Environmental Impact Assessment
Professor Harshit Sosan Lakra
Department of Architecture and Planning
Indian Institute of Technology, Roorkee
Lecture 2
State of Global Environment (Biodiversity)

Welcome to the course Environmental Impact Assessment, continuing with our exploration to review the status of the global environment. Today, we will cover biodiversity. We will follow Chapter 6 of Global Environment Outlook 6, which focuses on a healthy planet and healthy people.

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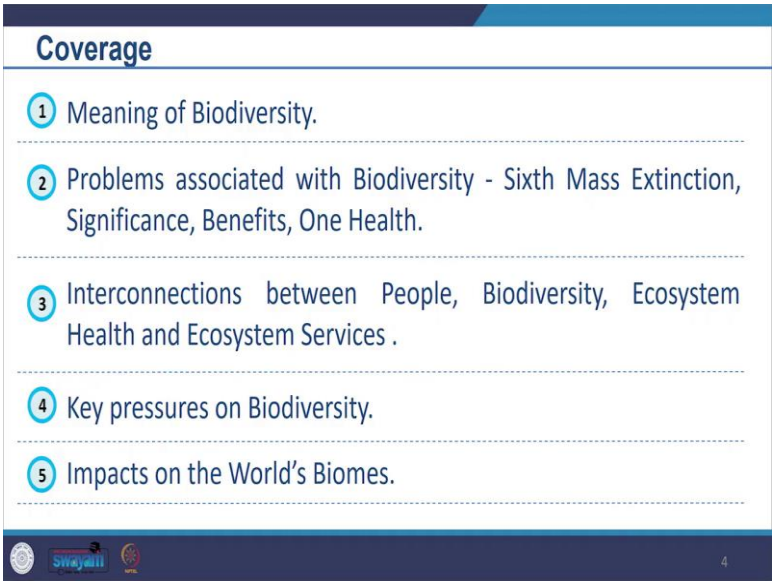

So accordingly, our coverage will include the meaning of biodiversity. We will look at the problems associated with biodiversity like the sixth mass extinction, its significance, benefits, and the concept of one health. We will review the interconnections between people, biodiversity, and health and provisions of ecosystems, we will look at the key impactful pressures on biodiversity. Thereafter, we will review the impact on the World's Biomes.

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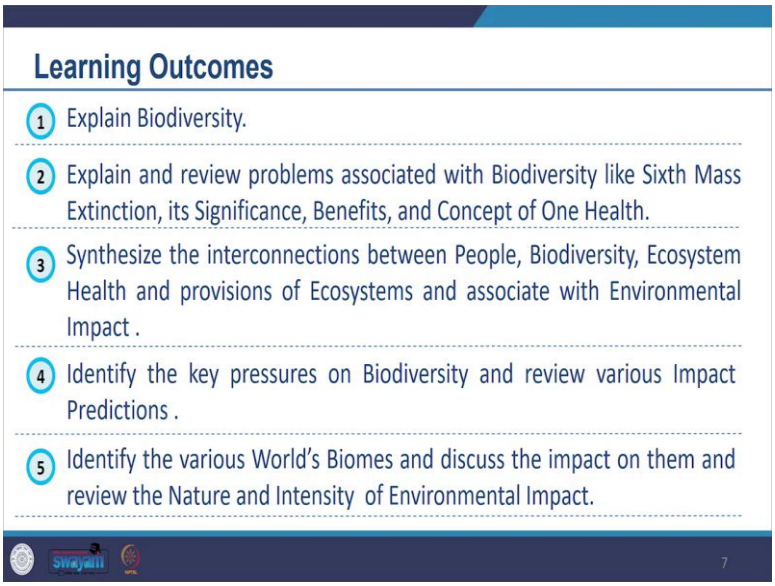

So accordingly, what you will be able to do is to explain biodiversity, and explain and review problems associated with biodiversity like sixth mass extinction. Its significance, benefits, and concept of one health synthesize the interconnections between people biodiversity, ecosystem, health, and provisions of ecosystems, and eventually connect these to understand environmental impact assessment, you should be able to identify the key pressures and biodiversity and review various impact predictions, identify the various World's Biomes and discuss the impacts on them, as well as review the nature and intensity of environmental impact.

Let us first understand what Biodiversity means. Biodiversity is the richness and variety of life we see on earth. Biodiversity relates to variability. Variability is the variety we see among living organisms from all sources, the diversity within species, between species, and of ecosystems, we see that biodiversity is said to be the health of the ecosystem, which allows for stability and recovery. It is said to be the most complex and important feature of our planet.

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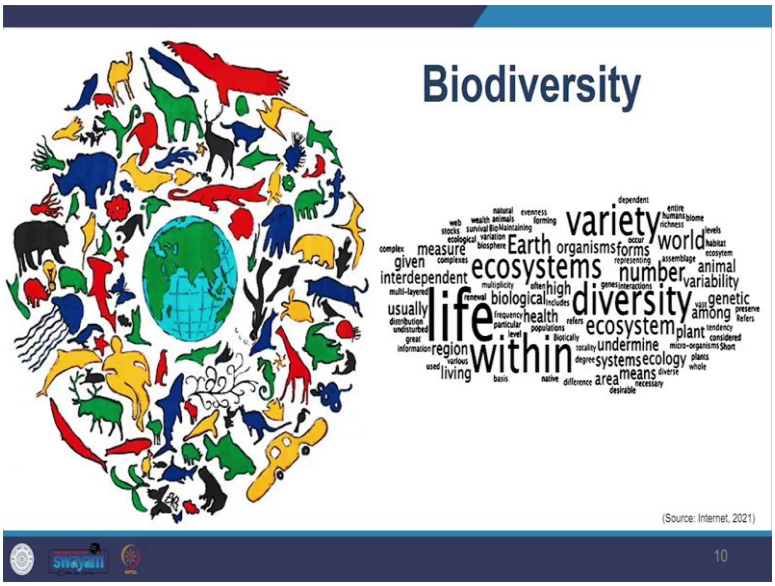

Without biodiversity, life will not stay. When we consider diversity, we ask how many different species are present in a given area, we look at the amount of inherited genetic variability contained within populations of species survival of species is dependent on genes that provide resistance to disease and environmental tolerance. This can be significantly affected by the destruction of habitats and other influences, that we have been doing.

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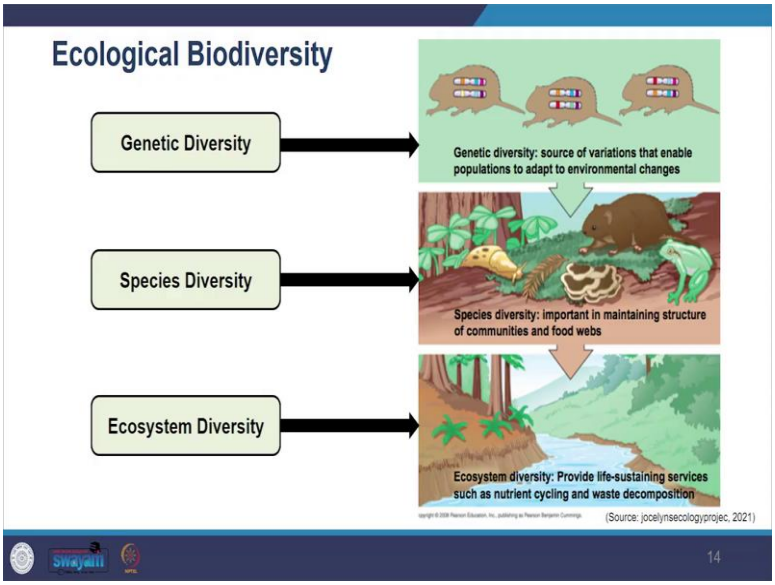

We also look at ecosystem diversity like the variety of communities or habitats that exist.

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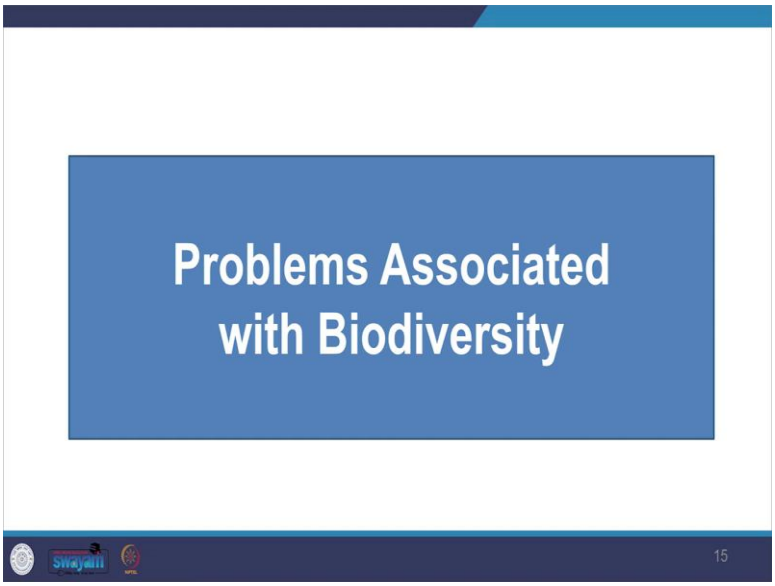

Now, let us investigate the problems associated with biodiversity. An important concern for us is that biodiversity is in crisis. There is well-established evidence that indicates an irrevocable meaning permanent and continuing decline of genetic and species diversity.

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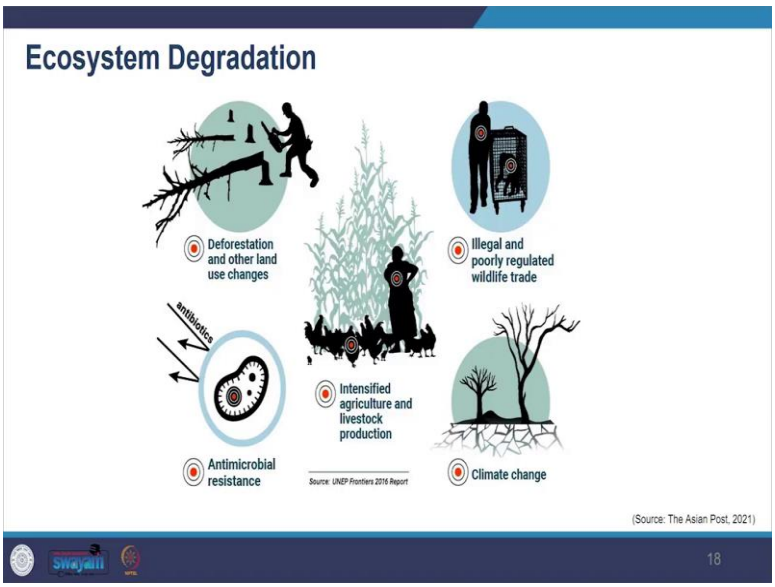

And this degradation of the ecosystem is happening at local and global levels. Scientists are increasingly concerned that if anthropogenic, human activities pressures that our activities exert biodiversity continue unrestricted without limit, we risk precipitating a sixth mass extinction event in the earth's history, and this will have tremendous impacts on our health and equity. Here is a brief understanding of the sixth mass extinction. The National History Museum says extinction is a part of life and animals and plants disappear all the time, about 98 percent of all organisms that have ever existed on our planet are now extinct.

