

INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI

NPTEL

**NPTEL ONLINE CERTIFICATION COURSE
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Ecology and Society

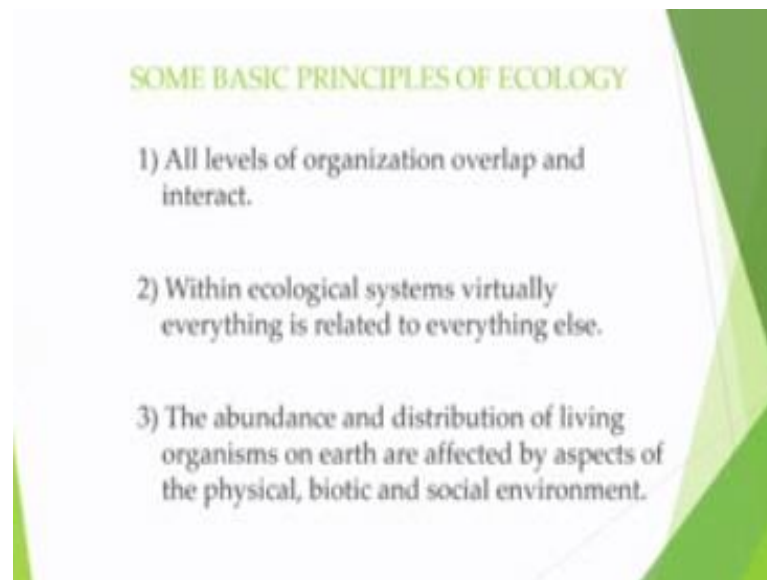
**Dr. Ngamjahao Kipgen
Department of Humanities and Social Sciences
Indian Institute of Technology Guwahati**

**Ecology and
Society –
Introduction II**

Well in the previous lecture we have begin with discussing some of the issues and problems which have been encountered and which in essence necessitate for us to look at why environment is one of the most growing concerns of this present era and today in this lecture we are going to look at some of the principles of ecology and also to look at some of the various trends or the waves of environmentalism with beginning from the1960s, so that we have an idea how these environments have evolves over a period of time and what are the kind of issues which are being raised regionally and globally and what are the initiatives they have taken.

And also in this we will try to have much more of an idea before beginning with the real the content of the course and to begin with we will just try to look at some of the principles of some basic principles of ecology.

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And yesterday in the previous class we had given an overview if not a brief conceptual analysis of what ecology is what environment is today in this lecture will be looking more into some of the basic principles of ecology now I just this down some of the points and we will just look at one by one the first one says all levels of organizations overlap and interact now in this the whole ecosystems some way or the other in interact in different levels and that overlaps any kind of actions of one species has an arching impact on the other that is the level of how different organizations of species interact at different levels.

And within these ecological systems virtually everything is related to everything else which means we cannot afford to see things in isolation but in a more interrelated man and thirdly if you look at this the abundance and distributions of living organisms on art are affected by the aspects of the physical biotic and the social environment. Now when we say social environment it is not this the human even animals have their own social organizations and they do also reflect some kind of how their physical aspects does have an influence on the social organizations.

Now in the fourth point of these biotic communities differ in numbers and kinds of species the diversity of species.

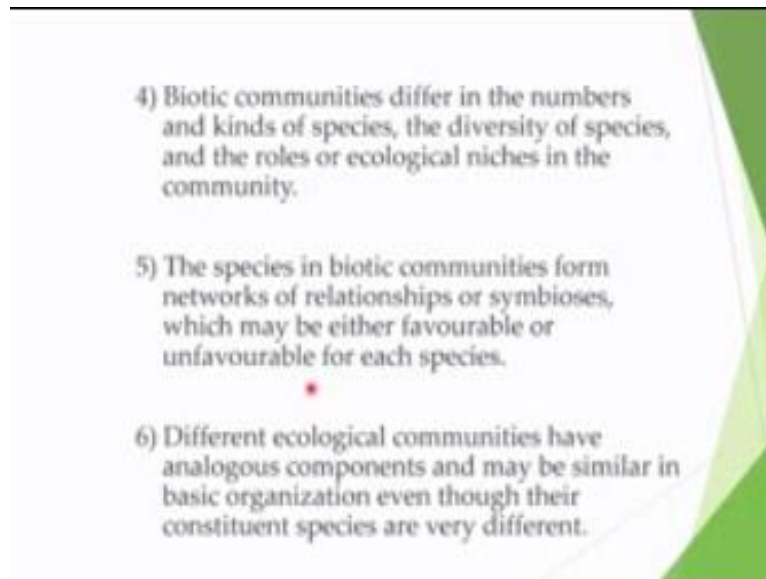
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And the roles of ecological needs in the community there is a vertical locations or habitations or environment does have some kind of influences on the species that is a that that particular ecological needs where the biotic inhabits and in the fifth point this species in by invited communities form some kind of a network of relationships or symbiosis which may be aided favorable or unfavorable for its species for instance if you classify and look at the animal kingdom there are the hardy Burris and carnivores herbivores are more dependent on plants for the means of livelihood.

