

Natural Resources Management (NRM)
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Week - 02
Lecture - 10
Biodiversity & conservation of Natural Resources Part 3

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Extinction of Natural Resources

- Natural resources are those resources that are in existence without human actions and they can either be renewable or non-renewable.
- The depletion of natural resources occurs when resources are consumed at a faster rate than that of replacement.
- It is this depletion rate that are causing serious threats to the existing natural resource base.
- There is a need for conserving each and every natural resource and using it in a sustainable manner.

Causes of depletion Natural resources

- ✓ Overpopulation
- ✓ Overconsumption and waste
- ✓ Deforestation and the Destruction of Ecosystems leading to loss of biodiversity.
- ✓ Mining of Minerals and Oil ✓
- ✓ Technological and Industrial Development.
- ✓ Erosion.
- ✓ Pollution and Contamination of resources.

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Welcome back to the next class of Natural Resource Management course, today we will be discussing on biodiversity and conservation of natural resources. As we all know, that extinction of natural resources is one of the most important aspect that today's world is facing, we must try to find out not only the reasons of the extinction of these natural resources, but we also need to find out some solution on or off the shelf.

By now, we all know that what our natural resources what are its important and why natural resources often gets depleted. There are various sets of reason, of course, because of increase in population, the high rate of consumption is another aspect, the faster rate of consumption, and then the delivery or rate of delivery as actually caused a lot of extinction of natural resources. Over exploitation has become an issue, it is this depletion rate that are causing serious threats to the extinction of various natural resources that we have already discussed in the previous class, there is a need for the conservation of each and every natural resources that we required for our own sustainable development.

So, a sustainable management of natural resources is a key to reduce the rate of extinction of various natural resources. In today's lecture, we will be touching all these issues. Let us start with first what are the causes of the depletion of these natural resources? If you look at of course, overpopulation is one of the most important causes of depletion of natural resources, overconsumption and creation of huge amount of wastes, deforestation, and destruction of ecosystems, which leads to the loss of biodiversity. In one of the previous lectures, I have discussed about this aspect.

Mining; mining of minerals and oil, because this source is finite. So, if the rate of extraction is very high, a day will come that we will run out of these two very important resources that we required for our own survival. Technological and industrial development also plays a role at times, erosion, and finally, the pollution and contamination of various resources. These are the few causes of depletion of natural resources.

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Few risks are also there for extinction of natural resources. And the resources which are at high risk are water, oil, forest, minerals, and various kinds of species, which has to do a lot with biodiversity as just a minute back I discussed. So, these are the major natural resources which we need for our own survival and meaningful developments are at risk.

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Biodiversity & its Conservation

- Biodiversity refers to the variety and variability among all groups of living organisms and the ecosystem complexes in which they occur.
- In the **Convention of Biological diversity (1992)** ^{CBD} biodiversity has been defined as the variability among living organisms from all sources including inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part. ^{con (conference)}
- Scientists have estimated that there are around 8.7 million species of plants and animals in existence. However, only around 1.2 million species have been identified and described so far, most of which are insects.
- Much of the Earth's biodiversity, however, is in jeopardy due to human consumption and other activities that disturb and even destroy ecosystems. Pollution, climate change, and population growth are all threats to biodiversity.

