habitat and placing it a new location, which may be a wild area or within the care of humans. While Ex-situ conservation comprises some of the oldest and best- known conservation methods.

a) Botanical Gardens and Zoo

Botanical gardens and zoos are the most conventional methods of ex-situ conservation, all of which house whole, protected specimens for breeding and reintroduction into the wild when necessary and possible. These facilities provide not only housing and care for specimens of endangered species, but also have an educational value. They inform the public of the threatened status of endangered species and of those factors which cause the threat, with the hope of creating public interest in stopping and reversing those factors which jeopardize a species survival in the first place. They are the most publicly visited ex-situ conservation sites.Botanical gardens hold living collections. Indeed botanical garden conservation could be considered as field gene bank or seed gene bank or both, depending on the conservation method being used. However, they tend to focus their conservation efforts on w ild, ornamental, rare and endangered species. Most of the germplasm conserved in botanical gardens do not belong to the plant genetic resources for food and agriculture.



i) Royal Botanical Garden, Kew, England:

ii) Indian Botanical Garden, Kolkata:

b) Seed Banks:

Undeniably, the most cost-effective method of providing plant genetic resources fa long-term Ex- situ conservation is through the storage of seeds under very specřic conditions, follow ing techniques well developed for crop plants by organisations such as the International Plant Genetic Resources Institute (IPGRI). The main advantage of seed banking is that it allows large populations to be preserved and genetic erosion to be minimised by providing optimum conditions and reducing theneed for regeneration endangered plants may also be preserved in part through seed banks or germplasm banks.The term seed bank sometimes refers to a cryogenic laboratory facility in which the seeds of certain species can be preserved for up to a Century or more without losing their fertility e.g., Indian clover.

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Consequences of Global Warming and Climate Change

- **Rahul Dhanwate**
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As a result of increse in levels of Green house gases (GHG) during 1950—2000 there occurred a gradual increse in surface air temperature. As a result it became apparent that the Earth has been suffering from fever, and we have to act sincerely to cure it. Carbon emissions still continue to increase. Climate change has became one of the the prime issues threatening the sustainability of world's environment. Besides environment, climate change has also impacts on liability, health and economy of the globe.

- A rise in global temperature causes sea levels to rise as polar ice caps and glaciers begin to melt, along with thermal expansion of water.
- More droughts and flood.
- More terrible storms
- Many more hot days
- More diseases like malaria and dengue.
- Impact on ecosystem would change the crop production potential of a region.

According to the second report (1995)of the Intergovernmental Panel on Climate Change (IPCC), global warming will lead to a rise in sea levels, fluctuating crop yields and loss of biodiversity.

- Concentration of carbon dioxide, methane and nitrous oxide have increased since preindustrial era by 30%,145%and 15% respectively, largely because of fossil fuels use, land use changes and agriculture.
- Global mean surface air temperature had increased between 0.3°c-0.6°c especially during latter half of 20th century.
- There will be a drastic change in weather patterns bringing more floods or droughts in some areas.
- Biological diversity may reduce, some species could become extinct.

The most affected will be none but the poorest on the planet, poor developing, countries, particularly small island nation states will be

the worst hit. A 15-95 cm rise in sea level could turn these people into refugees. Moreover, poor countries are least prepared to face the wrath of floods and hurricanes.

A two degree centigrade rise in global temperature predicted by the year 2030 may cause many damages to the planet. Shifting rainfall patterns are likely to leave some parts too wet and others too dry. The Himalayan glaciers would melt and increse flooding. The floods and droughts would spread diseases and reduce agricultural output. And this is really just the tip of the iceberg. The climate change will affect monsoon and agriculture in south Asia. Whether we like it or not, the weather has turned on us.

Global sea level had been rising steadily till 2003. In the Indian Ocean, though the period between 2004-2009 shows higher sea level rise the pace has grown slower since 2004. The climate change vulnerability index 2011 listed Kolkata in India and chittagong in Bangladesh as two of the six fastest growing cities at extreme risk of climate change impacts.

Who is responsible for Climate change?

Climate change is about cumulative historical emissions, a tonne of CO2 released in 1840 is equal to a tonne of Co2 released today. Rich countries account for about seven percent out of every 10 tonnes of Co2 that have been emitted since the start of the industrial area in 1840. USA accounted about 30 per cent, followed by Russian Federation, China, Germany, and U. K., with about 10%each and France, India, Canada and Poland with less than five per cent each.

Between 1980 and 2005,the total emissions of the USA were almost double that of China and more than seven times that of India.

What we are doing?

Frankly speaking very little countries around the world have been putting their heads together to meet the challenge. The only way to escape the disastrous consequences associated with climate change is to reduce emissions by 50-70 per cent below 1990 levels. The use of fossil fuels, hence carbon emissions are closely linked to economic growth and life style. The richer you are more you emit. You have to put limits to your emissions, hence to stope fuel guzzling sports utility vehicles i.e. life style. But few are wiling to change the way they live.

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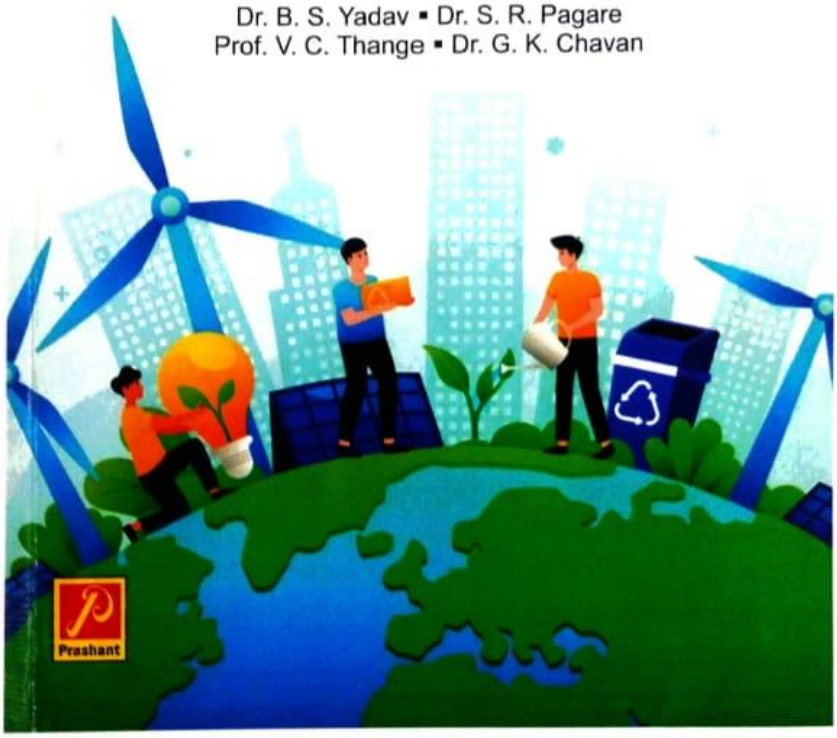

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Environmental Pollution and Waste Management

- Dr. Swati B. Patil
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This article will discuss the problem of environmental pollution and waste management.

Everything around us is directly or indirectly connected to the environment. All things

i.e. biotic or a biotic component which is present in environment constitutes the ecosystem. All components of ecosystems are depends on each other for balance the system. But long years ago the environment is disturbed due to pollution. Not only the man but also other living beings as well as the nature have effect on environmental pollution.

Environmental pollution is present from the very beginning of life but today it is a serious problem that threatens the survival of mankind. What is the influence of the waste management on the environment? Today every person living on planet earth is worried about environmental pollution because the consequences faced every day, through air we breathe, the food and water we consume, through pollution and radiation we are exposed to. Also the consequences of environmental problems are manifested through the lack of natural resources, extinction of plant and animal species, as well as the problems in the global ecosystem and biochemical processes. Based on the research problem we can hypothesize: Yes, waste management has a great impact on the environment. (Becir Kalac et.al. 2015)

Environmental pollutants have various adverse health effects from early life some of the most important harmful effects are perinatal disorders, infant mortality, respiratory disorder,



Solid Waste



mental disorders and various other harmful effect. Therefore it is time to take action and control the pollution. Otherwise the waste products from consumption, heating, agriculture, mining, manufacturing, transportation, and other human activities will degrade the environment. (Roya Kelishadi 2012)

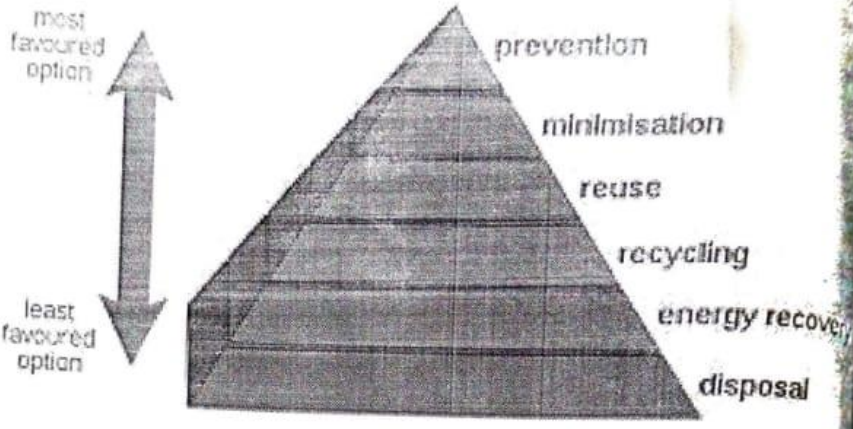
Industry has become an essential part of modern society, and waste production is an inevitable outcome of the developmental activities. A material becomes waste when it is discarded without expecting to be compensated for its inherent value. These wastes may pose a potential hazard to the human health or the environment (soil,

air, water) when improperly treated, stored, transported or disposed off or managed. Currently in India even though hazardous wastes, emanations and effluents are regulated, solid wastes often are disposed off indiscriminately posing health and environmental risk. In view of this, management of hazardous wastes including their disposal in environment friendly and economically viable way is very important and therefore suggestions are made for developing better strategies.) (virendra mishra and S.D. pandey 2005)

Solid waste management (SWM) is a major problem for many urban local bodies (ULBs) in India, where urbanization, industrialization and economic growth have resulted in increased municipal solid waste (MSW) generation per person

SWM disposal is at a critical stage of development in India. There is a need to develop facilities to treat and dispose of increasing amounts of solid waste. More than 90% of waste in India is believed to be dumped in an unsatisfactory manner. Waste dumps have adverse impacts on the environment and public health. Open dumps release methane from decomposition of biodegradable waste under anaerobic conditions. Methane causes fires and explosions and is a major contributor to global warming . There are also problems associated with odour and migration of leachates to receiving waters. Odour is a serious problem, particularly during the summer when average temperatures in India can exceed 45°C [39]. Discarded tyres at dumps collect water, allowing mosquitoes to breed, increasing the risk of diseases such as malaria, dengue and West Nile fever. Uncontrolled burning of waste at dump sites releases fine particles which are a major cause of respiratory disease and cause smog. Open burning of MSW and tyres emits 22 000 tonnes of pollutants into the atmosphere around Mumbai every year [21]. The impacts of poor waste management on public health are well documented, with increased incidences of nose and throat infections, breathtects.

Core to the vision for waste management in India is the use of wastes as resources with increased value extraction, recycling, recovery and reuse. Waste management needs to be regarded throughout Indian society as an essential service requiring sustainable financing. A strong and independent authority is needed to regulate waste management if SWM is to improve in India.



The conclsion is that the population growth and particularl the development of megacities is making SWM in India a majo problem. The current situation is that India relies on inadequate waste infrastructure, the informal sector and waste dumping. There are mai issues associated with public participation in waste managemen and there is generally a lack of responsibility towards waste in the community. There is a need to cultivate community awareness and change the attitude of people towards waste, as this is fundamental to developing proper and sustainable waste management systems. Sustainable and economically viable waste management must ensure maximum resource extraction from waste, combined with safe disposal of residual waste through the development of engineered landfill and waste-to- energy facilities. India faces challenges related to waste policy, waste technology selection and the availability of appropriately trained people in the waste management sector. Until these fundamental requirements are met, India will continue to suffer from poor waste management and the associated impacts on public health and th environment.

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Deforestation: Causes, Effects and Control Strategies

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Introduction:

The year 2011 is "The International Year of Forests". This designation has generated momentum bringing greater attention to the forests worldwide. Forests cover almost a third of the earth's land surface providing many environmental benefits including a major role in the hydrologic cycle, soil conservation, prevention of climate change and preservation of biodiversity. Deforestation is the conversion of forest to an alternative permanent non-forested land use such as agriculture, grazing or urban development. Deforestation is primarily a concern for the developing countries of the tropics as it is shrinking areas of the tropical forests causing loss of biodiversity and enhancing the greenhouse effect.

The causes of deforestation

The struggle to save the world's rainforests and other forests continues and there is an growing worldwide concern about the issue. In order to save forests, we need to know why they are being destroyed. Distinguishing between the agents of deforestation and its causes is very important in order to understand the major determinants of deforestation. Direct causes

Expansion of farming land

About 60 per cent of the clearing of tropical moist forests is for agricultural settlement (Myers, 1994; Anon., 1991) with logging and other reasons like roads, urbanization and Fuel wood .Tropical forests are one of the last frontiers in the search for subsistence land for the most vulnerable people worldwide (Myers, 1992). M

Forest and other plantations

Plantations are a positive benefit and should assist in reducing the rate of deforestation. The fact that plantations remove the timber pressure on natural forests does not translate eventually into less, but rather into more deforestation. Indeed, it is feared that agricultural

expansion which is the main cause of deforestation in the tropics might replace forestry in the remaining natural forests (Anon., 2002; Cossalter and Pye-Smith, 2003; Anon., 2005).

Logging and fuel wood

Logging does not necessarily cause deforestation. However, logging can seriously degrade forests (Putz et al., 2001). Logging in Southeast Asia is more intensive and can be quite destructive. However, logging provides access roads to follow-on settlers and log scales can help finance the cost of clearing remaining trees and preparing land for planting of crops or pasture. Logging thus catalyzes deforestation (Chomitz et al., 2007).

Overgrazing

Overgrazing is more common in drier areas of the tropics where pastures degraded by overgrazing are subject to soil erosion. Stripping trees to provide fodder for grazing animals can also be a problem in some dry areas of the tropics but is probably not a major cause of deforestation. Clear cutting and overgrazing have turned large areas of Qinghai province in China into a desert. Overgrazing are causing large areas of grasslands north of Beijing and in Inner Mongolia and Qinghai province to turn into a desert.

Fires

Fires are a major tool used in clearing the forest for shifting and permanent agriculture and for developing pastures. Fire is a good servant but has a poor master. Fire used responsibly can be a valuable tool in agricultural and forest management but if abused it can be a significant cause of deforestation (Repetto, 1988; Rowe et al., 1992

Mining

Mining is very intensive and very destructive (Mather, 1991; Sands, 2005). The area of land involved is quite small and it is not seen as a major cause of primary deforestation. Mining is a lucrative activity promoting development booms which may attract population growth with consequent deforestation.

Urbanization/industrialization and infra-structure

Expanding cities and towns require land to establish the infrastructures necessary to support growing population which is done by clearing the forests (Mather, 1991; Sands, 2005). Tropical forests are a major target of infra-structure developments for oil exploitation,

Deforestation: Causes, Effects and Control Strategies

- Anjali Tiwari
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K. J. Somaiya College, Kopargaon, Dist: Ahmednagar

Introduction:

The year 2011 is "The International Year of Forests". This designation has generated momentum bringing greater attention to the forests worldwide. Forests cover almost a third of the earth's land surface providing many environmental benefits including a major role in the hydrologic cycle, soil conservation, prevention of climate change and preservation of biodiversity. Deforestation is the conversion of forest to an alternative permanent non-forested land use such as agriculture, grazing or urban development. Deforestation is primarily a concern for the developing countries of the tropics as it is shrinking areas of the tropical forests causing loss of biodiversity and enhancing the greenhouse effect.

The causes of deforestation

The struggle to save the world's rainforests and other forests continues and there is an growing worldwide concern about the issue. In order to save forests, we need to know why they are being destroyed. Distinguishing between the agents of deforestation and its causes is very important in order to understand the major determinants of deforestation. Direct causes

Expansion of farming land

About 60 per cent of the clearing of tropical moist forests is for agricultural settlement (Myers, 1994; Anon., 1991) with logging and other reasons like roads, urbanization and Fuel wood .Tropical forests are one of the last frontiers in the search for subsistence land for the most vulnerable people worldwide (Myers, 1992). M

Forest and other plantations

Plantations are a positive benefit and should assist in reducing the rate of deforestation. The fact that plantations remove the timber pressure on natural forests does not translate eventually into less, but rather into more deforestation. Indeed, it is feared that agricultural

expansion which is the main cause of deforestation in the tropics might replace forestry in the remaining natural forests (Anon., 2002; Cossalter and Pye-Smith, 2003; Anon., 2005).

Logging and fuel wood

Logging does not necessarily cause deforestation. However, logging can seriously degrade forests (Putz et al., 2001). Logging in Southeast Asia is more intensive and can be quite destructive. However, logging provides access roads to follow-on settlers and log scales can help finance the cost of clearing remaining trees and preparing land for planting of crops or pasture. Logging thus catalyzes deforestation (Chomitz et al., 2007).

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Urbanization/industrialization and infra-structure

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logging concessions or hydropower dam

Air pollution

Air pollution is associated with degradation of some European and North American forests. The syndrome is called "Waldsterben" or forest death. In 1982, eight per cent of all West German trees exhibited damage that rose to about 52 per cent by 1987 (Raloff, 1989) and half of the trees reported dying of Waldsterben in the Alps (Lean, 1990). High elevation forests show the earliest damage including forests in the north-east and central United States.

Tourism

National parks and sanctuaries beyond doubt protect the forests, but uncautioned and improper opening of these areas to the public for tourism is damaging. Unfortunately, the national governments of tropical and sub-tropical countries adopt tourism for easy way of making money sacrificing the stringent management strategies. Further, many companies and resorts who advertise themselves as eco-tourist establishments are in fact exploiting the forests for profit

Indirect causes

The World Rainforest Movement's ..Emergency Call to Action for the forests and their Peoples asserts that is the inevitable result of the current social and economic policies being carried out in the name of development" (Anon., 1990d). It is in the name of development that irrational and unscrupulous logging, cash crops, cattle ranching, large dams, colonisation schemes, the dispossession of peasants and indigenous peoples and promotion of tourism is carried out.

Colonialism

Erstwhile colonies of the colonial powers like Britain, France, Spain or Portugal are now the Third World Countries or the developing nations mostly have the tropical rainforests except Australia and Hawaii were exploited for their natural resources and their indigenous people's rights destroyed by the colonial powers.

Exploitation by industrialized countries

Wealthy countries or the erstwhile colonial powers having deficit of their own natural resources are mainly sustaining on the resources of the financially poorer countries those are generally natural resource rich. Twenty per cent of the world's population is using 80 per cent of the world's resources.

Overpopulation and poverty

The role of population in deforestation is a contentious issue (Mather, 1991; Colchester and Lohmann, 1993; Cropper and Griffiths, 1994; Ehrhardt-Martinez, 1998; Sands, 2005). The impact of population density on deforestation has been a subject of controversy. Poverty and overpopulation are believed to be the main causes of forest loss according to the international agencies such as FAO and intergovernmental bodies.

Transmigration and colonization schemes

Transmigration of people to the forest frontier whether forced or voluntary due to development policy or dislocation from war is the major indirect cause of deforestation (Mather, 1991; Colchester and Lohmann, 1993; Sands, 2005). Moreover, governments and international aid agencies earlier believed that by encouraging colonization

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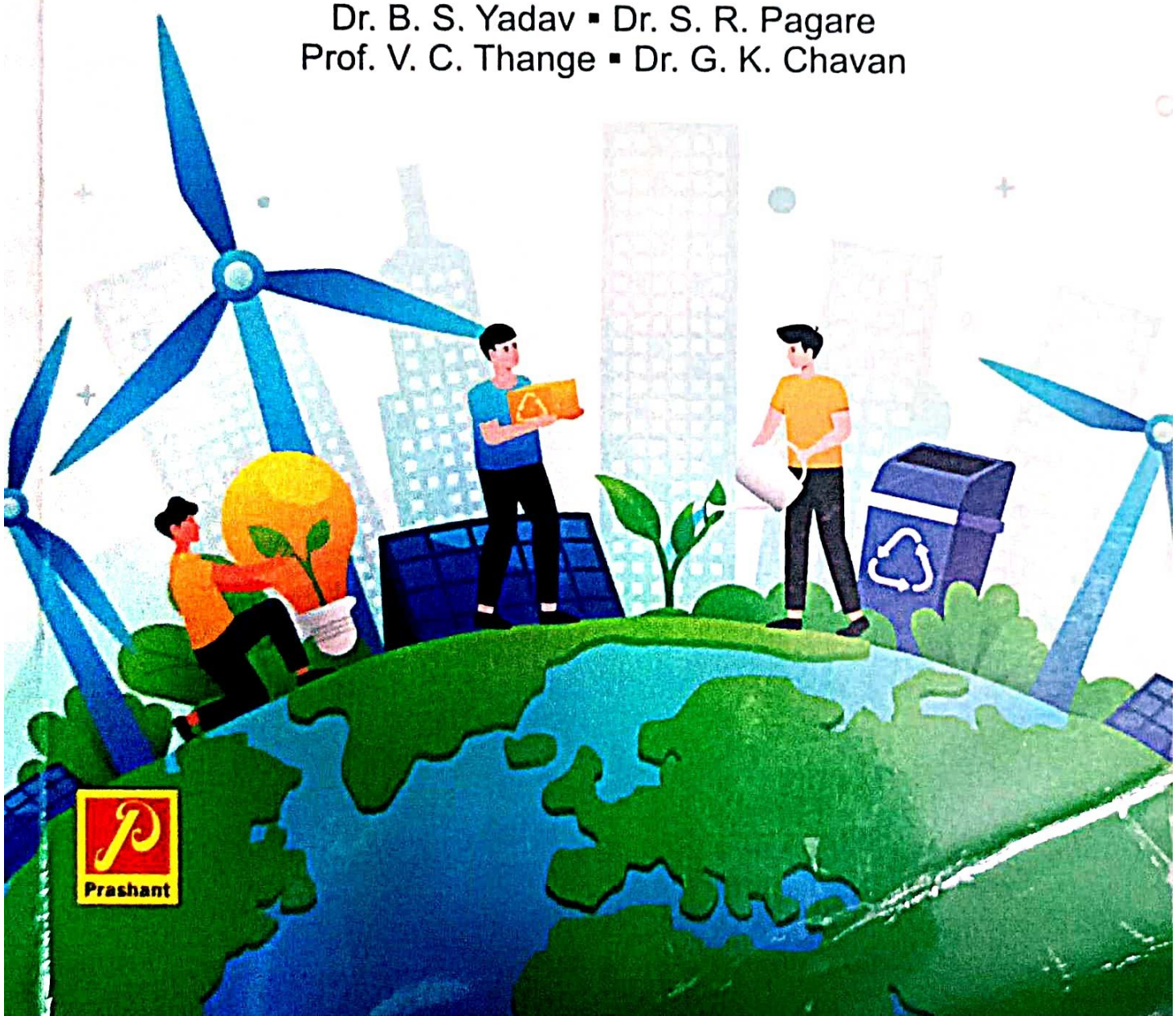

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Phytochemical Analysis and Antimicrobial Activity of Rhus semialata against microbial Pathogens causing Diarrhoea

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Abstract:

Sumac is common name for a genus Rhus that contains over 250 individual's species of flowering plant in the family Anacardiaceae. These plants are found in temperate and tropical region worldwide and have a long history of use by indigenous people for medicinal and other uses. (Sierra Giuseppe Mazza, 2003). The emergence of new infectious disease, the resurgence of several infections that appeared to have been controlled and the increase in bacterial resistance have created the necessity for studies directed towards the development of new antimicrobials. Considering the failure to acquire new molecules with antimicrobial properties from micro-organisms, the optimization for screening methods used for identification method of antimicrobials from other natural sources is of great importance.

Rhus semialata (Syn. Rhus chinensis Mill; R. javanica Linn.) is a deciduous tree of north eastern India. The fruit of these plant is traditionally used to control Urinary tract infection., Gastrointestinal infection, Pneumonia (Cystic Fibrosis). The present Research was undertaken to evaluate anti-microbial and phytochemical content of fruits of Rhus semialata against Vibrio cholerae. The antimicrobial activities of fruit extract of this plant were done in order to obtain its activity test micro-organisms.

Keywords: Phytochemical Screening, Antimicrobial Activity, Rhus Semialata.

Introduction:

A central tenet of green chemistry is the ability to obtain a commercially viable product with desirable properties from a widely available various source. Plants have been used for centuries in traditional medicines as they contain components of therapeutic values. According to World Health Organization (WHO), more than 80% of the world's population relies on medicines for health care needs. Plants

are natural source of antimicrobial agents. They contain wide range of metabolites that can be extracted from them and used to treat infectious and chronic disease. Vibrio cholerae, which causes cholerae (Joachim Reidl, Karl E. Klose et al.), is considered the most lethal pathogen of the last century and a threat to current global human health. One area of research is natural antimicrobials from plants. Plants have long been utilized as the source of therapeutic agents worldwide and to threat many life-threatening diseases due to bacterial infections (Taran et al. 2010). The antimicrobial effect of plant extracts against V. cholerae has been previously reported. Rhus semialata (Anacardiaceae) is a deciduous tree used in traditional medicine, found in the outer Himalayan ranges at an altitude of 3000-7000 ft. the hills of Assam, Meghalaya, Nagaland (Gurung, 2002; Rai and sharma, 1996; Bhattacharjee, 1998), upper Burma, China and Japan (Kirtikar and Basu, 1987).

The flowers are dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seeds is required) and they are pollinated by bees. The plant is not self-fertile. 3 Eastern Himalayas region is presumed to be a potent source of medicinal plants due to wide variation both in topography of land, soil type and their climate conditions. Nature has been particularly generous in her gift of Sylvan treasures of North Eastern Districts of India. Most importantly, these studies will be helpful to isolate and characterize the chemical constituents of plants would further be valuable in discovering the actual value folkloric remedies and qualitative investigation was carried out to evaluate the presence of phytochemicals. The active ingredient in medicinal plants is defined as chemical compound that act directly or indirectly prevent or treat disease. For centuries, the therapeutic properties of various medicinal plants have been used to treat human disease. It has been estimated that between 60%-90% of the populations of developing countries use traditional and botanical medicines almost exclusively and consider them to be a normal part of primary healthcare (WHO, 2002) Pharmacist are increasingly interested in complementary and alternative medicines, including herbal medicines, as they perceive these form of healing as being both safe and effective. This trend in use of alternative and complementary healthcare has prompted scientist to investigate the various biological activities of medicinal plants.

the activity of compound to inhibits the growth of microorganisms.

Then Antimicrobial assay were compared with standard antibiotics:

The standard antibiotic assay was performed with three standard antibiotics like:

1. Azithromycin:
2. Tetracycline:
3. Doxycycline:

Result and Discussion:

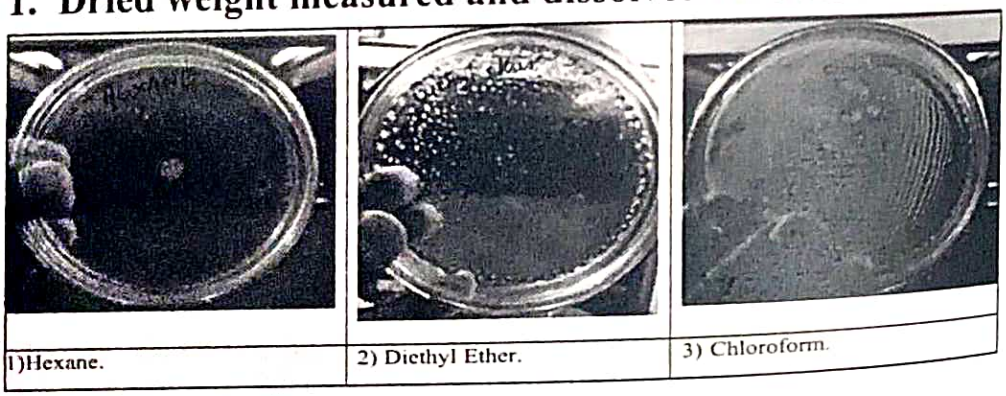
1. Phytochemical Screening: The fruit extract of plant was analysed for phytochemical components. The test showed presence of tannins, flavonoids, alkaloids, cardiac glycoside, Terpenoids and Phenols (Table 1).

Sr. No.	Phytochemical Tests	Observation	Interpretation
1.	Tannins	Blue black color	+
2.	Saponins	No form formation	-
3.	Flavonoids	Yellow precipitation	+
4.	Alkaloid	Green color	+
5.	Quinones	Red color	+
6.	Glycosides	No pink color	-
7.	Terpenoids	Brown color at interphase	+
8.	Phenol	green color	+
9.	Anthocyanin	no yellow color	-
10.	Cardiac glycosides	no brown ring at interphase	-

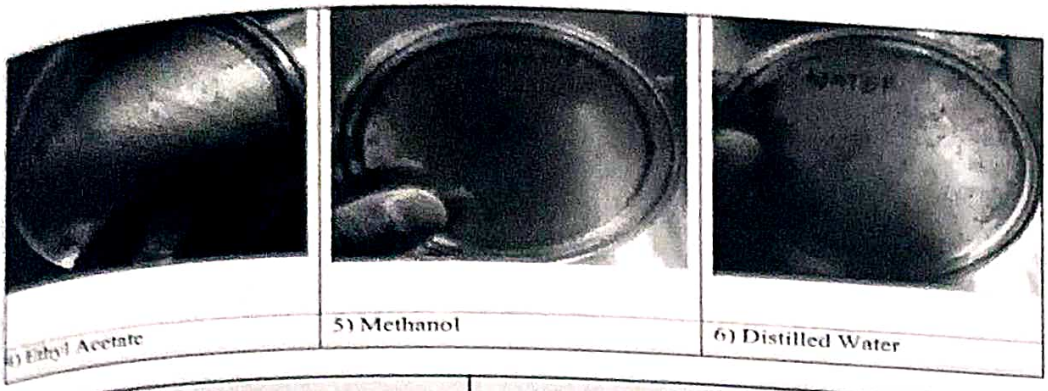
Table 1: Different group of phytochemicals present in aqueous extract of Rhus semialata plant fruit. Fruit of Rhus semialata was analyzed for phytochemicals (Table 1) by using standardized phytochemical screening method. The aqueous extract.