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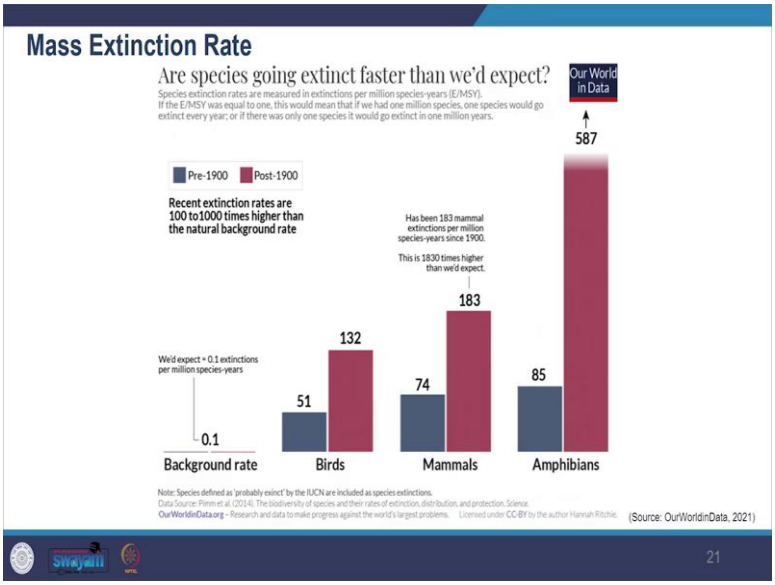

When a species goes extinct, its role in the ecosystem is usually filled by new species or other existing ones. Its normal extinction rate is often assumed to be between 0.1 and 1 species per 10,000 species per 100 years. This is known as a background rate of extinction. A mass extinction, when we say mass extinction event is when species vanish much faster than they are replaced.

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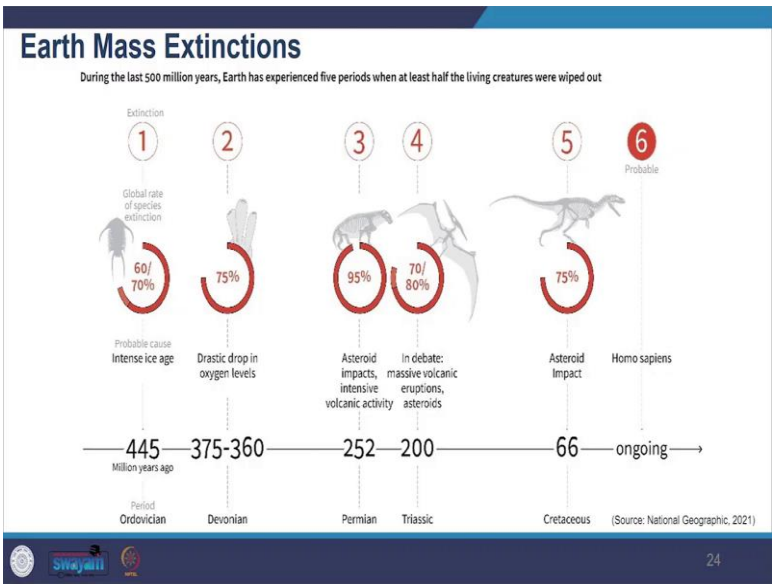

This is usually defined as about 75 percent of the world's species being lost in a short amount of geological time, less than 2.8 million years. It is difficult to identify when a mass extinction may have started and ended. However, there are five big events that we know of where extinction was much higher than the normal background rate, which we talked about. And these are often used to decide whether we are going through a sixth one now. So, now we understand what the sixth mass extinction means.

Subsequently, our understanding of biodiversity is much better today than we understand it much better in the current scenario. Here are some points that the report indicates the rate of species loss is estimated to be 1000-fold greater than the background rates. That is what we see today. This is raising concerns and debates among scientists over whether we have already entered into a sixth mass extinction event.

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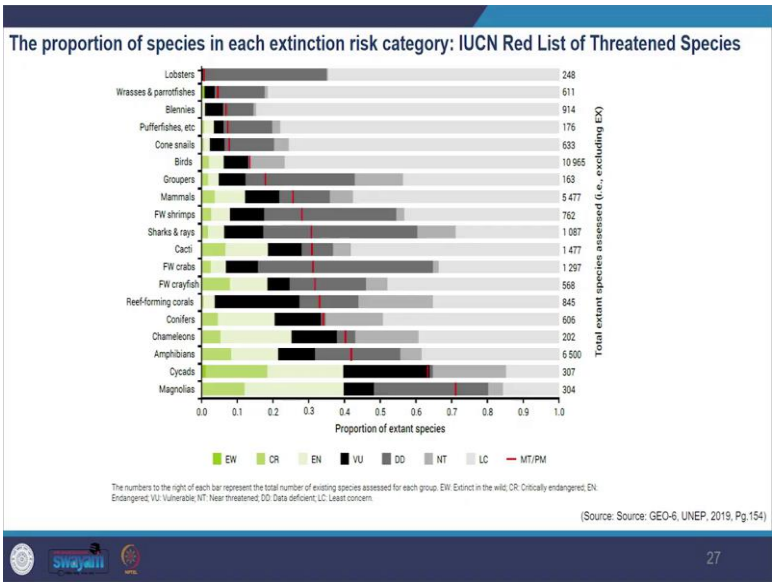

For many species populations are in decline globally, and genetic diversity, genetic diversity, which is vital for future adaptation to Global change is deteriorating. We need to understand that biodiversity loss and habitat decline continue to accelerate.

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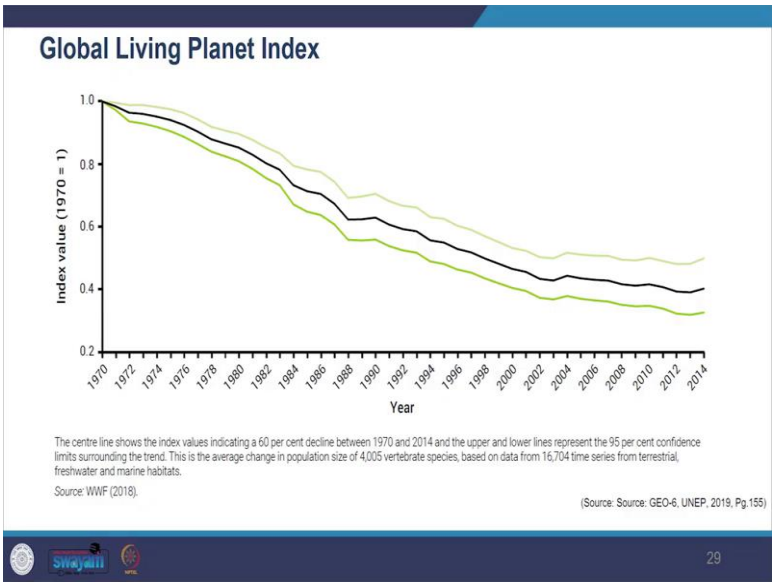

So, it is accelerating the decline is accelerating. This decline is at a greater speed and is believed to be beyond the planetary boundaries. The loss of biodiversity reduces ecosystem resilience, and the ability to get back to normal.

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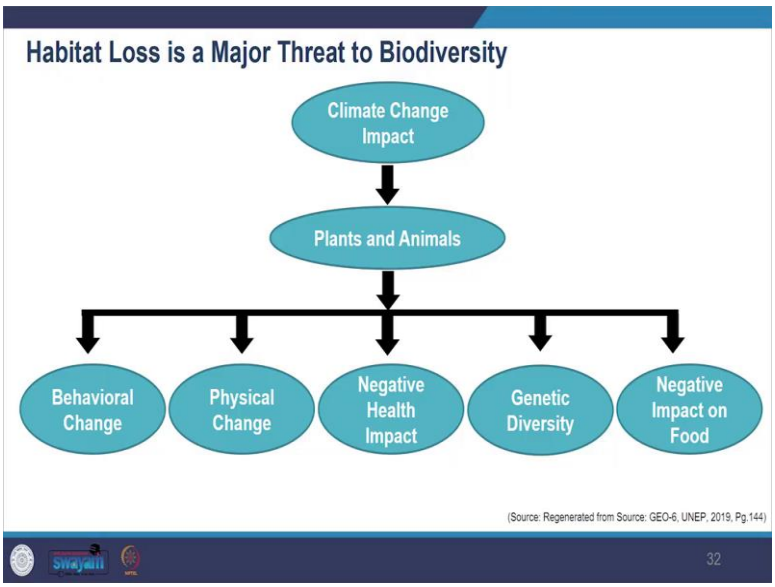

Furthermore, the loss increases vulnerability to threats, including the negative impacts of climate change. The genetic diversity we see is vital, the raw material that allows adaptation to these changes. So, if we lose that, the adapt will also lose the ability to adapt.

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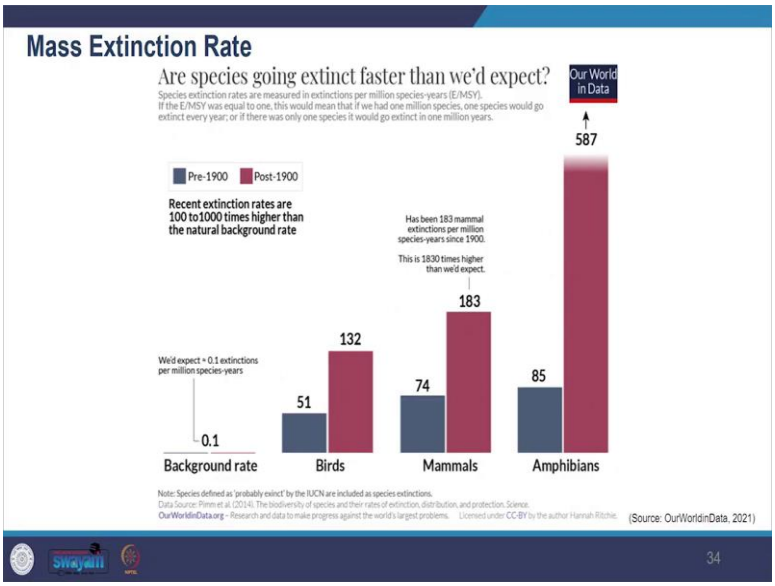

As per the report, natural communities of plants and animals are being reshaped because of climate change activities, which have caused the movement of species. We also see that some displaced species are invasive and aggressive, and they pose risks to not only our health but also the genetic diversity and food and water security. So, you see how significant they are in our life.

Such changes are set to reduce the efficiency of ecosystems, the ecosystem will not efficiently capture essential resources, it will not produce biomass, will not decompose and recycle nutrients, and it will also decrease resilience. We see that there is an increase in the rate of species population decline globally across all of Earth's major biomes. This is well established through various studies.

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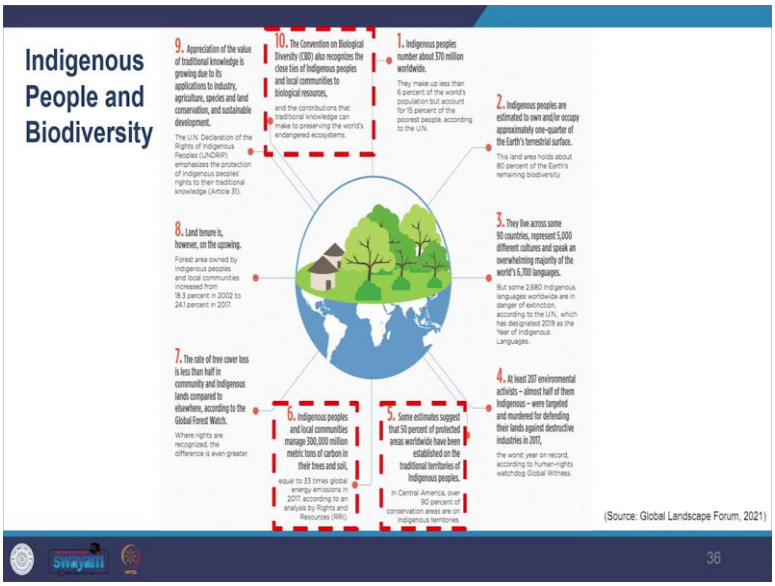

The report also highlights that at a local level, indigenous people and our local communities play a key role in protecting biodiversity. And if we do not take action, it will be very expensive for us. Moving on, let us look at the benefits of biodiversity.