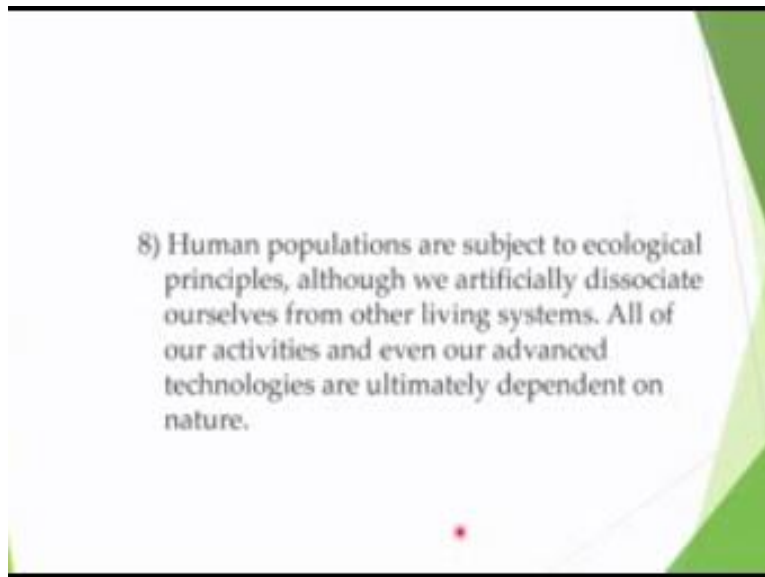
Whereas carnivorous are more or less dependent on the other species of animals now carnivores in some sense are more you know of unfavorable for the other species and similarly even humans whatever we consume if consuming access or maybe we are not able to meet the carrying capacity of that ecological niche which we have discussed earlier will eventually pose a threat to the equal ecological and will lead to equal we called imbalances.

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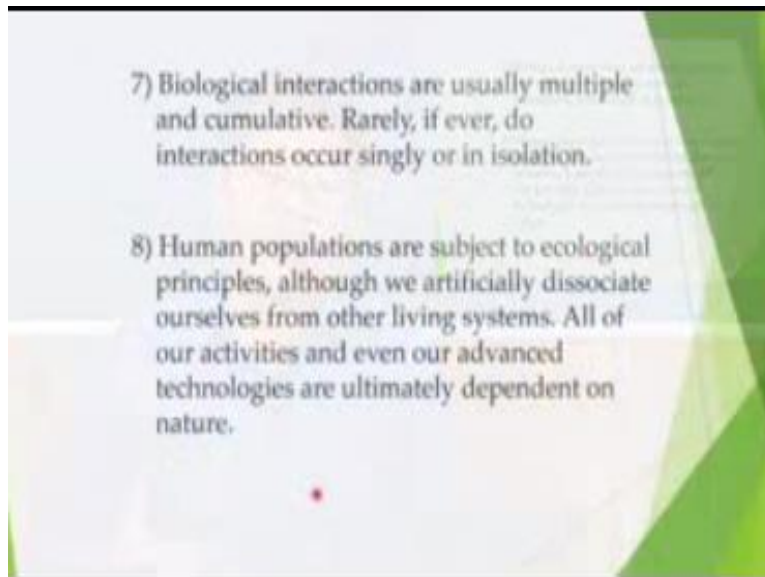
Now these different ecological communities have analogous components and may be similar in basic organizations even though their constituent species are very different no matter how different they are they have some bit of a similar similarities in the basic organization. Now the human populations if you look at.

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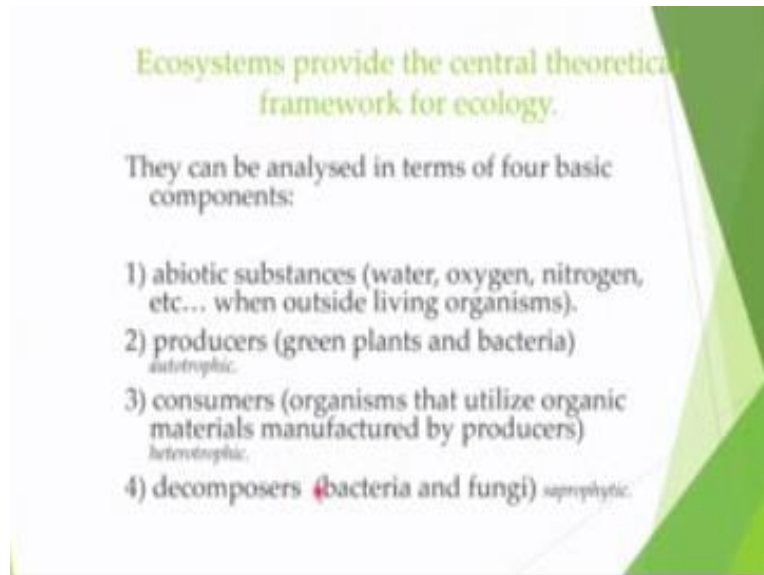
Are typically subject to certain ecological principles although we artificially dissociate ourselves from other living systems all of our activities whatever we do how we try to leave some kind of imprint on the environment and even our the use of this advanced technologies are ultimately dependent on nature now in the upcoming courses will also try to engage more in looking at the nature culture debate and how is nature evolving the kind of perceptions the kind of attitudes knowledge societies have will and get more in depth Lee in the debate between nature and culture.

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Now the biological interactions which are usually a multiple and cumulative and rarely if ever do interactions occur singly or in isolation as I had discussed a species cannot be understood in isolation but some form of interactions do occur among different species.