Antimicrobial Activity of Solvents:

1. Dried weight measured and dissolved in DMSO:



1)Hexane. 2) Diethyl Ether. 3) Chloroform.

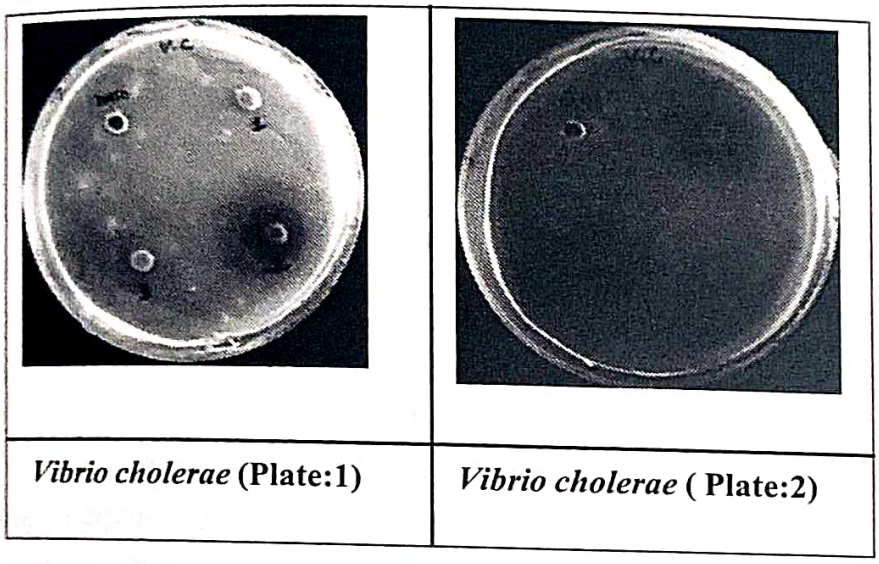


4) Ethyl Acetate | 5) Methanol | 6) Distilled Water

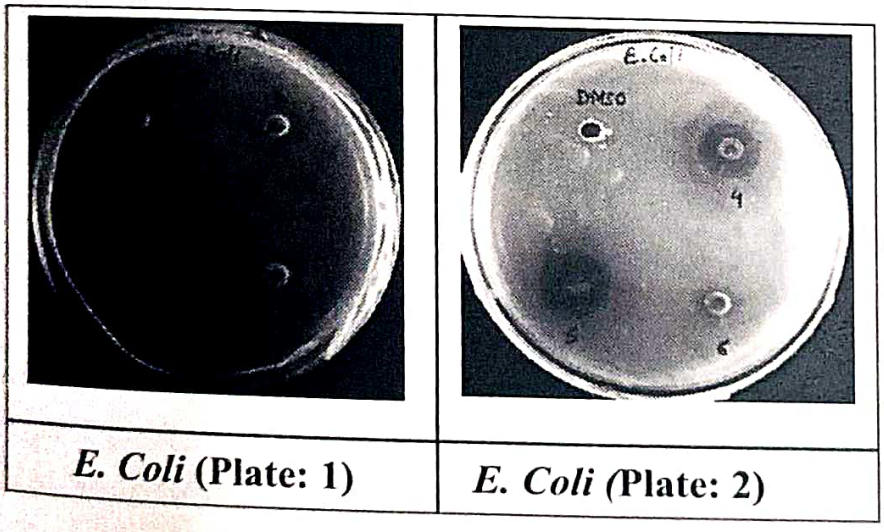
Solvents	Air Dried Weight in µg.
1) Hexane	0.048
2) Diethyl Ether	0.278
3) Chloroform	0.233
4) Ethyl Acetate	0.045
5) Methanol	0.007
6) Distilled Water	0.058

Table: Dried weight

2. Zone of Inhibition of Solvents:



Vibrio cholerae **(Plate:1)** | ***Vibrio cholerae*** **(Plate:2)**



E. Coli **(Plate: 1)** | ***E. Coli*** **(Plate: 2)**

Solvent	Vibrio cholerae	E. coli
1) Methanol	2.75 ± 0.05	1.45± 0.15
2) Ethyl acetate	1.45±0.05	2.0 ± 0.1
3) Doxycycline	2.75±0.05	1.85 ± 0.05
4) Diethyl ether	1.3 ± 0	1.5 ± 0
5) Azithromycin	2.85±0.05	1.5 ± 0
6) Tetracycline	2.3 ± 0	1.66 ± 0.05

Table: 2. Zone of inhibition

Antimicrobial activity: Agar well diffusion technique, we have spread 1.5 × 10 cfu / ml suspension in each plate. 20 µl of each 6-plant extract were added in each well with 20 µl DMSO as a control.

No.	Solvent Name	Polarity Index	Vibrio cholerae (cm)	E.Coli (cm)
1	Hexane	0.1	1.7 ± 0.15	-
2	Diethyl ether	2.8	2.2 ± 0.4	2.4 ± 0.4
3	Chloroform	4.1	-	-
4	Ethyl acetate	4.4	2.8 ± 0.6	2.4 ± 0.6
5	Methanol	5.1	1.8 ± 0.3	2.4 ± 0.6
6	Distilled water	10.2	-	1.1 ± 0.15

Table: 3. Antimicrobial activity with Standard Deviation.

Discussion:

Present study showed that there is antimicrobial activity against Vibrio cholerae and E. coli pathogens. In the phytochemical screening of Rhus semialata plant spp. Presence of tannins, flavonoids, alkaloids, cardiac glycosides and phenols was observed remarkably for further examination Rhus semialata plant fruit powder was immersed and dried plant extract was extracted with the help of hexane, diethyl ether, chloroform, ethyl acetate, methanol and distilled water. Dried weight (0.048gm, 0.0278gm, 0.0233gm, 0.048gm, 0.007gm, 0.058gm) respectively. In the antimicrobial activity against Vibrio cholerae spp. Methanolic extract, ethyl acetate, diethyl ether extract showed zone of inhibition (2.75±0.05, 1.45±0.05 and 1.3±0) respectively. In comparison with standard antibiotics i.e., Doxycycline, Azithromycin and Tetracycline showed zone of inhibition (2.75±0.05, 2.85±0.05 and 2.3±0) resp. as a result extracts showed significant zone of inhibition

in comparison with standard antibiotics with Vibrio cholerae spp. In gram negative E. coli spp. Methanol extract, ethyl acetate extract and diethyl ether extract showed zone of inhibition (1.45±0.15, 2.0±0.1 and 1.5±0) resp. In comparison with i.e., Doxycycline, Azithromycin and Tetracycline showed zone of Inhibition (1.85±0.05, 1.5±0 and 1.66±0.05) resp. As result plant extract showed significant zone of inhibition in comparison with standard antibiotics with E. coli. spp. For further analysis, preparative TLC technique has been performed for ethyl acetate extract. In standardization in solvent system Hexane: Ethyl acetate (90:10) showed good separation of components. Five spots were observed and documented with Rf values 0.28, 0.38, 0.53, 0.65 and 0.89 in cm. Spots were extracted with coated Silica gel were scratched and taken in vials. Further antimicrobial activity of five spots against Vibrio cholerae were performed. Spot 1, Spot 2, and Spot 5 with Rf values (0.28, 0.38, 0.89) resp. showed significant zone of inhibition. (0.45cm, 0.25cm and 1.05cm) resp. in the study Fifth Spot with Rf value 0.89 showed good inhibition in another examination with E. Coli. Spot 1 and Spot2 with Rf values (0.28, 0.38) resp. showed zone of inhibition (0.1 and 0.25cms) resp. DMSO as control for further analysis purification and ample amount of Spot 1, Spot 2, Spot 5 yet to be done. In future study FTIR and LCMS of isolated bio active component yet to be performed. As a result, Rhus semialata plant spp can be a good alternative and economically potent medicine against diarrhoea or gastro intestinal disease caused due to gram negative Vibrio cholerae and E. coli spp.

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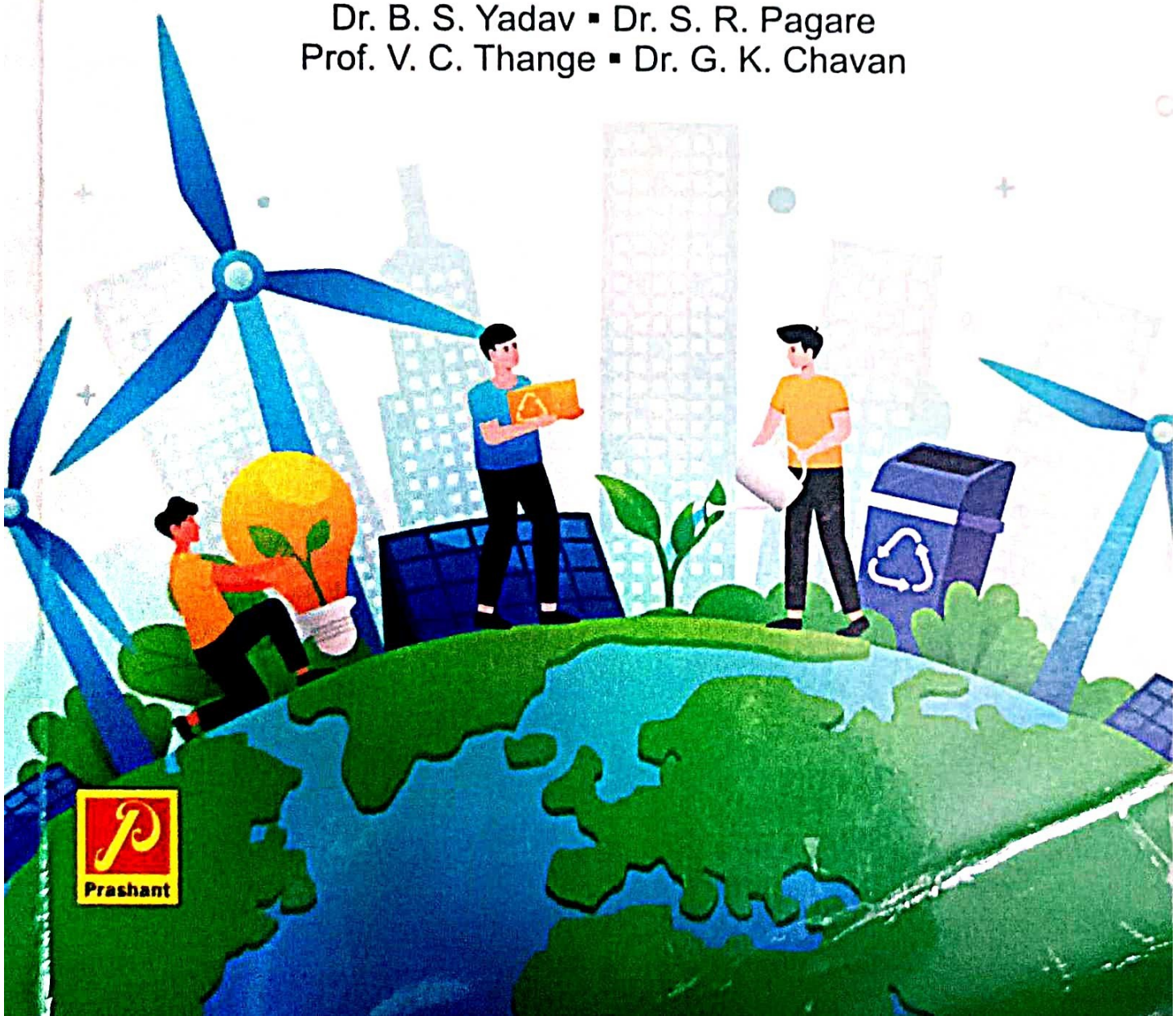

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Diversity of Spider Fauna in Kopargaon Region of Ahmednagar District, Maharashtra State, India

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Abstract:

The Phylum Arthropod order Aranae of class Arachnida has a significant value in the study of Environmental Sciences as it is a biological indicator. The objective of the present study was to find out the diversity of spiders from Kopargaon of Ahmednagar district, Maharashtra state of India. The study of spider diversity was done from different collection sites such as Kopargaon, Kumbhari, Godavari River area, Madhi B.K. The 15 - Spider Specimen were collected from different sites during July 2020 to August 2020. The Spiders collected were photographed, observed, identified and classified with the help of reference books and internet sources. Among 15 spider species identified, represented 09 families and 14 genera, were recorded from this work.

Key Words: Diversity, Spider, Godavari River, Biological indicator, Aranae, Environment.

Introduction:

India has plenty of flora and fauna and has mega diversity in the world. The knowledge regarding the diversity, distribution and abundance of spider in India is scattered variably. Spiders are one the most diverse group of organisms. Spider acts as bio-control agents, (CIKS, 2002). Spiders maintain and regulate the terrestrial arthropod population as they form important predators, (Riechert, S.E. and Bishop, L., 1990). Spiders are ample in number and are ecologically important in almost all terrestrial habitats.

Spiders are found to be predators in several ecosystems. Spiders form an important food source for bird, lizard, wasps, and other animals (Johnston, J. M., 2000). Spider silk is important to some birds for preparation of their nests. Out of 42, 24 families of passerine birds and nearly all species of humming birds depends on spider's silk and caterpillars to build their nests reported by Skerl K. L. (1997).

With consideration of the importance of spiders in the natural reduction of many insect pests and as bioindicators, immediate efforts are needed to understand diversity of spiders. The present information of spiders of Western Ghat refers to the work of Bawaskar K., Haldar R. and Kosankar S. (2018); Jose S. K. and Sabestian P. A. (2001); Jose S. K., Sudhirkumar A. V., Davis S. and Sebastian P.A. (2006), who tried to collect data for documentation of diversity of spider's fauna in Western Ghat.

The 42 species of spiders under 20 genera and 14 families at Sawanga-Vithoba Lake region, District Amaravati of Maharashtra, India reported by Wankhade, V. W. and Manwar, N. A. (2013).

The present study was undertaken to determine the diversity of spiders. We expect that the results obtained from this work will be helpful to update faunal data of spiders of the Kopargaon Tehsil and Maharashtra region.

Material and Methods:

Study Area: Study area of present investigation was Kopargaon Tehsil of Ahmednagar District which is located in state of Maharashtra, India. (19.4555° N, 74.4057° E) as shown in figure No. I and II. The studies on diversity of spider were performed from different collection sites such as Kopargaon City area, Kumbhari, Godavari River banks, Madhi B. K., as shown in Table No. I. The 15 - Spiders specimen were collected from above sites during July 2020 to August 2020.

Collection sites are surrounded by some urban area, Village area and agricultural fields. Spider specimens were collected from residential area, College campus, Botanical Garden, Godavari River bank, crop field, and agriculture fields from various localities of Kopargaon Tehsil region.

Following were the methods used for the spider collection: (1) Hand picking and (2) Sweep Netting by using insect collection Net. The specimens were preserved in 70 % alcohol. Identification of the Spider for their species classification is done by observation of taxonomic characters by using the reference books of Tikader B. K. (1977, 1987); Tikader B. K. and Biswas B. (1981)

Before preservation, all the spider specimen were photographed by Sony digital Camera.

Figure No. I: Location Map of Ahmednagar District for Survey of Spiders

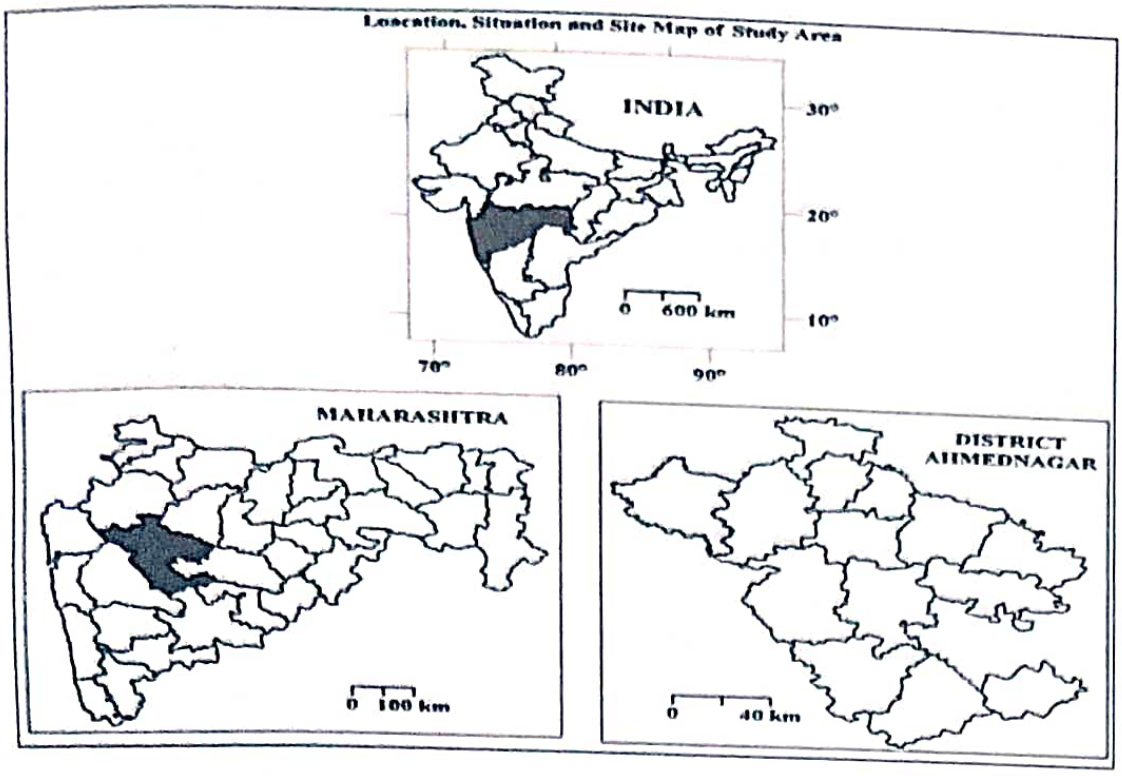


Figure No. II: Locations Map: Selected Collection Sites from Kopargaon Tehsil

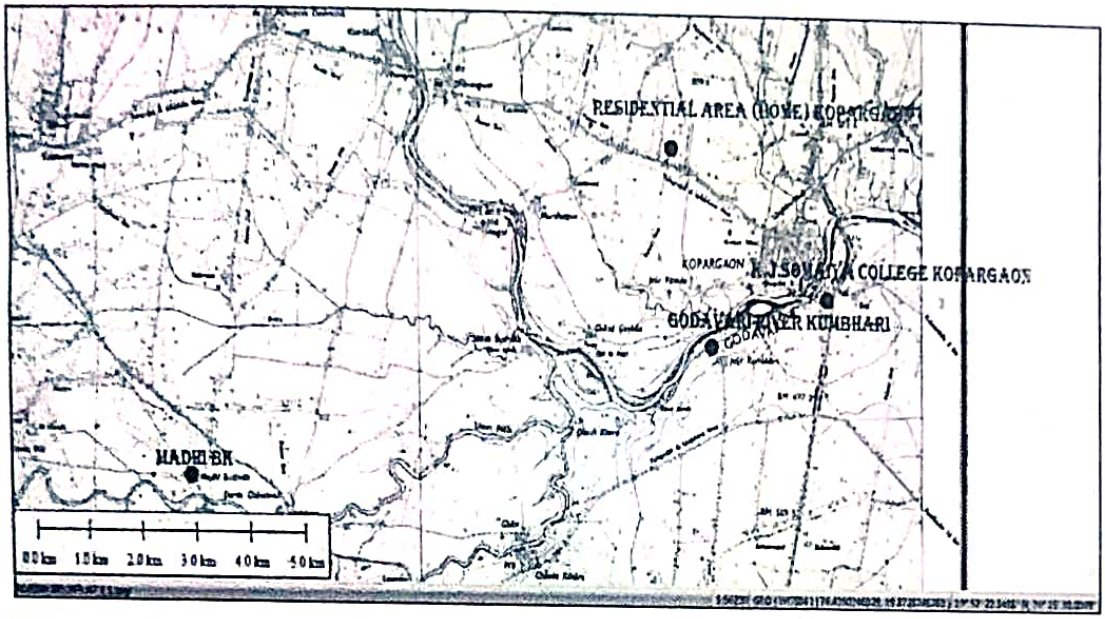


Table No. I: Collection Sites from Kopargaon Tehsil for Survey of Spiders

Collection Site	Geographical Location	Habitat type
1) Residential area, Dwarakanagari, Kopargaon	N 19°53'35.1" E 074°17'26.4"	Collected from residential area
2) K. J. Somaiya College of Arts, Comm. and Science, Kopargaon	N 19°52'27.7" E 074°28'57.7"	College Campus, Botanical Garden
3) Kumbhari, Godavari River Bank	N 19°54'15.4" E 074°24'51.0"	Godavari River side
4) Madhi B. K.	N 19°54'15.4" E 074°24'51.0"	Agriculture field

Observations and Results:

Total 15 Spider specimens were collected from various sites from study area and identified with the help of reference books together with keys (Tikader, B. K., 1987). The list of spider species is presented below Table-II. Out of 15 specimens identified, results obtained shows that total 15 - Species of spiders representing 09 families and 14 genera were recorded from this research work. The Salticidae is the most represented family with 05 species followed by Pisauridae and Araneidae with 02 species each and 01 species each from family Oxyopidae, Linyphiidae, Deinopidae, Tetragnathidae, Sparassidae and Sicariidae Table No. III showing Family wise percentage and Number of species in each family.

Table No. II: List of Family Wise Spider Species

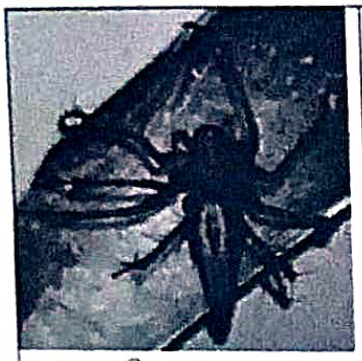
Sr. No.	Name of Family	Zoological Name
1.	Oxyopidae	Oxyopes species
2.	Pisauridae	Dolomedes tenebrosus
3.	Salticidae	Hasarius adansoni
4.	Salticidae	Menemerus birittatus
5.	Linyphiidae	Neriene radiata
6.	Pisauridae	Dolomedes scriptus
7.	Araneidae	Eriophora tranmarina
8.	Salticidae	Thyene imperialis
9.	Deinopidae	Deinopis subrufa
10.	Salticidae	Salticus scenicus

11.	Tetragnathidae	Tetragnatha shoshone
12.	Sparassidae	Heteropoda venatoria
13.	Sicariidae	Loxosceles reclusa
14.	Araneidae	Araneus ventricosus
15.	Salticidae	Plexippus paykulli

Table No. III: List of Family wise Number and Percentage of Spider Species

Sr. No.	Family	Species	Percentage (%)
1	Oxyopidae	1	6.7
2	Pisauridae	2	13.3
3	Salticidae	5	33.4
4	Linyphiidae	1	6.7
5	Araneidae	2	13.3
6	Deinopidae	1	6.7
7	Tetragnathidae	1	6.7
8	Sparassidae	1	6.7
9	Sicariidae	1	6.7

Family Salticidae was found to be most dominant with 05 species. This family accounts for 33.4 % of total species recorded in the present study. Salticidae is followed by Pisauridae and Araneidae (13.3 % of two species) and six families Oxyopidae, Linyphiidae, Deinopidae, Tetragnathidae, Sparassidae and Sicariidae, each one has represented only 01 species accounting for 6.7 % of each species. The images of 15 Spider Specimens are as given below.



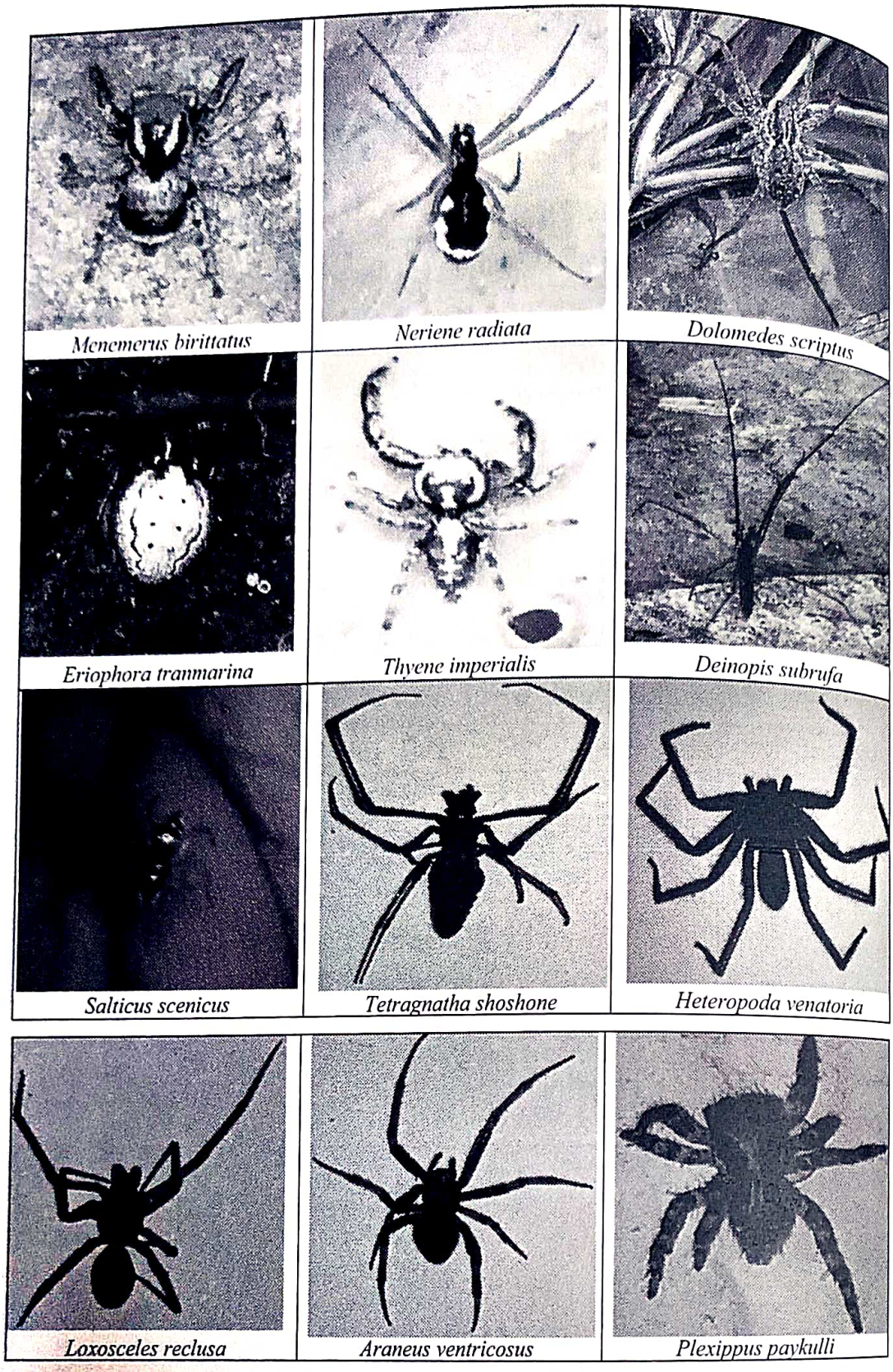
Oxyopes sp.



Dolomedes tenebrosus



Hasarius adansoni



Discussion:

The results obtained shows the dominance of spiders from family Salticidae (05 species) followed by Pisauridae and Araneidae (02 species each), followed by Six families Oxyopidae, Linyphiidae, Deinopidae, Tetragnathidae, Sparassidae and Sicariidae with each one has represented only one (01) species. The results show that the

ground-dwelling Spider families such as Salticidae are quite common in the study area. Out of 252 genera of spiders from India reported by Siliwal M., Molul S. and Biswas B. K. (2005), 14 genera are recorded in the present study. Out of 60 families represented from Indian region reported by Jose S. K. and Sabestian P. A. (2001); Jose S. K., Sudhirkumar A. V., Davis S. and Sabastein P. A. (2006), 09 families were represented from Kopargaon region of Ahmednagar district. This means that 15 % of the families were represented in the study. The high diversity of spiders in Ahmednagar can be attributed to high diversity of spider habitats such as plants, farm areas, and agricultural fields in the area. Our results are quite similar to those obtained by Wankhade V. W., Manwar N. A., Rupwate A. A. and Raut N. M. (2012), who recorded 32 spider species from Pune region. The results obtained confirmed with those obtained by(Bawaskar K., Haldar R. and Kosankar S. (2018); Halarnkar M. M. and Pai I. K. (2018); Lawania K. K. and Mathur P. (2017); More S. (2013, 2015); Nalini B. G. and Ravindranatha B. P. (2012) and Umarani S. and Umamaheshwari S. (2013).

Conclusion:

The present study is a result of preliminary survey of spider species. The attempt is made for documentation of the spider diversity; however, further more studies are essential to find out remaining spider species from the Kopargaon Tehsil of Ahmednagar district.