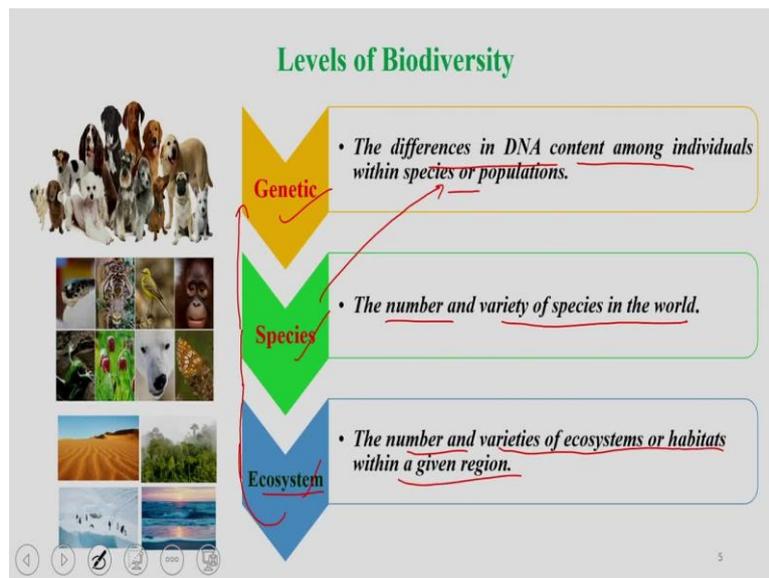


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Now, for that to reduce these risks, we need to go for conservation. Now biodiversity, you all know that it refers to the variety of variability among various groups of living organisms within this ecosystem. And biodiversity basically provides the various kinds of resources for our sustenance. Now, convention of biological diversity or CBD, as it is popularly known as actually takes care of the suspect, like Conference of Parties, which is for climate change issue. For biodiversity, we have CBD, or conventional biological diversity, which has been defined as the variability among living organisms from all sources, including inter alia, terrestrial, marine, aquatic systems, you name it.

Now, across the world various ecological scientists have estimated that around almost 9 million species of plants and animals are here in this earth. However, only around 1.2 million species have been tilld now identified and described most of which are insects. Much of the earth biodiversity however, is in very bad shape. And the reason for this is human consumption, anthropogenic activity, disturbance of the ecosystem, destruction of natural resources, pollutions, climate change, high rate of population growth; these are all the threats to towards biodiversity.

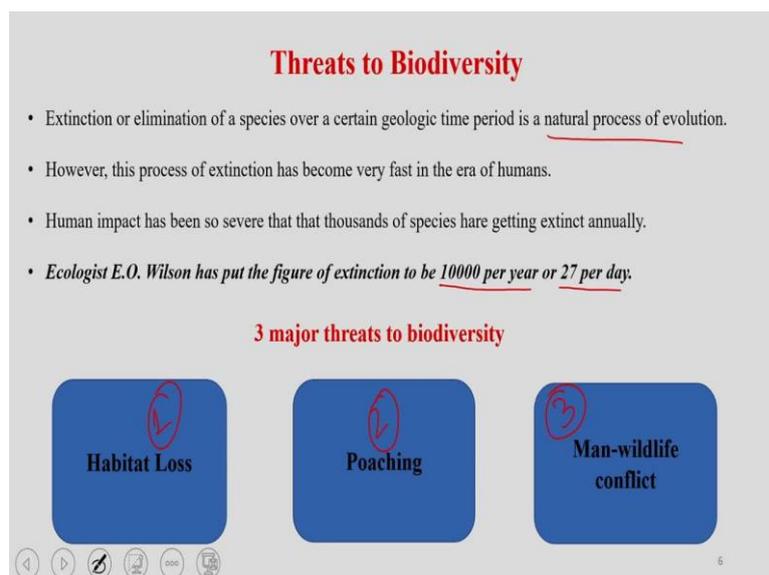
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Now, if you look at there are various levels of biodiversity that often we discuss with first at the genetic level, species level, ecosystem level, or let us go from bottom to up ecosystem species and gene level, genetic. Now, if you look at the genetic level, the differences in DNA content among various individual within the species, or a population is studied.

At the species level biodiversity, the number and the variety of species in this world. Now, ecosystem level, the number and varieties of ecosystems are habitats within a given region in this world. So, we have three major levels of biodiversity that we often discuss with.