And, it is well established that biodiversity provides many valuable goods and services to us. This variability the variety we talked about, helps to regulate climate through carbon removal and control of local rainfall, filters air and water, and mitigates the impact of natural disasters such as landslides and coastal storms it also even protects us.

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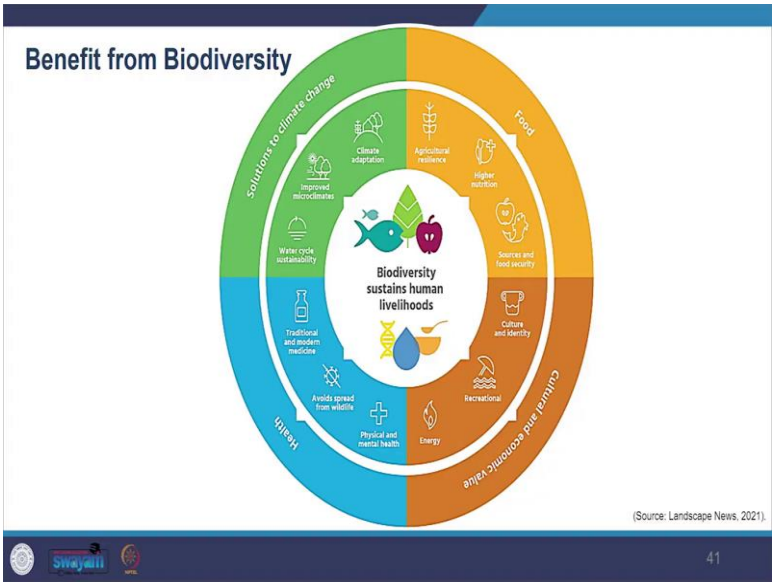

Direct benefits from biodiversity include food and fibers from natural vegetation wood and non-wood products from forests, fish oceans, and freshwater systems, pollination of crops, medicines from plants, and even psychological health. If we restore and maintain biodiversity, we will be able to enhance the adaptive potential of our earth and help sustain nature's contribution to livelihoods, health, and wellbeing. The report also suggests that the loss of biodiversity is a significant equity issue. So, as explained the livelihoods of 70

percent of people living in poverty, rely to some extent on natural resources. If we damage these resources, we put the livelihoods of many at risk.

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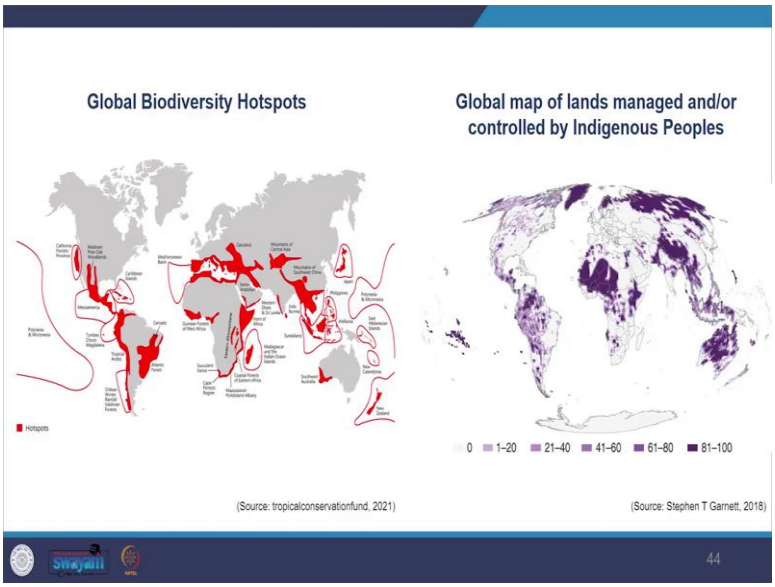

Furthermore, the report assesses that 80 percent of global biodiversity is found in traditional territories of indigenous people, and stresses that the future generations of these indigenous people will experience relatively impoverished poor lives if losses continue to happen. So, you see how, how big the problem is.

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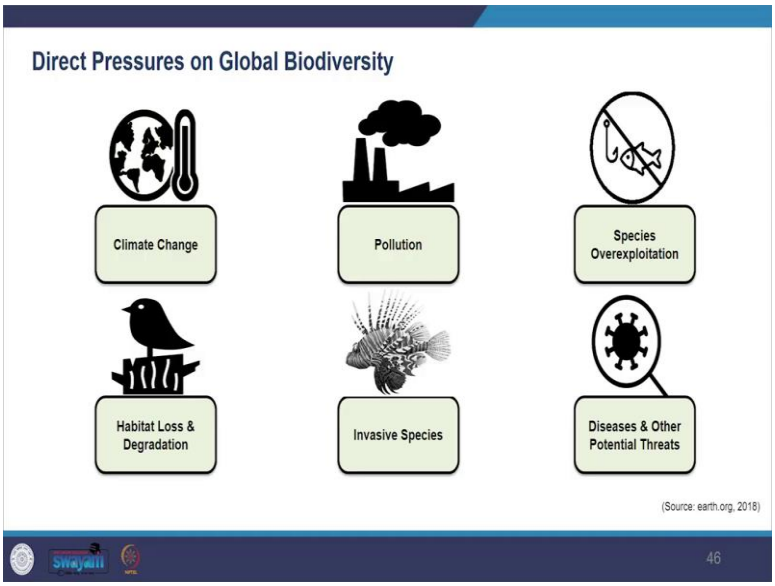

The report indicates that the pressure on biodiversity continues to increase there is a loss of habitat degradation because of agriculture, and infrastructure development. Then there are over-exploitation and pollution. We also see invasive alien species, and now we are experiencing climate disruption. Furthermore, these changes are interacting between themselves and causing further change. So, all the changes that we are seeing, are also interacting between themselves, we have noted and continued to substantially ongoing losses of populations, species, and habitats.

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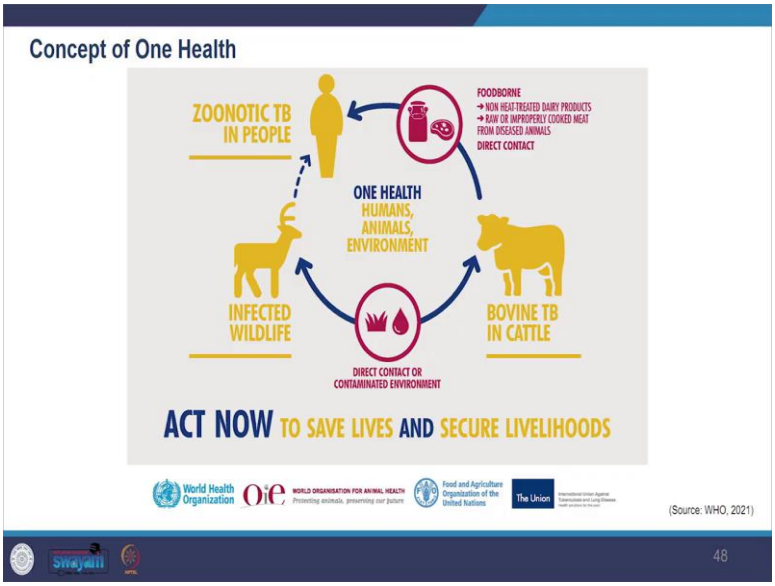

Let us try to understand the concept of one health. The report states one health is an approach that recognizes the opportunities and challenges related to these interconnections at the human-animal ecosystem interface and aims for optimal health outcomes for all it is particularly relevant in the prevention and control of zoonosis which accounts for more than 60 percent of human infectious disease.

Several aspects such as urbanization, agricultural practices, land use, and biodiversity are changing the ecological dynamics. These changes are also in some cases facilitating human-animal conflict. These

changes are also in some cases facilitating human-animal contact that worsens the risk of zoonotic disease emergence and spread.

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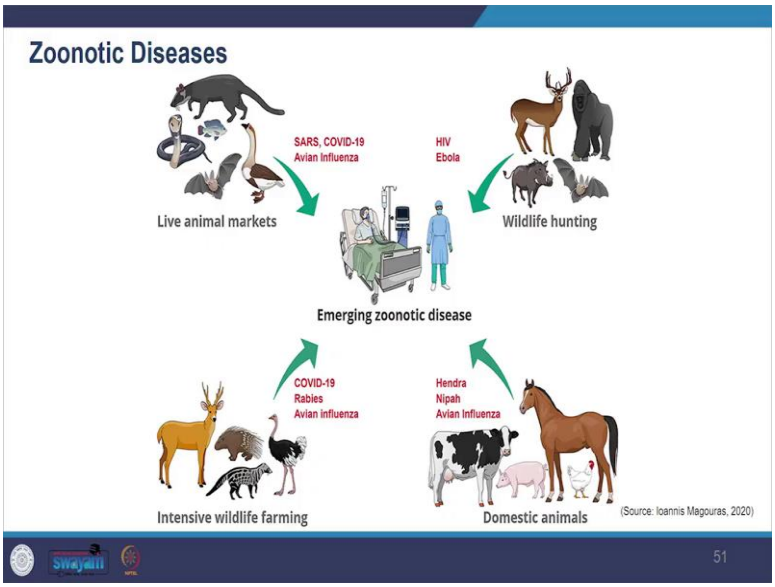

For example, COVID-19, which we are experiencing now, zoonotic diseases are transmissible from domestic or wild animals to humans, through direct contact or water, food, and the environment. All these aspects of this study were published in 2019, which makes a very strong case for the reflection, of what we are going through at this moment, considering the drivers of environmental change.

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We have already seen that these drivers include population, demography, urbanization, economic development, technology and innovation, and climate change. These have caused several negative impacts on biodiversity, which in turn have led to the loss of genetic diversity, which is important for their survival and arrest population decline, and because of these changes, some of these species will disappear.

Furthermore, such changes are also leading to the reshaping of natural communities, while creating concerns for the stability and functioning of ecosystems. Let us try to understand the interconnections between people biodiversity, ecosystem, health, and provisions of the ecosystem through this image by the World Wide Fund for Nature.

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In the figure, we see that our population consumption and resource use pattern trigger the indirect drivers such as agriculture and forestry, fishing and hunting, urbanization and industrial development use of water, energy, and required transportation, which create direct pressure on biodiversity and ecosystem as seen in the third row in dark green color.

The direct pressure indicated includes habitat loss, changes and fragmentation in the habitat, over-exploitation of resources occurrence of invasive species pollution, and climate change from our activities. These pressures change the state of global biodiversity shown for a throw in pink color changes as indicated include terrestrial change, changes in freshwater quality, and quantity, and marine biodiversity. In the bottom last row, we see the service benefits we get from our ecosystem.

The service includes provisioning services like food, medicine, timber, fiber, and bioenergy, regulating services, like water filtration, waste, decomposition, climate regulation, crop pollination, regulation of some human diseases, and we also see supporting services like nutrient cycling photosynthesis and so on.

Then we also see cultural services like enriching, recreational, aesthetic, and even spiritual also reflect that as it is predicted that the population will increase and urbanization will increase. Most of the drivers will increase, they are going to further create more pressure, and it is predicted that climate change will become the dominant driver of biodiversity change in the next few decades. Ultimately, reducing pressures on biodiversity will require addressing these drivers of change.