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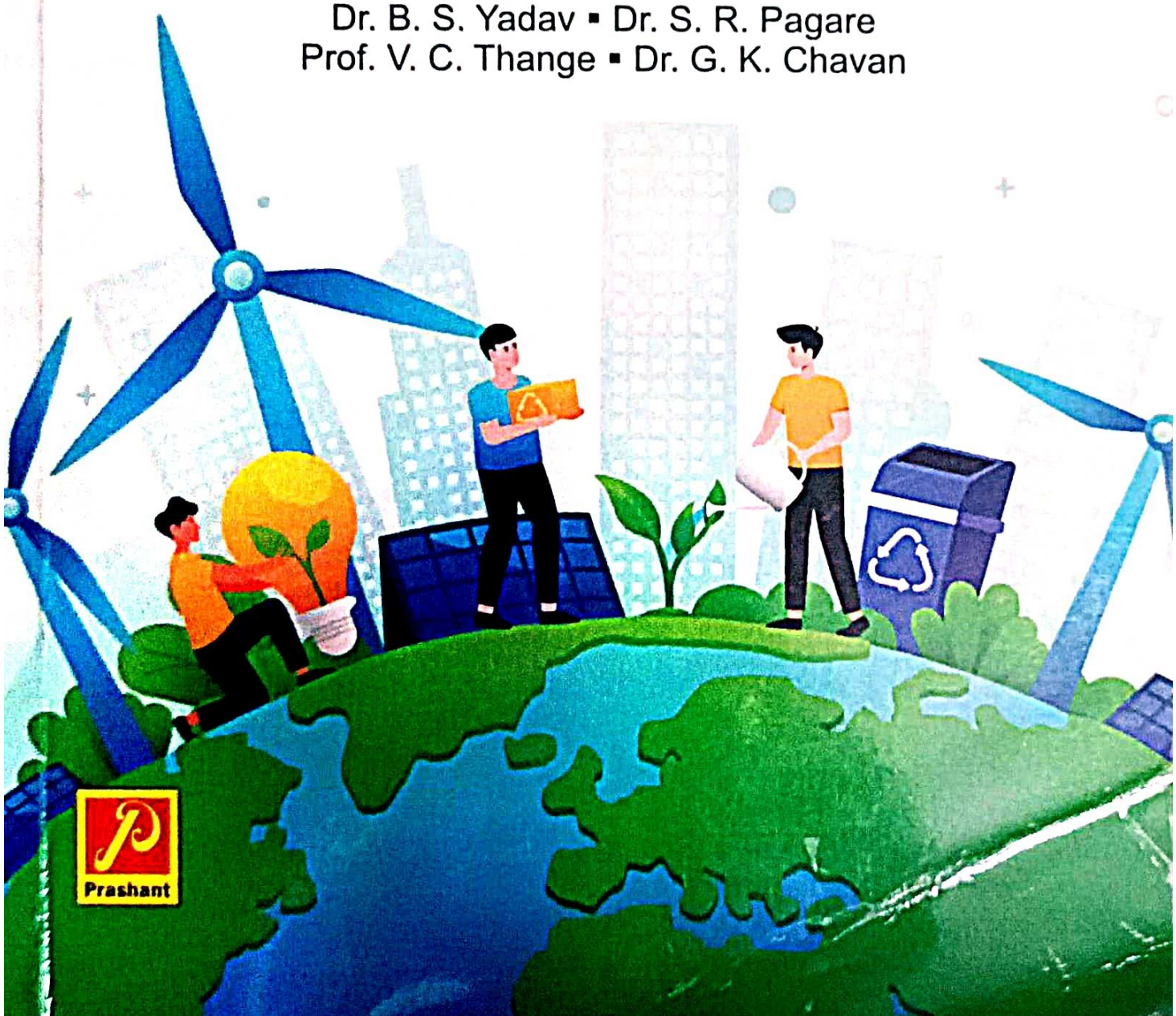

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To Study Diversity of Migratory and Local Birds in wild life Sanctuary Nandur Madhymeshwar in Winter Season

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Abstract:

The study is mostly based on the avian community observed in the Nandur Madhymeshwar region. The Nandur Madhymeshwar is having very good biodiversity having a different type of flora and fauna. It having large wetland region and different type of flowering and fruits plants on its surrounding, which provides grounds for feeding, breeding. and nesting for avian fauna. In total 27 different birds species are observed in that 09 are Residential migrant, 07 are Migratory, 10 are Residential and 01 are Vulnerable. It was observed that the concerned community shows a considerable diversity.

Keywords: Nandur Madhymeshwar, Birds, Diversity, Wetland, Migratory.

Introduction:

A Bird has been described as a 'Feathered Biped'. This description is apt and precise, and can apply to no other animal.

Birds are vertebrate warm-blooded animal, i.e., whose temperature remain more or less constant and independent of the surrounding temperature. This is a contradistinction to Reptiles, Amphibians and Fishes which are cold blooded, i.e., of temperature that changes with the hotness or coldness of their surrounding. To assist in maintaining an even temperature, the body of a bird is covered with nonconducting feather. Which in detail of structure and arrangement reflect the mode of the group to which the bird belongs. Compare for example the thick, soft, well-greased covering on the under side of aquatic bird like a Duck or Grebe with the peculiar, narrow, hairlike, 'double' feathers of the Cassowary to be seen in any zoo. A study of the arrangement of the feather tracts (pterylosis) which varies in the different order, families, and even species, is of great importance in determining the natural relationship of different birds. The feathers covering the body of a bird fall into 3 classes : (1) the ordinary outside feathers is known

as Contour feathers or penne, whether covering the body as a whole or specialized as pinions or flight feather or as a tail feather which serve as a rudder and brake : (2) the fluffy Down feather hidden by the contour feather and comparable to flannel underclothing, whether confined to nestling or persisting throughout life; (3) the hair like Filo-plumes which are hardly seen until the other feather have been plucked off. They are particularly noticeable, for instance, in a plucked pigeon. The body temperature of birds, about 38 to 44 °C., is higher than that of most mammals. Assisted by their non-conducting covering of feathers birds are able to withstand great extreme of climate.

As long as they can procure a sufficient of food supply, or 'fuel' for the system, it makes little material difference to them whether the surrounding temperature is over 60 °C. On the burning desert sand or 40 °C. Below zero in the icy frozen north. Their rate of metabolism is higher than that of mammals. They lack sweat-gland. The extra heat generated by their extreme activity which would, under torrid climatic conditions result in overheating, a fever, and death, is eliminated throughout lungs and air sac as fast as it is produced. For one of the functions of air sac a feature peculiar to birds and found in various parts within the body is to promote internal perspiration. Water vapor diffuses from the blood into these cavities and passes out by way of the lungs, with which they are indirectly connected. (The book of Indian bird - Dr. Salim Ali-2012)

Material and Method:

Nandur Madhymeshwar wild life bird sanctuary located at Niphad tehsil district Nashik Maharashtra state lies between 20°00'11. 82"N to 20°01'35. 66"N and 74°05'53. 08"E to 74°07'56. 68"E and located around 40 km from Nashik. It is famous bird sanctuary discovered by Dr. Salim Ali. The study site lies in and around backwater of Nandur Madhymeshwar dam, situated on Godavari and Kadwa river. During the study of September-January 2020, by use of Binoculars, camera Nikon D1800 Lense 70-300 using photographic capturing method identified birds using Dr. Salim Ali Sir book on Indian birds. And classified birds in various categories (http://ibcn.in). The checklist was prepared by using the standardized common and scientific names of the birds. The status of bird is categorized as as residential (R), local migrant (LM), migrant (M), common (C), etc. (Rasal,et.al., Diversity

Of Birds in Local Ecosystem Aurangabad, Maharashtra).

Result:

Sr. No.	Common Name	Scientific Name	Family	Migratory Status	IUCN Key
1.	River Tern	Sterna aurantia	Laridae	RM	NT
2.	Northern-shoveler	Spatula clypeata	Anatidae	M	LC
3.	Common greenshank	Tringa nebularia	Scolopacidae	M	O
4.	Brahminy shelduck	Tadaorna ferruginea	Anatidae	RM	C
5.	Black -Tailed Godwit	Limosa limosa	Scolopacidae	M	NT
6.	Chestnut bittern	Ixobrychus cinnamomeus	Ardeidae	RM	LC
7.	Common Pochard	Aythya ferina	Anatidae	M	UC
8.	Golliath Heron	Ardea goliath	Ardeidae	V	LC
9.	Gadwall	Anas strepera	Anatidae	M	O
10.	Eurasian oyester catcher	Haematopus ostralegus	Haematopodidae	M	NT
11.	Virginia rail	Rallus limicola	Rallidae	RM	C
12.	White Bellied minivet	Pericrocotus erythropygius	Campephagidae	R	LC
13.	Large egret	Casmerodius albus	Aradeidae	RM	VC
14.	Indian pond Heron	Ardeola grayii	Ardeidae	R	VC
15.	Sirkeer malkoha	Phaenicopheus leschenaultia	Cuculidae	R	LC
16.	Red munia	Amandava amandava	Estrildidae	R	LC
17.	Common crane	Grus grus	Gruidae	M	A
18.	Red collared Dove	Steptopelia tranquebarica	Columbidae	R	VC

19.	Eurasian Spoonbill	Platalea leucorodia	Threskiornithidae	RM	LC
20.	Great cormorant	Phalacrocorax carbo	Phalacrocoracidae	RM	VC
21.	Painted stork	Mycteria leucocephala	Ciconiidae	R	O
22.	Paddy-feild pipit	Anthus rufulus	Motacillidae	R	VC
23.	Little Cormorant	Phalacrocorax niger	Phalacrocoracidae	RM	VC
24.	Coat	Coat coat	Anatidae	RM	A
25.	White-breasted kingfisher	Halcyon smyrnesis	Alcedinidae	R	A
26.	Rufous-backed shrike	Lanius schach	Laniidae	R	LC
27.	Openbill stark	Anastomus oscitans	Ciconiidae	R	LC

LC= Least Concern, NT= Near Threatened, R= Residential, O= Occasional, C= Common, UC= Uncommon, VC= Very Common, RM= Residential Migratory, M= Migratory, V= Visitors and A= Abundant

Discussion:

It is greatly significant for being one of the few winter abodes for migratory bird species and this fame has earned it the prestigious title of a 'BHARATPUR' of Maharashtra (Dr. Salim Ali, 2011). We had been informed that the main bulk of inter-continental migratory winter visitors of the place were scheduled to arrive late that year (Chattergee, et. al., 2015). Avifaunal diversity from khairabanda lake in Gondia district Puri and Virani also observed some uncommon species like Gadwall, Pochard, Black-headed ibis, Coot, Wagtail (Puri and Virani, 2016). In Nal Sarovar Gujarat, state Chatergee A., et.al. studied on diversity of early winter migrant and resident's birds and observes different 36 birds of 20 different families and classified it with migratory and IUCN status with feeding habitat (Chatergee, et.al., 2015). In Solapur near Ekrukhe water reservoir Darekar P.P. observed different piscivorous birds and captured in photograph. They identified 18 different piscivorous birds (Darekar, Choghule, Kumbha, 2016).

Conclusion:

During the study of winter season observing different type of local and migratory birds in wild life bird Sanctuary Nandur Madhymeshwar tehsil Nashik. Out of 27 different birds species 09 species are Residential Migrant, 07 species are Migratory, 10 species are Residential and 01 Vulnerable.

Significance:

- Help in study of Ornithology.
- To study diversity of wetland birds.
- This data is helpful for society to conserve rare, near threaten bird's species.
- People became aware about bird's rescue, and may be stop hunting.
- Also help in management of wetland area.

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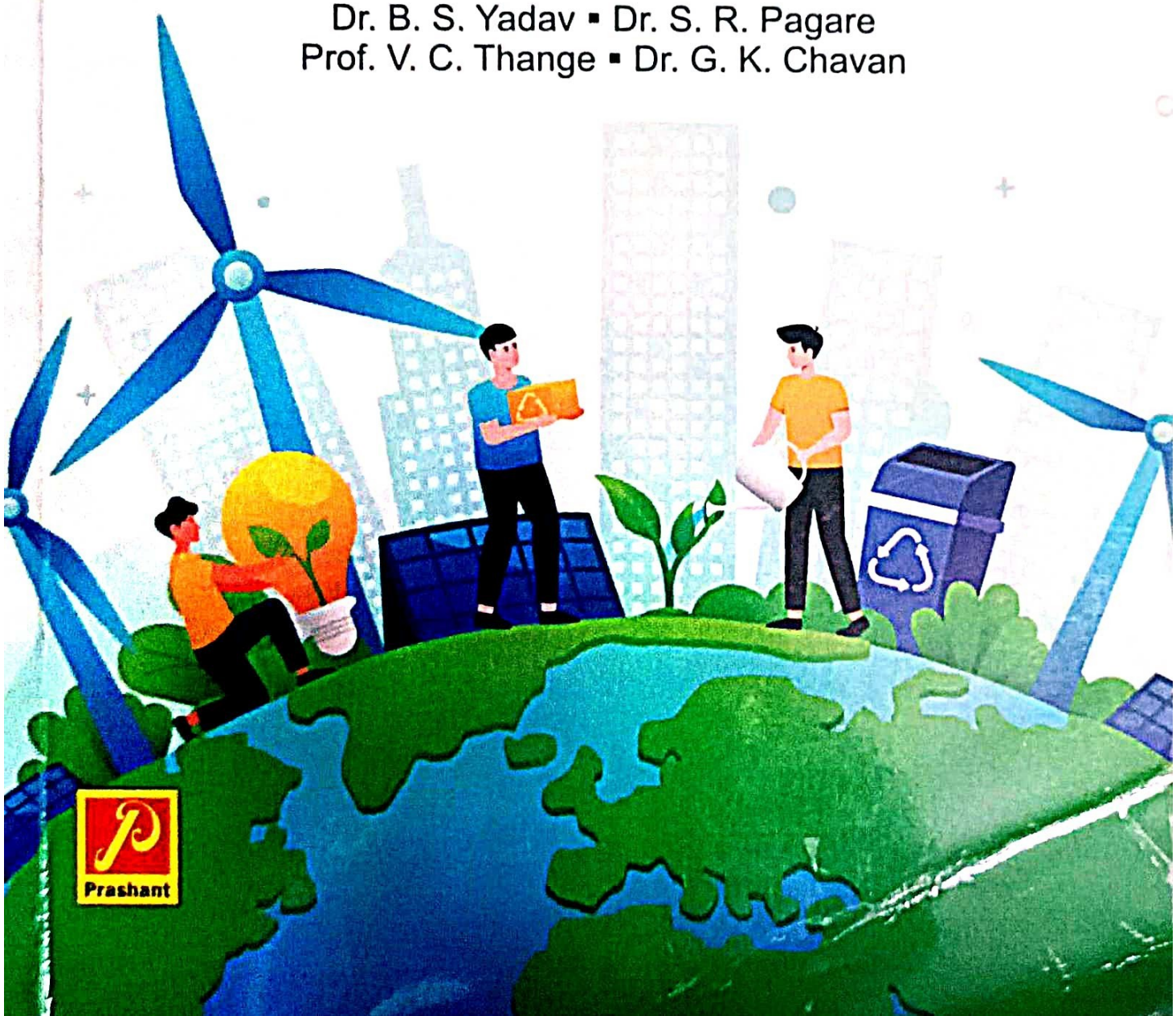

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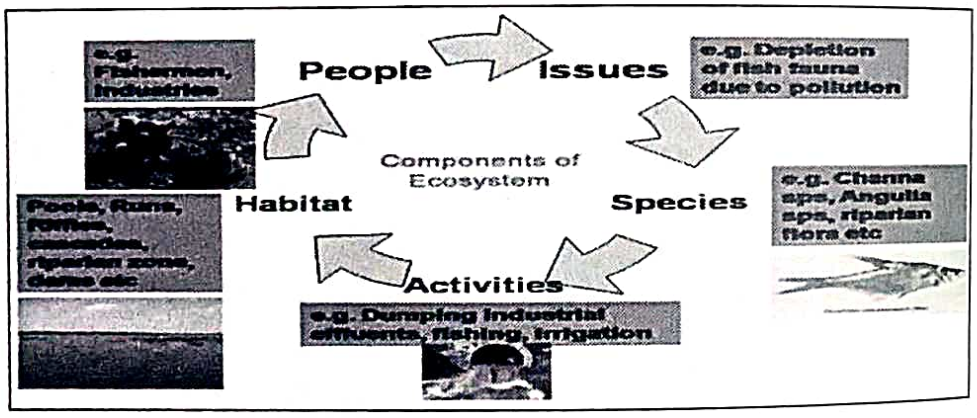
Ecosystem Conservation For Sustainable Environment and Our Livelihood

- Nitin G. Shinde
Department of Zoology
K. J. Somaiya College, Kopargaon, Dist: Ahmednagar

Introduction:

Ecosystem is the geographical area which include biotic and abiotic components together where life flourish. Biotic factors which include plants, animals and all other living organisms, abiotic factors include physical environment like weather etc. For our healthy life we need enrich ecosystem and suitable environment. In present day as we know the earth is the only planet where life exists, along with us on earth different other organisms exists and they have equal right to live. Nature have made the balance on earth so to live all organisms. We for our need and greed continuously scratching and mining the treasure of nature to its extreme. All the biotic factors are in correlation with abiotic factors including us.

An ecosystem offers shelters to different plants and animal species supporting diverse organisms of food chain and food webs. Which forms important ecological phenomenon and help to the flora and fauna. Along with providing the life it supports in recycling of different nutrients through biogeochemical cycle in between biotic and abiotic components. This systematic dependency in food web and food chain is nothing but ecosystem functions[1].



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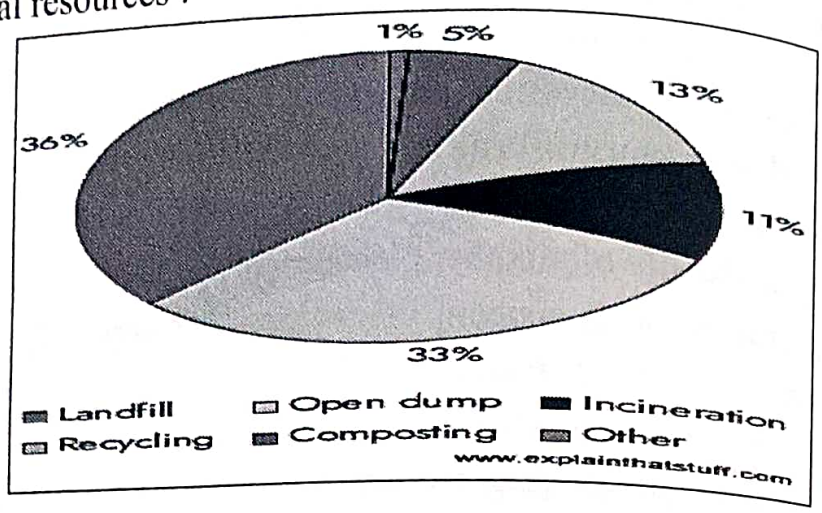
In an ecosystem all biotic and abiotic components are inter dependent either directly or indirectly. Any slight change in any parameter or living organism may affect the other components like if the temperature changes it instantly affect the plants and animals of the ecosystems. All the living organisms must cope up with the physical parameters of the ecosystem if they unable for it they have to leave that ecosystem or perish[2]. Excessive Human population and its intrusion into forest and other organisms is at its extreme which continuously rises the temperature of earth causing global warming affecting adversely and disturbing the life of all other plants and animals.

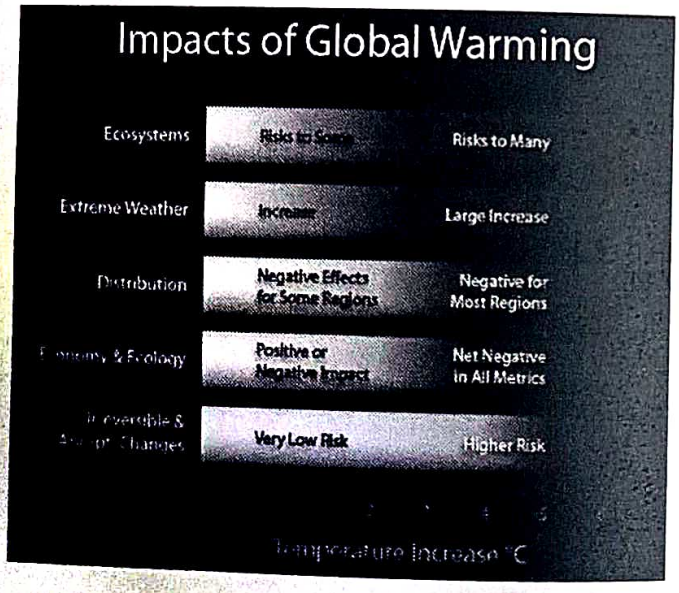
Development with concern of environment automatically help in sustainable livelihood, this sustainable development automatically benefits the environment, also help in biodiversity enrichment which will also help in minimizing the poverty and better the life of the people. So that sustainable development must be implemented for both benefits of environment and reduce poverty. Throughout world most of the population living in poverty their sustainable development enhances the environment and automatically the boost the ecosystem enrichment[3]. Conservation of biodiversity must be promoted and as far as the research and development is concern which must be with understandable recommendations to policy makers so they can convert it into laws, which also aware local management or governing authority and they look after the environmental protection laws so as to enrich the ecosystem and will help in sustainable development. For the sustainable environment and development of peoples instead of forcefully applying the laws peoples must make aware about benefits of sustainable development so they can carry out these environment friendly things by their own. For sustainable development and livelihood local context must be consider for finding relevant and potential ways which will be for long term use[4]. In our country where almost 275 million people depend on natural resources for their day-to-day life. Sustainable natural resources and conservation of biodiversity are essentially connected to people's rights to protect their livelihood. Sustainable life pattern not only help people to be more secure and relax in fulfilling their day to day need but uplift their lifestyle along with enriching the that particular ecosystem, by which they can face the natural disaster and enhance their economic and social life. Adaptation of sustainable

way of life will also help in reducing the poverty at the same time uplift the biodiversity conservation. In case of development projects like big construction if the biodiversity conservation considered and sustainable development is carried out which also reduces the burden on natural resources[5].



(Soil Pollution, Image Courtesy: https://www.explainthatstuff.com/land-pollution.html)

Supportable living considering environment reduces the demands of human being which certainly reduces the pressure on environment and ecosystem or natural resources at individual or community level, with appropriate alternatives. In sustainable lifestyle minimum use of natural sources are carried out and also the minimum waste is generated which positively affect in flourishing the environment, this policy must be promoted throughout the world to minimise the burden on natural things. (UNEP, 2016)[6].



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Responsible Factors for Ecosystem disturbance & ways to mitigate

Human population explosion

Global population increase is playing crucial role in environment degradation and ecosystem disturbance, which create excess burden on the natural resources. Some parts of the world like Asia have huge population explosion. In the countries where there is excess population in which Government must make strict laws and should rigorously implemented.

Lack of awareness

Most of the people throughout the world are not aware about the alarming signs of these ecosystem imbalance. People should make aware of this problem which also definitely help to sort out this problem to some extent.

Human need and greed

Human for its need and greed excavated the nature to its extreme causing severe threats to nature and damages the ecosystem which adversely affect our life. We have live simple life and stop over exploitation of natural resources.

Pollution

Pollution like air, soil and noise also causes severe damage to environment and subsequently badly affect the ecosystem. The different industries regularly honestly check against pollution control laws.

Global warming

Excess carbon dioxide (CO2) emission from green house gas and industries increases the global warming which leads to the ice melt of the glaciers and increase the water quantity of oceans causing threats to seashore cities of the world. More and more native trees should be planted to reduce carbon emission.

Over use of plastic

Now everywhere there is plastic, we even can't imagine life without it, but it should be properly recycled and those with less micron strictly banned, less micron plastic should be immediately stopped. Minimum use of plastic must be carried out by every person and used plastic must be send to recycled units, alternative for it must be searched.

Reforestation

Proper reforestation is very important to maintain the balance of ecosystem, the ideal example in which over 1300 acres of baren land have been converted into dense forest by 65-year-old single man Jadav Payeng. He has to work for it almost 30 years to form this forest. He started planting in 1979 and continues planting trees even today[7].

Miyawaki way of forestation

In cities where there is less land available for planting trees this Miyawaki way is faultless in which two to four trees per square metre planted, these forests grow in two to three years and are self-sustaining which not only lower the temperature but reduce air and noise pollution effectively. This forest forms heaven to local animals who get shelter form their nests and enhance the ecosystem of the region, it also creates carbon sinks[8].

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ENVIRONMENTAL PROBLEMS

CAUSES AND SOLUTIONS



Editors

Dr.S. V. Rankhamb

Dr. V. B. Kulkarni

Environmental Problems : Causes and Solutions



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- Editors -
Dr. S. V. Rankhamb
Dr. V. B. Kulkarni

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CHALLENGES IN BIODIVERSITY CONSERVATION

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Abstract: Diversity of living organisms on the earth refer as biodiversity. On the basis of endemic population of living organisms, it called as biodiversity hotspots. There are 36 biodiversity hotspots throughout the world out of which we are having 4. These hotspots are shrinking day by day though different government have enacted strict laws to protect biodiversity. It is challenge to us protect our biodiversity and duty of every individual to have somewhat fruitful share in biodiversity conservation. Increased human population have tremendous pressure on our biodiversity. Infrastructure development and to fulfill the demands of increasing population we have encroached in the areas of wild animals who plays the crucial role in maintaining the biodiversity and this biodiversity maintain the natural balance on the planet. Every year number of plants and animals are becoming extinct, only the collective efforts will help in biodiversity conservation.

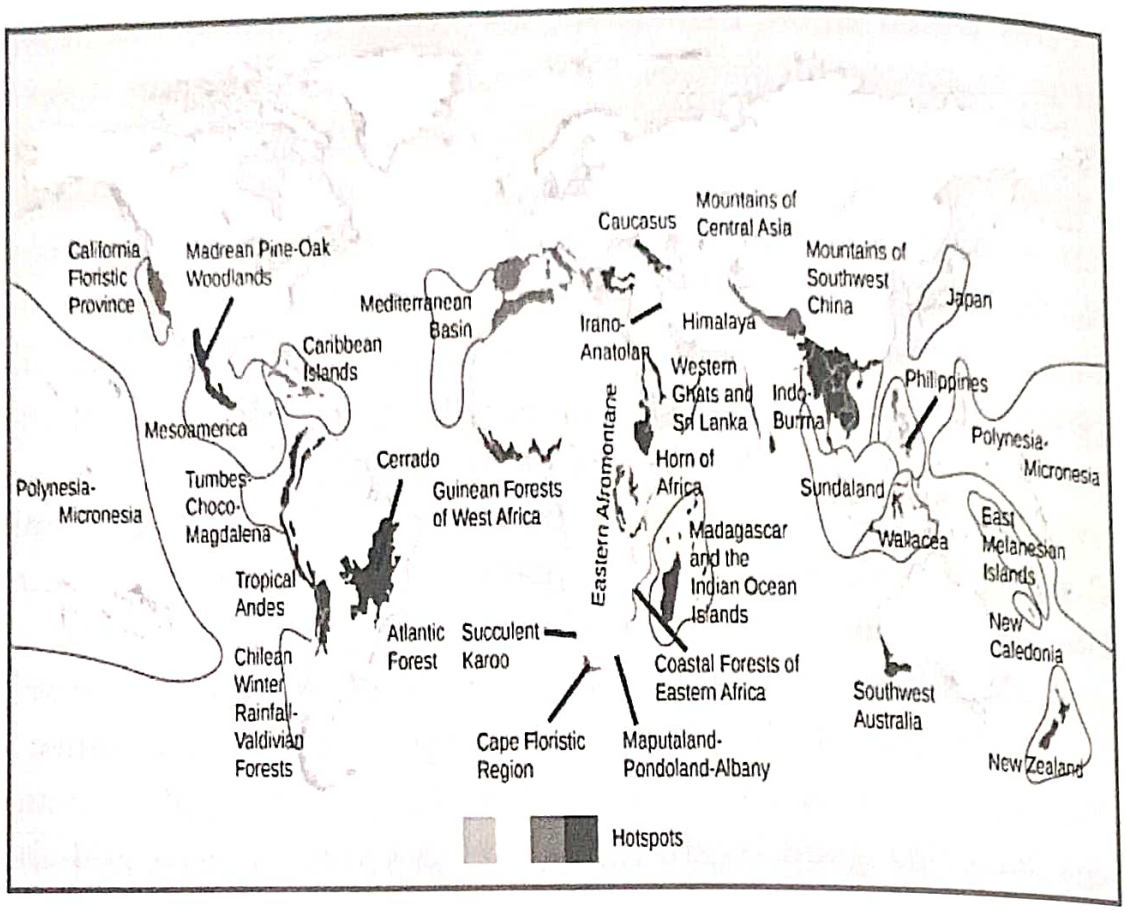
Key words: Biodiversity, conservation

Introduction: Biodiversity the term refers the different form of life on earth, it includes the plants, animals and microorganisms.

All the living forms present on earth living together forming a unique ecosystem which include different types and forms of ecosystems. Almost all the living beings are codependent with slight change in any living population have tremendous effect on that specific ecosystem. Nature itself maintain the balance of different populations on earth as proposed by **Darwin** in his world-famous book **'Origin of Species'** in which he quote those species which adjust themselves according to their environment are more successful species. On earth there are enormous diverse living species, we are yet to recognize all of them. Nature controls the rise and fall of species in its own ways, before the human evolution there were also the different species which flourish and extinct, but after the human evolution and as the human dominate the earth, especially after the industrial revolution, rate of extinction of other species mostly the wild one is much faster than ever before. Due to our greed, we pull our environment and biodiversity into extreme grief, which not only adversely affect environment of earth but tremendously harm us also. After the industrialization in 19th century there is tremendous damage to our nature for which we are the culprit. Though the industrialization and development in infrastructure is need of hour but we must concern about our biodiversity because if we have the good biodiversity, we can survive well and live long. To maintain the biodiversitypresent, we must conserve our environment and we have to put more efforts towards excellent healthy environment.

On the basis of endemic population of living organisms, it called as biodiversity hotspots. There are 36 biodiversity hotspots throughout the world out of which we are having 4. These hotspots are shrinking day by day though different government have enacted strict laws to protect biodiversity. As far as biodiversity is concern, those areas with minimum 1500

endemic vascular plants mean the plant diversity of that area not found anywhere in the world also the area should have 30% or lower of its original natural plants i.e., plant population of that area must be threatened; throughout the world 36 such areas are declared as biodiversity hotspots[1]



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Out of these global biodiversity hotspots we are fortunate to have 4 different biodiversity hotspots, which include, The Himalayas, Indo-Burma region, The Western Ghats and Sundaland.