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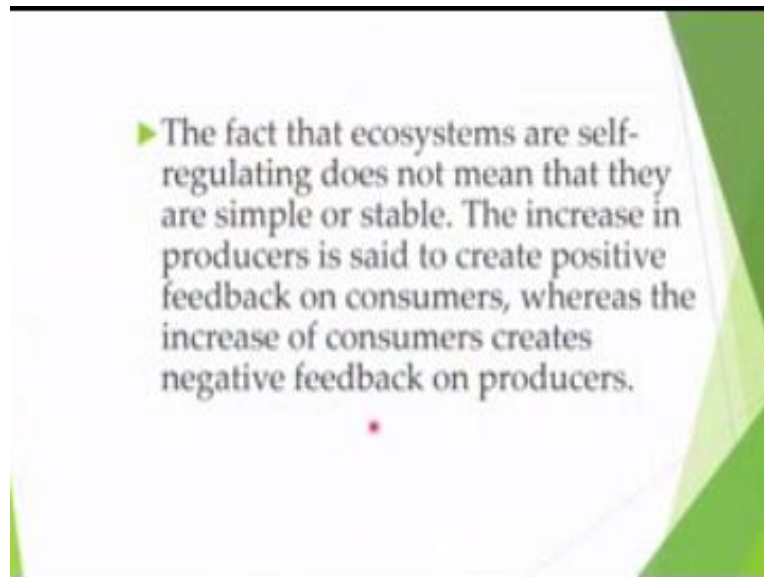


I will just try to categorize into for how these ecosystems are being divided into the same components which will to some extent provide a central theoretical premise in looking at ecology in a more general sense. Now if you look at the first one that is the a biotic substances it includes water oxygen nitrogen extra which are supposedly outside the living organism but we cannot survive and live without all this which of course is also a basic part of our existence.

And the second thing is the producers that is the green plants and bacteria which is commonly known as autotrophic and these producers are on bits we the living species rely on for the supply of our food chain systems, and thirdly if you look at that is the consumers which is more or less the organism the living species which utilized organic Naturals which again is manufactured by the producers that is the heterotrophic and finally it is the decomposes that is bacteria and fungi which is known as sepra phytic.

Now there is this constant interrelation between the producers the consumers and decomposers now if any of this is missing or there is inadequate or inefficiency on the part these whole basic components of our ecosystems will become imbalance.

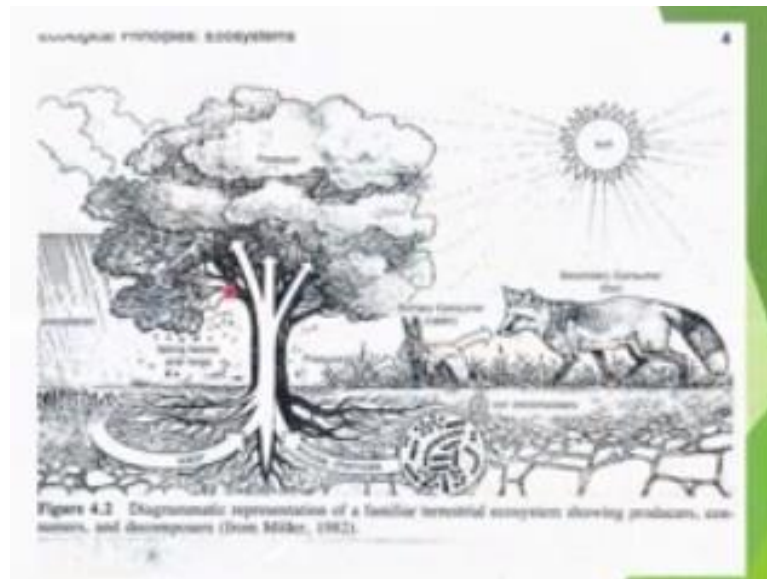
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Now the fact remains that these ecosystems are in essence self-regulating and that is not mean that they are simple or stabled or innocence inexhaustible or which cannot be innocent destroyed but this the increase in these producers innocence is said to create a positive feedback on consumers that is the living organism whereas the increase in consumer screech negative feedback on producers.

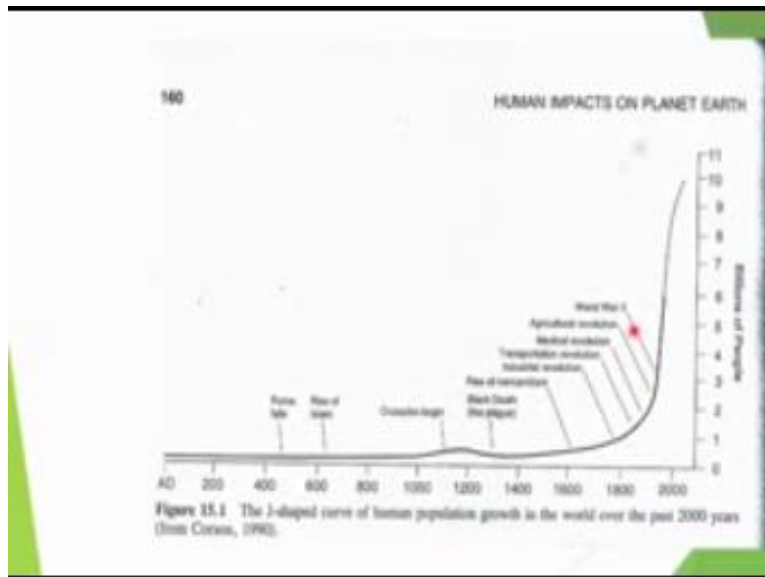
Now over here we can try to look at or contextualized by looking at the relationship which are normally applied in economic system that is the demand and supply now for instance if there is too much of a demand and like in supply there will be some kind of a negative if not imbalances. So there has to be a mutual or balance between the demand and supply and maybe if the supply is much more in higher positioned then it can have a positive feedback on the consumers.