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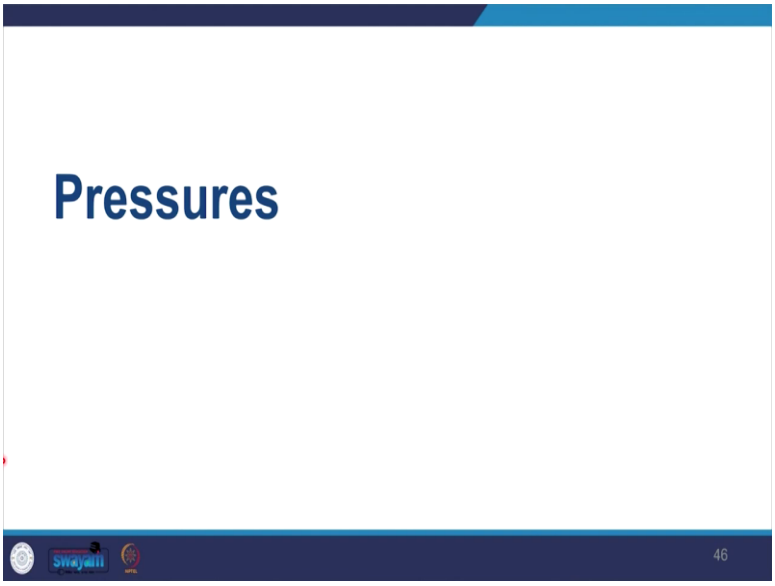

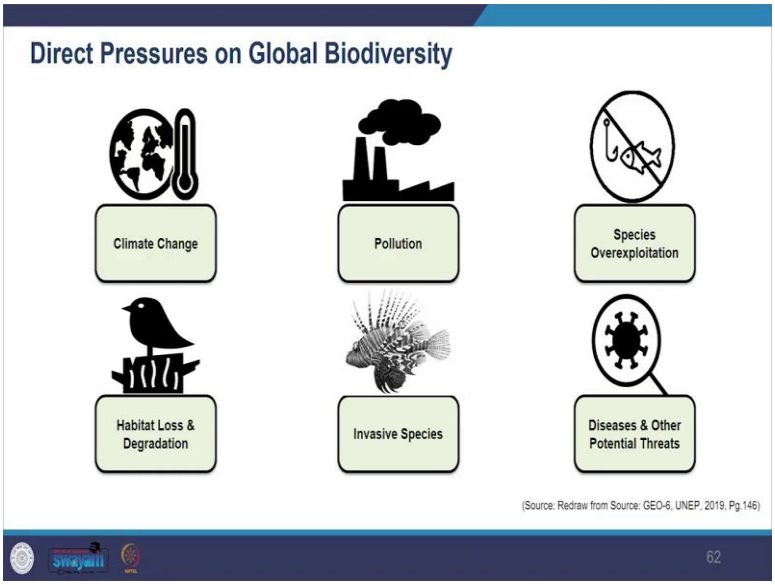

Now, let us look at the pressures. The main direct pressures on global biodiversity, are habitat stress and land use change, invasive species pollution, unsustainable use over-exploitation, and climate change, mainly as a consequence of higher temperature changes in precipitation patterns and increasing frequency and severity of extreme weather events and wildfires.

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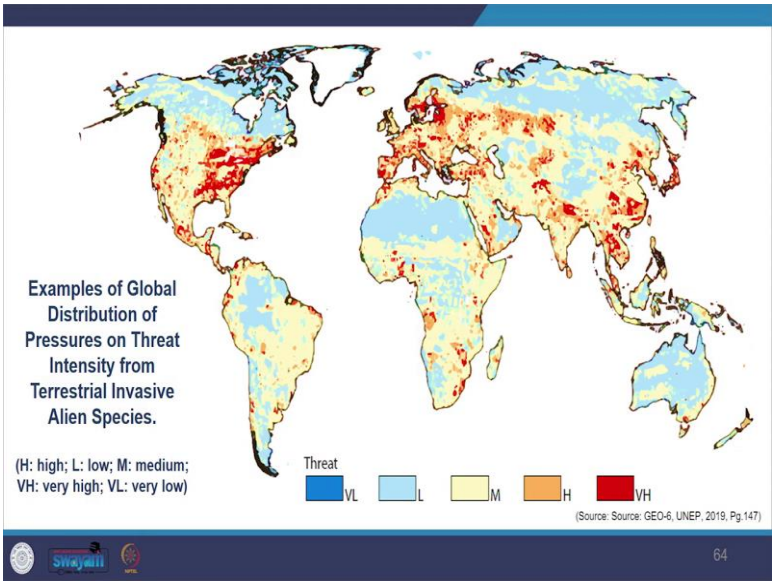

The spatial distribution and combination of these pressures varies across the globe as you may see in the figure, which shows the global distribution of the threat. The red zone shows very high threat intensity, and orange shows high threat intensity, and so on. You may look at our country to identify the threat level as per the study given here.

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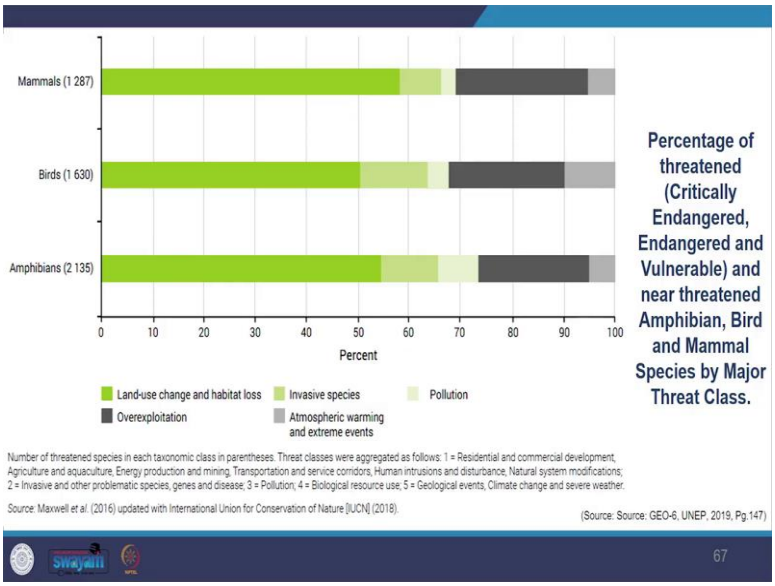

In the following graph, you may see the proportion of critically endangered, endangered, and vulnerable mammals, birds, and amphibians due to land use change and habitat loss, which constitute the major portion shown in dark green color. You may see invasive species in lighter shades of green and further pollution.

You may further see that exploitation shown in black color is another major reason for threats followed by atmospheric warming and extreme events shown in grey. Looking at the first point pressures, land use change, and habitat loss. Land use change which means what changes we make to the existing land cover to put into use to meet our growing requirements, such as for residential purposes. In particular, we are single in the urbanization process, industrial purposes, infrastructure purposes, and mining for agricultural purposes is increasing drastically.

Therefore, the associated global human footprints like how much we are consuming our footprints are increasing, assessing the natural areas leads to because of this we are causing desertification, deforestation and also causing loss of habitat.

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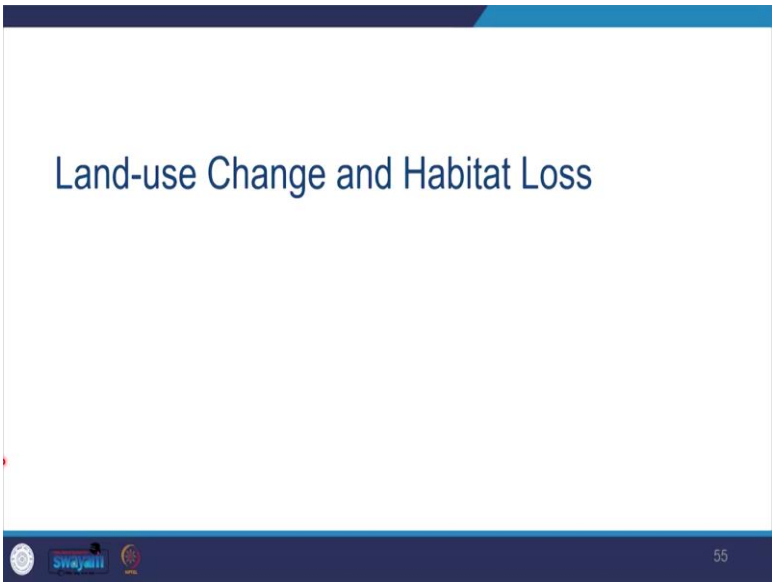

So, continue to think about the environmental impact our activities have, we see that land use changes impact both aquatic and terrestrial environments with exposure to pollution-exhausted pathogens, then emerging infectious diseases harmful to humans, livestock, and wildlife. And we also see increased human conflict.

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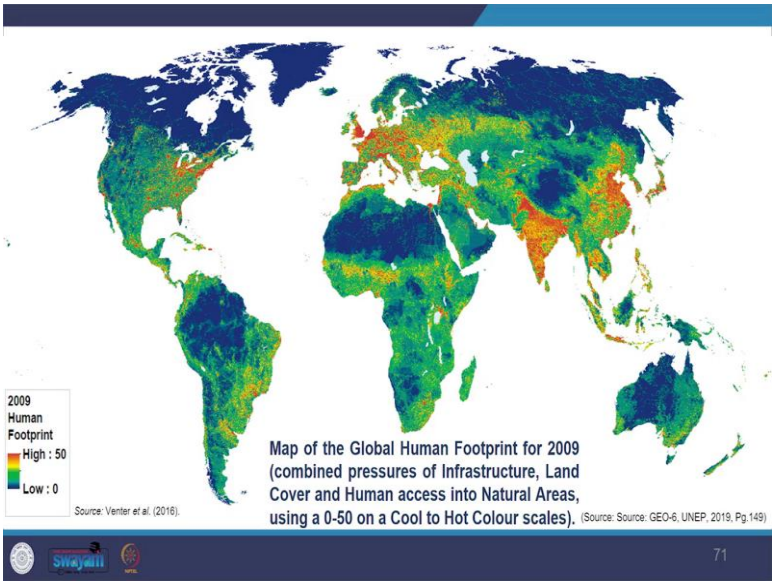

As you can see in the figure which shows the global human footprints for 2009 based on the combined pressure of infrastructure, land cover, and human access into natural areas on a scale from 0 to 50, 50 you may see indicated in red colors, you may look at India and reflect on color. Likewise, pay attention to the other warm color zones on the map.

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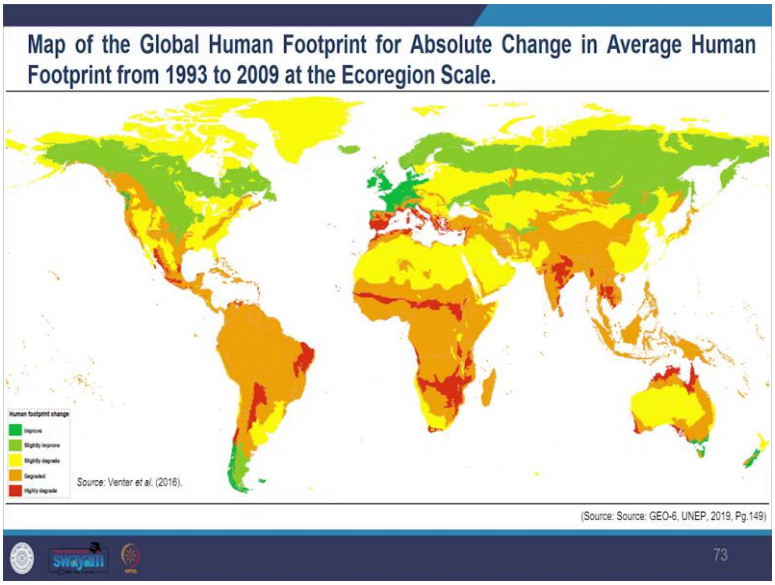

And the following map you can see the absolute change in average human footprints from 1993 to 2009 at the ecoregion scale, the zones indicated in red color show the change in the negative directions, and in these areas, the human footprint change is highly degraded. In orange color, you may see the changes again on the negative side which shows that it has degraded, the zone colored in green shows improvement areas you may pay attention to footprint change in India as per the study given here. So, through these figures, you may reflect upon how much we are changing and accessing the natural areas.