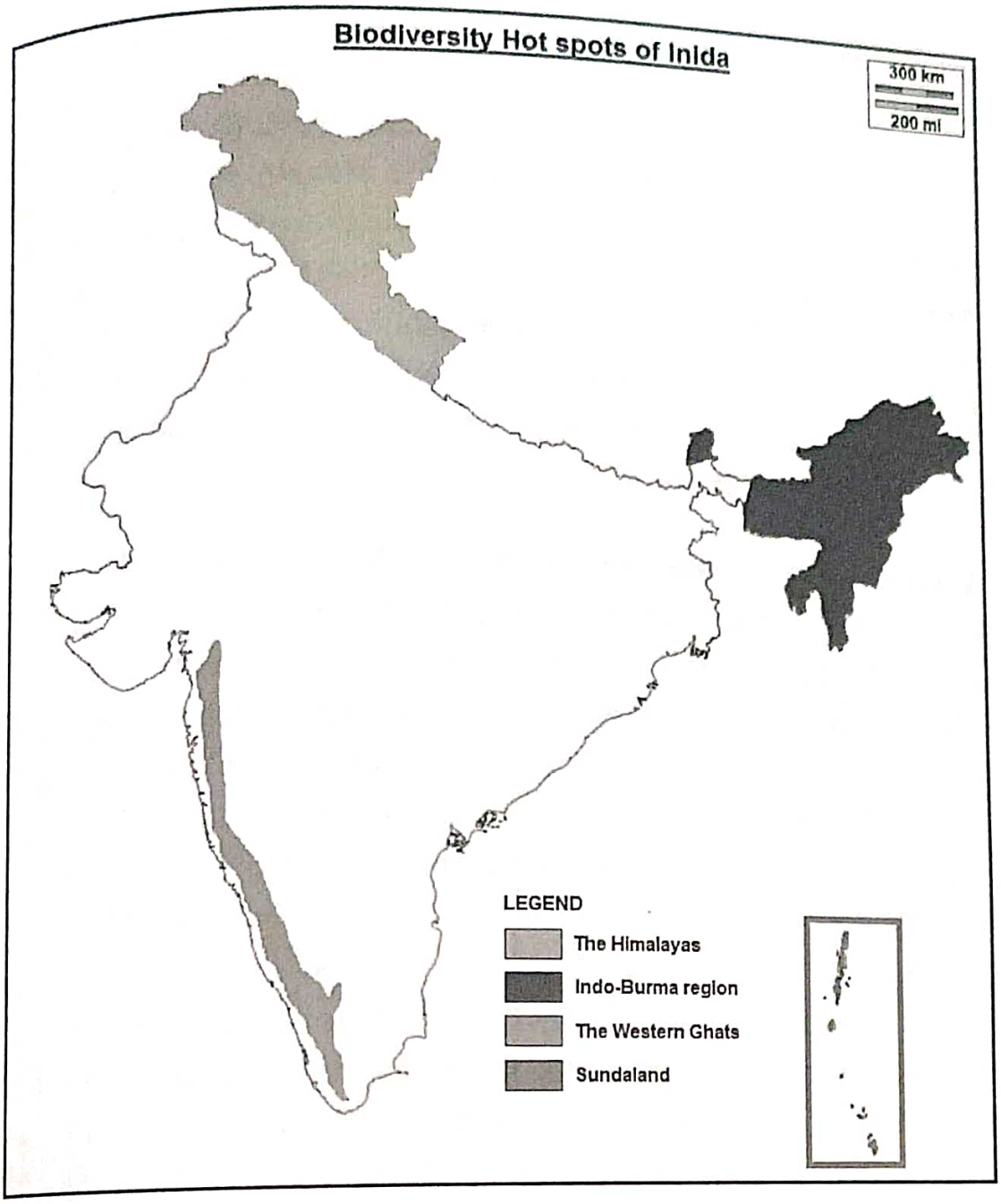

Image courtesy: https://lotusarise.com/biodiversity-hotspots-upsc/

Legal Provision for Biodiversity Conservation: Globally different government implemented the legal provision for biodiversity conservation, similarly our country also biological diversity law in 2002 for conservation of sustainable use of bioresources, also National Biodiversity Authority (NBA) and State Biodiversity Boards (SBB) becomes functional under this act; in Biodiversity law there is provision for ecosystem

conservation under section 37 in which legally declared areas of biodiversity importance are considered as Biodiversity Heritage Sites[2]. Along with the legislation biodiversity conservation have different important sides like scientific survey, policy reforms, international co-operation, non-government organizations, public interest; in India along with these we have Forest Survey of India, Botanical Survey of India, Zoological survey of India which under ministry of Environment and Forestry carry out extensive studies continuously to mitigate the challenges of biodiversity conservation[3].

Menace to Biodiversity: Researcher predicted that anthropogenic activities are likely eliminate around 10 million species by up to 2050, at present we have recognize about 1.8 million species of plants and animals; currently regrettably 25% of world species will undergo extinction just quickly; this rapid and quick destruction is just due to explosion of human population, more industrialization, change in crop cultivationand farming pattern; massive extinction occurs in tropical forest, wetlands, and coral reefs[4]. Human introduced many exotic species in different habitat which is the major cause of extinction of native species; introduction of species from one area to other disturbing the balance in existing communities[4]. Damage of species occurs due to destruction of natural habitat which may be due to agriculture, infrastructure or industry or over burden on their resources or due to air, water and soil pollution[4].Three to four wildlife species extinct due to desertification in India in 2019. Along with this many other wildlife species from India become critically endangered because of the climate change[5].

Conservation Strategies: International Union for Conservation of Nature (IUCN) have declared different protected areas in different categories like Strict Natural Reserve, Wilderness Area, National Park, Natural Monument or Feature, Habitat/Species Management Area, Protected Landscape/ Seascape, Protected

Area with Sustainable Use of Natural Resources[6].There should be involvement of local people in conservation of biodiversity which plays a key role towards it as they have complete information of the past and present of the area; along with that there should be collaboration of outside experts with local researchers also boost the efforts of biodiversity conservation[7].

Biodiversity assistances: Biodiversity not only enhances farm production and ecosystem protection but also provide many environmental services like climate and biogeochemical cycle regulation, water regulation, pollination of crops, pest control and ecosystem resilience measure these services are important ecologically and financially[8].

Conclusion: Conservation of biodiversity is the extreme importance for wellbeing of mankind, as the biodiversity flourish it provides plenty of bioresource to us, increasing human population is the prime cause in biodiversity degradation; all the countries especially Asian must take this issue with a prime concern to maintain the human population constant in the region. Along with this infrastructure development, excess use of forest land for cultivation, encroachment in the areas of wild animals, excessive poaching of wild animals for different purposes, killing the wild animals with electric fencing, ill efforts, insufficient funding, lacunas while implementing the laws by different Governments for the protection of biodiversity.

Laterally with terrestrial and freshwater biodiversity, marine biodiversity also declining very rapidly like excessive fishing by using modern tools and techniques, fish population decline very rapidly. Beside fishing, illegal poaching of marine animals, coral mining, destruction of mangrove forest, excessive lime extraction from the oceans, extreme collection of crustaceans, molluscs, echinoderms along with sea weeds for our

greed are also the reasons of biodiversity degradation we are tremendously emptying the oceans with bioresources.

Due to our lust and unawareness towards the biodiversity every day new species comes under threaten or danger category or critically endangered category in Red Data book published by IUCN (International Union for Conservation of Nature). There are so many species which already extinct and on the verge of extinction, unless and until we look into matter seriously, we will lose these important species.

Biodiversity conservation is the concern of every individual; for this awareness campaign should organize throughout the world to aware all the peoples regarding the importance of biodiversity. Along with strict action to the culprit, removing loopholes in laws, with proper funding for biodiversity conservation, taking local people into consideration will definitely improve the situation. We can't do much more for the extinct flora and fauna but for the present with our dedicated and devoted efforts towards conservation we can save this heritage.

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ENVIRONMENT AWARENESS

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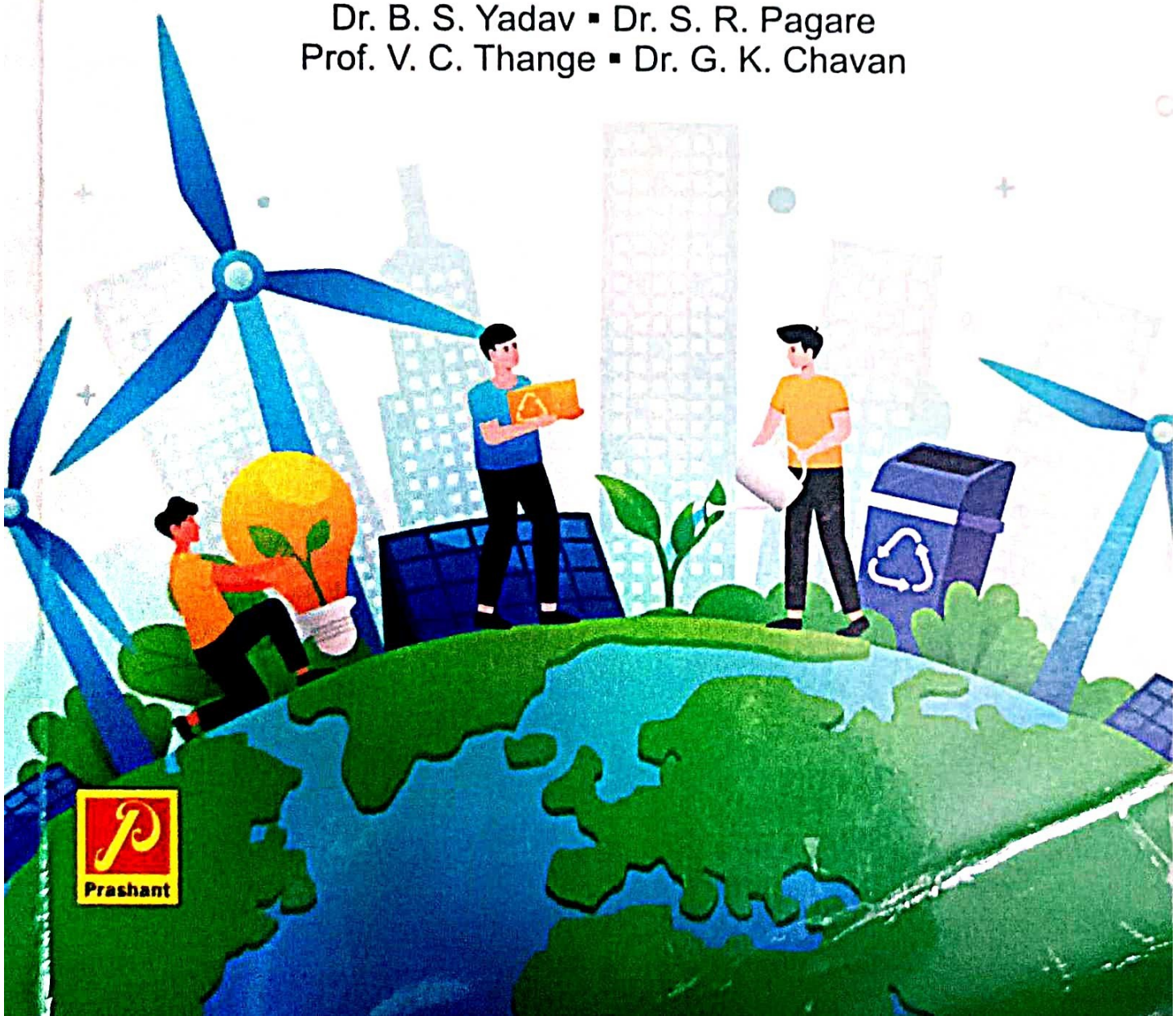

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Diversity of Coleopteran Insects from Nategaon, Ahmednagar, Maharashtra, India

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Abstract:

The present coleopteran insect diversity of 24 types from Nategaon, Ahmednagar, Maharashtra, India were collected, identified and classified using the keys describe by fauna of British India. These coleopteran insects were classified into 7 families. Insects were collected by handpicking method within the study area. Scarabidae is dominant family including 11 members.

Keywords: Coleoptera, Diversity, Insects, Beetle, Weevil, Nategaon Village.

Introduction:

The order of the coleopteran was originated in "Jurassic period". It is the largest order of whole animal kingdom and containing number of species. It is the diversity among those ones found overall in the world [3]. Coleoptera are also known as beetle. Much type of beetles and weevils are included in this order coleopteran found mainly in nature. The coleopteran insect are mainly found at underground in soil, crack-crevices, dung, plant, crop, bark, leaf, aquatic, near root, under stone etc. beetle are widely distributed in the world[2]. Study of the coleopteran diversity is important, because new species are

discovered and identified by the distribution of the insect. The total number of insect are discovered according to the type of family genus, species are found in the same area or the particular region. All the study of supply of fecal matter for the sustainance play an important role in distribution of corphagus beetles in a given range by addition of element like fauna, flora, solar radiation, temperature, soil pH [6]. Coleoptera are the holometabolus insect. Life cycle is completed in 45 days that is an egg, larva, pupae and adult. The size of coleopteran insect is ranging from 0.5 mm to 155mm long. Many coleopteran insect are harmful to agricultural crop, plant which destroy the crop. They are harmful when contact with human being and create allergic reaction.

some beetles are pest for stored grain, household, furniture and drug also. The coleopteran insect population increased very fast. The some beetle are beneficial to the agriculture, such insects are said the friend of farmer known as lady bird beetle which is carnivorous in habitat and feeds on aphids and white flies hence act as biological agent. Other insect are harmful to agriculture and feeding on the plant such as leaf miner, sap sucker, bark and borer, fruit, stem borer [2].

Dung beetles are also useful as decomposer and recycler of organic matters. The all types of coleopteran insects are not beneficial to agriculture and some beetles and weevils harmful to agriculture acting as pest, Certain House hold pest such as Rice weevil, floor beetle, and pulse beetle are harmful insect to the stored grains and destroy them completely causes thread to the human economy, Hence study of Coleoptera is important [9].

Material and Method

Insect were collected by day time and some were collected during night time. The collection of insect between was during January to May 2021. Insect were collected by hand picking method. Specimen was collected and preserve as per the standard procedure and specimen were identified with the help of fauna of British India reference book.

Study Area:

Nategaon is located near Kopargaon which 99k.m. away from Ahmednagar. Nategaon is a small village predominant agricultural land; the insects were collected from the same study area. Nategaon is lying at the longitude 19.9904 and latitude 74.461.

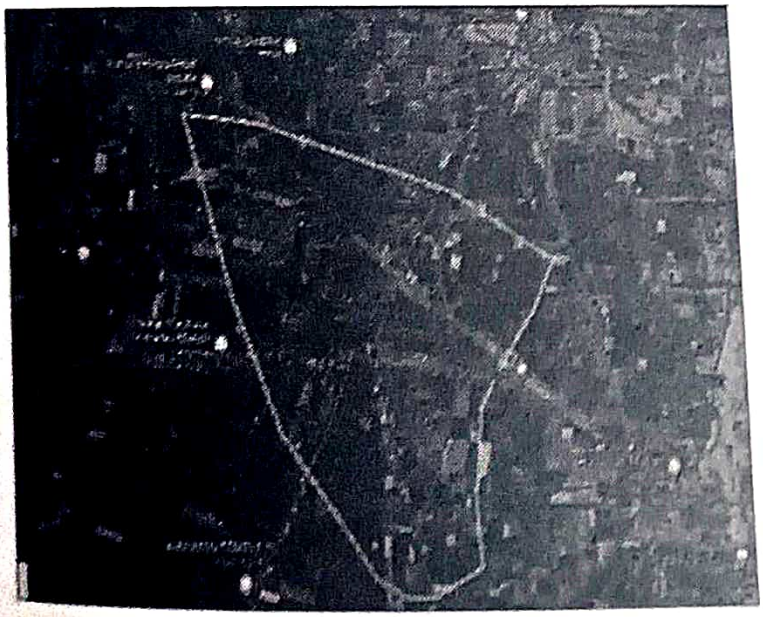

Fig.1 Google Map of Nategaon village

Result and Discussion

Diversity of coleopteran was studied from Nategaon, Ahmednagar (Maharashtra) and a total of Seven (7) Numbers of families were recorded. In the present 24 members of coleopteran insect were recorded. These are,

1. Scarabidae, 2.Chrysomeloidae, 3.Carabidae, 4.Coccinelidae, 5.Meloidae, 6.Tenebrinoidae, 7.Geotrupidae.

Observational Table

Class	Order	Family	Genus	Species
Insecta	Coleoptera	1. Scarabidae	1:1 Helicopris	Grigas
			1:2 Oryctus	Rhinoceros
			1:3 Holotricha	Serrate
			1:4 Gametis	Versicolor
			1:5 Glycophala	Cuculus
			1:6 Holotricha	Consaguinea
			1:7 Pentodentini	-
			1:8 Odontanius	Disjunctus
			1:9 Cyclophala	Borealis
			1:10 Rhytinota	Indica
			1:11 Case:Tiger beetle	-
		2. Chrysomeloidae	2:1 Ditropidus	Fugilitus
			2:2 Monocesta	Coryli
			2:3 Chardotella	Sexpuctata
			2:4 Zygogramma	Tortusa
			2:5 Acini	longi tortus
		3. Carabidae	3.1 Elaphrus	Cupreus
			3:2 Anemoterus	Illaware
			3:3 Brachinus	Crepitans
		4. Coccinellidae	4:1 Coccinella	transversalis
			4:2 Coccinella	Cardinalis
		5. Meloidae	5:1 Mylabris	Pustulata
		6. Tenebrinoidae	6:1 Eleodes	Eschscholtz
		7. Geotrupidae	7:1 -	Balbocerous

The family scarabidae includes 11 number of insect recorded. 11 species are identified. Chandra. et. al., (2005) studied coleopteran from

Madhya Pradesh and recorded 44 species in 24 genera and 8 subfamilies [4]. Scarabidae were studied from Jabalpur, Madhya Pradesh (India) and reported new to the beetle fauna of district. Pranil. et. al. (2017) studied Scarabidae [6]. Moitreyee.et. al., (2013) studied Chrysomelidae & recorded 6 number of insect from dargapur region [2]. Carabidae includes 3 number of insect recorded and identified. Thakare. et. al. (2012) studied carabidae and recorded by 3 species [5]. Coccinelidae includes 2 number of species recorded and identified. Meloidae includes 1 number of insect recorded and 1 species identified. Thakare, et. al., (2012) recorded a single member in which single member of Meloidae family from the region Melghat tiger reserve India [5].

In the present study Tenebrinoidae family was recorded with only 1 insect. Thakare, et. al., (2012) recorded two member of the Tenebrinoidae family from melghat tiger reserve of India [5]. Fagundes, CK. et. al., (2011) studied the coleopteran fauna from Brazil, and supports the present findings [8]. Geotrupidae includes 1 number of insect recorded. Pranil, et. al. (2017) studied coleopteran and only two species were recorded belongs to Geotrupidae family [6].

Conclusion:

It can be concluded that Nategaon also shows great diversity of beetles. The Nategaon has rich floral diversity that can support large growth of fauna. Each of the sites shows moderate coleopteran diversity in January to May. Thus pre-monsoon is the time when relatively moderate beetles and weevils are found. It is known that most animals prefer monsoon as their breeding season as it is favorable and resourceful for their proper growth and survival. This study helps to predicts that beetles are no exception to the occurrence in specific period of time. It is also true that insect usually avoid harsh winter through diapauses, thus diversity of beetle in all three sites are least in winter months.

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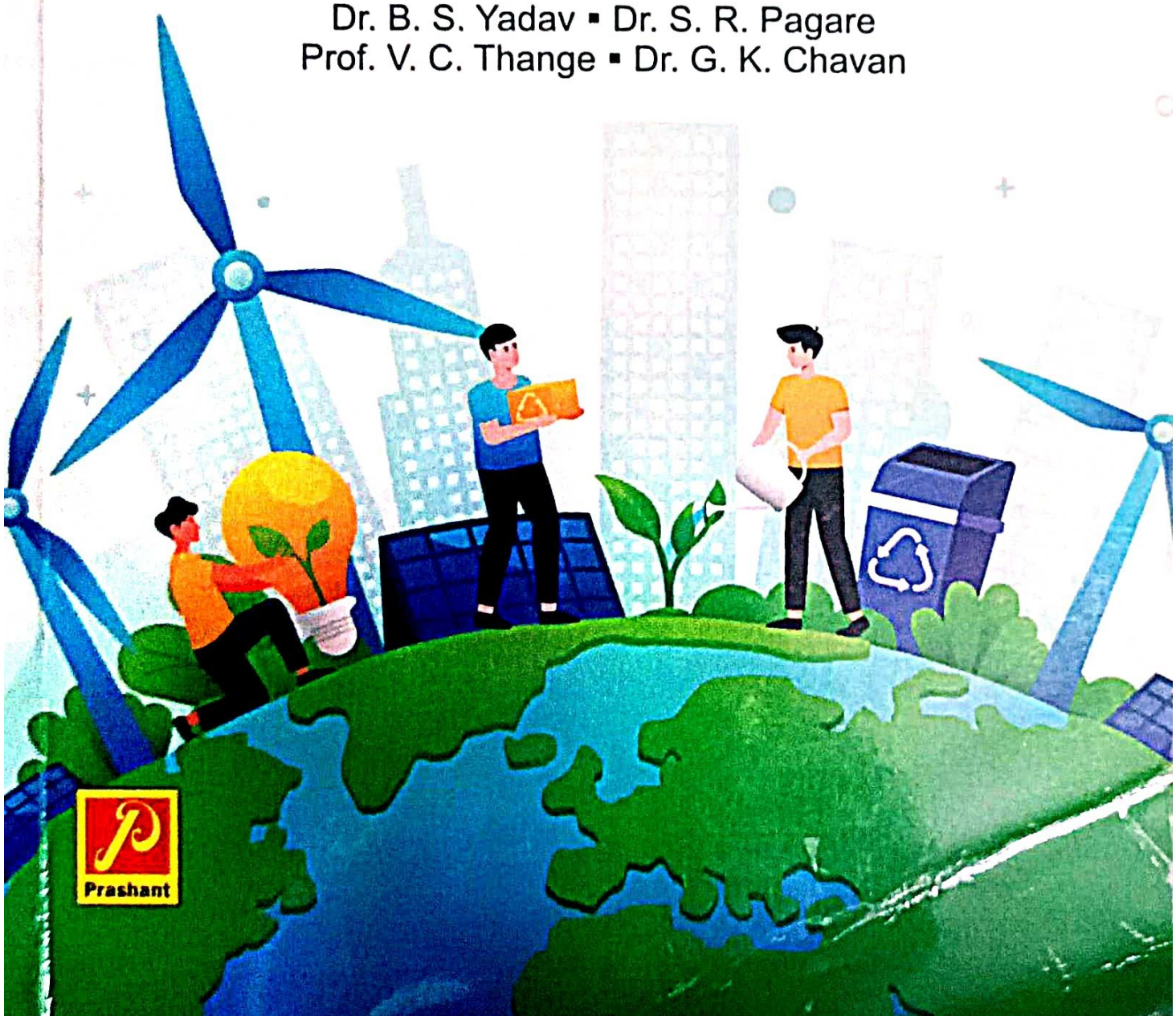

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Prevalence study of gastrointestinal parasite of chicken in Shirdi region

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Abstract:
The poultry industry is fastly growing in Maharashtra. The sector is facing different challenge like drop in production due to infectious disease. Hence this study came up with study of gastrointestinal parasite of chicken. The study conducted local and exotic breeds of chicken in shirdi region of ahamadanager district. Sixty cloacae of slaughtered bird were collected from slaughtering units in the study area. Samples examined for gastrointestinal parasite using simple flotation technique & microscopy. Nematodes & Platyhelminthes were recovered in 40 (66.65%) of the sample Gallus spp. The genus Giardia were found in Gallus gallus Spp. The local breed most susceptible breed to gastrointestinal parasite.

Keywords: Gastrointestinal parasite. Gallus gallus spp.

Introduction:

The total population in poultry in the Maharashtra is 742.98 lakh (http://maharastra gov in). The most commonly Kept Poultry are the domestic chicken Gallus gallus domesticus. Based on number of animals, poultry represent the largest! Domestic" animal stocks in the world. (Gilbert et.al 2015). This has been demonstrated by the number and fact that during the last three decades, egg production has doubled and poultry meet. Whereas there is no much increment in livestock production due to higher demand for poultry product (C. E, Bennett et al 2018). These birds provide man with high nutritional value through the consumption of their meat and /or. Other Socioeconomic benefit which cannot be overemphasized (H. junaidu et.al 2014, H. Djang-fordjouret.al2017). India produces around 5.3 million MT of meat and 75 BN eggs annually. The current processing level in poultry are 6% while for meat it stands at levels 21 % (https://mofpi Nic in) Across the world poultry market, India ranks Sixth The domestic poultry industry is fastest growing segment with a compound growth

rate of 18%. Poultry meat being the most popular meal in India, it has been receiving significant boost through investment. (Https/ www. Poultryindia co.in). The average per capita consumption of meat & egg in India is around 5.5kg and 79 egg per annum (https// WWW. newindian express) com) as compared to the world average of 9.7 kg of meat of 154 egg per person per year (N. Yenibehit et .al 2019). This is partly attributed to losses encountered in the poultry industry which have been linked to outbreak of disease-causing agent such as viruses, bacteria (A.I. Youssef and S. Uga et .al 2013) & mostly parasite (O. Agbolande, A. Arisoye, et.al 2014).

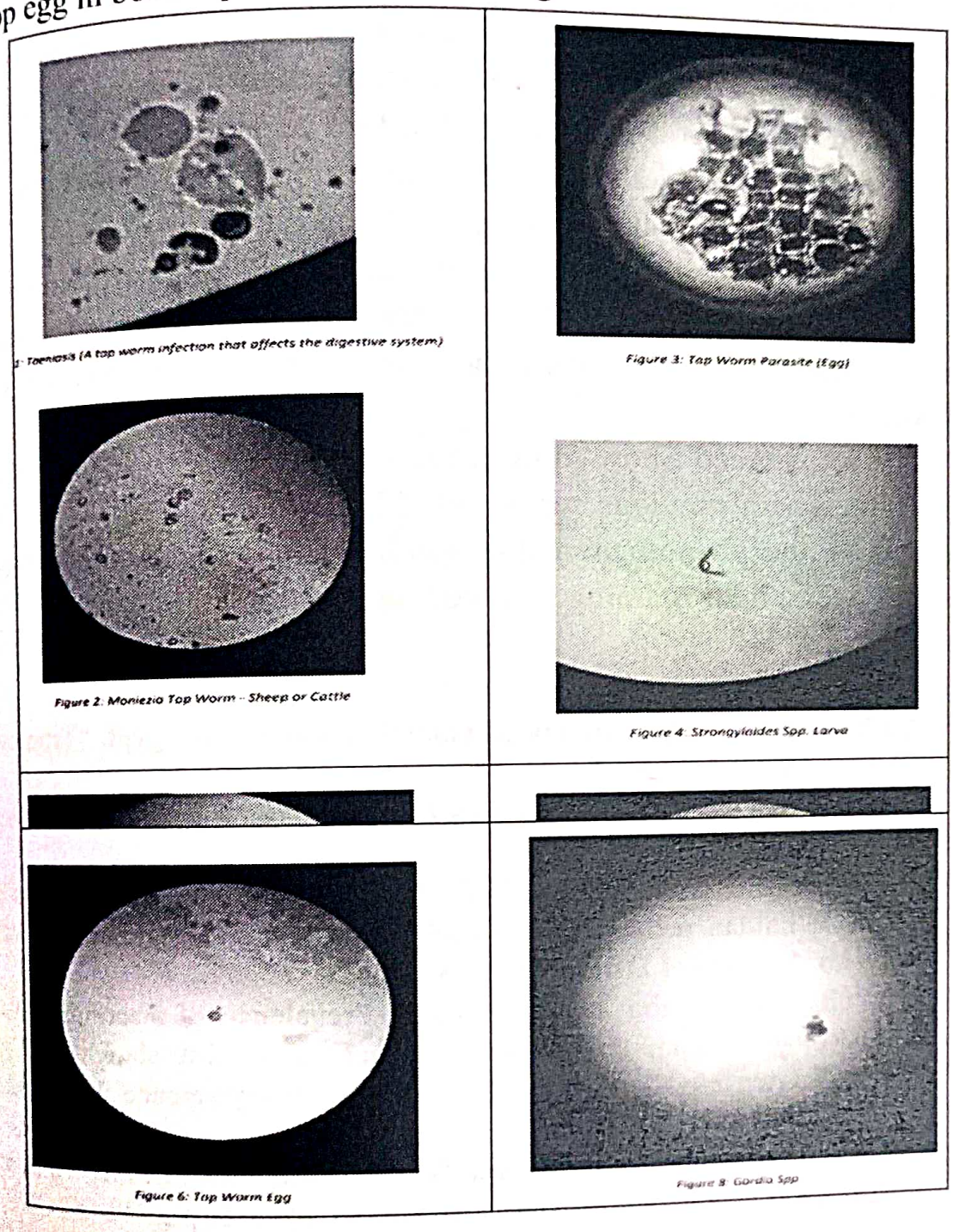
Good knowledge of parasite of domestic chicken, Species composition & site is essential for prompt disease diagnosis of treatment (S. Kumar, Garg, et, al 2013). This study therefore, explored the gastrointestinal parasite of the domestic Chicken (Gallus gallus domesticus) both local & exotic in shirdi area of Ahmednagar district. This Study conducted for sturdy of types of parasites in chicken gut. Secondary which species in prone for infection of parasite. The outcome of this research will be useful for the poultry farmer & consumer for identification of parasitic infection in chicken.

Material & method: The Study was conducted between January to April 2021. For the purpose of study gastrointestinal part of chickens were considered. 60 cloacae and intestinal part of slaughter chicken considered for study of gastrointestinal parasite. In the lab, the intestinal part cut longitudinally & screened for presence of parasite. 0.8N saline solution prepared by using sodium chloride 0.8 gm in 100 ml water. The recovered parasite was was thoroughly for three time to remove debris. Then the parasite processed and mounted as per the standard protocol (Bowman 2009). Intestinal content was also examined by sedimentation and Flotation method as per the procedure of Bowman.