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Now perhaps these pictures can best explain which is of course our diagrammatic representation of how the characters trails ecosystems which source the producers consumers and decomposers how there is this linkages or interconnectedness among these basic components of our ecosystem.

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Now if you look at this statistic or chart this gesture j-shaped curve of human population growth and over here the years are given now over the span of 2,000 years human have encountered different kinds of disasters like some of them to mention a few of the black death flag which was more or less between 1200 to 1400 AD and again the world war 2 which was in the late 1940s again now all this to some extent have impacted on the human population but yet the human population has increased and on the right and on the in the light of this we can perhaps talk about how the Malthus tries to explain the rise of population.

And he in fact in a very critical manner sees the occurrence of war as a check or a measures to control this rise of these populations and he infers is popular the rise of population as attracted to the existence of mankind itself because the resources which we have might not be sufficient enough to meet the increasing demands of this rising population. Now no doubt Malthus does have many critics as well.

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And there are many who do not really subscribe and agree to the kind of theory he posits in that population theory. Now this ecosystem homeostasis refers also to a relative balance of Newton cycles energy flows and species and compositions in the ecosystem which of course we have sinned in that diagram how the provider consumer and a composer oldest in their relationships are being sinned now moving on to the other the second part that is by looking at what are the trends if not there want a movements which have been witnessed in the second half of the 20th century.

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The New Environmentalism of the 1960s

- ▶ Prior to the 1960s, environmentalism focused on preservation of wilderness and conservation of resources.
- ▶ The environmental movement flourished in the 1960s in the midst of the Civil Rights, Peace and Women's movements.
- ▶ Rachel Carson's *Silent Spring* brought to public attention the dangers of environmental pollution to public health, such as the use of DDT, and sparked the beginning of modern environmentalism.



And which of course begins in the West now prior to this period of 1960s the environmentalism focus mostly on preservation of wild earnest and conservation of resources now what is this preservation of wildness and conservation this idea of environmentalism developed as a result of preserving the nature outside the human touch. So that this nature remains untouched and more or less in the southern countries that is mostly in the third-world countries this idea of preservation of wildness if not wild earnest thinking is being strongly criticized.

Because it is seen to be more of the ecology of affluence because this preservation of wilderness or wilderness of thinking is serving only the purpose of the developed or developed societies so it does not really have much of an application to the third-world countries nevertheless this idea of wilderness thinking if not conservation of resources are being borrowed and if you look around maybe in the context of India at least the tiger reserve projects whatever we have the national parks and the sanctuary so and so forth.

All these things are more or less being borrowed from the Western culture from this idea of the environmentally which focus entirely on preservation of wildness and conservation of resources. Now if we elaborate this a little further, now Ram Telugu ha and martinis they tries to give a

critique of this because by trying to give a boundary of the north and south which is known to be ecology of the affluent and environmentalism of the poor we are in Tonkin in Cardwell countries mostly people are pretty much dependent on the surrounding environment and resources which in essence is basic sustenance for them.

Now when this idea of preserving or conservation of resources has stem end now many of those communities who are pretty much dependent on these surroundings are being denied access to this so in a sense it posed some kind of a trap not only to their means of livelihood but also the kind of traditional rights which they have on these resources that is when I talk about resources it means land water and forests and in the Hindi parlance it is equal to be dull jungle and jemend, now this environment movement which flourished in the 1960s in the midst of the civil rights peace and women's movement.

Now around this time there was a book which was published by Rachel Carson's which of course the title is the Silent Spring which in essence awakens or brought to the public attention the multiple dangers of environment till pollution to public health such as the use of DDT and also sparks the beginning of modern environmentalism. Now the use of these chemicals or fertilizers in order to maximize the output or product especially in agriculture for example this whole idea is not in E but which has been conceived from the poles or industrialization process because nature is seen to be co modified and where it has to be the more you exploit the more abundantly you tend to have a sort of the output of the harvest.

Now the past few decades India also witnessed similar kind of sort of changes in terms of our agriculture practices mentioned may be made of the main revolution, now as a result of Green Revolution no doubt the food supply has increased abundantly but in many states like Punjab and Haryana where these green revolutions has taken place there are some case studies which are being done and they face a kind of environmental problems related to the fertility of the soil.

Now many of those agriculture fields have become de-certified the new trends and fertility of the soil has gone down and being more less becoming barren because of excessive use of chemicals and fertilizers and these are some of the issues which have been encountered and of course the

growing concern of the environmental pollutants not just to the public health but the carrying capacity of a geographical space is a growing concern and this book in essence can be said to be apart breaking.

Because it is sort of awakened the idea or the perceptions humans have towards the environment now there is also this face of new environmentalism that is beginning from the 1960s.