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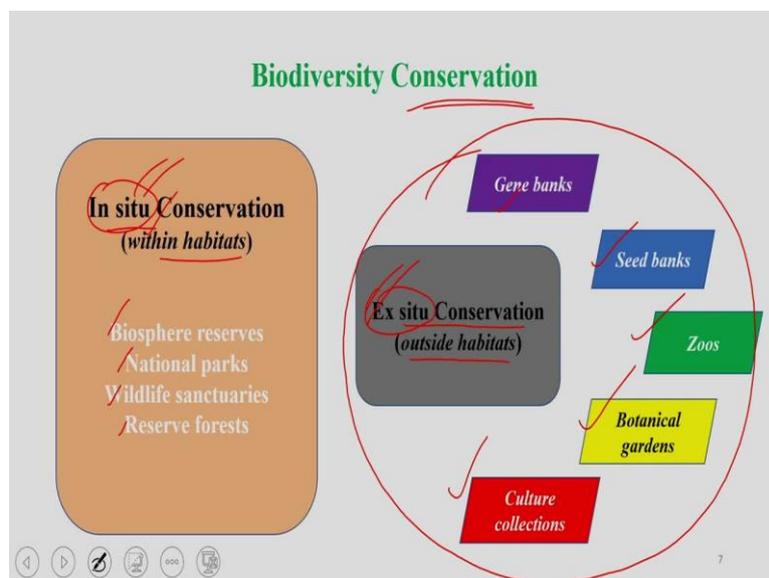


Now, if you look at, again, the threats, the three major threats to our biodiversity, one is habitat loss, to poaching and number three, man wildlife conflict. Now, the extinction of species over a certain region or certain time period is a natural process of evolution. However, if this process of extinction becomes very fast, then there is a problem.

And that often happens when human interference takes place, whether through different kinds of anthropogenic activities, or by simply increasing the population in a very faster rate. Because with the growth of population, the demand for food, the demand for medicine, the demand for cloth, everything rises. And as from previous lectures, by now, all of you know that most of our human need or requirement comes from the ecosystem, from the biodiversity that we have around us.

So, the process of this natural extinction, which normally is a natural process of evolution, but because of our activities, the rate of extinction becomes very fast, and then there is a problem. So, our impact has been so severe that thousands of species are getting extinct annually from this ecosystem. And that is a huge alarm from for this world, for the humanity. Now famous ecologist, Dr. Wilson has put a figure that extinction will be almost around 10,000 per year, or 27 per day, that is a quite alarming figure that we are actually facing with.

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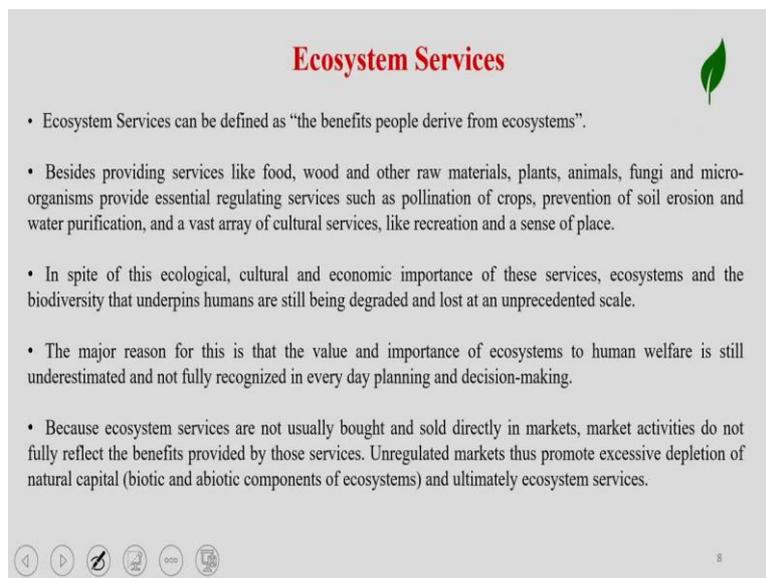
How to control or how to regulate or reduce this extinction, or the destruction of ecosystem or biodiversity conservation. So, biodiversity conservation is one of the important ways that we can actually reduce this extinction of important natural resources from our ecosystem. If

you look at biodiversity conservation, we have mainly two different types of conservation practices in situ, which is within the habitats ex situ conservation, which is outside its habitat.