Result: In the present study, out of 60 chickens Screened, 40 chicken harboured (66.65%) gastrointestinal parasite. This is accordance with (katoch et al 2012. Saad et (1986) and (Puttalakshmamma et al 2008) who reported 72.0, 77.5 and 71% parasitic infections in local and exotic chicken respectively. The difference might be due to variation in the management practices adopted, geographical location & number of samples included in study.

In this study are found the high infection of nematode. Similarly

(Nadakal et. al (1979) & (puttalakshamma et. al) (2008) reported the highest prevalence of nematodes in desi bird. also, in study area find the high infection of Hexamitide, strongylidia. Also, it followed by taeniasis & moneizia, Gardia. During present study none of the background chicken harboured trematode parasite. This might be due to non-availability of necessary intermediate host of trematode in and around study area Shirdi. The intestinal content of sample of positive case were examined sedimentation & flotation method for detection of parasite eggs/ ova. Samples showed the infection of tapeworm Species egg/ ova, as well as the Some Sample showed the infection of Tania Spp egg in boiler species bird Shirdi region.



Taeniasis (A tap worm infection that affects the digestive system)

Figure 2: Moniezia Tap Worm – Sheep or Cattle

Figure 3: Tap Worm Parasite (Egg)

Figure 4: Strongyloides Spp. Larva

Figure 6: Tap Worm Egg

Figure 8: Gordia Spp

Discussion: The overall prevalence of infection with gastrointestinal parasite recorded in this study was 66.65%. This is relation to63.6% reported by (C-I ogbaje E.O Agbo et al 2012) 77% by (Punalashmamma et al 2008) 75.5% by (Saad MBEL et al 1989) It could be related to difference in management system, control practice in farms and seasonal difference in the study area.

The study revealed nematode & cestodes as the most common intestinal parasite in accordance with work of (S.Luka and I Ndams et al 2007) in Zaria of (H. Junaidu et. al 2007) (S. Luka (2007)) in which cestode and nematode were implicated as major cause of helminth infection in domestic chicken. Cestodes generally undergo an indirect mode of transmission where they make use of intermediate hast such as ants, grasshopper and beetels to perpetuate their transmission. This organism Serve at food for scavenging bird & hence transmitte the infective stage of parasite to the bird at ingestion. The high prevalence of nematodes and cestodes recorded in local and exotic breed gives an indication that neither breed is spared by raid of gastrointestinal parasite in study area and the ability of the infective stage to withstand environmental conditions for a long time before they are taken in by the host.

The local breed Show more infection over the exotic birds this study agrees with previous report by (M. Mwale et al-2011) which conforms to the phenomenon that local breed is more predisposed infection due to their roaming and feeding habitat.

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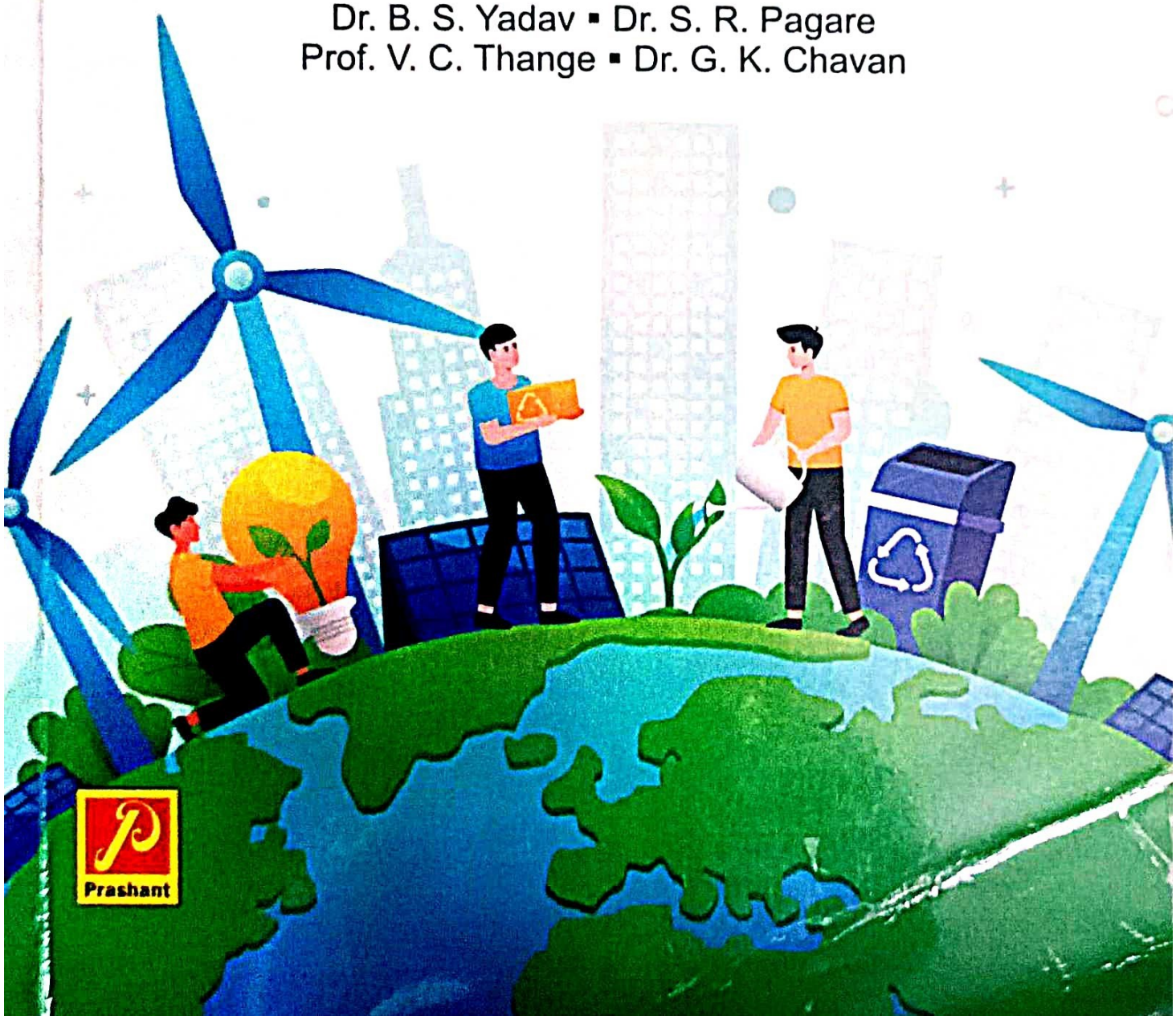

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To Study Biodiversity of Hymenoptera in Kopargaon Region

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Abstract:

Hymenoptera are pollinators have a key part in the Survival of terrestrial ecosystem Integrity through their major role in plant reproduction. The main objective to find out the diversity of Hymenoptera in kopargaon region 50 specimens collected from Shingave identified & classify with the help of taxonomy books (IMMS).

Keywords: Hymenoptera, Biodiversity, Kopargaon, pitfall, scented trap

Introduction:

Hymenoptera order contain the minute to medium sized insects such as bees, wasps, carpenter bees, ichneumon files, saw Flies, termites & ants. Hymenopterans are pollinators have of key part in the survival of terrestrial ecosystem integrity through their major role in plant Reproduction, thereby providing services & good to the society, because many of the world Crop plants dependent upon Pollination. Productivity (Pott et. al 2003) Many empirical Studies have found Positive correlations between pollinator and other animals is significant in most terrestrial habitats. It involves 67% of species flowering plants and a relatively high diversity of insect taxa (Forup et al 2008). on the other hand, 35% of crop production worldwide (Kerman c et.al 2007) And 70% of major global crop Species rely on animal Pollination (Steffan-Dewenter I and Westphal 2008). Increased human activities like deforestation, Urbanization, agricultural indemnificatory Grazing and mining were creating a serious Problem to the flora & fauna of many terrestrial ecosystem various throughout the world (N.B Patkar et.al December 2014) Hymenopterans play an important role within the terrestrial ecosystems because they have numerous interactions with different plant. species. Including seed disperses, leaf & seed Predators in some cases as Pollinators (Vazquez 1998; Hemandez 2005). Hymenopterans are among the leading predators in the terrestrial

habitat because they feeding and other insect and small invertebrates, ...that hymenopterans can be used as biological control of Insect pests (Suryanto 1993). Hymenopterans were considered to be sensitive to habit transformation and disturbance, and for this reason have been extensively used as biological indicator (Hoffman Anderson 2003)

Material and method:

Study area: Shingave is small beautiful Village with different habitat types located at District Ahmednagar of Maharashtra State lies between latitude 19. 7975 N, longitude 74.9556°E. Hymenoptera Collection was done in village Shingave during January 2021.

Following Method was used for collection of Hymenopterans.

1. Hand collection method (HCM)
2. Pitfall trap (PT)
3. Scented trap (ST)

Collected specimen were sorted, wasted & preserved in 70% alcohol in separate plastic vials 3 brought to the laboratory for identification (IMMS)

Observation Table:

Sr. No.	Scientific Name	Common Name	Family	Habitat	Size
1.	Apis cerena	Asian honey bee	Apidae	Nesting	10-11mm
2.	Apis florea	Red Dwarf Honey bee	Apidae	Flowering plant	7-10 mm
3.	Apis dorsata	Jaint honey bee	Apidae	Tall tree	17-20 mm
4.	Apis mellifera	Western honey bee	Apidae	Hive box	1.2 cm
5.	Ropalidia marginate	Paper wasp	Vespoidea	Nest	1.9-3.2 cm
6.	Vespa affinis	Lesser banded hornet	Vespoidea	Shrub, building	17 mm
7.	Tetraponera rufonigra	Slender ant	Formicidae	Dead decaying matter	10-12 mm

8.	Tapinoma sessile	Odorous house ant	Formicidae	Wall area with high moisture	1.5-3.2 mm
9	Dorylus labiates	Driver ant	Formicidae	Ground nest	40-63 mm
10	Tapinoma melanocephalam	Ghost ant	Formicidae	Warmer habitat	2 mm

Results & Discussion:

In the present study area total 10 with 07 genera of hymenopteran species were reported. From the below result it is concluded that species richness, diversity and abundance were higher in undisturbed study area as compare to disturbed study area. This is due to habitat destruction and increasing disturbance of various anthropogenic activity. Related studies of hymenopteran have shown to species richness and diversity decrease with increase in disturbance (Anderson 1995: Blair 1996: et al) study from different region of world. Many studies have shown that habitat degradation, disturbance & fragmentation have a negative effect on Hymenopteran diversity & abundance where undistributed study area has higher species richness than those in distributed habitat (Greenslade Greenslade 1977: Olson 1991: Suarez et.al1998: Et al) our result match with (Kumar et.al 1997) and (Pachpor & Ghodke 2000). They mentioned that, habitats with abundant tree support high diversity of Hymenoptera. This, habitat variables such as canopy cover and litter content in the soil can provide an appropriate habitat for hymenopteran.

Relative abundance of family Apidae and Formicidae were high in the study area. At some study area we found the Vespoidea from species diversity is different in study area. Hymenopteran can be effectively used in indicator studies because they immediately respond to any alteration in surrounding environment. The detailed studies of disturbance, type of disturbance, physiochemical properties of soil, climatic factor, exotic flora and fauna etc.

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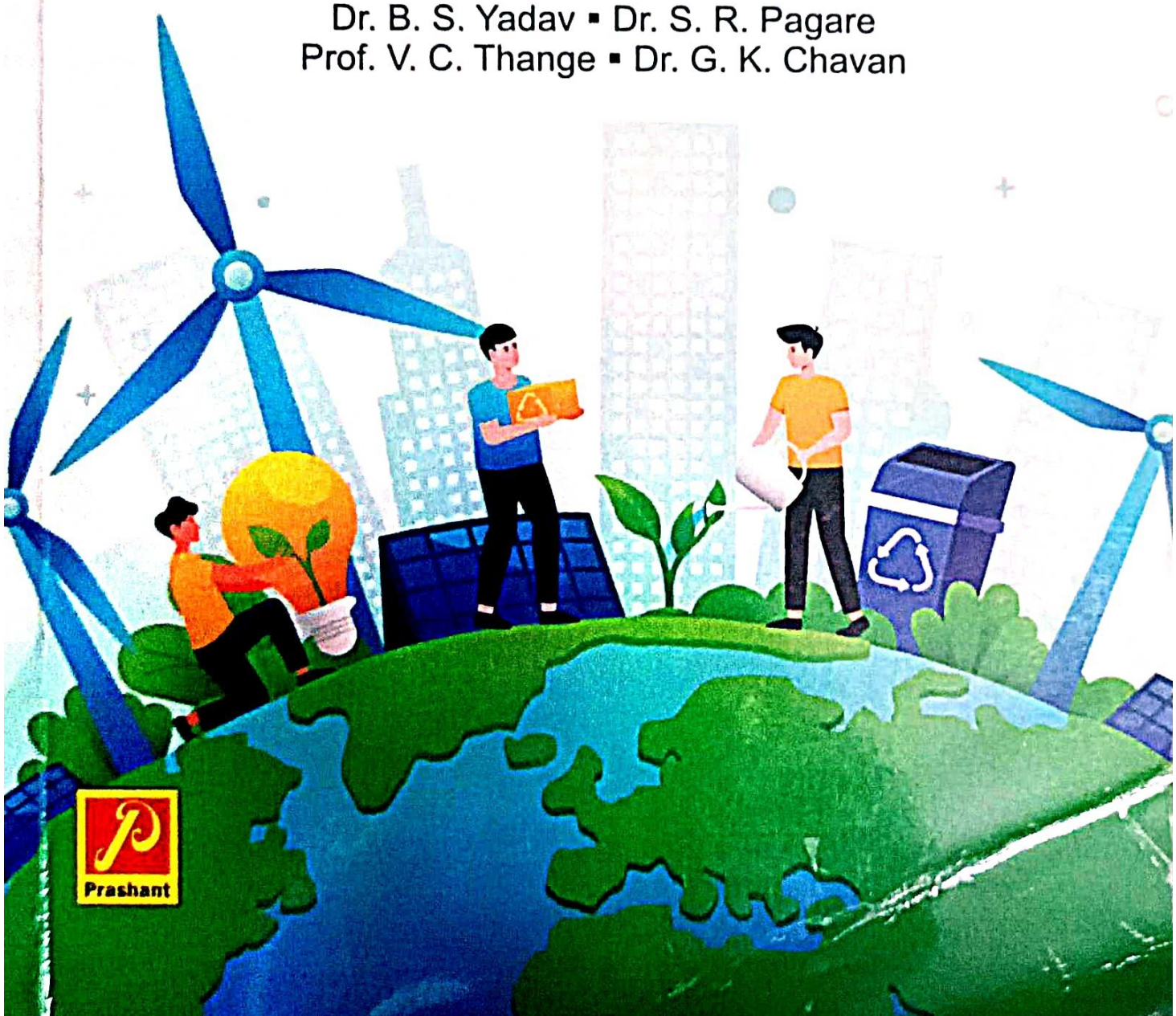

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Issues and Perspective

- E d i t o r s -

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Global water scarcity and the safety of drinking water are today's concerns and tomorrow's crisis

- Rohan Virendra Yadav
- Dr. B. S. Yadav
K. J. Somaiya College, Kopargaon, Dist: Ahmednagar

Introduction:

Water is an essential resource and crucial element for sustain life and human activities. Over 97.2 % of water is found in the oceans as saltwater, 2.09 % in icecaps and glaciers, 0.6 % available on groundwater, and 0.11 % runoff and surface water. Ensuring Safe drinking water is most important for public health concerns. The presence of contaminants in the water is becoming a major serious problem and consequently, affects the drinking water quality. The microorganisms related to waterborne diseases are present in contaminated waters like bacteria, Viruses, helminths, and protozoa. Waterborne diseases like Typhoid fever, Malaria, Hepatitis, Amoebic dysentery, Diarrhea, Enteric fever, Gastroenteritis, Cholera. As reported by UNICEF, in 1993, 3.8 million growing children under age five loose one life during they are mainly affected by diarrhea diseases because of poor drinking water. In India in 1992 in which over 3,52,980 cases in addition to 735 deaths were recorded. The case of malaria in which around 1.87 million cases of malaria with 1006 deaths recorded from the country in 2003. The outbreak of hepatitis is most frequent, with about 60,000 cases recorded in the U.S. every year. This explosion takes place because of an unsafe water supply and inadequate sanitation. In the case of Amoebic dysentery, the protozoan infection is perhaps severe nevertheless, as elucidated at outbreaks in Chicago (1933) in that about 1400 persons were afflicted along with 98 deaths occurred during potable water was polluted because of sewage carrying an Entamoeba histolytica. Apart from this water scarcity is increasing on an alarming rate. Without assuring the availability of safe water for all users, global sustainability will be impossible to achieve. Despite being one of the UN2030 agenda's primary goals (SDG6) for sustainable global development (UN, 2015), the current water deficit is rapidly worsening and affecting an increasing number of residential,

commercial, industrial, and agricultural water consumers around the world. Global water consumption is expected to increase by 55%, while approximately 25% of large cities are now facing some form of water stress. Climate change, severe droughts, population growth, demand growth, and poor management have all put additional strain on the world's limited freshwater supplies in recent decades, resulting in a severe water scarcity for nearly 4 billion people for at least one month each year.

Many water utilities have tried to meet normal water demand due to rapidly depleting freshwater resources and deteriorating water infrastructure in many urban and rural areas. Water utilities' methods to deal with the water shortage are mostly focused on supplying alternate sources of water (e.g., rainwater harvesting, reuse,) Increasing the amount of water available (e.g., mixing) and lowering water usage (e.g., intermittent water supply). Furthermore, when there is a severe water scarcity, bulk water is provided to users via tanker trucks to meet their critical potable water needs. Water users, on the other hand, are being pushed to reduce their water consumption in order to reduce demand. Despite this, many homeowners save some water in their buildings' storage tanks to deal with insufficient potable water delivery caused by frequent breakdowns. Consistent monitoring and proper execution of mitigation strategies could lessen the potential dangers associated with these practices.

Causes of water contamination:

Water contamination can come from a variety of places, but wastewater treatment plant discharges, defective septic systems, and animal waste are the most common sources of fecal coliform bacteria in freshwater. The double origin of anthropogenic and zoogenic of numerous point and non-point containing waste of industrial/ municipal/ domestic wastewater is referred to as fecal water contamination.

» **Rapid Urban Development:** Physical disruption of the land occurs whenever large numbers of people congregate in one compact region. The utilization of detergents, chemicals, and exhaust emissions in the construction of new roads, houses, and factories has an impact on the water purity. When it rains, these pollutants flow into rivers and streams, in the end making their way into our drinking water.

- **Improper Sewage Disposal:** Filthy sewage disposal is increasingly resulting in serious global concern. The waste goes somewhere every time we flush. either to a sewage treatment facility or to the oceans, were the residual sewage is deposited.
- **Fertilizer Run-Off:** Fertilizers play an important role in the context of water pollution in this world, with people trying to maintain their yards vibrant green and weed-free, and farmers coping with the growing population of crop pests. As a result, hazardous algae blooms occur, eventually leading to the extinction of much underwater fauna and fish.
- **Oil Spills:** Oil spills do pollute water; however, oil leaks from vehicles and mechanic trades are a major source of water pollution. The spilled oil combines with groundwater and enters streams and rivers.
- **Chemical Waste Dumping:** Chemicals are notoriously dumped into the ocean by large factories. Every day, very toxic things such as detergents, polychlorinated biphenyls, and lead are released into our environment
- **Radioactive Waste Discharge:** Radioactive discharges account for a very small proportion of the average background radiation to which we are exposed daily. They come from a variety of sources, the most common of which is the nuclear industry. Other potential sources include educational institutions, hospitals, waste management, and disposal facilities, and the oil and gas industry

Water supply and potential threats to potable water quality:

- **Water blending (Mixing):** Because groundwater resources are rapidly depleting, many water utilities that previously relied on groundwater are considering combining treated groundwater with finished surface water to supplement their supply (Liu et al., 2017, Taylor et al., 2006, Liu et al., 2010). The irregular variations in water chemistry induced by blending different sources of water, on the other hand, may result in more aggressive water and, as a result, estabilization of inorganic scale and microbiological biofilm that has built over decades on the water main and building plumbing.

Mixing different types of water can change the chemistry of the water, which can destabilize the iron-bearing scale and release iron and other contaminants like arsenic (As) that have accumulated on it (Tang et al., 2006, McNeill and Edwards, 2001, Sarin et al., 2001). Furthermore, the dissolution of heavy metals like arsenic, iron, lead, and cadmium from inorganic scale accumulated on other types of water mains like steel, polyvinyl chloride (PVC), polyethylene (PE), and glass-reinforced pipes (GRP), as well as a detachment of bacterial community accumulated on these pipes, could have negative health and aesthetic consequences (taste, odor, and color).

» **Bulk water distribution:** Bulk water delivery is typically used in developing countries for isolated rural areas without water distribution networks, in arctic locations where water cannot be transported through the piped network due to permafrost, and in industrialized countries during emergencies such as earthquakes and wildfires (Gora et al., 2020, Abdullah, 1999). Furthermore, in the event of a severe water scarcity, water utilities may be unable to distribute sufficient drinking water to consumers via the distribution network. As a result, water utilities are required to provide bulk water to consumers through water tanker trucks in order to meet their critical potable water needs (Paper, 2017, Pike, 1996, Raina et al., 2019). By neglecting sanitary measures throughout water filling, transportation, storage, and final distribution, microbiological contamination of supplied water could occur, posing a health risk to water users. Due to the operators' hygienic habits and/or inappropriate tanker materials, tankers have been identified as a major source of total coliforms for water contamination. Bacterial multiplication and biofilm formation could be aided by insufficient disinfection residuals, extended water storage, and elevated outside temperatures in these tankers (Constantine et al., 2017). Using non-potable water tankers to deliver potable water when resources are scarce poses a serious health risk to customers. Water quality must be monitored on a regular

basis at filling stations and trucks to ensure water safety.

» **Intermittent water supply (IWS):** Many utilities in water-stressed areas have switched from continuous water supplementation to intermittent water provision as a result of water resource constraints (IWS) (Simukonda et al., 2018, Ellawala and Priyankara, 2016). Drinking water is delivered to users inside the distribution network for less than 24 hours per day in an intermittent water supply that may occur daily, weekly, or seasonally. Stopping and restarting the water supply can cause pressure transient events, which can damage the water mains and degrade the water's chemical, microbiological, and aesthetic quality (Farmani et al., 2021). (1) microbial contaminant intrusion into underground pipes from the surrounding environment via leaks, (2) contaminant backflow from users' connections during low or negative pressure events, (3) microbial growth in bulk water, pipes wall in stagnation zones, and (4) sloughing off biofilm, scales, and corrosion products from pipe surfaces due to shear forces created by the rapid increase in pressure.

Conclusion:

Although alternative procedures such as water mixing and intermittent water supply temporarily meet consumers' needs for potable water, water suppliers should conduct thorough investigations and monitoring practices before and during implementation to minimize contamination of provided water. Furthermore, water customers should be warned about the potential risks associated with drinking first flush water provided after water service has been restored, as well as given suitable instructions on how to minimize their exposure to chemical and microbiological pollutants in tap water. Before being used for delivering potable water, tanker trucks should be thoroughly examined and disinfected. To ensure water safety, disinfectant residuals and microbiological pollutants in water delivered by tanker trucks should be evaluated on a regular basis. Future research is needed to better understand the potential threats to the quality of water provided by tanker trucks so that efficient sanitation techniques may be developed.

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Environmental Legislation

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Introduction:

Legislation can refers to the laws or processes by which they are enacted in several countries. Environmental legislation is the collection of laws and regulations, the main purpose of which is the protection of the environment, as well as prevention of a danger to humans, animals, and plants. Over the years, along with a spreading of environmental consciousness, there has been a change in the traditionally-held perception that there is a trade-off between environmental quality and economic growth as people have come to believe that the two are necessarily complementary. The current focus on the environment is not new—environmental considerations have been an integral part of the Indian culture. The requirement of conservation as well as sustainable use of natural resources has been indicated in Indian scriptures, more than three thousand years old, and is reflected in the constitutional, legislative, and policy framework as also in the international commitments of the country. The awareness, as well as consideration for the environment, covers various environmental problems like pollution of water, air, and soil, land degradation, industrialization, urbanization, depletion of natural resources, etc. Environmental Law plays a very essential and key role in regulating the use of natural resources along with protecting the environment. The success of environmental legislation mostly depends on the way they are enforced. The legislation also assists as an important tool for educating the masses concerning responsibility in maintaining a healthy environment. Several legislations have already been put forth at national as well as international levels. In this lesson, you will learn about some important environmental legislation. Indian legislations are called Acts whereas international legislations are in the form of conventions, protocols, and treaties.

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Objectives

1. Describe the constitutional provision for environmental protection together with conservation in India;
» List and describe the several Indian environmental laws with their objectives;
» Describe the various pollution-related acts such as water, air, and environment act;
» Explain the several global conventions along with their objectives in the field of environment.

The genesis of several legislations in the country lies in environmental issues. The need for useful legislation to protect the environment or otherwise the need for resources by the growing population will generate havoc on the environment. Another main aspect is the enforcement of these laws. To protect our environment from further degradation as well as pollution, the laws must be required to be enforced forcefully and effectively.

Need for legislation

In the recent past, several environmental issues have become dangerous for human health. A major factor of environmental problems is that their effect is not limited to the source area but spills over far and extensive areas.

Effective legislation is required in a way to restrict misuse as well as degradation of the environment. To curb the destructive practices of unscrupulous people, forest mafia groups, poachers, polluters, and over-exploitation of environmental resources, effective legislation is required. Pollution is a major component and it does not notice political territories or legislative jurisdictions. The environmental issues are intrinsically global. For that reason, to prevent such problems environmental legislation is not required only at the national level but also at the international level.

National Legislation

At the national level, significant efforts have been formed for the improvement as well as protection of the environment by incorporating changes in the constitution of India. Our constitution, primarily, did not include any direct provision about the protection of the natural environment. Although, after the United Nations Conference on Human Environment, held in Stockholm in 1972. Indian constitution was

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amended to involve the protection of the environment as a constitutional mandate. Although India had an Elephant's Preservation Act of 1879 and a Forest Act of 1927, environment-associated legislation came very late in 1972 with Wild Life Protection Act 1971. As we are all aware, India is one of the twelve mega diversity countries. There are numerous species, their capability is not even known to date. Biodiversity has precise consumption use in agriculture, medicine as well as industry aside from it being a nations' wealth. There is a constitutional provision in India for biodiversity conservation.

The forty-second amendment Clause (g) to Article 51A of the Indian constitution formed a fundamental duty to protect along with improving the natural environment. "It shall be the duty of every citizen of India to protect as well as improve the natural environment involving forests, lakes, rivers, and wildlife and have compassion for living creatures." There is a directive, provide to the State as one of the Directive Principles of State Policy related to the protection along with the improvement of the environment. Article 48A states "The State shall endeavor to safeguard and improve the environment along with to protect the forests as well as wildlife of the country". The department of Environment was initiated in India in 1980 to secure a safe environment for the country. This after became the Ministry of Environment and Forests in 1985. This Ministry has whole responsibility for administering as well as implementing environmental legislations along with the policies. The constitutional provisions are backed by several legislations – Acts and rules.

The majority of environmental legislations are Acts of the Parliament or the State Legislatures. These Acts commonly delegate powers to regulatory agencies, to formed rules for the aim of their implementation. In the wake of Bhopal Tragedy, the Government of India enacted the Environment Protection Act of 1986 and is regarded as umbrella legislation as it fulfills numerous lacunae in the existing legislation. Afterward, many environmental legislations have been passed to deal with particular environmental issues. For example, in the recent past, the use of CNG for public transport vehicles has been made compulsory in Delhi. This has decreases air pollution in Delhi.

International Legislations

There is no international legislation body with authority to pass

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legislation identical to national legislations, neither are there international agencies with the power to regulate resources at the global level. Therefore, international legislation should depend on the agreement of the parties concerned. Various problems of multinational concern are directed by a collection of policies, agreements, as well as treaties that are generally called International Environmental Legislations. Many of the international legislations are international agreements that nations attach voluntarily. These agreements are commonly finalized by way of international conventions or treaties. Nations that have assented to be bound by the convention are known as Parties. Convention gives the framework to be regarded by every party, which has to be acquired its national legislation to ensure that convention is carried out at the national level. To support the conventions, eventually, protocols are as well framed. A protocol is an international agreement that stands on its own but is associated with an existing convention. It can be concluded that the climate protocol shares the concerns and principles set out in the climate convention. It then makes on these by add on new commitments that are powerful and far more intricate as well as elaborated than those in the convention.

Environment Legislation, Acts

The environment is a natural world contain land, water, air, plants, and animals that are mainly affected by human activity.[1]. Pollution is defined as the addition of substances into the environment that are harmful to humans and other living things.[2]. Human activities have harmful effects on the environment and they have polluted the water, air, and soil. Pollution is increasing all across the world [3].

Environmental laws play a very essential and crucial role in regulating the use of natural resources and protect the environment. The achievement of environmental legislation mostly depends on which manner they are enforced. Legislation act as an important tool for creating environmental awareness as well as promoting environmental education to maintain a healthy environment.

Types of pollution

- Air
- Water
- Soil
- Noise

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- **Air pollution**

The air we breathe is an important component of living things[4]. Air pollution is the presence or introduction of substances in the air like chemicals, particulates as well as biological substances that greatly affect humans and other living organisms and damage the environment.[5]. Air pollution is a great impact on human health.[6]. Air pollution in which some gases in the atmosphere present greater than regular conditions and that is dangerous for humans and other living organisms[7].

Sources of Air pollution

1. Fuel-burning operation for heat and energy production in the large steam electric generating plant, clubs, in-residence, hospitals, in-hotels as well as in the various process of laundry, dry cleaners, and service stations.
2. The refuse burning equipment in various industries and residential apartments.
3. The fuels are burned during transportation which consists of buses, rail, trucks and motor vehicles use diesel, petrol as well as gasoline.
4. Industrial along with commercial procedure emission in various manufacture activity that is Chemical plants, metallurgical plants, refineries mineral production, etc.