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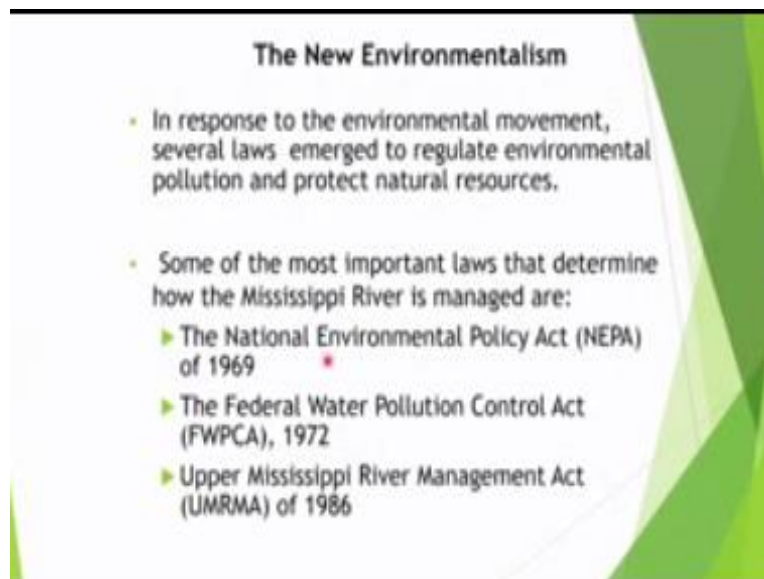


Now as a result of this people became more aware of environmental issues such as air and water pollution radiation pesticides poisoning and other problems they demand the federal government to take more responsibility or to act more responsibly. Now if you take the examples of pollution also has surfaced differently in different parts of the world in developed countries pollution is seen to be a threat because it affects the health of the affluent societies whereas in the third-world countries pollution is also to be sinned in terms of the kind of dependence people has for instance of the use of Chula for instance the amount of smoke it incurred cannot really be categorized and seen to be a pollutions from the environmental perspective.

Therefore whenever we try to highlight certain kind of environmental problems it has to be ripped and can contextualize therefore it will have a rational interpretation because we cannot afford to borrow the idea which evolves and circles around in the Western culture and no doubt are continuing with the environmental problems are the issues of 1960s there is a growing public concern for the environment because there are some initiatives which are being taken for example beginning from 1970s of this odd pay has been sort of observed and today like if you look at globally on this very occasion so to say there is a growing awareness and increasing of initiatives which are taken by individuals maybe in the state in the locality or regionally.

And then may before instance you can mention about putting off light for few hours in essence is accept which are being initiated or taken up in order to conserve the resources of the art.

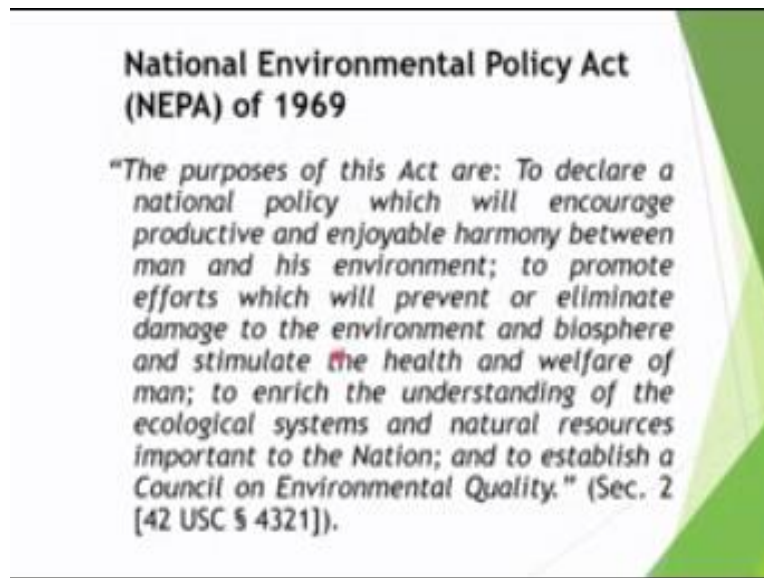
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Now the new environmentalism is in essence a respond to the rental movement where several loss emerges to regulate unwanted pollution and protect natural resources right, now some of the most important laws or legislations or regulations which are being past of maybe we can cite the examples of the Mississippi River how it is being managed now for instance the National Environmental Policy Act that is NEPA of1969 and also you take the case of the federal Water

Pollution Control Act the FWPCA 1972 and you can also take the under Mississippi River Management Act UMRMA of 1986.

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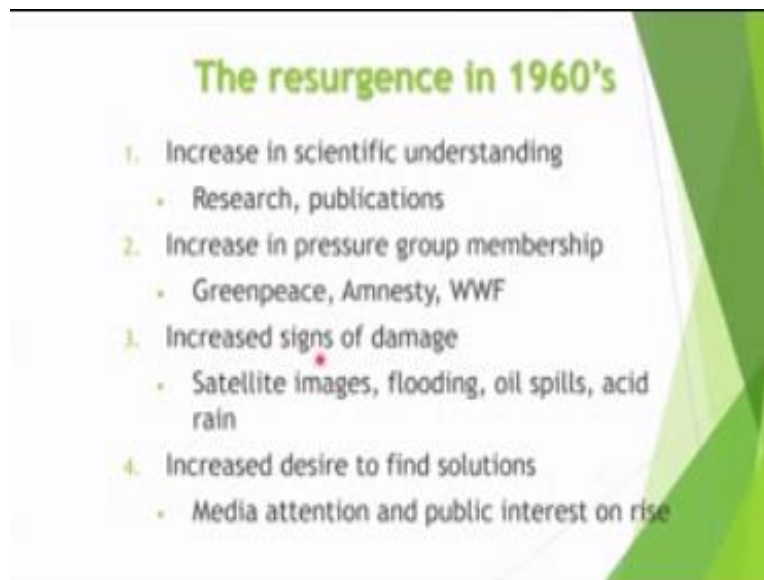
Now all these policies are in essence being initiated in order to maintain a healthy River and ecosystem and others rid out one of the act of the National Environment policy of 1969 which says that the purpose of this act are to declare national policy which will encourage productive and enjoyable harmony between man and his environment to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of mint to enrich the understanding of ecological system and Natural Resources important to the nation and to establish a Council of environmental equality which is a board from section 2 of that act.