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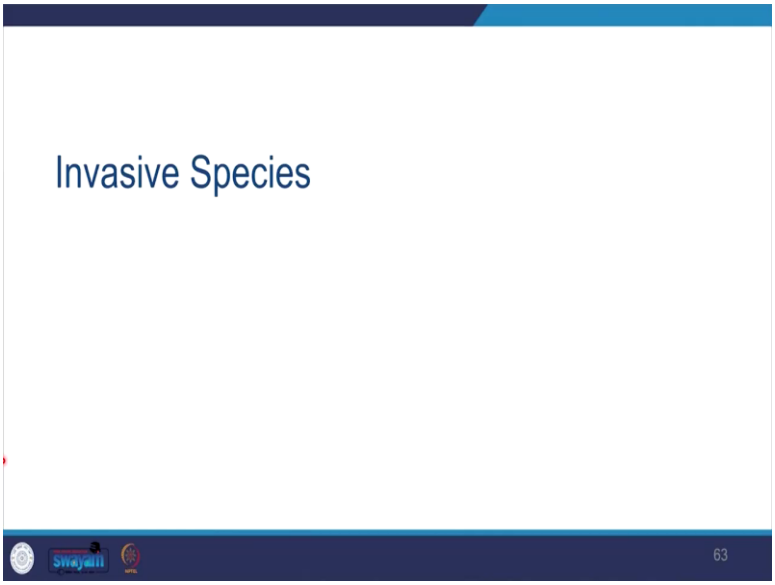

Let us look at the second number of pressure-identified invasive species. The report suggests that in developing countries, due to inadequate planning often the development coincides with biodiversity hotspots, and we end up interfering with that. Also, it is suggested that road construction assess the spread of invasive species and allow for easier access into previously intact habitats, exposing the species to threats from hunting and resource exploitation.

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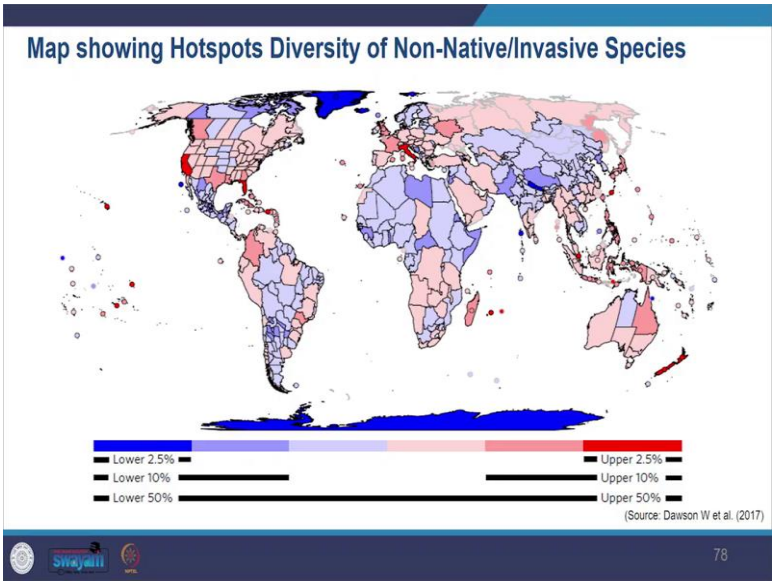

Invasive species threaten ecosystems, habitats, and other species. They are usually non-native, like invasive alien species, but can also include expanding native species that when they go beyond their proportion. Looking at the ecological impact of invasive species, it is said that they have a direct and indirect competition to suggest predation, that is spraying of one animal on another. The action of attacking or plundering study suggests habitat degradation indicates hybridization, which is the process of an animal or plant breeding with another individual another species over (())(22:57).

Further importantly, what we see now, is that it is a threat to human health and food security, their role as disease agents and vectors. It is also indicated that the invasion of plants can impact the provisioning of key ecosystem services which we have already seen.

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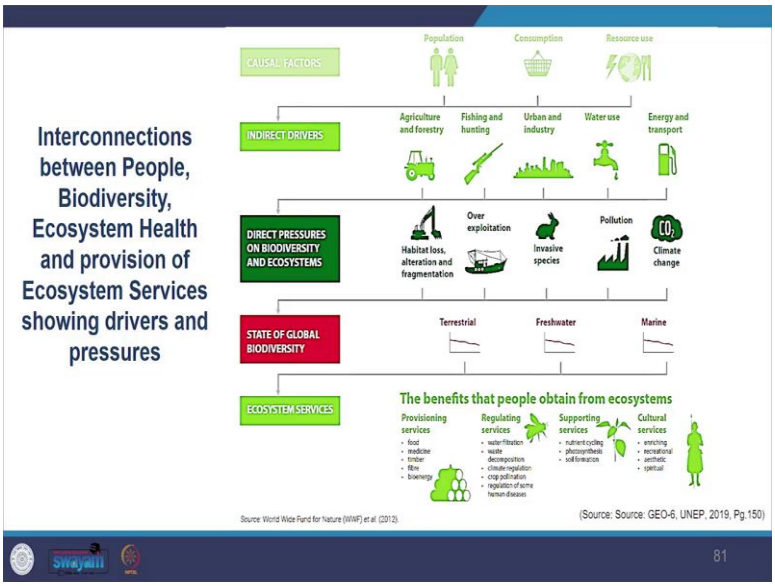

You can see the diagram here and look at all the ecosystem services we had discussed that have all been impacted. We also see that invertebrate species which are animals without backbone, that have become invasive may pose an even greater risk.

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The population expansion example that we are seeing here of invasive Zebra Mussel in the North American Great Lakes was so great that it impeded the water flow of municipal water supplies and hydroelectric companies. The danger is particularly high on islands because of invertebrate species, which can cause biodiversity loss to a great extent. I have also linked the YouTube video here for your further detailed understanding if you wish to see it.

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Invasive pests such as the Gypsy Moth in North America, as we can see here in the picture have an impact on biodiversity and the economy.

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Likewise, we see another invasive species Emerald Ash Borer in North America impacting biodiversity and economy. It was introduced in us you see how things happen and it was introduced in us in 2002. It arrived accidentally in cargo imported from Asia. And back to this as recorded by the National Invasive Species Information Center, the US Department of Agriculture shows that ash trees lose most of the canopy within two years of infection. So, it just takes two years and dies within three to four years. So, that range of damage can happen.

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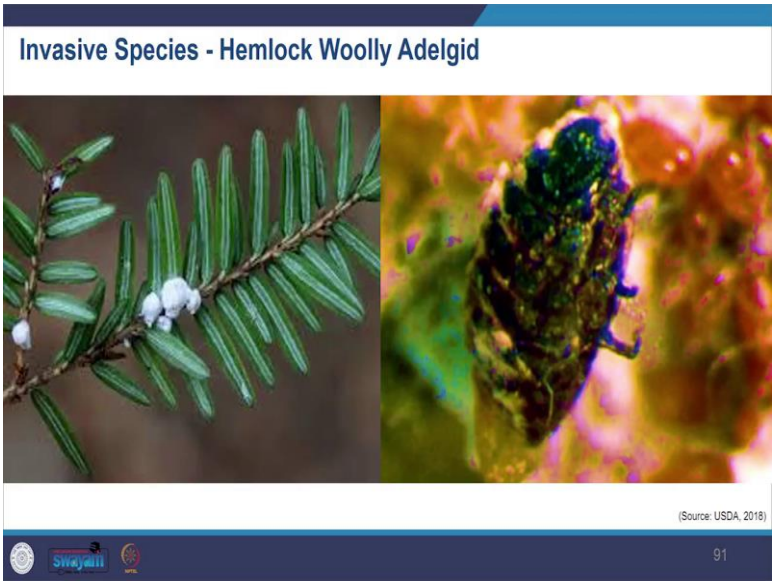

Data another recorded by the National Invasive Species Information Center. Again, the US Department of Agriculture shows Hemlock Woolly Adelgid in North America impacting the biodiversity and economy. It is native to Japan. This was also introduced by accident to destroy Eastern Hemlock trees. You may also see the YouTube video to learn more links provided in the suggested read and it is also suggested that invasive insect vectors can also facilitate the spread of parasites and lead to infectious diseases. You are very much familiar with Chikungunya, Dengue, and Zika, which are vectored by mosquitoes.

We also see unsustainable uses and over-exploitation, because of the construction of dams, mines, and other hard as well as energy infrastructure developments which we are going to constantly review in our environmental impact assessment. Furthermore, the climate warming and the increasing frequency of extreme weather events, we see these days like very hot summers, heavy rain causing floods, seasons of scares, rainfall, drought, and also forest fires. All of these contribute to habitat loss and degradation of already stressed habitats.

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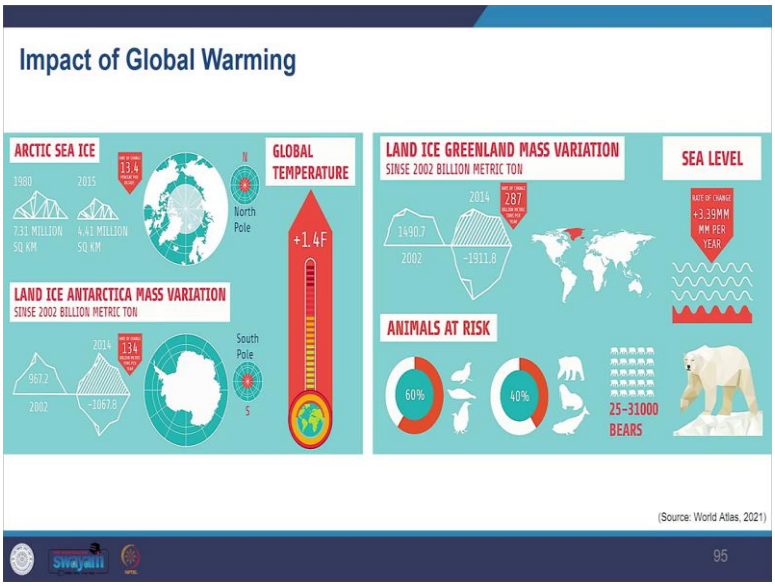

Because of the increased temperature, the seas are getting warmer, which we have already seen. And that is reducing the sea ice extent. The reduction is affecting the critical hunting habitat for polar bears, seals, and fishing birds. As per the Intra-government Panel on Climate Change, IPCC report we also see increased atmospheric carbon dioxide and acidification of ocean habitats.

We further see that the loss of habitat of wild species affects the ecosystem services mostly they provide, as we have seen pollinators and predictors of agriculture pest report also known as the loss of human access to nature. In particular, it largely impacts the indigenous communities in that they are no more they can access nature that is, that is been abstracted.