Now, in situ conservation, when we talk about we mean to say biosphere reserves, national parks, wildlife, sanctuary, reserve forest, these all come under in situ conservation means a particular species will be kept allowed to stay within its habitat, we will not take out that species from its original habitat and not put somewhere else.

But in case of ex situ conservation, what we do, we take out a species from one its original place and bring it somewhere and we nurture it, how we do it through gene banks, seed banks, zoos, botanical garden, and through culture collections; you name it, animals, bacteria, flowers, trees, so basically all kinds of flora and fauna, which we take out from this from his original habitat, and then we nurture through different processes or technology that is available to us. So, or in situ and ex situ these two are the major way of conservation that we can actually carry out for biodiversity conservation.

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Ecosystem Services

- Ecosystem Services can be defined as “the benefits people derive from ecosystems”.
- Besides providing services like food, wood and other raw materials, plants, animals, fungi and micro-organisms provide essential regulating services such as pollination of crops, prevention of soil erosion and water purification, and a vast array of cultural services, like recreation and a sense of place.
- In spite of this ecological, cultural and economic importance of these services, ecosystems and the biodiversity that underpins humans are still being degraded and lost at an unprecedented scale.
- The major reason for this is that the value and importance of ecosystems to human welfare is still underestimated and not fully recognized in every day planning and decision-making.
- Because ecosystem services are not usually bought and sold directly in markets, market activities do not fully reflect the benefits provided by those services. Unregulated markets thus promote excessive depletion of natural capital (biotic and abiotic components of ecosystems) and ultimately ecosystem services.

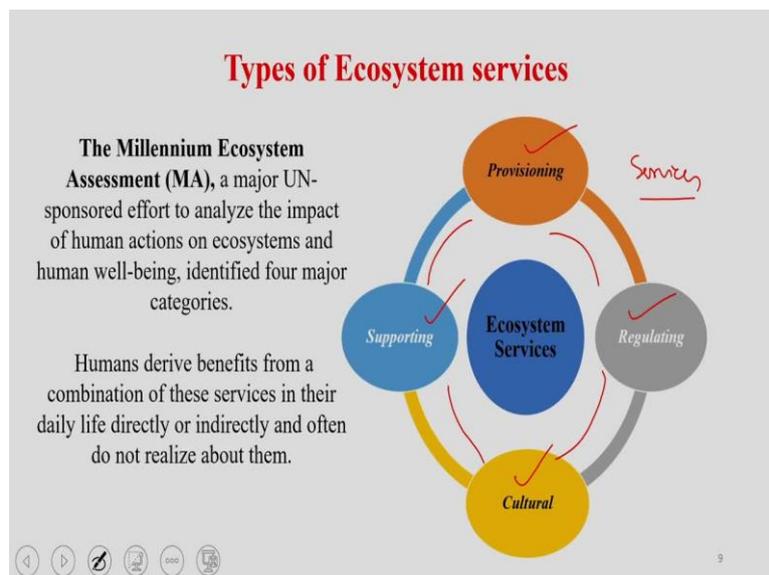
Ecosystem services. In one of the previous lectures I have mentioned about ecosystem services that how important it is and especially in current time. Ecosystem Services basically says the benefits that people derive from any ecosystem that they live in. It provides various kinds of services; food, fodder, cloth, medicine, microorganisms, which regulate different kinds of activities, pollination of crops, prevention of erosion, moisture content, water purification, various others aspects, which are required for our survival.

In spite of this ecological, cultural, economical importance of these species, ecosystem and the biodiversity that underpins the human are still being degraded and lost at an unprecedented scale. Why? When we know we understand that these systems is provide us so much of services, why we are not taking good care of this ecosystem?

Because if that ecosystem is lost, we are also bound to get lost. The major reason for this is that the value and importance of ecosystems to human welfare is still underestimated, and also not fully recognized. It has to be recognized, every individual living on this earth should be able to recognize respect and understand the value of individual natural resources for their survival. The day, everybody will understand this importance, naturally, one individual will try his or her best to take care of natural resources.