Causes of Air pollution

1. Increase in population and traffic
2. Development of industries
3. Automobiles engineering
4. Thermal and nuclear production
5. Agriculture development[8].

Effects of Air pollution

» Human health
» Animals
» Plants
» Ozone depletion
» Global warming
» Acid rain

Air pollution-related acts

1. **1948 – The Factories Act and amendment in 1987** This

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was the first to show thing for the functioning environment of the workers. The amendment of 1987 has improved its environmental aim and extended its function to the dangerous procedure.

2. **1981 – The Air (Prevention and Control of Pollution) Act** This is formulated with the sole purpose to give control and abatement of air pollution. It confers the power of executing this act to the Central Pollution Control Board.
3. **1982 – The Air (Prevention and Control of Pollution) Rules** describe the strategy of the meetings of the Boards and the powers authorized to them.
4. **1982 – The Atomic Energy Act** accord with radioactive waste.
5. **1987 – The Air (Prevention and Control of Pollution) Amendment Act** empowers the central and state pollution boards to associate with a case of emergency of air pollution.
6. **1988 – The Motor Vehicles Act** says that all dangerous waste is to be appropriately packaged, labeled as well as transported [9].

• **Water Pollution**

Water is a very essential element for life[10]. The addition of certain substances to the water like organic, inorganic, biological, radiological, heat affects the quality of water so that it makes the water unsuitable for use. Water pollution is a big global problem[11]. Water pollution greatly influences the whole biosphere of plants and living organisms[12]. The various sources that are caused the water pollution. Industrial waste contains some toxic and harmful components that commonly affect the aquatic system. Agriculture activities are also the main source of water pollution.

Sources of water pollution

1. Point source

It involves pollutants that are discharged from any identifiable single source. It's called point source pollution. Examples consist of oils spill from a tanker, effluent out from industries. Wastewater treatment plants are another common source of point source pollution. The point source of pollution arises from a particular origin.

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2. Non-point source

The Non-point source in which diffuse contamination that does not arise from a single discrete source. Nonpoint sources of pollution in which arise from various sources of origin and so many routes through which contaminants penetrate groundwater and appear in the environment from several unidentified sources. Examples are runoff from agriculture as well as urban waste etc.[13].

Causes of water pollution

1. Industrial wastes
2. Oil leaks and spills
3. Fertilizer runoff
4. Radioactive waste
5. Chemical waste dumping
6. Sewage leakages
7. Flooding occurring in the rainy season that transfers waste into the water
8. Failing septic system
9. Animal waste[14].

Effects of water pollution

» Chemicals in water that affect human health
» Waterborne diseases
» Flooding
» Harms animals
» Acid deposition
» Effects of nutrients on water quality
» Oil spoilage
» Thermal pollution

• The water pollution-related acts

1. **1882 - The Easement Act** permits private rights to utilize a resource i.e. groundwater, by observing it as a connection to the land. It also says that all surface water be included in the state and is a state property.
2. **1897 – Indian Fisheries Act** – This act provides for certain matters associated with fisheries. It initiated two sets of penal offenses through which government can bring an action against if any person uses any dynamite or other explosive substance in any water with a purpose to catch or

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destroy any fish or poisons fish to kill.

3. **1956 – The River Boards Act** This act provides for the formation of River boards because regulation and expansion of inter-state rivers and river valleys empower the central government.
4. **1970 – Merchant Shipping Act** goal associated with the waste derived from ships across the coastal region within the definite radius.
5. **1974 – The Water (Prevention and Control of Pollution) Act** This act is enacted with the aim of prevention and control of water pollution and the maintenance or restoration of wholesomeness of water for the formation, with intend to accomplish the aim of aforesaid of boards for the prevention as well as control of water pollution, for converging on and allocate to that Boards powers and working associated to and for matters related with. This act is formed by the central and state Boards and authority and power to constitute as numerous committees as required to bring about particular functions for it.[15].
6. **1977 - The Water (Prevention and Control of Pollution) Cess Act** The main purpose of this act is to levy and collect cess or fees on water-consuming industries. The central and state levels are permitted to prevent and control water pollution.[15].
7. **1978 – The Water (Prevention and Control of Pollution) Cess Rules** include the standard definitions and designate the type of and places of meters that each consumer of water is recommended to affix.
8. **1991 – Coastal Regulation Zone Notification** For regulations on several activities, in addition to construction, are regulated. It allows protection to the backwaters as well as estuaries.

• **Soil Pollution**

Soil is a thin layer of organic and inorganic materials that covers the Earth's rocky surface. Soil pollution refers to the addition of substances to the soil, which adversely affects the physical, chemical, and biological properties of soil and decreases its productivity. Soil

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pollution takes place because of the discharge of chemicals or the discarding of wastes, like hydrocarbons, heavy metals, and pesticides.[16]. Soil pollution is commonly caused by industrial activities, agriculture chemicals as well as inappropriate dumping of waste.[17].

Sources of soil pollution

1. **Industrial wastes :** Industrial waste consists of chemicals like zinc, mercury, cadmium, copper, cyanide, lead, alkalies, chromates, acids, organic substances, etc.
2. **Pesticides :** Pesticides are chemicals that consist of insecticides, fungicides, algicides, rodenticides, weedicides sprayed in a way to enhances the productivity of agriculture, forestry, and horticulture.
3. **Fertilizers and manures:** Chemical fertilizers are added to the soil to enhanced crop productivity. The enormous use of chemical fertilizers decreases the population of a soil-borne organism and crumb structure of the soil, the productivity of the soil, and raised salt content of the soil.
4. **Discarded materials:** It consists of concrete, rungs, cans, asphalt, leather, glass, paper, plastic, discarded food, and carcasses.
5. **Radioactive wastes:** Radioactive component from mining and nuclear power plants, determine their way into the water and then into soil.
6. **Other pollutants:** Several air pollutants (acid rain) and water pollutants eventually are component of the soil and the soil further take other toxic chemicals through the process of weathering of rocks.

Causes of soil pollution

1. The enormous use of fertilizers, insecticides, pesticides as well as herbicides.
2. Dumping of the huge amount of solid waste
3. Deforestation and soil erosion
4. Pollution because of urbanization

Effects of soil pollution

- Decreased soil fertility
- Loss of soil and nutrients
- Increased salinity

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» Decreased crop yield
» Harmful chemicals penetrate underground water
» Reduced vegetation

• Noise pollution

Noise pollution is an unpleasant noise created by people or machines that can be annoying, distracting, intrusive, and physically painful. Noise pollution is one of the types of environmental pollutions all over the world. It causes harmful effects on the lives of humans and animals.[18]. Noise pollution is generally affecting the quality of life all over the globe.

Mainly rapid industrialization, urbanization, and other communication, as well as a transportation system, cause noise pollution.[19].

Sources of noise pollution

1. Road Traffic noise
2. Public address system
3. Agriculture machines
4. Defense equipment
5. Miscellaneous sources
6. Industrial activities
7. AirCraft
8. Construction noise

Effects of Noise Pollution

» Hearing impairment
» Negative social behavior and annoyance
» Sleeplessness
» Physiological effects
» Cardiovascular disturbances
» Disturbances in mental health[20].

• Noise Pollution related Act

1. The Noise Pollution (Regulation and Control) Rules, 2000
   This rule provides that raise the ambient noise level in the public area from industries, loudspeakers, music systems, construction activities, as well as public address system that are causes harmful effects on human health.[21]. To regulate and control noise producing and generating sources along to maintain the ambient air quality standards regarding

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noise[22].

- **The Environment (Protection) Act, 1986**

  The Environment (Protection) Act was enacted in the year 1986. The main objective of this act is to provide the protection and improvements of the environment and prevention of hazards to humans, other living things, and plants. This is an "umbrella" Act that provides a Plan for central government cooperation of the activities of the several central as well as state authorities formed under prior laws, like the Water Act and Air Act.[23].

» Certain rules related to several forms of management of dangerous chemicals, wastes, etc. became notified. Under this Act, Central Govt. has relegated, the restricted site of industries in the distinct region to safe the environment.

» Subject to the plan of this Act, Central Govt. has the power to take action as it is essential for the aim of protection as well as improving the environment.

• Biodiversity Related Acts

1. **The Wild Life (Protection) Act of 1972 and Amendment, 1982**

   The Wildlife law in India is enacted because of protecting wild animals, birds as well as plants.[24]. The Wild Life (Protection) Act, 1972 is an Act of parliament. The Wild Life Act provides for state wildlife advisory boards, regulates the hunting of wild animals as well as birds. The formation of sanctuaries along with national parks, regulations of trade of wild animals in addition to animal products and judicially enforced the punishment for breaking the Act. The amendment of the Act in 1982, initiated a provision allowing the capture as well as transportation of the wild animals for scientific management of the animal population.

2. **The Forest (Conservation) Act of 1980**

   In 1927, the first forest act was enacted. This is one of several surviving colonial legislations. It was enacted to develop the law associated with forest, the transport of forest generates, and the duty tolerable on timber and other forests generates. Consequently, the Forest (Conservation) Act

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was enforced in 1980 to produce various reforms over the previous act of 1927. The 1927 Act was associated with the four divisions of the forest such as reserved forests, village forests, protected forests, and private forests. Alarmed at India's expeditious deforestation and causing environmental damage occurred, Center Government formulate the Forest (Conservation) Act in 1980. Under the provision of this act, previous acceptance of the Central Government is necessary for deviation of forestlands for non-forest intent.

3. **Biological Diversity Act 2002**

The Biological Diversity Act, 2002 is enacted by the parliament of India. The Biological Diversity Act 2002 is a portion of the Indian attempt to produce some development and to operate the two main provisions of the Convention on Biological Diversity. The objective of this Act is to assist conservation, managing its sustainable use, and equitable sharing benefits of biological resources, consist of cultivars, habitats, domesticated stocks, and breeds of animals as well as microorganisms. The act envisaged a three-tier structure to regulate the access to biological resources such as the National Biodiversity Authority, State Biodiversity Boards, and Biodiversity Management Committees at the level of Panchayats and Municipalities.[25].

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Environmental Disasters

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Introduction:

Environment and disasters are close terms. Change in Environment enhances the intensity of disasters. Disaster is the impact of both natural and man-made events that influence human life and the environment that surrounds us. Environmental deterioration alters natural processes, affects human health, and rises vulnerability. Because of human interference in natural processes, the losses and frequency of natural disasters have increased significantly. According to the data of the United Nations, natural disasters kill 1,00,000 persons on average and cause property defilement of Rs 20,000crores globally per year.

Disasters in India:

Environmental disasters have had a miserable history in India and throughout the world. India is fighting disasters for years. Now with the temperature rise, the Earth is more prone to them occurring. How can we forget the deadly Tsunami that started on the west coast of Sumatra, Indonesia; struck the coastal part of India, affected around 12 countries, and killed more than 2.3 lakh people? In the year 2013, about 5,300 people died in Uttarakhand flash floods due to heavy rainfall and massive landslides. These are just a few cases. We often listen to such kind of news that one part of India is affected by drought while another faces flood. India stands second after China among the top ten natural disaster susceptible countries. Therefore, there is a necessity of creating awareness among all divisions of the people about its sources, consequences as well as preventive measures so that they can handle it as an individual, and as a member of society.

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Environmental Disasters:

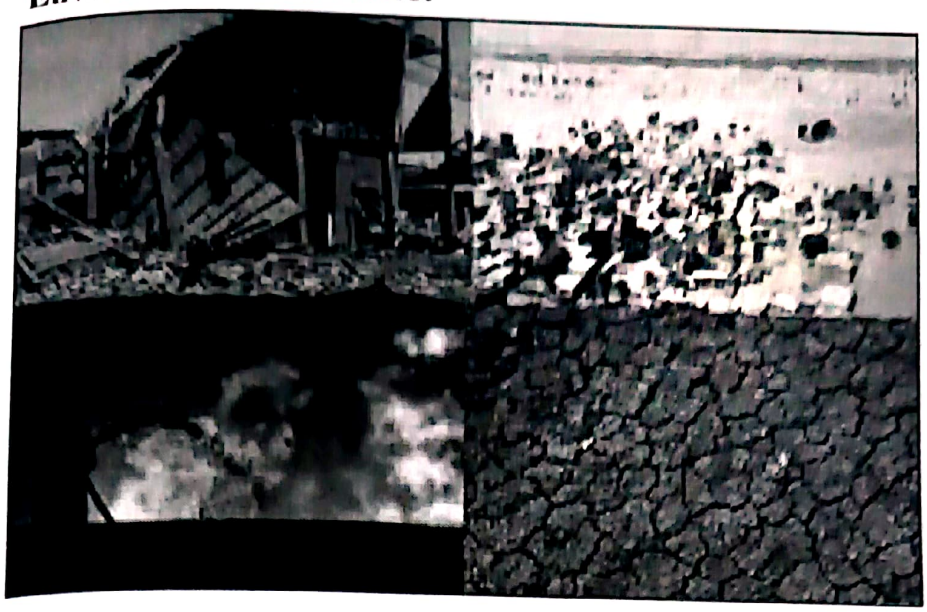

Fig.1: Different Disasters like Earthquake, Floods, Fire and Drought

Every disaster scenario is unique and represents new and uncommon challenges to victims. Environmental disasters may be sudden and snowstorms that unfold over minutes or hours like a tidal wave, earthquake, hurricane, or slow-moving events that span days, weeks, or months like floods, droughts, and wildfires. Change in climate rises the frequency and intensity of these climate-related hazards. This leads to a higher number of deaths as well as increased property and economic losses.

Types of Environmental Disasters:

Tidal wave/ Tsunami:

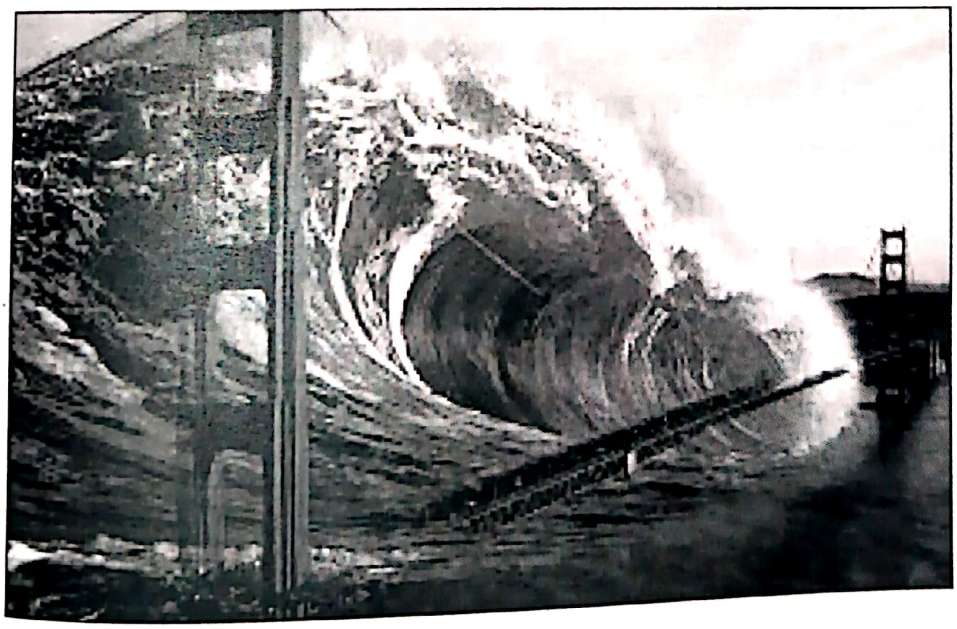

Fig.2: Seismic sea waves

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A tsunami is a series of the wave created when water is moved very quickly. On the planet, Tsunamis are the mortal type of major natural disaster in terms of the proportion of victims killed. This high level of mortality explains why World Tsunami Awareness Day is being inaugurated on November 5, 2016. Volcanic eruptions and Earthquakes cause the sea bed to move abruptly which results in sudden displacement of ocean water in the form of high vertical waves which are called seismic sea waves or tsunamis. The speed of the seismic wave in the ocean depends on the depth of water. It is less in the ocean deep and more in the shallow water. As a result of this, the influence of tsunami is more near the coast which causes large-scale devastations and less over the ocean. Tsunamis are often observed along the Circum-Pacific Belt, particularly along the coast of Alaska, Japan, and other islands of Southeast Asia, Indonesia, Malaysia, Myanmar, Sri Lanka, and India, etc. On 26thof December 2005, Sri Lanka experienced perhaps its most devastating natural disaster through an impact of a Tsunami.

How are Tsunamis measured?

In the deep ocean, a tsunami has a small amplitude which is less than 1 meter but a very long wavelength i.e. hundreds of kilometers. This means that the slope of the wave is very small, so practically it is undetectable to the human eye. However, there are ocean observing instruments that can detect tsunamis.

Characteristics of Tsunami:

1. **Tsunami waves:** Waves of Tsunami involve the movement of the water to the sea-bed. The effects of wind-driven ocean waves are seen only near the surface of the ocean.
2. **Long Wavelength:** Tsunami waves in the deep ocean have extremely long wavelengths. In comparison to wind-driven waves, tsunami waves may have wavelengths up to hundreds of kilometers between wave crests. Tsunamis are therefore much more destructive than normal waves because the huge flooding body of water can continue to rush onto land for an extended period. This may last from a few minutes up to an hour.
3. **Tsunamis are speedy:** A tsunami can travel more than 900 kilometers per hour in the deep ocean, close to the speed of a jet plane, and in shallow water, it can be described as

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roughly the speed of a fast cyclist.

4. **A tsunami -' series' of waves:** A tsunami consists of a series of waves. The amount of time between successive waves is known as the wave period. Waves may have a short period or can last for hours. Often, the first tsunami wave is not the largest. Subsequently, sometimes the fifth or sixth can be many times larger.

5. **Variation of tsunamis in size and severity:** The effect of a tsunami can vary widely. A small tsunami may result in unusual tides that can be dangerous to swimmers or can cause damage to berthed boats. A large tsunami can cause widespread flooding and deterioration such as that seen off the west coast of Northern Sumatra on 26 December 2004. Large tsunamis cause strong rips and tides in oceans around the world for up to a few days after the initiating of volcanic eruption or earthquake.

Earthquakes:

What is an Earthquake?

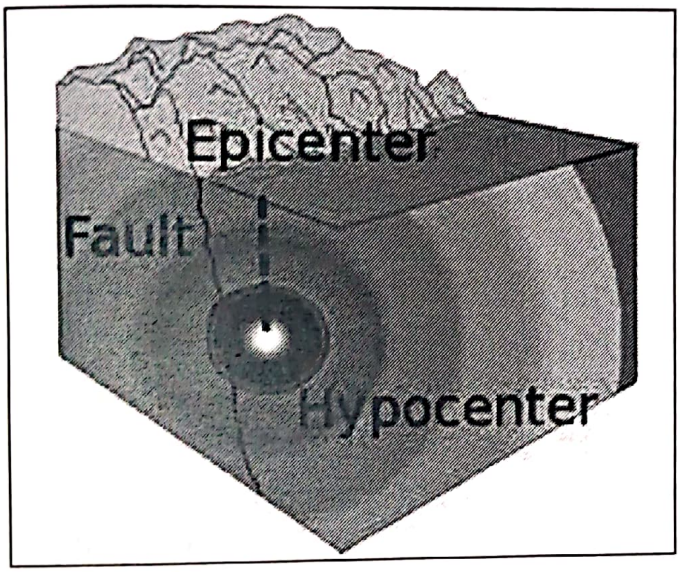

Fig.3: Parts of an Earthquake

An earthquake is a process where two blocks of the earth instantly slide one another. The surface where they slide is called the fault or fault plane. Position beneath the earth's surface where the earthquake starts is called a hypocenter, and the location directly above the surface of the planet is known as the epicenter. In easy words, the sudden trembling of the earth's surface is an earthquake.

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How are Earthquakes measured?

Earthquakes are measured by instruments called Seismographs and the data obtained by it is referred to as seismogram. The instrument consists of a base that sets firmly in the ground and a heavyweight that hangs freely. When the ground shakes due to an earthquake the base of the seismograph shakes too, but the hanging weight does not. Instead, the hanging string absorbs all the movement. The difference in position between the shaking part of the seismograph and the motionless part is measured.

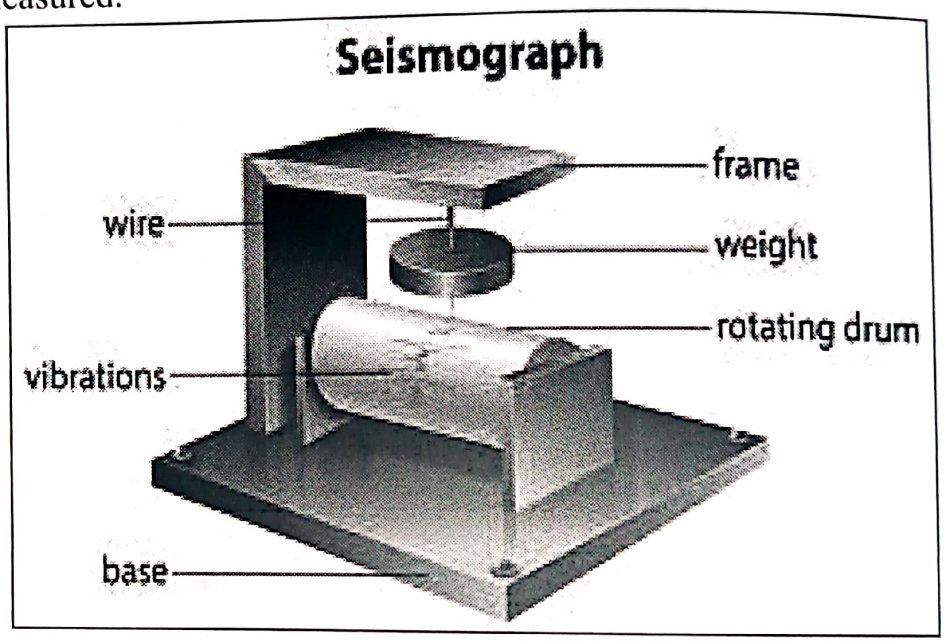

Fig.4: Seismograph

Seismic (Earthquake) Zones in India:

Earthquakes can occur at any time of the year. The result of it is very instant. There are no warnings or pre signs of this disaster. India has had the world's largest number of earthquakes in the last centenary. Bureau of Indian Standards has constructed earthquake Seismic zones on the map of India. The intensity of each zone, result, and losses are different for each zone. Its updated edition has been issued in 2002.

The zones are described below:

Zone I is the least severe and Zone VI is the most severe zone. Seismic Zone II comprises minor damage. The earthquake is felt by all. Heavy furniture may slightly move. Cracks in chimneys may occur. Moderate damage may be observed in Zone III. Slight damage is there even in the strongly built building. More breakage in ordinary houses etc. Everyone runs out of doors. Substantial harm to ragged

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buildings and bridges. It comprises regions like Kerala, Maharashtra, Lakshadweep islands, Gujrat, Bihar, etc. Major devastation is observed in Zone IV. Little damage is seen in specially designed and well-built building bridges etc. Heavy damage to poorly constructed and badly built structures. Poles, memorials, walls, etc. fall. Delhi and Mumbai are situated in this risk zone. Earthquake Zone V is the most vulnerable to earthquakes. Practically all structures fall and small buildings or houses are greatly damaged or destroyed. The North-East part of India, Kachchh, Gujrat, Uttarakhand, Himachal Pradesh, and Jammu & Kashmir are included in danger zone no. V.

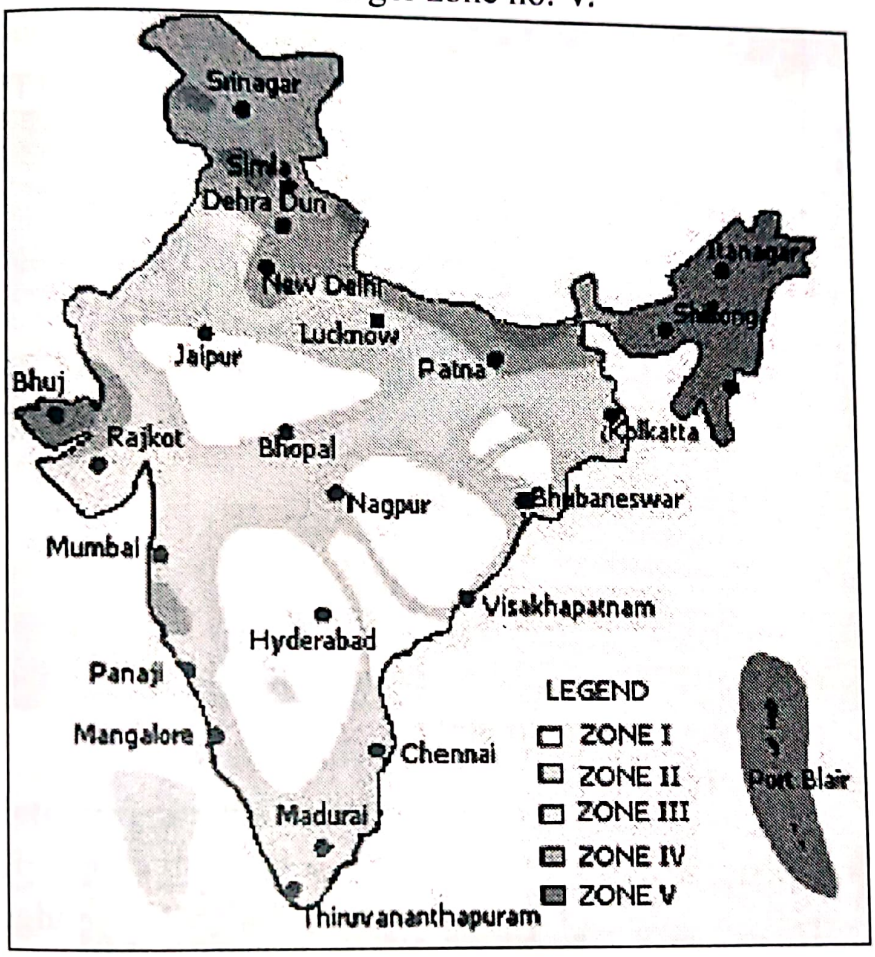

Fig.5: Seismic Zones in India

Floods:

Floods are the most common type of natural disaster. Flood is defined as water overflowing and submerging onto land that usually is dry. Flooding frequently occurs as a result of heavy rainfall nevertheless floods can also arise in a series of ways that are not directly related to ongoing weather circumstances. The immense power of moving water with the deposition of dirt and debris causes damage.

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Causes of floods:

» Dense rainfall: Denserainfall in the river basin causes an overflow of water on its banks, which results in the flooding of nearby areas.



» Tsunami: Coastal regions are flooded by rising seawater, as a tsunami hits the coast. Fig.6: Flood situation

» Deforestation: Flock hampers the water flow and forces it to percolate in the ground. As a result of deforestation, there is no blockage in the land and hence water flows with high speed into the rivers and causes a flood.

» Cyclone: Cyclone-generated tides of unusual height spreads the water in the adjoining coastal areas. Orissa cyclone in October 1994 generated severe floods and caused huge loss of human life and property.

Floods in India:



Fig.7: India lost more than 1,800 lives and suffered huge economic Loss due to floods in 2018.

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Droughts:

Mortality rate increases in a region that has been severely affected by drought, because of protein deficiency called kwashiorkor calorie malnutrition. The catastrophe caused by drought affects the people slowly and considerably. 'Drought' is defined as a long-term period when water is scarce due to inadequate precipitation, high rate of evaporation, and excessive use of water (elements of Meteorology) from the storage and other reservoirs, including the groundwater. From the year 2016 to 2018, Southern India was hit by severe drought conditions arising from less rainfall during the northeast monsoon, which occurs during the winter.

Types of Drought:



Fig.8: Drought region

Meteorological Drought: Meteorologicaldrought is usually defined based on the degree of dryness and the period of dryness. Onset of Drought generally occurs with meteorological drought. In this type of drought, precipitation departs from the long-term normal; then a particular number of days.

Hydrologic Drought: The rate and severity of hydrological drought are defined on a watershed or drainage basin scale. Hydrological drought is defined as periods of precipitation that include snowfall and shortfalls on the surface like a reservoir, groundwater, etc.

Agricultural Drought: Agricultural drought occurs when the moisture level in the soil is depleted. The characteristics of

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Meteorological & Hydrologic drought are somewhat similar. Protection of crops during stages of crop development, right from origination to maturity is a good definition of agricultural drought.

Socio-economic Drought: Drought which associates the supply and demand of social- economic good with elements of meteorological, hydrological, and agricultural drought is termed as Socio-economic drought.