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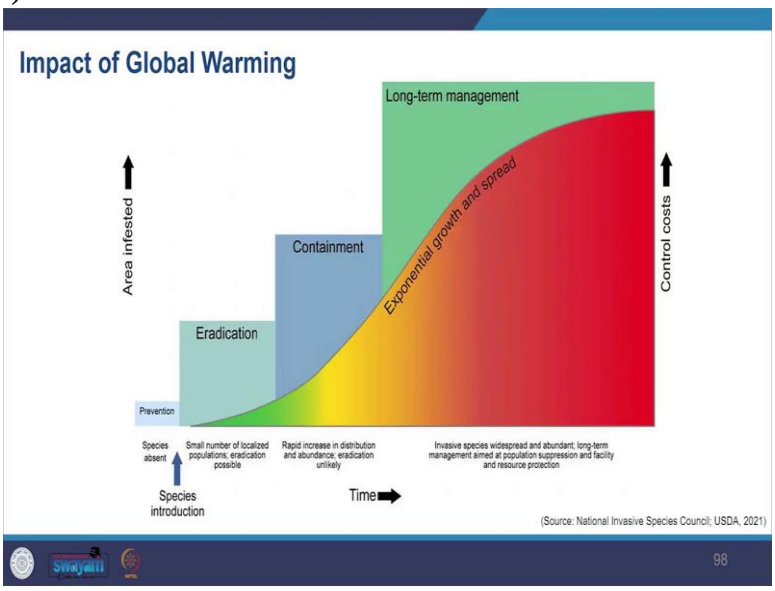

The economic costs both direct and indirect, such as the cost of efforts to control them can be in the range of many billions of dollars annually. And major routes for species invasive include deliberate release escape accidental introduction, as you have already seen, it could be to resume and ship blast water, as we had seen,

Wherever loss of native bias diversity happens, it is likely to make it vulnerable to the invasive, invasion risk. So, you reflect upon the nature of changes we make around and how it eventually impacts us. Moving forward, we will look at another element that causes pressure which is pollution.

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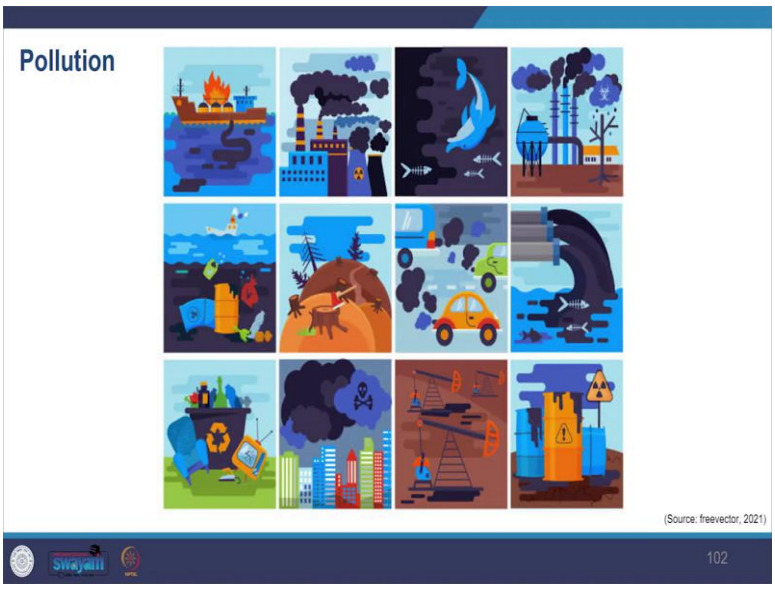

Pollution happens in many forms such as waste and chemical products deliberately or accidentally released into the environment. Pollution in the form of light noise, heat microbes, a major emitter of pollution includes transport, industry, agriculture, and aquaculture, so we see these there are wide range of pollutants, the increasing pollutants include synthetic chemicals, pesticides, cosmetics, and so on. You may think of the stuff you use regularly.

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Pollution also happens to open waste dumps on land which has local impacts on plants and animals. Land soil pollution also leads to protecting the microbial that is bacteria population and hampers the important ecosystem functioning. There is an increasing problem of bioaccumulation of toxins, including heavy metals which may have multiplying impacts across the entire food chain including impact on us, probably problem of water pollution, including marine and freshwater environments we see an increasing problem of plastics, chemicals which threaten the wildlife.

We are also witnessing air pollution that contributes to the acidification and eutrophication of terroristic ecosystems, lakes, estuaries, and coastal waters and mercury bioaccumulation and aquatic food webs, aquatic food webs. We also witness another pressure from over-exploitation which includes illegal, unreported, and unregulated activities, such as fishing, logging, and so on.

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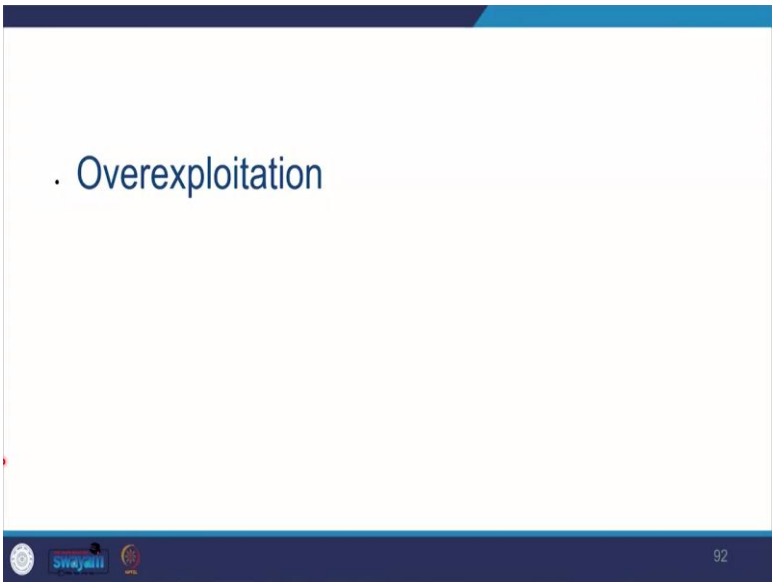

We see that the direct exploitation has resulted in threats to both land and marine species. The over-exploitation of wildlife has implications for equity, as suggested it deprives poor and vulnerable local communities and indigenous people who are dependent on them for sustenance, traditional medicines, tourist income, and other ecosystem benefits.

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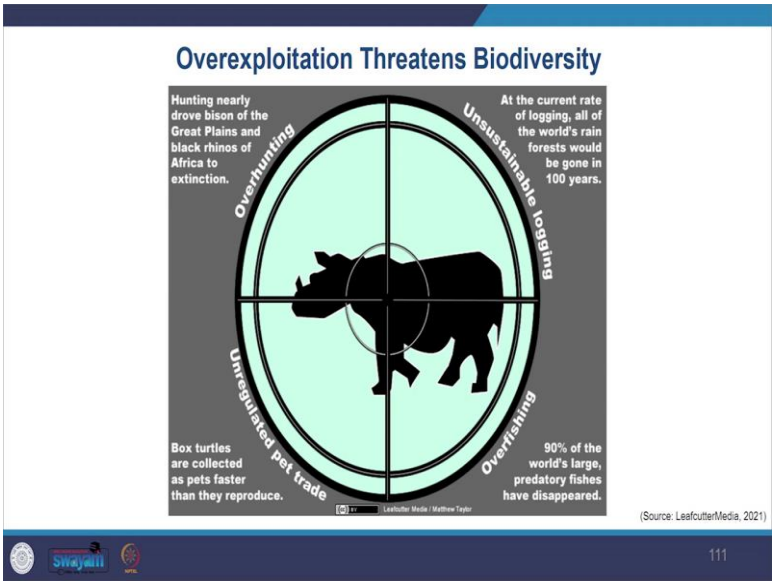

So, we see how our activities over-exploitation of the resources and impact of biodiversity and diverse and vulnerable communities so we see how our activities over-exploitation of the resources impact biodiversity and how to impact biodiversity and also the vulnerable communities.

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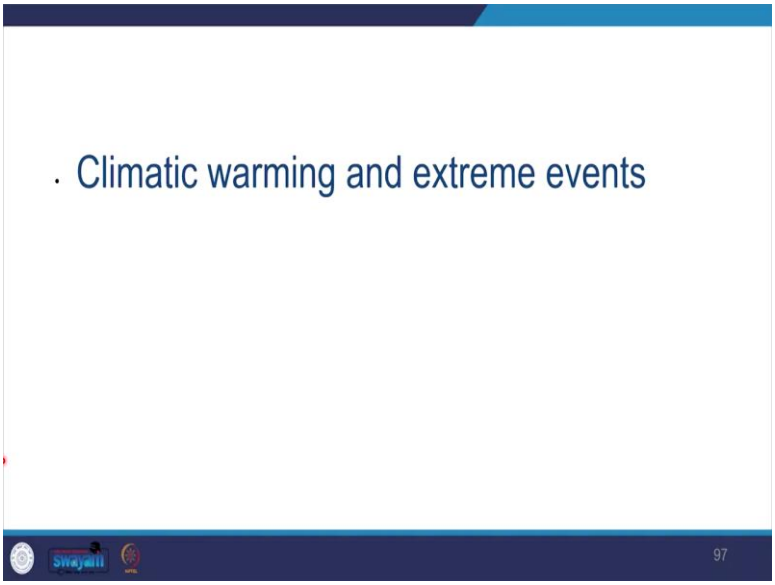

Now, we will look at another driver climate warming and extreme events, creating pressure on biodiversity. The impacts of anthropogenic climate change on biodiversity are most evident in natural systems. The report suggests that up to one in six species could be threatened with extinction by 2050. If the current warming trend continues.

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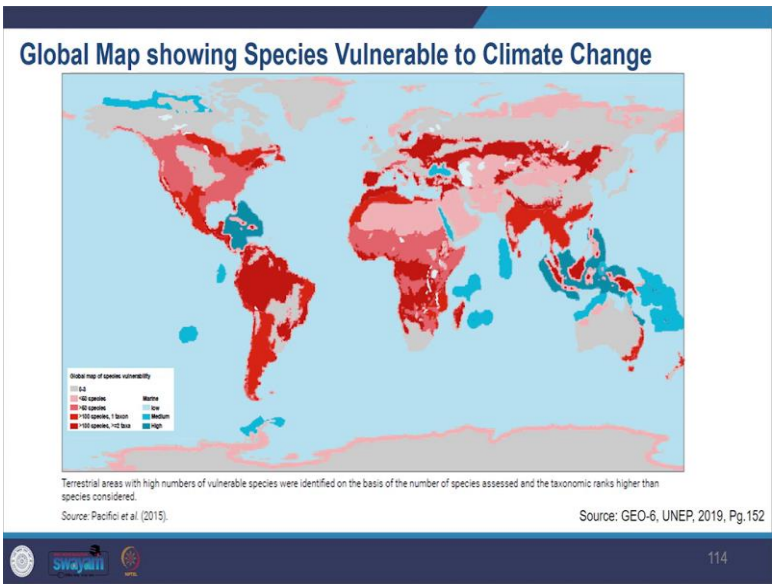

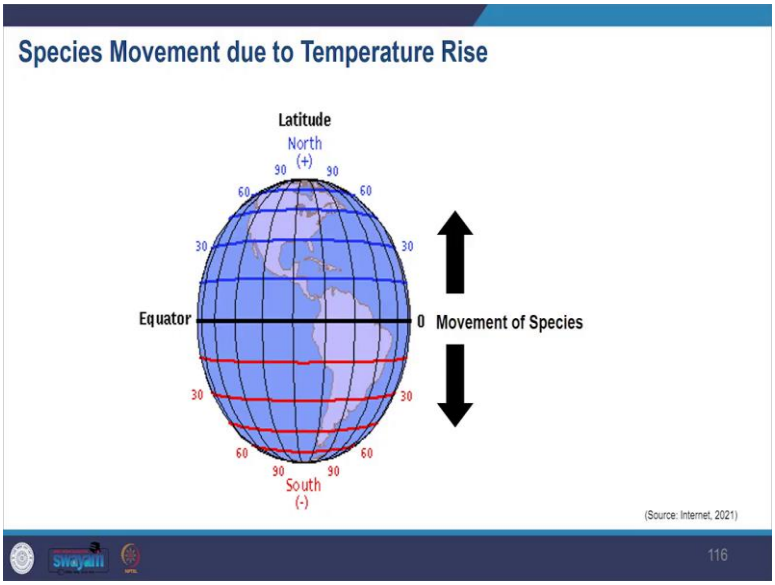

In the figure, you may see several species vulnerable to climate change. The darker shades indicate a high number of vulnerable species, both on land and marine, and the darker shades indicate the high value of 100 species, we may reflect on the danger we see. However, known impacts are not distributed evenly and our knowledge of impacts remains incomplete at this moment, it is suggested that in response to rising temperatures, species may move to cooler locations or alter their phenology to flower breed or migrate sooner evidence suggests that they are doing both they are moving up, changing places as well as this changes in the phonology to flower.