Now if you give a closer examination to this act the policy is designed in order to sort of promote a healthy relationship between land and environment now remember many of the rivers today if you look at our being polluted as a result of a careless disposition of industrial waste and also their responsible act of the humans the dumping of any kinds of objects now many of the river

system or reverie system which we have are today are being under trapped and which snips to further design a policy.

So that the we humans in essence are being to responsibly act in preserving our environment, now what is the kind of resurgence which has been witnessed in the post 1960s.

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Well there is an increase in the scientific understanding maybe there has been much more of a research which are being conducted in this domain and which of course can be seen from the kind of research publications in academic and also there is an increase in pressure group membership for instance the Greenpeace amnesty the world while Wildlife Foundation now there is a growing urgency if not a relations from citizens from different nation-states and they try to participate if not initiate some kind of exercise by being a member of any of these group and volunteer themselves.

So that one step which is being taken by a single individual will make a lot of difference in a wider domain now there has been also an increasing science of damage and which of course can be seen from the satellite images flooding oil spills as it rained and there is an increased desire to

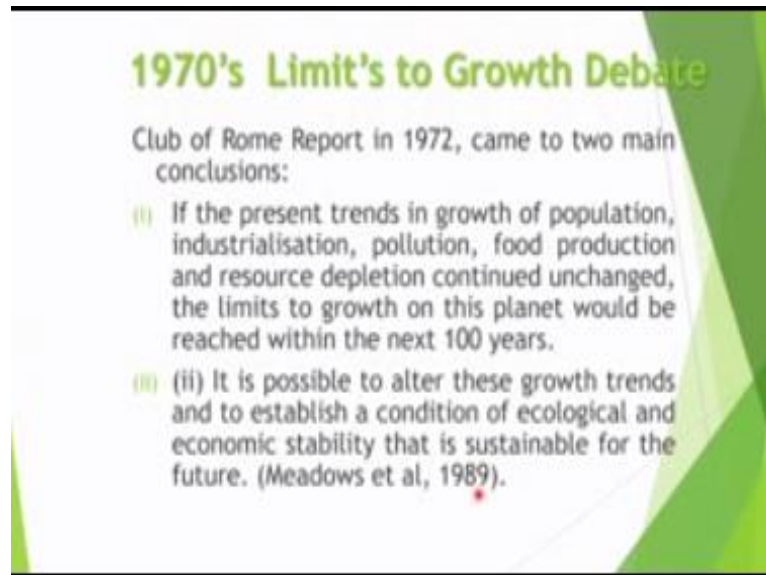
find solutions which of course is being again initiated by the media's and of course there is much more of a wider media attention in this domain and there is also a driving rise in the public interest related to the environmental concerns.

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Now again moving on in the post 1970s as I had mentioned the first Earth day was being observed and the Greenpeace have the initiation of the Greenpeace have kick-started in 1971 and we all I hope we all know like what the Greenpeace are up to and the polluters in a way pace principles by this OECD in 1971 is also being initiated and globally there is the conference on human development which was organized in 1972 the World watch Institute of 1975.

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Perhaps all this development in essence can be termed as a growing awareness or an increased or a step towards the increasing rise of environmental concerns now if you look at this the period of 1970s there is to some extent a limit in the good debate like for instance in 1972 the Club of Rome report and in that there was two main conclusions and the first one is if the present trends in growth of populations industrialization pollution food production and resource depletion continued until if it goes in to this pace the limits to growth on this planet would be reached within the next 100years.

Now the main concern is the limits to growth because every part of the ecosystems has their own limits that is carrying capacity now once that carrying capacity is crossed or lapse there will be an imbalance and this is exactly what the Club of Rome report talked about now in a second it talks about it is possible to alter these growth trends and to establish a condition of ecological and economic stability that is sustainable for the future. Now this question of sustainability is being raised in order to establish equal is equals the conditions of ecological and economic stability.

Now if you look at the kind of the pairs of exploiting or use of resources has increased dramatically in the post industrialization period simply because to expand the industry there is a growing need for raw materials and natural resources has to be exploited in a very rapid and increasing manner and if this is the case will it be possible to have a sustainable future for instance if you take the example of let us say the fishing in the merit the kind of stroller which is being used in order to get forget all of the fees is different from the traditional methods of fishing which is seems to be much more less harmful and then sustainable.

But the use of machines like trawlers has a far-reaching and impact on the biodiversity of the water bodies now we need two different fit the kind of actions which we as a humans are in essence committing towards nature. So this debate has to be brought into in order to look at some of the problems which we are facing and when I say problems I meant to say the ecological and environmental problems which we are fishing, now if you look at the past few decades have actually witnessed different kinds of the intensity of these ecological disasters can be seen.