As an example, today, under this COVID pandemic, we all know that how important is mask for our own good health. Now, if we do not carry a mask with us, and if we do not carry or use sanitizer in an appropriate manner, then definitely we are putting ourselves at risk. And none of us want that to happen. Similar way in case of natural resources the day we will understand the importance of each and individual natural resources for our safety for our good life, I am sure that the conservation of natural resources will automatically take place at individual level.

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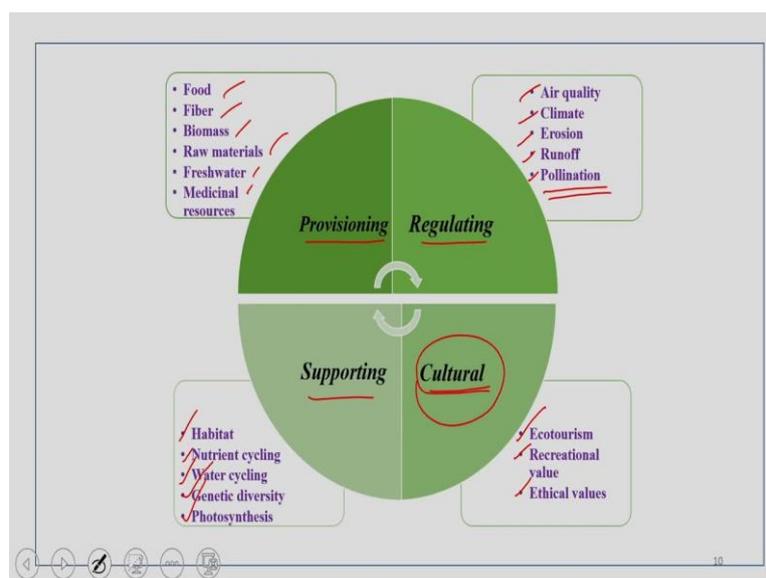
To say a few words about ecosystem services, as most of you might be aware of the Millennium Ecosystem Assessment, this was a major United Nations initiative to carry out to

study the impact of human actions on ecosystems and human wellbeing, identify basically by four major categories.

Now, human derive benefits from a combination of these four services in our daily life directly or indirectly. And while deriving these benefits from this combination of services, we hardly actually recognize that we are how much dependent on these natural resources and ecosystem services. That is the point I am trying to make it here. We need to generate awareness within our academic system that every individual person should be able to know that their life is at stake if a natural resource is going to get lost.

Now, what are those four major ecosystem services that I was just talking about provisioning, regulating, supporting, cultural, so these are four services that ecosystem provides to us for our sustainable life and growth. Combination of these different services actually takes care of if you will see that entire life of an individual.

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Now, a little bit more into detail about these four critical ecosystem services. What comes under provisioning? Largely as you understand food, fiber, biomass, raw materials, fresh water medicinal resources. These are largely come under provisioning ecosystem services as provided by our ecosystem.

Regulation regulating like air quality, climate, erosion, runoff, pollination and I need not to say that how important is pollination for agriculture, crop growth, etcetera and so, the food.

Cultural; in cultural, ecotourism, recreational value ethical values or various system that you get it. To give an example here in Northeast if you go to Nagaland if you go to Meghalaya there are various ecosystem structure or cultural beliefs are there that those actually are in one or other way is involved with daily human life and northeast specially are very important as far as cultural services is concerned.

Supporting, well, habitat, nutrient cycling, water cycling, genetical diversity, photosynthesis, these all come under the supporting services by an ecosystem. Friends, as you see that ecosystem, and associated natural resource basically is allowing us giving us a life to enjoy and to do good for our own and for the society.

So, we certainly have a responsibility to regulate, to allow this biodiversity to flourish and each individual of us, as I mentioned, need to recognize the importance of individual natural resources in our life, for our safety, for our sustainable growth and happiness. Thank you very much. We will meet in the next class.