Now, let us look at another extreme event. Natural disasters such as earthquakes and tsunamis or floods, landslides, wildfires, and droughts following extreme weather events, kill and injure hundreds of thousands of people a year cause widespread destruction to ecological habitats, and threaten wildlife pollution with local extinctions. So, they are also creating loss.

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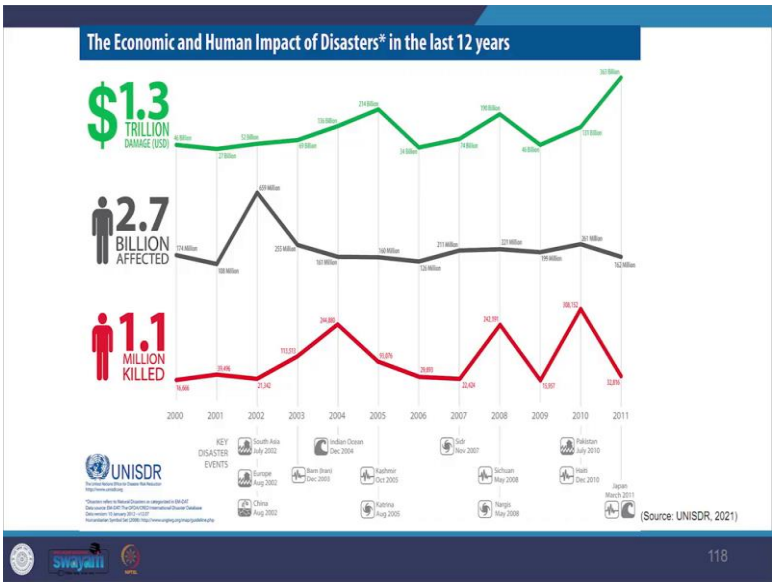

We, further sea marine environment. Because of the warming and acidification, there is loss happening which we will see further in detail. So, we have seen the different drivers that create pressures and biodiversity and the range of impacts direct and indirect. We have seen them here briefly touched upon. Now, we look at the global state and trend of biodiversity.

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Global Change is what we are witnessing which has had a negative impact across all dimensions of biodiversity, which we discussed. The changes are happening from genes to ecosystems. However, we are yet not able to measure the genetic diversity we are not aware of, and further published baseline data is also limited. Moreover, the status of the ecosystem is under evaluation. So, we should see this keeping all this in perspective. So, when we review this you should be conscious about this.

Looking at the state and trends in genetic diversity, genetic diversity is important. It is the raw material for continuing adaptation of wild species by natural selection. It also helps in maintaining and enhancing the diversity of cultivated plants and breeds of livestock. This eventually helps in the resilience of the

agriculture system and food security. We are witnessing a long-term decline in the number of varieties of crops and breeds of livestock. There is a decline in biodiversity at the global level we have been repeating that according to the International Union for Conservation of Nature IUCN's latest estimates.

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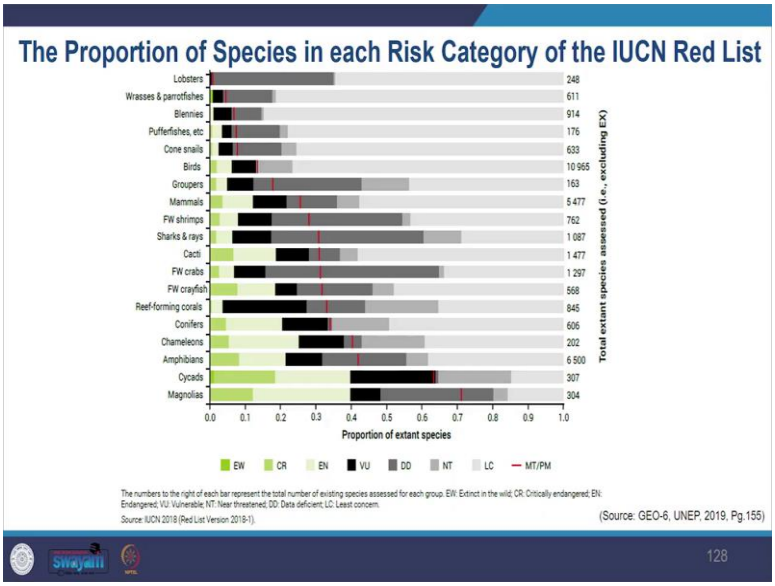

In the figure you can see the red list of threatened species, the green color bars you can see critically endangered species you may note the highest being cycads, second from the bottom, you may see vulnerable in the black color bar, you may see sixth from the bottom the reef, forming coral are identified as vulnerable.

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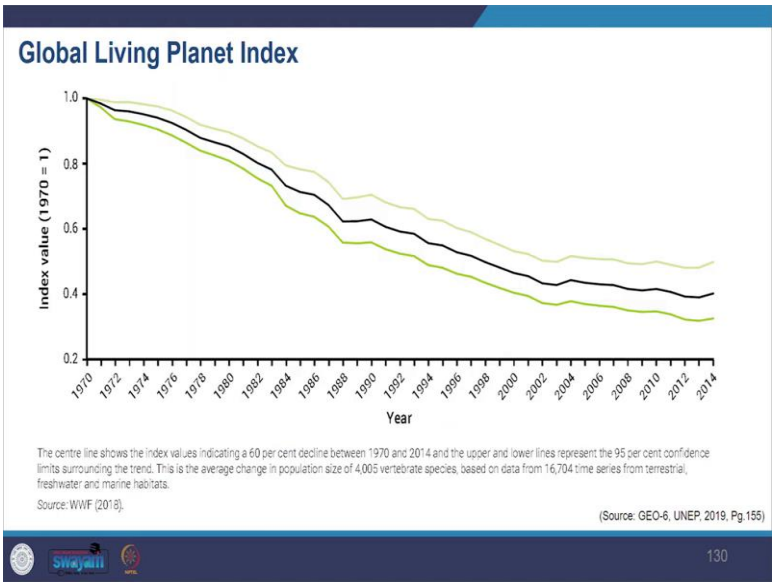

In the figure showing the Living Planet Index, you can see the decline from 1970 to 2014, because of the anthropogenic land use change. So, you can see the decline here.

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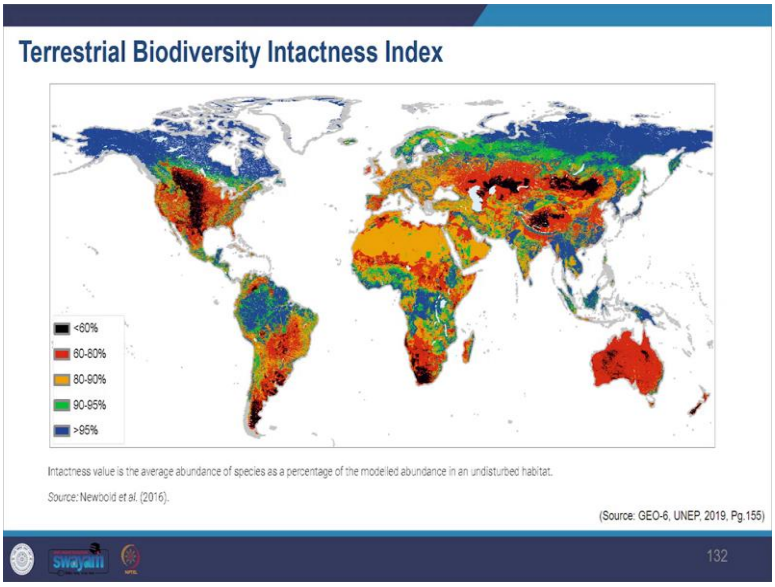

In the figures showing the biodiversity intactness index, you can see the spread of the decline and vulnerability of the species due to anthropogenic land use change in the last 44 years.

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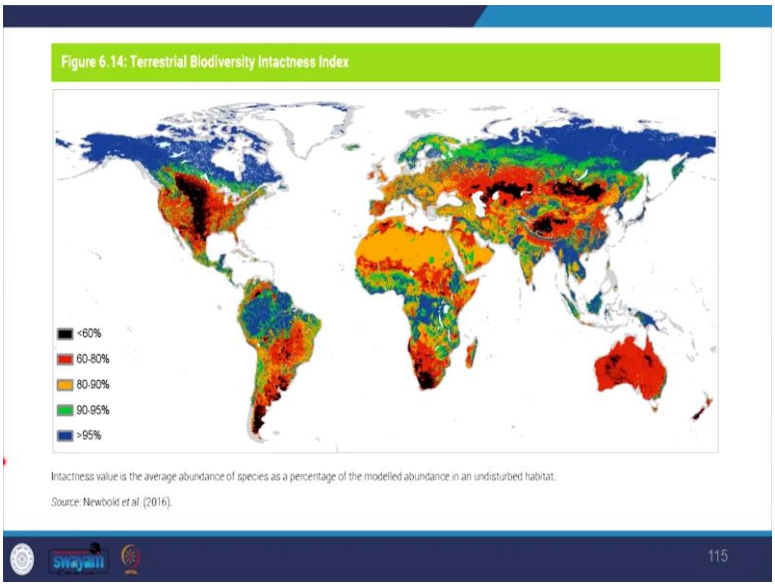

Look at the overall color distribution across the globe and also look at the colors in our country. The study also indicates a decrease in vegetation productivity between 2000 and 2013 because of anthropogenic factors. A study also indicates that 34 percent of terrestrial ecoregions are under danger.

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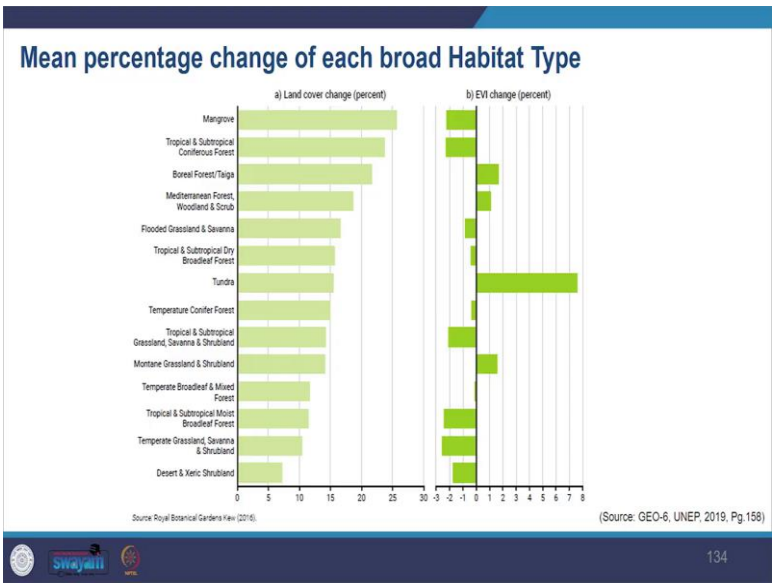

In the figure, you can see that the land cover change in broad habitats, such as Mangrove, Tropical, Subtropical, and Coniferous forests, and also change in productivity. Knowing the percentage change and change in productivity, the study also indicates an average decline in natural wetland area of about 30 percent. Between 1970 and 2008. There has been an increasing impact on marine ecosystems due to anthropogenic activities.

Many of these ecosystem processes are thought to be under threat as a consequence of observed wildlife decline and ongoing threats to biodiversity. Mammals, birds, amphibians, and species that are used for food our medicines are at greater risk of extinction. So, we saw the state of biodiversity and how it is declining rapidly at different scales, and many of the processes we are unaware of.