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We I am sure we all must be aware in and around and originally and globally the kind of ecological disasters which the world actually have witness now I just I just mentioned few of

these incidents the way back in 1978 there was an oil spill in the course of Brittany that is the Amoco Cadiz oil spilled which actually have caused a lot of destruction and trip to the biodiversity of the Mile Island, now again in 1979 the Three Mile Island nuclear accident occurs in Pennsylvania now the magnitude of these disasters have a far-reaching impact on the human society and these are nothing but a man-made disaster which in essence could have been avoided in the previous lecture I had talked about mention about some of the environmental natural disasters like the Sunnah means earthquake so and so forth which in essence is behind the controls of humans.

Now in that case if you look at there is a link between what is the natural disasters and what is man-made disasters right, now citing an example of again the 1984 Bhopal gas tragedy in India as a result of the Union Carbide toxic chemical leak which eventually leads to the deaths of thousands of people and more than three lakhs or three millions in dude and there is been an ongoing case wherein those people who are being affected has even approached the Supreme Court so that a compensation be given to those affected families and members.

So these are the kind of magnitude of disasters which are of course been witnessed in the past few decades and God forbid may be in the future like this sort of magnitude may increased. Now if you look at the 1980s again what are the growing concerns globally?

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What are the kind of issues which are being raised, now the climate change is something which is being hotly debated and talked about globally and there is been an extensive research in academic trying to look at what are the wider implications of these climate chains across communities across nations in 1985 the global warming was predicted and there are spent and increasingly a feeling that global warming innocence has affected even those of people who are being based inhabited inhabiting the rural hinterland or the rural villages.

And the 1988 IPCC was established and secondly the ozone depletion was talked about because in 1985 again the ozone hole was discovered and in 1987 as a result of this the Montreal Protocol was adopted. Now why is this climate change and the was not depletions again is an American concern for us because it will have a far-reaching implication and impact on not just our well-being but on the kind of our means of survival and existence as humans on this planet.

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Now again in 1980 there is a growing concern and need to discuss sustainable development and as a result of these the world's conservation strategy come up with a definition where I quote or without writ out that humanity's relationship with the biosphere that is the king covering of the planet that contains and sustain life. So will continue to deteriorate, now mark this deteriorate until a new international order is achieved a new environmental ethics is adopted human populations stabilize and sustainable modes of development become the rule rather than exceptions for development to be sustainable it must take account of social and ecological sector as well as economic ones of the living and non-living resource base.

And of the long term as well as short term advantages and disadvantages of alternative actions over here in these particular definitions we can actually look at three important which I feel things. Now the first one is the environment attics what kind of attics we as humans or as a society has followed the ethics and principles which has been a guiding principle concerning the environmental relations which we will share and of course this environmental ethics will be broadly discussed in the upcoming lectures and which of course is a part of this particular course and secondly in order to have a sustainable development it is also important to take the social and ecological factors.

And again this is the second point which will be discussed in this course because we will be more concerned of the cultural ecological approaches and by taking the case study of few societies we will be able to have an idea of how important this social and ecological factor is in order to have a sustainable development and finally the idea of this alternative actions or alternative way out needs to be one of the growing concerns of this time.

Now in recent times as I had discussed in the previous lectures about whilst there is a growing concern and necessity of incorporating if not adopting or the coexistence of the knowledge and the wisdom of the traditional societies could perhaps be one way of an alternative in looking at this now this world conservation strategy has a very deep message and meanings which we as a humans are pretty much responsible to take an action. Now there is another definitions of sustainable development again of 1987 which was given by the world Commission on Environment and development.

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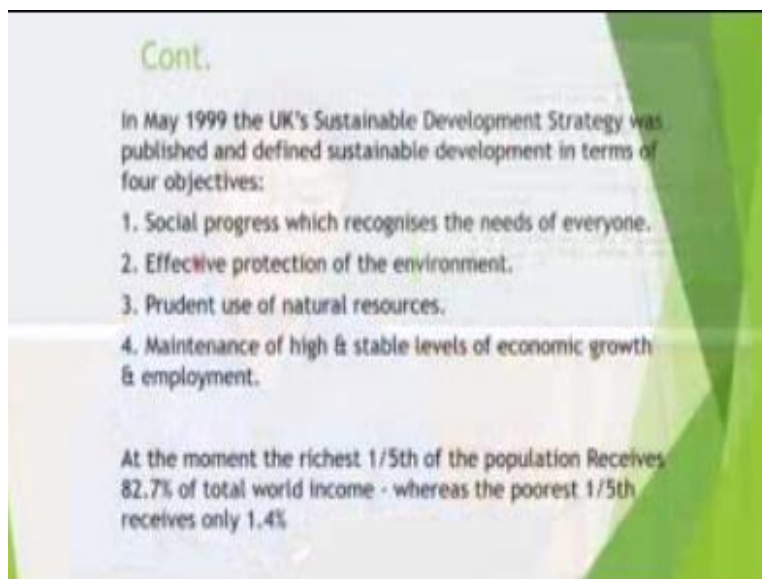


Now which talks about again equates sustainable development equity or equitable distribution of resources or if not how do we maintain an ecological justice and what is ecological justice now this WCED definitions of sustainable developments talks about equate sustainable development

with progress which means to meet to meet the needs of the present without compromising of the present and the ability of future generations to meet their own needs.

Now it is important for us to not only thing our narrow gains but also be concerned about the future what be holds our future and if it has to be an equitable distribution of resources the question is how many sections of the world population actually have control over these resources and which sections of the human societies are more in a advantageous or in a more better position to have access to these environmental resources these are some of the issues which needs to be taken up and discuss partly I will try to engage in discussing all these more elaborately in the upcoming lectures now for the time being let us also have a relook at some of the developments in the post1980s.