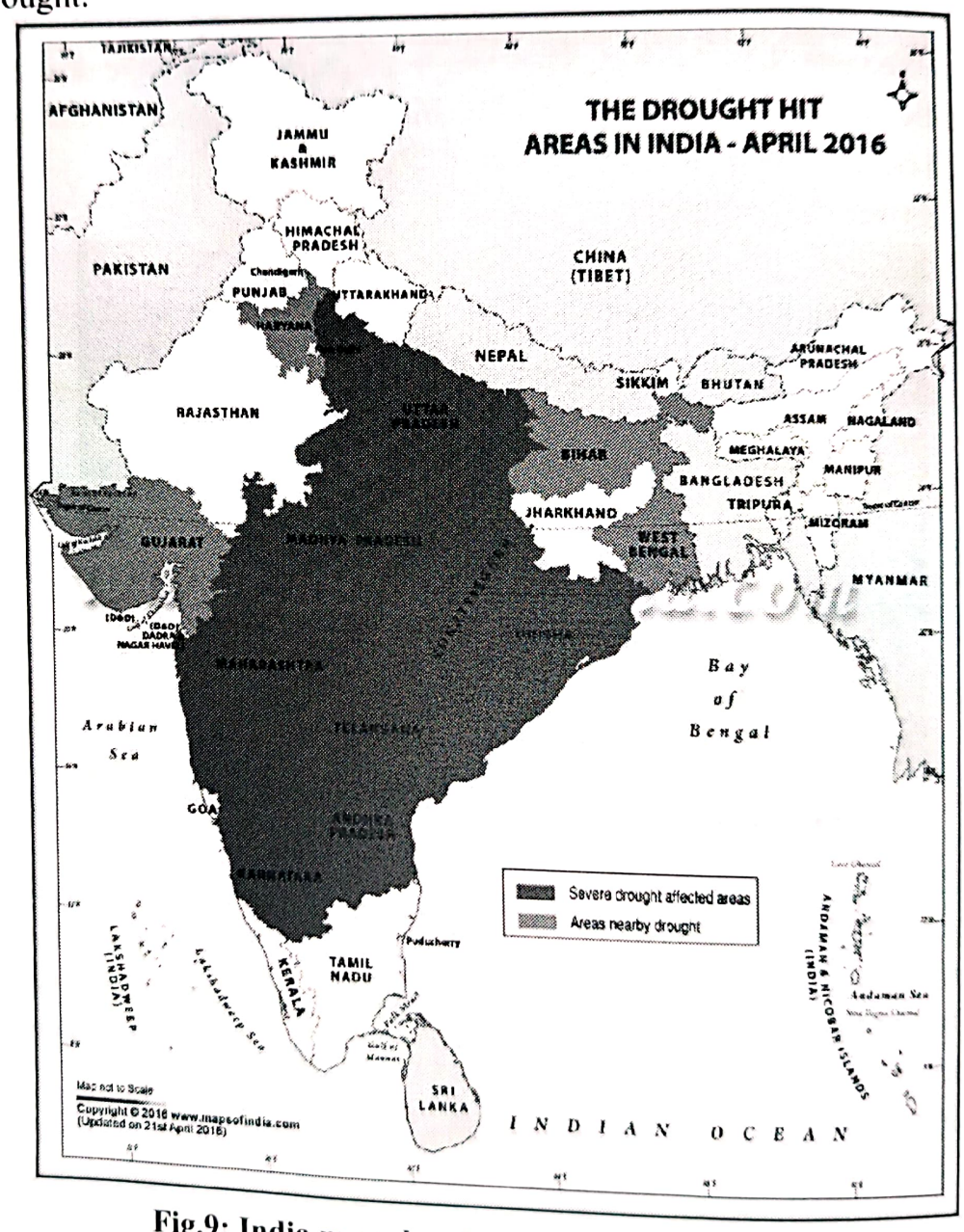

Fig.9: India map showing drought-affected states

Disaster Management:

Disaster management holds an important position in this country's policy framework. Disasters due to Earthquakes, Tsunamis, Floods, Cyclones lead to damage and disturbs human life. Therefore pre and

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post-management are necessary to prevent the losses of catastrophe. Disaster Management involves a constant and integrated process of planning, organizing, coordinating, and implementing measures that are necessary to reduce risk or threat of disaster (Mitigation) and for rehabilitation.

Disaster Management Act 2005:

Disaster Management Act 2005, deals with institutional, legal, financial, and cooperative mechanisms at the local level, state, district, and national levels. A DM consists of six elements divided into 2 categories: 1. the pre-disaster phase includes prevention, mitigation (risk of disaster), and preparedness, and 2. the post-disaster phase includes a response, rehabilitation, reconstruction, and recovery.

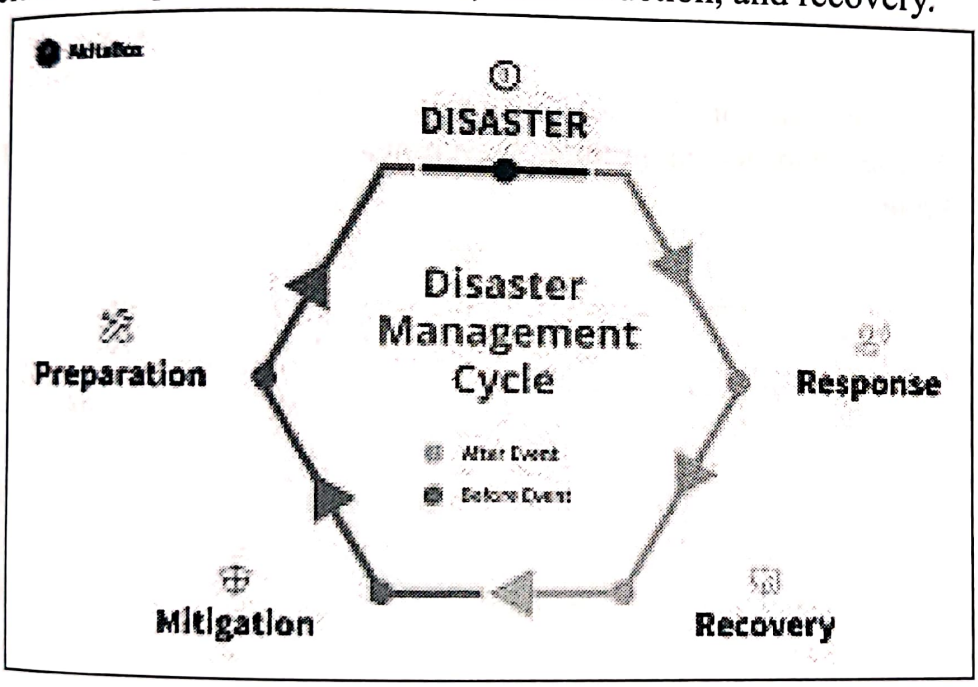

Fig.10: Disaster Management Elements

Objectives of Disaster Management:

- Checking efficient mechanism for identification, monitoring, and evaluation of disaster threat.
- Promoting productive and proactive partnerships with the media to allow awareness and contributing towards economic development.
- Undertaking reconstruction program as a chance to build disaster strong structures and habitat for safer living.

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Ground Pollution

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Introduction:

Most of the human activity resulted in the degradation of the quality of the natural environment is resulted as pollution. Environmental pollution is the world's greatest problem facing humanity, and all living things on the earth. Environmental pollution occurs more in middle and low developed countries.Many peoples are generally unaware about the environmental pollution that results in the formation of pollutants and environmental pollution.

Definition of Pollution

The Royal Commission on Environmental Pollution in U.K. in its third report gave the following definition to the term "Pollution", namely: The introduction by man into the environment of substances or energy liable to cause hazards to human health, harm to living resources and ecological systems, damage to structure or amenity or interference with legitimate uses of the environment".

According to Section 1(3) of the U.K. Environment Protection Act, 1990, the term "Pollution" means: The release (into any environmental medium) from any process of substances which are capable of causing harm to man or any other living organisms supported by the environment.

It is likely that humans face pollution daily without knowing it or we may have possibly become immune to it in our fast-paced lives. Deforestation, by human beings, deeply impacts our environmental ecosystem. Mainly it causes soil erosion, that causes land sliding. Some other activities of humans like excess use of chemical fertilizers, disposal of household waste into the water, improper disposal of e-waste leads to the increase in soil pollutants.

Environmental pollution may broadly be classified into: (1) Natural pollution; (2) Man-made pollution.

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1. Natural Pollution: Environment is polluted often by natural disasters like s earthquakes, floods, drought, cyclones, etc.
2. Man-made Pollution: Human activities.

Most of the environmental pollution is caused due to industrialization, urbanization, population growth, exploration, and mining, but also transboundary movement of pollutants from developed to developing countries or vice versa. Transboundary pollution is part of the reason that pollution has remained a global challenge. Industrialization has led to environmental degradation in terms of industrial pollution. Additionally, environmental pollution is triggered by the introduction of harmful materials, such as gaseous pollutants, toxic metals, and particulate matter (PM) into the atmosphere; sewage, industrial effluents, agricultural runoffs, and electronic wastes into water bodies; and activities such as mining, deforestation, landfills, and illegal dumping of refuse that cause soil pollution.

- **Three Major types of pollution**

I. Air pollution

Air pollution can be defined as the occurrence of chemical compounds in the atmospheric air that are toxic and present at concentrations that may be injurious to animals, vegetation, buildings, and humans. Mainly air pollution means the occurrence of the unnatural particles into the air which decreases the quality of the air.As day to day increasing in the adverse quality of the air it directly leads to the ozone depletion. Global warming occurs when carbon dioxide (CO2) and other air pollutants collect in the atmosphere and absorb sunlight and solar radiation. Normally this radiation would escape into space, but these pollutants, which can last for years to centuries in the atmosphere, trap the heat and cause the planet to get hotter.Following (Fig.1) Graph shows the effect of global warming on the change in the temperature of the environment. These heat- trapping pollutants, specifically carbon dioxide, methane, nitrous oxide, water vapor, and synthetic fluorinated gases are known as greenhouse gases, and their impact is called the greenhouse effect.

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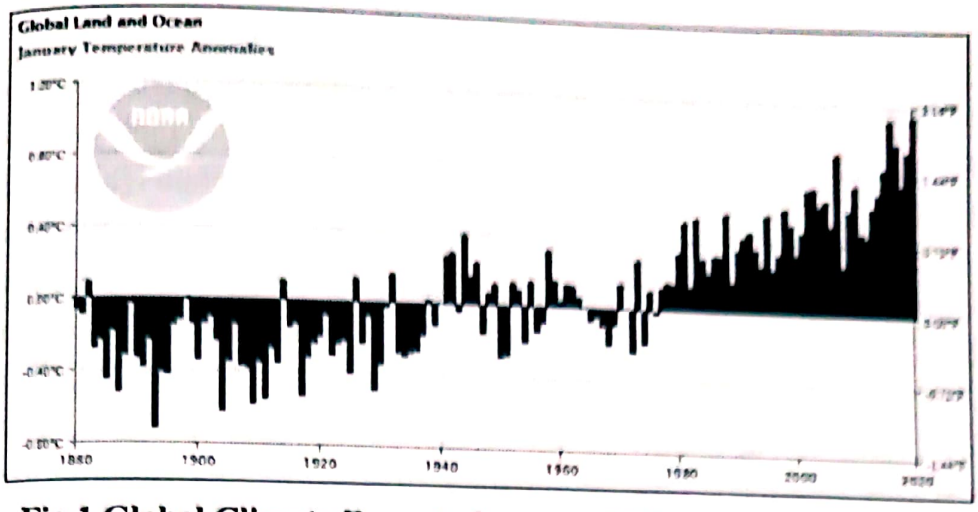

Fig.1 Global Climate Report- January 2020| National center for Environmental Information (NCEI)

II. Water pollution

Water pollution is mainly classified into both man-made and natural sources. Toxic substances from farms, towns, and factories readily dissolve into and mix with it, which causes water pollution as a result. Even with the treatment of water some harmful bacteria and pathogens are found in the sewage and wastewater. Release of the household sewage and wastewater into the rivers, mostly affect the aquatic lives. Underground water sources may possess naturally occurring ores that are rich in toxic metals, which leach into water bodies causing pollution. Instances of high arsenic and lead contamination of groundwater sources are linked to such ores. To control the pest farmers use chemical pesticides, which excess chemicals are excluded into the groundwater, when it's raining the chemicals mix into the rain water and flow into the waterways and further it causes water pollution.

III. Soil pollution

Apart from earthquakes, erosion, and other natural disasters that tend to damage the soil, the main sources of soil contamination are industrial and domestic wastes. It is typically caused by industrial activity, agricultural chemicals or improper disposal of waste. Some industrial soil pollutants include heavy metals, hydrocarbons, inorganic and organic solvents from the effluent. Fossil fuels from petrochemical plants, petroleum refineries, and power-generating plants also support soil pollution. Petroleum exploration, refining, and distribution through road transport often result in soil pollution. Pollution of land by plastics

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is beginning to receive global attention due in part to the toxic nature of the additives used in their production and direct effects plastics have on plants and animals. Plastic litter on land is unpleasant to the eyes, may penetrate into the soil and prevent nutrient uptake by plants, and cause entanglement of terrestrial animals. Pollution of soil does not only result in human health problems but also may modify metabolic processes in plants resulting in reduced crop yields. Pollutants may equally find their way into the food chain through absorption by plants.

- **Ground Pollution:**

World Soil Day was established in 2002 by the International Union of Soil Sciences (IUSS) to celebrate the importance of soil and its vital contributions to human health and safety. On December 20, 2013, the 68th UN General Assembly recognized December 5th, 2014 as World Soil Day and 2015 as the International Year of Soils. This official recognition of these events will emphasize the importance of soils beyond the soil science community.

World Soil Day serves as a reminder to all of us that we owe our existence to the soil. As we face mounting global production, climate and sustainability challenges Soil is fundamental to human life on Earth. Most plants require a soil substrate to provide water and nutrients, and whether we farm the plants directly or consume animals that feed on the plants, this means that we don't eat without soil. Having said that, it is not hard to see that a) it is possible to have a sea-based diet and b) it is possible to grow our food hydroponically. In those cases, it is possible to reduce the importance of soil. However, we still have the other reasons that soil is fundamental: it is required for trees. I don't think I need to go into the importance of trees for shade, animal habitat, or building materials.

According to Environmental Pollution Centers, soil pollution is, "The presence of toxic chemicals (pollutants or contaminants) in soil, in high enough concentrations to pose a risk to human health and/or the ecosystem. In the case of contaminants which occur naturally in soil, even when their levels are not high enough to pose a risk, soil pollution is still said to occur if the levels of the contaminants in soil exceed the levels that should naturally be present."

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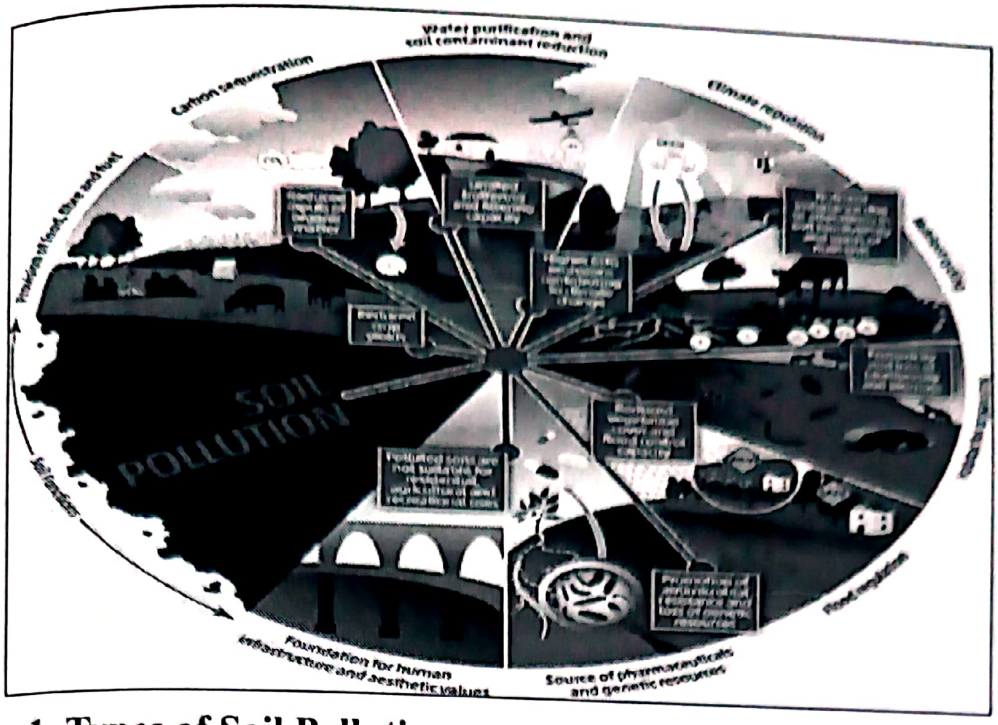

1. Types of Soil Pollution

Soil pollution may be any chemicals or contaminants that harm living organisms. Pollutants decrease soil quality and also disturb the soil's natural composition and also lead to erosion of soil. Types of soil pollution can be distinguished by the source of the contaminant and its effects on the ecosystem. Types of soil pollution may be agricultural pollution, Industrial wastes and urban activities.

2. Agricultural Pollution

- » Agricultural Activity
- » Chemical fertilizers cause soil pollution.
- » Pesticides also harm nontarget species with the target pest.
- » Fertilizers seep into the soil and mix with the water also.
- » Mixing of fertilizers in the waterway leads to contamination of the soil and water pollution.
- » Industrial Waste
- » Most of the pollution is caused by industrial waste.
- » Improper disposal of waste contaminates
- » This harmful disposal waste affects all living
- » Toxic fumes from the regulated landfills form acid rain and can damage the soil profile.

3. Urban Activities

- » Unknowingly most Human activities can lead to soil pollution directly and indirectly.

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- Improper drainage.
- Improper disposal of trash.
- Excess waste deposition increases the presence of bacteria in the soil.
- Decomposition by bacteria generates methane gas contributing to global warming and poor air quality.
- Radioactive substances such as Radium, Thorium, Uranium, Nitrogen, etc. can infiltrate the soil and create toxic effects.

4. Causes of Soil Pollution

Soil pollution can be natural or due to human activity. However, it boils down to the activities of the human that causes the majority of soil pollution such as heavy industries, or pesticides in agriculture. Soil pollution is associated with ungoverned use of farming chemicals, such as pesticides, fertilizers, etc. Pesticides applied to plants can also leak into the soil and water, it retains long-lasting effects Heavy metals can enter the soil through the use of polluted water in watering crops, or through the use of mineral fertilizers. Industries are by far the worst polluters of the soil with all the chemicals they release into the environment be it in liquid or solid form.Acid rains caused by industrial fumes mixing in rain falls on the land, and could dissolve away some of the important nutrients found in soil, as such change the structure of the soil. Deforestation is a major cause for soil erosion, where soil particles are dislodged and carried away by water or wind. As a result, the soil loses its structure as well as important nutrients found in the soil and soil fertility. Some the causes of soil pollution can be as follows:

- Industrial harmful effluents.
- Uses of Agrochemicals, such as pesticides, herbicides and fertilizers.
- Improper or ineffective soil management system.
- Improper management and maintenance of septic systems.
- Sanitary waste leakage.
- Toxic fumes from industries get mixed with rains causing acid rains.
- Absence of proper garbage disposal system.
- Unscientific disposal of nuclear waste contaminates soil and can cause mutations.

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» Petrochemicals
» Mining and activities by other heavy industries
» Oil spill

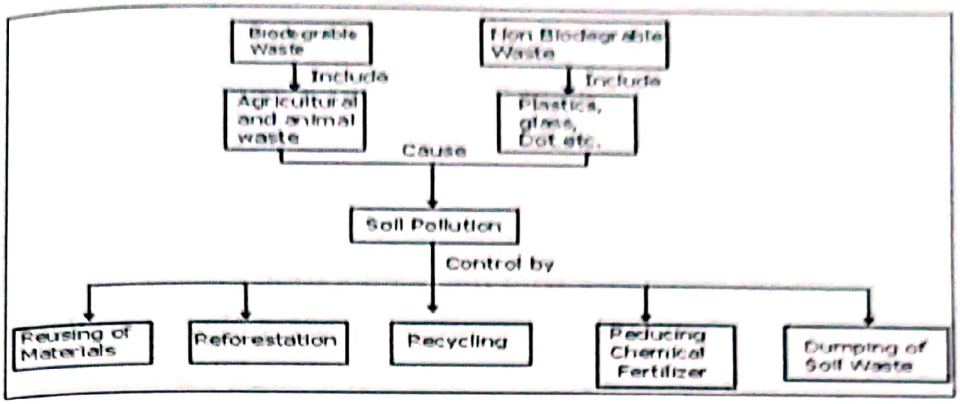
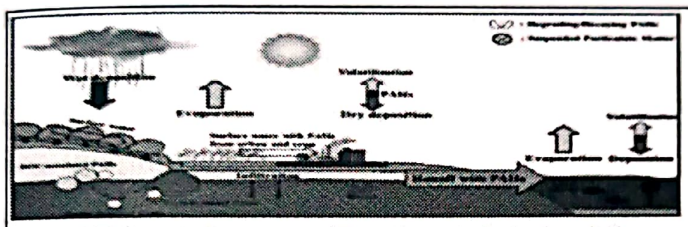


Fig.2 : Soil Pollution Causes and its control mechanisms.

5. Effects of soil pollutions





Some PAH particles can readily evaporate into the air from soil or surface waters.





Silicosis is a lung disease caused by breathing in (inhaling) silica dust. Silica dust forms during mining and quarrying.

» Soils affect the food we eat, the water we drink, the air we breathe, our health and the health of all organisms on the planet.
» Soil contamination leads to health risks due to direct and indirect contact with contaminated soil.
» Soil pollution causes disturbance in the ecosystem.
» Soil loses the fertility if soil pollutants are retained in it. Normally crops cannot grow and flourish in a polluted soil.
» If some crops are able to grow on this contaminated soil, it may absorb the pollutant chemicals from soil and may lead to serious health problems.
» Soil pollution also may increased salinity of the soil.
» People living near polluted land cause serious health issues

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like incidences of migraines, nausea, fatigue, skin disorders and even miscarriages.

» Depending on the pollutants present in the soil, some of the longer-term effects of soil pollution include cancer, leukemia, reproductive disorders, kidney and liver damage, and central nervous system failure.

» The nutrient content of a plant's tissues is directly related to the nutrient content of the soil and its ability to exchange nutrients and water with the plant's root.

» Climate change: Deforestation causes a change in the rain cycle and this is a contributing factor to global warming and loss of ecosystems.

- **Control of the soil Pollution**

Reforestation: Everyone should have taken the initiative to plant more trees, it will help the environment to decrease the pollution.

Bioremediation: Bioremediation is the most effective and less costly technique to reduced the pollutants from the environment

Reduce, Recycle, and Reuse: Items that can be used again should not be disposed of; things made of paper, glass, aluminum and the like should be recycled; lastly, where excesses such as the use of polythene paper can be avoided, then, by all means, reduce their use.

Reduced the use of chemical fertilizers: Chemical fertilizers contribute more to environmental pollution. We have to reduce the use of chemical fertilizers. Biocontrol agents are alternatively the most effective choice over the chemical fertilizers in agriculture.

Sewage and wastewater: It is most important to Proper disposal of sewage and wastewater with the treatment.

Public awareness: Informal and formal public awareness programs should be imparted to educate people about the environmental pollution, its causes and side effects on living things.

Ban on Toxic chemicals: Ban should be imposed on chemicals and pesticides like DDT, BHC, etc which are fatal to plants and animals. Nuclear explosions and improper disposal of radioactive wastes should be banned.

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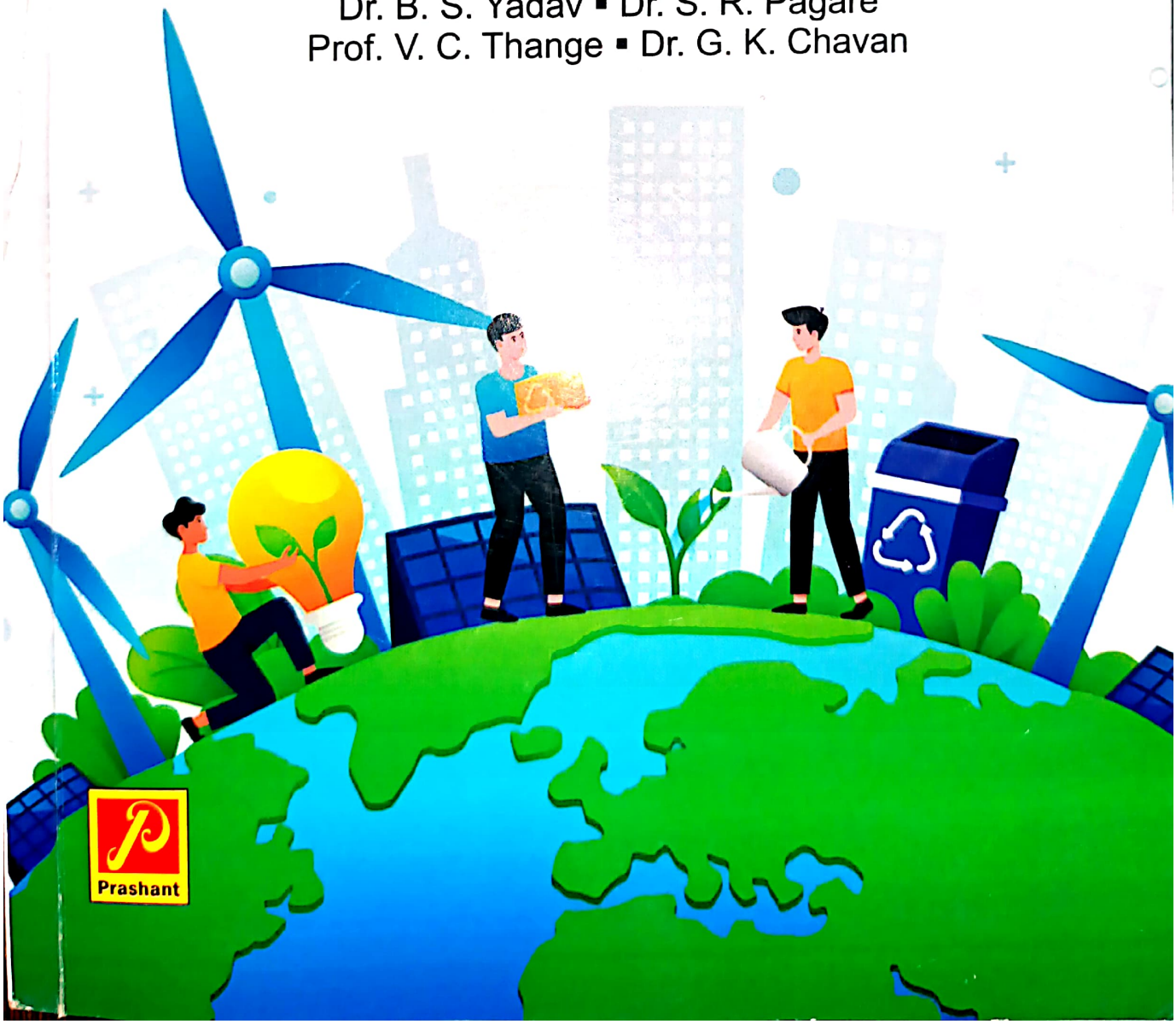

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Waste Management

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Introduction:

We human depend on many things from our environment to satisfy our various needs. In the process of development, we generate a produce lot of things which are actually of no use to us. We simply discard them. We often by packet foods, bottle drinks, canned food etc. But what we do after having it. We throw away the wrapper or the bottles and leftover food or vegetables from the kitchen that also goes into our dustbin. We discard many things like the old newspaper plastic and cardboard wrappings broken objects. We discard these things because they can no longer be of any use to us or they might be unwanted, defective, old and worthless. Such objects which are no longer of any use to us are waste. This waste can be as small as a used pen or as large as an old vehicle also one person may not necessarily, we waste to another. We normally get rid of the waste generated at houses by keeping our bins outside the house. These wastes undergo series of processes right from its collection segregation transportation some wastes are even treated and then finally are disposed off. All wasters is particularly hazardous: If not carefully disposed of, it will have an impact on the environment, whether it be unsightly litter in urban streets or contaminated air, soil or water. But what is equally important about waste is that it is recyclable. For example, if all human, animal and solid wastes are recycled back to soil, then we do not need inorganic fertilizers to maintain the high yields of crops. Today India produces 180 million tonnes of food grains and consumer 13 million tonnes of inorganic fertilizers at a huge cost. Therefore, time has come when we have to look at the waste not merely as an environment polluter but a recyclable material of great potential and energy saver.

- **Biodegradable Waste and Non-biodegradable Waste:**

1. Bio-degradable -

Biodegradable waste includes any organic matter in waste which

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can be broken down into carbon dioxide, water, methane or simple organic molecules by micro-organisms and other living things by composting, aerobic digestion, anaerobic digestion or similar processes. In waste management, it also includes some inorganic materials which can be decomposed by bacteria. Such materials include gypsum and its products such as plasterboard and other simple organic sulfates which can decompose to yield hydrogen sulphide in anaerobic land-fill conditions.

2. non-biodegradable -

Non-biodegradable waste is defined as a substance that cannot be decomposed or dissolved naturally and acts as a source of pollution. ... Non-biodegradable waste examples include- plastics, metal, aluminium cans, tyres, pains, toxic chemicals, toxic chemicals, polystyrene.

Examples of Non-Biodegradable Waste: Glass, Metal, Batteries, Plastic bottles, Medical waste

- **Classification of waste:**

1) Solid waste:

It is defined as non liquid, non soluble material ranging from municipal garbage to industrial waste that contain complex and something hazardous substances. Solid waste also include Garbage, demolition product, sewage treatment residue, dead animal.solid waste is not limited to wastes that are physically solid. Many solid wastes are liquid, semi-solid, or contained gaseous material. An inefficient municipal solid waste management system may create serious negative environmental impacts like infectious diseases, land and water pollution, obstruction of drains and loss of biodiversity.

Solid Waste Management

Solid waste management includes the proper collection, transport, and treatment of the waste that can cause possible health hazards and disrupt the quality of the environment. Once the waste is collected from the source, it is further separated and segregated as per non-hazardous and recyclable objects and hazardous waste which needs to be processed, treated and disposed of accordingly.Among all management of radioactive waste is of utmost importance since the radioactive substances stay in the environment for thousands of years before they completely decay. The transport of hazardous waste is generally done by the treatment, storage, and disposal facility (TSDF). In recent years

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laws are passed for proper dumping of the respective waste to decrease the damage caused to the environment. The transports responsible for carrying these waste are labeled properly to make sure it is disposed of accordingly. Most of the time the hazardous waste is carried by trucks. The waste management follows two main criteria that are, firstly, the reduction of the production of waste at the source and secondly recycling the waste such that it is useful in other domains. Once these criteria are observed, the leftover waste is properly disposed of.