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In May 1999 the UK's Sustainable Development Strategy was published and defined sustainable development in terms of four objectives:

1. Social progress which recognises the needs of everyone.
2. Effective protection of the environment.
3. Prudent use of natural resources.
4. Maintenance of high & stable levels of economic growth & employment.

At the moment the richest 1/5th of the population Receives 82.7% of total world income - whereas the poorest 1/5th receives only 1.4%

Now in May 1995 of the UK's sustainable development so strategy was published again with ad meanings to define what sustainable development is and comes up with four objectives, now the first objective talked about social progress which recognizes the needs of everyone now in a sense this also talks about equitable distribution of resources because we need to reframe and focus on the social progress and recognizes the needs of everyone and not just a few sections of

society and in the next point it also talks about the effective protection of the environment how do we initiate exercise in order to protect the environment or what kind of strategy should be developed.

So that the environment is less affected or the kind of actions and imprint which we have on this planet is being minimized now the third one says the prudent use of Natural Resources that is to use natural resources in a more sustainable and in a more judicious manner, now the maintenance of these high and stable levels of economic growth and employment also should be one of the basic objectives of the this strategy which was initiated by the country in the UK.

Now as I had discussed in the previous slide now how do we talk about a equitable distribution or if not is there any ecological justice being practiced if you look at this statistic at the moment the reaches that is one-fifth of the population globally receives.

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Around 82.7% of the total world income whereas the poorest that is 1/5 receives only 1.4 % now these are some of the statistic with innocence has been pretty much eye-opening and with actually source that there is an increasing need to locate the crux of the problem the crux of the

problems lies in this equitable distribution and ecological justice. Now in the case of our India like for example if you take a few examples who are actually benefiting from the income by utilizing the resources only few corporate or companies dumb bunnies the Tata's the Birla's few of them this handful of the mare actually benefiting from the utilization of these resources.

And again this is some of the rising concerns which we need to focus therefore this some of these growing concerns today is the ecological injustice.

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The growing unequal distribution of resources which we have just seen from the statistics, now there is also another concern which is known as environmental racism that is one sections of the society is being treated as not really an outcast but there is an injustice being done to them for instance this particular term is being explained in the context of northern America where the pollutions and toxic items are usually being dumped in and around the surroundings of those black people's.

Now if you take the examples even the Indian context there has been a strategy to dumb the pollution and toxic items the waste to the neighboring of the slum dwellers now which the in

essence is not a social justice let alone keep aside the ecological justice but the social justice which are being normally initiated by the government policymakers now these are some of the growing concerns which we needs to innocence be concerned of and finally there is a growing concern of the indigenous peoples in terms of protecting their learning resources.

Because if you get the examples of mining and also some of the constructions of dams have actually been seen to be a new form of colonialism or innocence a colonizing attitude which are being initiated by the state sponsor development projects this again in essence post a threat models to the means of livelihood or existence of the indigenous people but also the urging needs to recognize their rights.

Now these are some of the growing concerns not just in the Indian context but it is a major concern globally and which suit in a way be addressed if we are actually serious about delivering what is being enshrined in the CC DD about sustainable development now how serious are we in maintaining sustainability or sustainable development is yet to be seen but perhaps the growing concerns is in essence posing antithetical to whatever we are engaging in to, yeah as discussed these are some of the growing concerns currently and in our summit in 1992there was 5 agreements.

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Which were introduced and the first one talks about the framework one mentioned on climate change and the second talks about the Convention on biodiversity Agenda 21 the Rio declarations the forest principles again here there has been a changes or maybe reframing of the forest policies which we have but then if you take the examples of the Indian context the forest policies which we are following now does have its route or if not without being carried forward right from the colonial period and we need to really look at some of these policies because whatever we follow now today might not necessarily address the needs of the citizens or communities for instance the forest policies needs to be reframed and relook so that it meet the needs of the citizens. Now in brief what we have discussed so far is the 1960s.

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Given about the new consciousness of movement and there is an emerging groups organizations which are formed because of environmental concerns and also in the 1970s there has been attempts battle ground between the economists and the environmental movement and no doubt this debate and fight will continue and in the 1980's the concept of these sustainable development has been introduced and since then there has been a different meanings and different definitions concerning this sustainable development and also in the 1990s again there is a much more wider concern about sustainable development and in the post2000 era.

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We have rich estates where and how to move ahead this is a Pixies diagram to show you about the interconnections and which in a way could have deliver some kind of a sustainability.

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Now the questions and one of the main idea of this course would be to find an alternative development that is to find a way out how do we move out or how do we tackle these ecological crisis which we are facing now there is an ordinate for alternatives and an appropriate technology which I would say a technology which is more human and which is which has much of a wider respect and concern for human society, now what is this alternative which will eventually touch upon the interrelationship between society nature and culture.

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Now these are some of the debates or topics we would end with in this course and I will stop here, thank you.

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Production

HEAD CET

Prof. Sunil K. Khijwania

Officer- in- Charge, CET

Dr. Subhajit Choudhury

CET Production Team

Bikash Jyoti Nath

CS Bhaskar Bora

Dibyajyoti Lahkar

Kallal Barua

Kaushik Kr. Sarma

Queen Barman

Rekha Hazarika

CET Administrative staff

Arabinda Dewry

Swapam Debnath