2) Liquid Waste:

Liquid waste can be defines as such liquid as a wastewater, fats, oils, liquids, solids, gases, sludge's and hazardous household liquids. These liquid that are hazardous or potentially harmful to human. The improper disposal of waste water play a role in the contamination of surface water, ground water, and the soil Solid and Liquid Waste Management 28 thereby posing health problems. These phenomena persist in developing countries and affect almost every one. Liquid wastes cannot be easily picked up and removed from an environment. Liquid wastes spread out, and easily pollute other sources of liquid if brought into contact. This type of waste can also soak into objects such as soil and groundwater. This pollution then carries over to pollute the plants we eat, the animals in the ecosystem, as well as the humans within the area of the pollution.

Liquid waste management :

A. Disposal by dilution/ "Self-purification of water bodies"

It is a common practice in some communities to discharge raw sewage into near by water bodies such as rivers, streams, etc., so that it is diluted or reduced in strength by the water.

⇒ Unsanitary: Nuisance (creating offensive condition).

Water and soil pollutions (a aquatic life start to die off)

Spread of infectious organisms greatly increases

B. Cesspool

A cesspool is a pit dug in the ground in order to receive waste water/sewages from kitchen, toilet or barns. Cesspool can be classified in to two kinds by its removal mechanisms. These are:

1. The leaching type of cesspool
2. The watertight cesspool Solid and Liquid Waste Management.

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1. Leaching type of cesspool or Seepage/soakage or absorption pit:

The leaching type cesspool, otherwise known as a seepage pit, soakage pit or absorption pit, is a pit dug in the ground to receive sewage from kitchen, toilet, or barns, and to allow the liquid to seep, leach or percolate into the ground. *f* The liquid portion seeps or leaches off into the surrounding soil, while the solid component (sludge) is retained in the pit. *f* The side of the pit is constructed with open joints in order to facilitate seepage of the liquid portion, while the top most part (60-90 cm) is plastered to make it watertight as shown in figure 9. *f* A concrete slab cover with a man-hole is provide to permit access to the pit, and an outlet pipe takes the effluent into another pit or serious of pits.

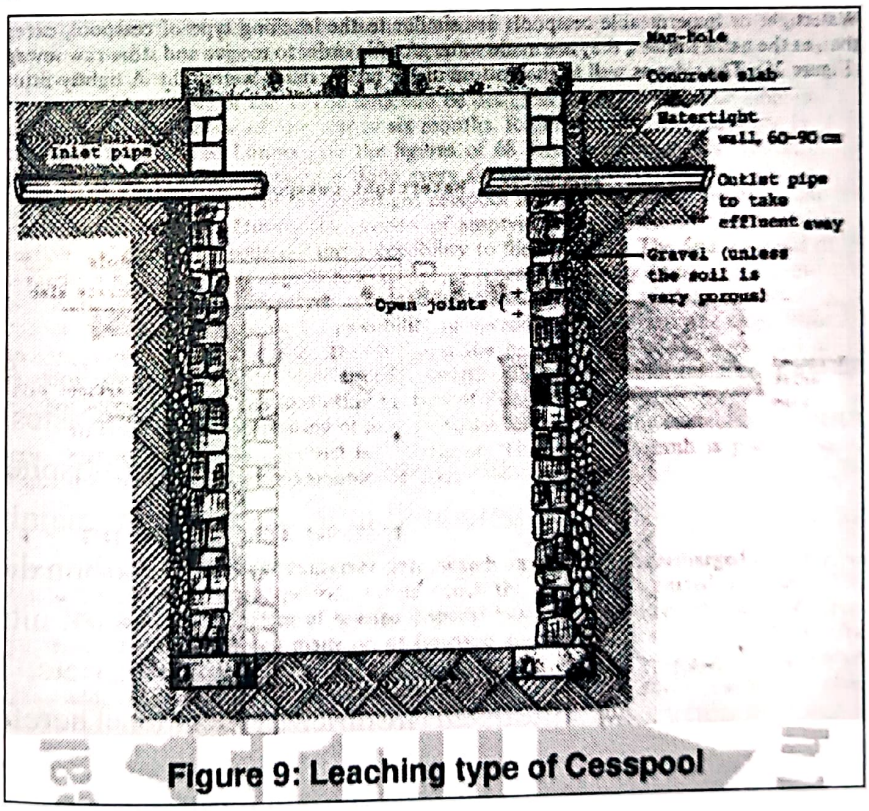

Figure 9: Leaching type of Cesspool

2 Watertight cesspool

Similar to leaching type except made water proof in order to receive and store sewage.Inside water tight tank sewage undergoes anaerobic decomposition but should not considered sewage treatment.

Problem: periodic emptying and disposal of contents.

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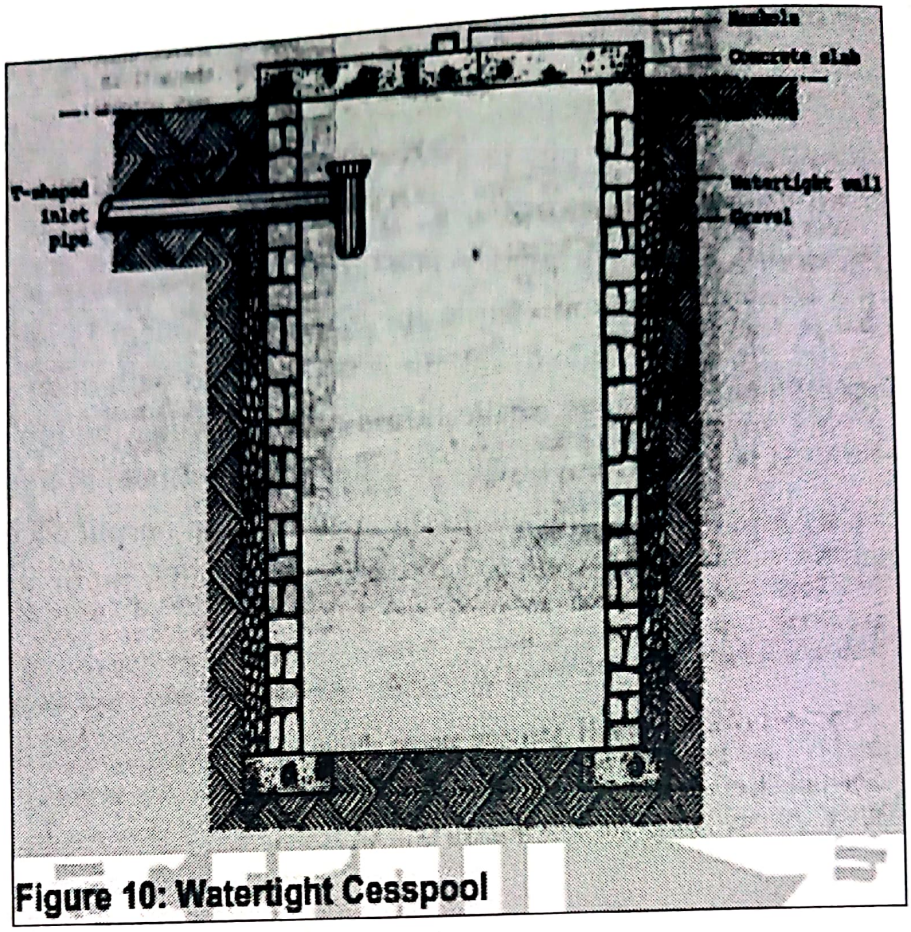

Figure 10: Watertight Cesspool

3) Gaseous Waste

The gaseous wastes are the main source of air pollution. As air pollution is most dangerous to human health, the gaseous wastes must be properly treated before they are disposed of into the atmosphere.

The gaseous wastes are generated in to environment mainly due to anthropogenic activities. The gaseous wastes include carbon dioxide (CO_2), methane (CH_4), chlorofluorocarbon (CFC), oxides of nitrogen (NO_x), carbon monoxide (CO), oxides of sulphur (SO_x) etc. These gaseous wastes can cause serious environmental hazards. Therefore, it is highly essential to take appropriate steps for the proper management and control of gaseous wastes in the environment.

Gaseous Waste Management

The following techniques are undertaken for the management and disposal of gaseous wastes.

1. Filters:

Filters are employed to remove the particulate matter in the gaseous wastes. The filters remove the particles by trapping them into porous bags which allow only air to pass through. Such filters are also called bag filters. The bags are prepared from cotton, polyester, spun

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glass fibers, etc. The bags are 10-15 m long and 2-3 m wide. When the gaseous wastes are blown into the bottom of the bag, gases escape through the pores and the particulate matter is trapped. After regular intervals the bags are cleaned to remove the accumulated particles. Such filters are commonly used in textile, glass and asbestos industries.

2. Scrubbers:

Scrubbers are devices that are installed to separate particulate matter as well as gaseous pollutants. It consists of a device in which the gaseous wastes are passed through a space containing wet packing. Therefore, these are also called wet scrubbers (Fig. 17.5). Water is most commonly used for wet packing, while some other liquids may also be used to remove the pollutants.

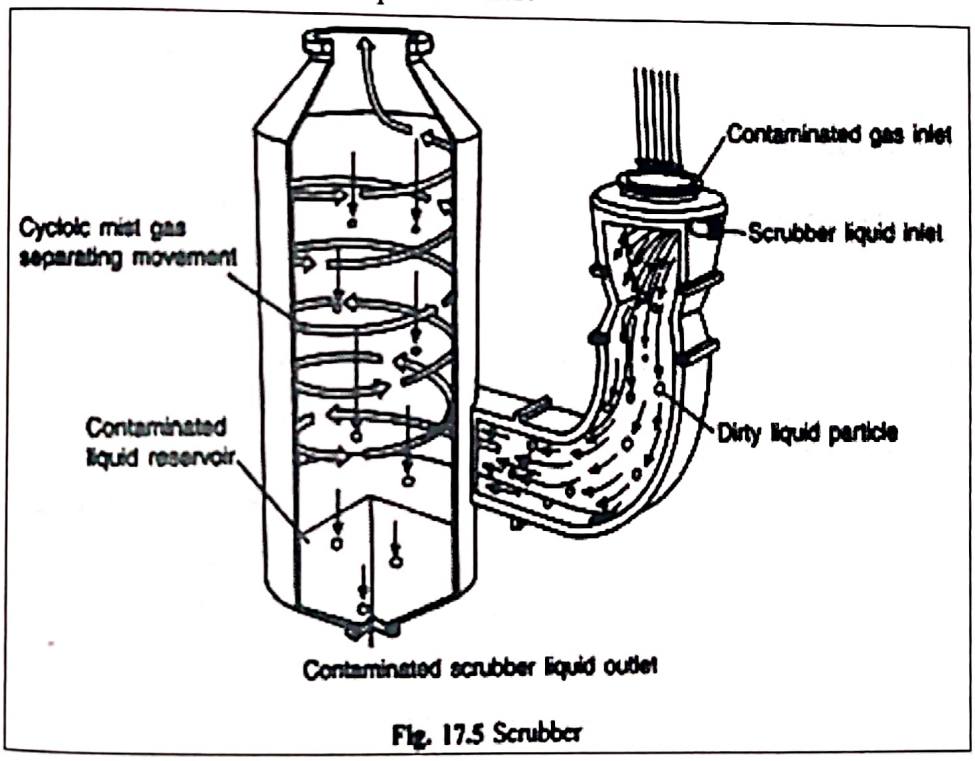

Fig. 17.5 Scrubber

The solid particles as well as the gaseous pollutants are adsorbed on the wet packing. Though, scrubbers are highly efficient as they remove 80 to 90% of the hazardous wastes, they are quite costly as they consume water and electricity. A cost effective method is to install spray towers where the gaseous pollutants are sprayed with water to remove the gaseous and particulate contaminants.

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• **Sources of waste:**

1. **Household Waste:** Waste generated in house during various day today activity which is the domestic waste. Most of the waste generated at home consists of food scraps like fruit peels, vegetables, spoiled products, newspapers and magazines, bottles, packaging in general, toilet paper, disposable diapers and a wide variety of other items, including products which may be toxic[1]
2. **Industrial waste:** Industrial waste is defined as waste generated by manufacturing or industrial processes. The types of industrial waste generated include cafeteria garbage, dirt and gravel, masonry and concrete, scrap metals, trash, oil, solvents, chemicals, weed grass and trees, wood and scrap lumber, and similar wastes.The wastes generated at homes are decomposed by the microorganisms, when they put into the land via landfills method. We throw them into the dustbins, and they are brought together, and separated and then, the wastes are regenerated.
3. **Clinical or biomedical waste:** Biomedical waste (BMW) means any waste, which is generated during the diagnosis, treatment or immunization of human beings or animals or in research activities pertaining thereto or in the production or testing of biological process. Public concerns about incinerator emissions, as well as the creation of federal regulations for medical waste incinerators, are causing many health care facilities to rethink their choices in medical waste treatment. As stated by Health Care Without Harm, non-incineration treatment technologies are a growing and developing field. Most medical waste is incinerated, a practice that is short-lived because of environmental considerations. The burning of solid and regulated medical waste generated by health care creates many problems. Medical waste incinerators emit toxic air pollutants and toxic ash residues that are the major source of dioxins in the environment.
4. **E-Waste:** Electronic waste or e-waste describes discarded electrical or electronic devices. Used electronics which are

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destined for refurbishment, reuse, resale, salvage recycling through material recovery, or disposal are also considered e-waste. Informal processing of e-waste in developing countries can lead to adverse human health effects and environmental pollution.

Electronic scrap components, such as CPUs, contain potentially harmful materials such as lead, cadmium, beryllium, or brominated flame retardants. Recycling and disposal of e-waste may involve significant risk to health.

• Waste Management Methods

1) Landfill -

A landfill site, also known as a tip, dump, rubbish dump, garbage dump, or dumping ground, is a site for the disposal of waste materials. Landfill is the oldest and most common form of waste disposal, although the systematic burial of the waste with daily. Some landfill sites are also used for waste management purposes, such as temporary storage, consolidation and transfer, or for various stages of processing waste material, such as sorting, treatment, or recycling. Unless they are stabilized, landfills may undergo severe shaking or soil liquefaction of the ground during an earthquake. Once full the area over a landfill site may be reclaimed for other uses. Landfill leachate has also been effectively treated by the rotating biological contactor (RBC) process. ... The most common biological treatment is activated sludge, which is a suspended-growth process that uses aerobic microorganisms to biodegrade organic contaminants in the leachate. Landfills are located, designed, operated and monitored to ensure compliance with federal regulations. They are also designed to protect the environment from contaminants, which may be present in the waste stream. Landfills cannot be built in environmentally-sensitive areas, and they are placed using on-site environmental monitoring systems. These monitoring systems check for any sign of groundwater contamination and for landfill gas, as well as provide additional safeguards.

2) Incineration:

Incineration is a disposal method in which solid organic wastes are subjected to combustion so as to convert them into residue and gaseous products. This method is useful for disposal of both municipal solid waste and solid residue from waste water treatment. Incineration

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and other high temperature waste treatment systems are sometimes described as "thermal treatment". Incinerators convert waste materials into heat, gas, steam, and ash. It is used to dispose of solid, liquid and gaseous waste. It is recognized as a practical method of disposing of certain hazardous waste materials (such as biological medical waste). Incineration is a controversial method of waste disposal, due to issues such as emission of gaseous pollutants including substantial quantities of carbon dioxide. A first step in controlling emissions is to minimize their creation in the incinerator. Measures for pollution prevention include reductions of pollutant precursors in the waste stream (for example, metals, chlorine, sulfur, and nitrogen) by means of product and packaging redesign, the reuse of products and packaging that contain precursors or catalysts for production of trace toxics, and recycling products and packaging, especially those containing such precursors. Reduction of the quantity of toxic elements in the waste stream or reduction of elements that are transformed into, or catalyze production of, pollutants of concern upon incineration are often- overlooked components of source reduction.

3) Segregation:

If conscious people do not use the organic waste in their kitchen-garden, the least they can do is to segregate the inorganic waste i.e. fused bulbs, blades, razors, old shoes, tooth paste tubes, glass wares, empty battles etc. at source Municipalities should create a bank or a dumping point where inorganic waste can be sent by a simple and effective collection system. For example, a municipal official can visit each street after every fortnight to collect such wastes from each house. In Western countries waste banks have been formed where people can sell empty glass bottles or deposit other inorganic wastes. Fortunately, in our country, a lot of inorganic waste is already being recycled.

4) Reduced:

To make something smaller or use less, resulting in smaller amount of waste. Source reduction is reducing waste before you purchase it, or by purchasing product that are not wasteful in their packaging or use. A key part of waste reduction is conservation using natural resources wisely , and using less than usual in order avoid waste. You can reduced amount of waste you create by choosing what rubbish you throw away. This can be easy and fun just follow the simple guidelines to reduced

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your waste at home, school or work.

5) Recycling and Re-use :

As already stated the solid waste consists of two parts i.e. decomposable organic waste and recyclable inorganic waste. The composting of organic waste into soil manure in itself is a recycling process. The inorganic waste once fully segregated at the final disposal site can be recycled for different purpose. But the inorganic waste will be fully recycled if proper technologies are made available. These days there is no problem to recycle paper and cardboard waste because there are lot of factories which use these wastes as the only raw material to manufacture recycled paper. But till now no technology has been developed to use the old shoes. For example, there is a plant in Delhi which manufactures new plastic shoes from the plastic waste. Likewise, the bulb industry should be asked to develop a technology to recycle the used electrical bulbs. In view of the scarcity and value of raw materials, it is the duty of every citizen to look at every waste as a recyclable material and harness its potential. The Govt. Should create a separate department for recycling of waste. Such processes will also result in lot of improvement in our environment where we live. The disposal of waste should not be, taken as a problem but an opportunity.

6) Household Waste Management

A) **Avoid Plastics:** It can be difficult to manage plastic waste as it is not recyclable. This is one of the primary reasons why you should avoid plastic bags. Carry your own shopping bag when you go to the grocery shop. Do not use plastic containers to store kitchen items either. Use glass for storage. It is healthier for your family and for the environment.

B) **Buy Food That Has Minimal Packaging:** Shop at the 'bulk buy' section of the grocery store. Rice, pulses, and other essentials can be bought without plastic packaging. Food that comes in multi-layered packaging can increase the waste in your house. Pick products that do not include so much packing. For example - you don't need the box of the toothpaste. So, pick a paste that comes without the carton. It will help you dispose of home waste effectively.

C) **Compost Your Kitchen Waste:** An eco-friendly waste

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management method is to compost your organic waste. Invest in a good composting bin and make rich compost from your kitchen waste. This will reduce your organic waste and leave you with quality manure for your gardens.

D) **Perform Transactions Electronically So That You Can Minimize Use of Paper:** Ask for a soft copy of bills on your email address rather than a hard copy. Remind merchants not to print your copy of POS transactions while shopping. Transfer money through NEFT or RTGS to avoid printing cheque books. This will cut down the amount of recyclable paper waste in your house and teach your child a little about the importance of household waste management.

Conclusion:

Effects on life and environment:

Waste management reduces the effect of waste on the environment, health, and so on. It can also help reuse or recycle resources, such as paper, cans, glass, and so on. There is various type of waste management that include the disposal of solid, liquid, gaseous or hazardous substances.

Direct handling of solid waste can result in various types of infectious and chronic diseases with the waste workers and the rag pickers being the most vulnerable.

The more emissions that we produce due to how much trash we generate, affects us long term. One can develop diseases such as asthma, birth defects, cancer, cardiovascular disease, childhood cancer, COPD, infectious diseases, low birth weight, and preterm delivery.

Disposing of waste has huge environmental impacts and can cause serious problems. Some waste will eventually rot, but not all, and in the process it may smell, or generate methane gas, which is explosive and contributes to the greenhouse effect. Leachate produced as waste decomposes may cause pollution. Badly-managed landfill sites may attract vermin or cause litter. Incinerating waste also causes problems, because plastics tend to produce toxic substances, such as dioxins, when they are burnt. Gases from incineration may cause air pollution and contribute to acid rain, while the ash from incinerators may contain heavy metals and other toxins.

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ENVIRONMENT AWARENESS

ISSUES AND PERSPECTIVE

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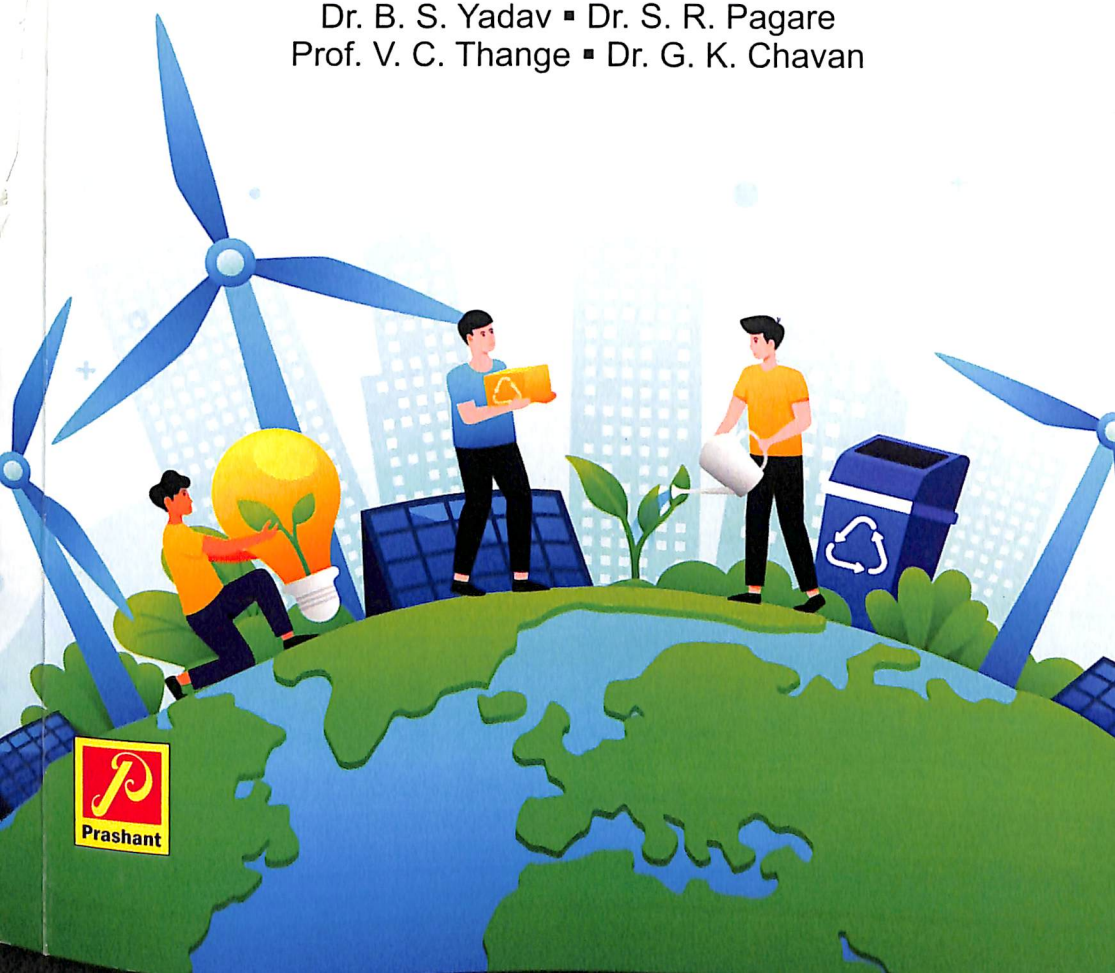

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Environment Awareness

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Abstract:

Presence globally awake means sympathetic how our comportment influences the environment and committing to making changes to our activities to protect the planet. The environmentalist movement in recent decades has prompted many people to make both minor and substantial lifestyle changes to live in a more environmentally friendly way.

Being environmentally friendly means reducing your impact on the environment as much as possible. Individuals affect the environment in a variety of ways including pollution emission to land, air and water, use of natural resources, energy consumption and waste. There are several significant environmental problems that highlight the importance of being more environmentally aware.

Keywords: Natural Resources, Environment, Nature, Earth, Technological Adventment.

Introduction:

All the usual things which makes life possible on the earth includes under an environment like air, Sunlight, Land, Fire, Forests, Animals, Plants etc. it is considered that earth is the only plants, etc. it is considered that earth is the only planet in the universe having required environment for the life existence. Without environment we cannot guess life here so we should keep our environment safe and clean to ensure the life possibility in future. It is the responsibility of each and every individual living on the earth worldwide. Everyone should come forth and join the campaign for environment safety.

There are various cycles which happen regularly between environment and living things to maintain the nature's balance. However by any means if such cycles gets disturbed, nature's balance also gets disturbed which ultimately affects the human lives. Our environment helps us and other forms of existence to grow, develop

and flourish on the earth for thousands of years. As human beings are considered as the most intelligent creatures made by the nature on the earth, they have lots of eagerness to know things in the universe which lead them towards the technological advancement.

Such technological advancement in everyone's life put the life possibilities on the earth in danger day by day as per our environment is destroying gradually. It seems that one day it becomes as harmful for life as the natural air, soil and water are getting polluted. Even it has started showing its bad effects on the health of human being, animal, plants and other living things. Artificially prepared fertilizers by using harmful chemicals are spooling the soil which indirectly getting collected into our body through the food we eat daily. Harmful smokes created from the industrial companies on daily basis are polluting the natural air which affects our health to a great extent as we breathe it every moment.

In such busy, crowed and advance life we must take care of such types of small bad habits on daily basis. It is true that only a small efforts by the end of everyone can bring a major positive changes towards our declining environment. We should not use the natural resources in wrong ways for just our selfishness and fulfil our destructive wishes, we should grow and develop science and technologies for the betterment of our lives but always be sure that it would not ruin our environment in future in anyways. We should be sure that new technologies would never disturb the ecological balance.

Why is it important?

Subsequently the industrial revolution, concentrations of greenhouse gases have increased by more than a third. This highlights how human activity has the greatest impact on greenhouse gas emissions. Therefore, it is our responsibility to change our behavior to protect the environment.

Due to the rise in greenhouse gas emissions, research suggests that the global temperatures might increase by more than two degrees Celsius by the end of the century. This means extreme climate change, including hurricanes, droughts and floods. These conditions jeopardize biodiversity, human welfare and wildlife. As we have lived in such an unsustainable manner for the past few decades, the security of our natural resources is also at risk. It is essential that everyone understands

their impact on the environment and actively engages with attempts to promote sustainable development.

Environmental Problem

Land Air and Water: pollution of land and water has affected plants, animals and human beings. The quality of soil is deteriorating resulting in the loss of agricultural plot. The loss is estimated to be about five to seven million hectares of land each year. Soil erosion, as a result of wind and/or water, costs the world dearly. The recurring floods have their own peculiar casualties like deforestation, silt in the river bed, inadequate and improper drainage, loss of men and property. The vast oceans, after being turned in to dumping grounds for all nuclear wastes, have poisoned and polluted the whole natural environment

Population Growth: population growth means more people to eat and breathe, and putting an excessive pressure on land and forest, and ultimately disturbing the ecological balance. Our growing population is putting pressure on land, leading to poor quality of productivity, deforestation (the loss of forest land so necessary for ecological balance and extinction of wild life leading to imbalance in the ecological order, loss of wild life heritage and ultimately dwindling of several species. The growing population is not only a problem for the natural environment; it is a problem for any other aspect of environment, say, for example social, economic, political etc.

Urbanization: Urbanization is no less a source of pollution, and therefore, a threat to the environment. Urbanization means maddening race of people from villages to the cities. The net result of urbanization is dirt, disease and disasters. In a state of growing urbanization, environmental problem like sanitation, ill-heath, housing, water-supply and electricity keep expanding. On the other, the environmental degradation is caused in the rural life due to indiscriminate collection of firewood, overgrazing and depletion of other natural resources.

Industrialization: Industrialization coupled with the development of the means of transport and communication has not only polluted the environment, but also has led to the shrinking of the natural resources. Both ways, the loss is really heavy. Increasing level of heat fluxes, carbon dioxide and particulate, radioactive nuclear wastes and the like create environment hazards. On the other hand, the consumption of conventional source of energy leads to the loss of natural resource. We

are building a world without caring for future generations.

Who needs to be aware and why?

Everybody has a duty to be more environmentally friendly and reducing your carbon footprint can be achieved through very minor lifestyle changes. It is critical that we teach children and adults alike about the importance of environmental awareness, to ensure that the lives of future generations are secure. It isn't very fair that the severe environmental consequences of our actions will be experienced by innocent future generations.

When promoting environmental awareness, it is imperative to ensure you're completely updated with the latest environmental news and developments to ensure that the information you're communicating is accurate. Many environmental advocates choose a specific issue and launch a campaign to raise awareness and promote environmental awareness about that area of concern.

In the past two decades, environment has attracted the attention of decision makers, scientists and even laymen in many parts of the world. They are becoming increasingly conscious of issues such as famines, droughts, floods, scarcity of fuel, firewood and fodder, pollution of air and water, problems of hazardous chemicals and radiation, depletion of natural resources, extinction of wildlife and dangers to flora and fauna. People are now aware of the need to protect the natural environmental resources of air, water, soil and plant life that constitute the natural capital on which man depends.

The environmental issues are important because the absence of their solutions is more horrible. Unless environmental issues are not solved or not taken care of the coming generations may find earth worth not living. The need of the planet and the needs of the person have become one.

Individuals can have a positive effect on these large-scale problems with relatively minor changes to their lifestyles. For example, reducing the amount of plastic you buy, using transport less and ensuring you recycle as much as possible.

There is no denying the fact that environment has to be protected and conserved so to make future life possible. Indeed, man's needs are increasing and accordingly the environment is also being altered, indeed, nature's capacity is too accommodating and too regenerative

yet there is a limit to nature's capacity, especially when pressure of exploding population and technology keep mounting. What is required is the sustenance, conservation and improvement of the changing and fragile environment.

Conclusion:

Environmental awareness important because it has positive effects on environmental health, sustainable development and reducing global warming.

Many of the organizations play a huge role in this process. They can set good environmental standards for employees, and the general public. They can do so by staying compliant with the UK and EU rules and regulations that promote green practices. By doing so, they build a positive public image and people will use their resources or services more.

The single most important thing that environmental awareness does, is to inform people of the dangers of continuing to consume as much as we currently do. This is because people need a good understanding of the threats to our earth, to fully realize the scale of harm. Consequently, awareness is all about topics like environmental health, sustainable development and global warming.

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