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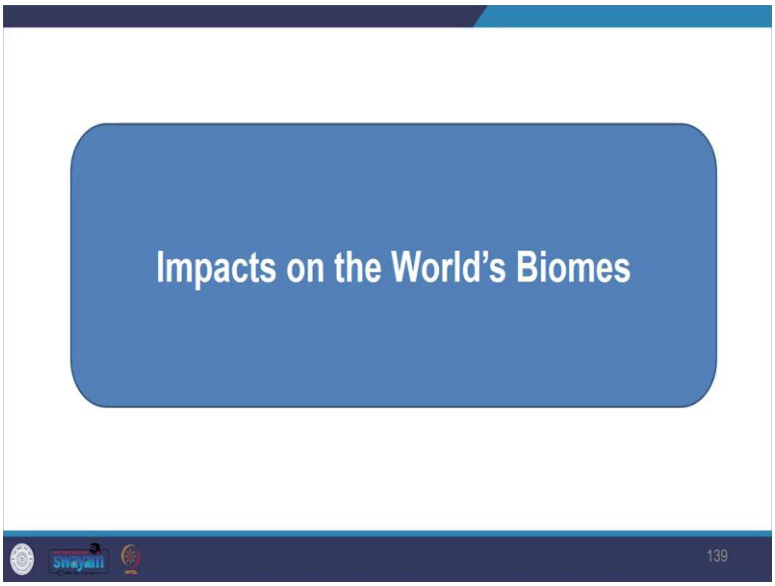

We will now look at the impacts on the World's Biomes. Let us first see what biomes are biomes are defined as a major ecological community of organisms adapted to a particular climatic or environmental condition across a large geographical area. Within biomes, several ecosystems may co-exist, and you may see a lot of things.

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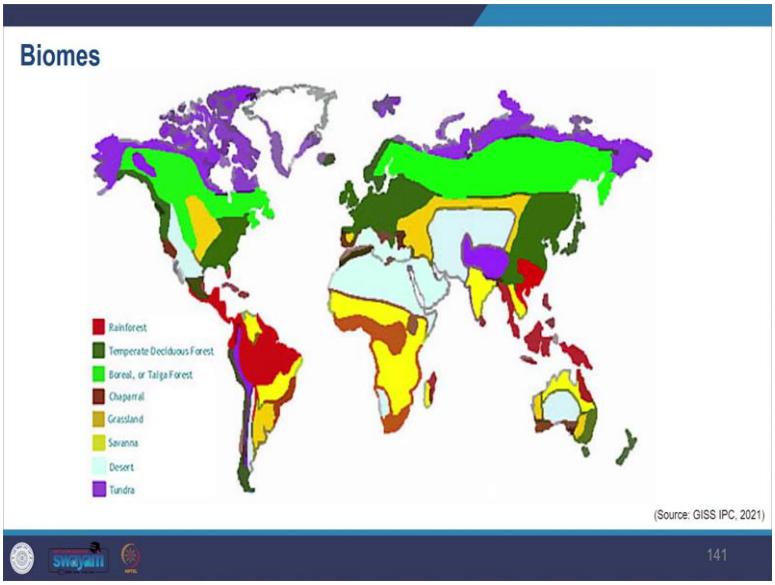

Here we see eight broadly defined biomes that encompass most of the earth's biodiversity so that we are aware of the different reigns variety we have. First, we see ocean and coast as per the report the primary pressure on open ocean biodiversity are over-exploitation, pollution from land-based activities, and climate change.

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A report suggests that coastal ecosystems have additional pressure associated with habitat destruction, aquaculture, and invasive species. coastal systems are said to be particularly vulnerable. For example, between 20 and 35 percent of Mangrove areas have been lost since 1980. That is a big loss and the current annual rate of seagrass habitat destruction is about 8 percent, Coral reefs are among the most biodiverse marine ecosystems they are most vulnerable, and under increasing decline, all these declines are eventually affecting us.

Secondly, sea freshwater systems freshwater system is exposed to multiple pressures because of land use change, habitat loss, invasive species, use of water courses for development and hydroelectric power, and pollution. We are creating a widespread and significant impact. Freshwater vertebrate species declined at a massive scale reporting a record average of 81 percent, over the past 42 years, which is huge.

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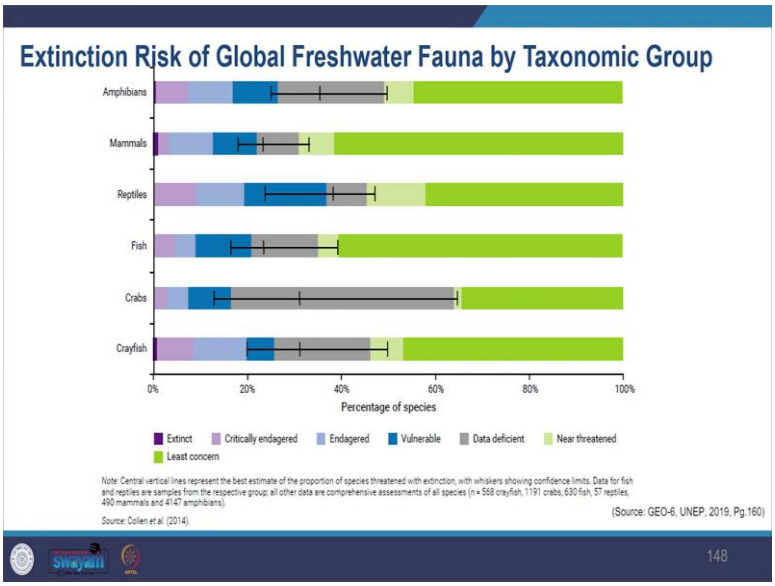

Six groups of global freshwater fauna assessed are in extinction risk, as seen in the figure amphibians, mammals, reptiles, and so on. About a third of the more than seven thousand freshwater invertebrate species on the IUCN red list are considered threatened. That is, that is a big number we are looking at. These species combined to provide a wide range of critical services for humans, such as flood protection, food, water filtration, and carbon sequestration. So, they are important for us.

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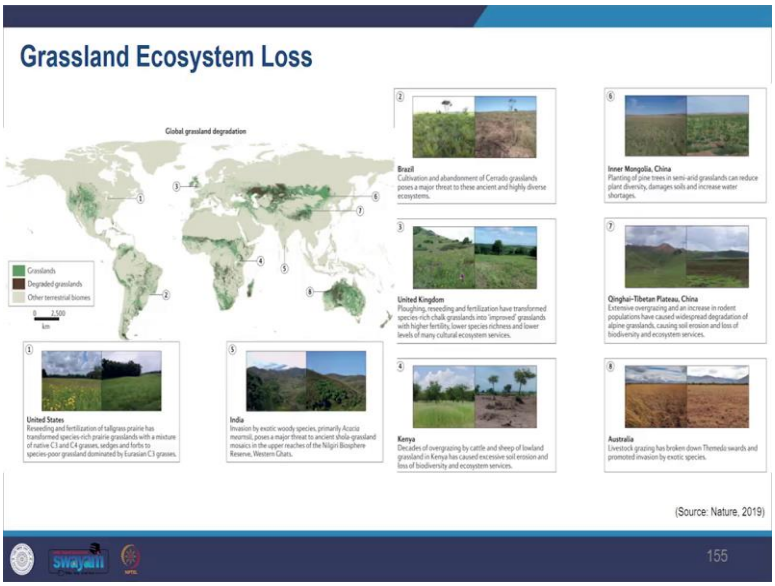

Now, let us see the grassland. As per the IUCN report, grasslands cover about 8 percent of the total land area and were once home to some of the largest wildlife collections on earth. They have now drastically changed and are now an endangered ecosystem. They are facing multiple pressures including land use change over grazing fragmentation, meaning that there is been disrupted invasive species suppression of natural fire, climate change, and afforestation. Currently, 4.5 percent of global grasslands have protected status. So, there is a lot of dependency on small- and small-scale economic activities, and grassland and degradation in such areas impact the livelihoods of many.

Now, let us look at the agricultural landscape. agricultural expansion for thousands of years has led to biodiversity loss in many biomes. However, we also see that there are landscape transformations and fragmentation of natural habitats. It is also a non-cropped area with water causes and air quality. There has been a drastic decline in the animal population, negatively impacting agricultural livelihoods.

However, some of the agricultural practices such as crop combinations and applications of fertilizers and pesticides also impact below-ground biodiversity. The report also emphasizes that it is important to maintain the agricultural landscape, as agriculture can sometimes maintain rare species in semi-natural habitats. So, even that is important.

Now, let us look at the dry land. Drylands are said to be less diverse than other ecosystems. However, they contain thousands of species that are highly adapted to the dry land environment. Dryland species are highly resilient and recover quickly from doubt, from drought, fire, and herbivore pressure.

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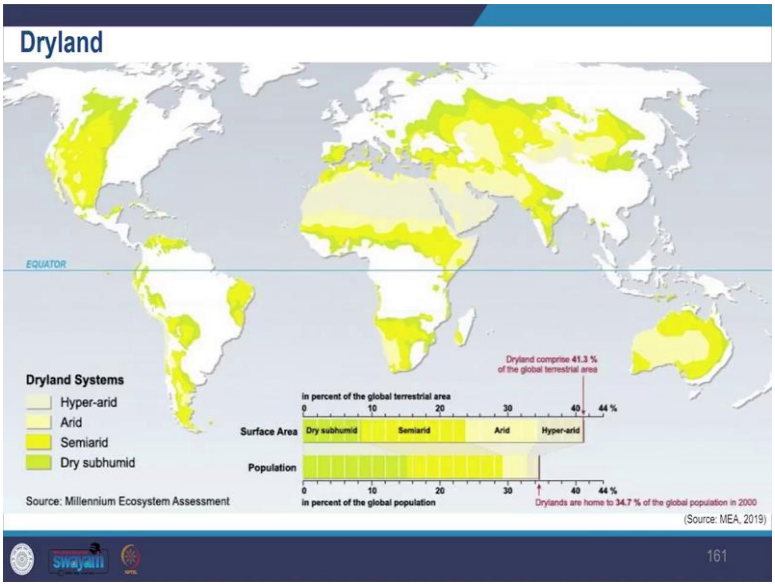

We are witnessing worldwide desertification, which is also known as land degradation and dry lands. Dry land degradation has many causes including human conflicts. We see that large amounts of waste garbage and toxic material were dumped and burned in the desert ecosystem due to war. Drought overgrazing, overuse of groundwater, and unsustainable agriculture practices also impose extra pressure on the dry land.

There are numerous impacts of the degradation of Semi-Arid and Arid landscapes such as the availability of freshwater food production, which also affects the species and genetic resources. Because of desertification, we witness an impact on soil health and vegetation which eventually affects us salinization also happens which is a major problem in these biomes.

Let us now see forests we all know that forests provide habitat for large numbers of animals and plant species contribute a range of ecosystem services and provide essential regulation services we have seen all this deforestation and forest degradation happening at a large scale and it is increasing, increasingly causing

threats to species diversity. This is all happening due to demands of biomass, urban expansion, agriculture, energy mining, and transportation development.

So, when we do EIA, you look at all these aspects. If deforestation and degradation continue the forest can convert to the source of carbon itself. There will be a loss of livelihood there are direct health consequences of deforestation ranging from physical and mental well-being. Forest loss increases exposure to infectious diseases including malaria and other vector-borne parasites.

Let us now look at mountains. The report indicates that the mountain range covers around 22 percent of the terrestrial space of the planet and provides multiple ecosystem services. Mountain habitats at lower elevations are more bio-diverse. We observe habitat degradation and fragmentation and it has impacted many mountain ecosystems. We may note that the mountain ecosystems are especially vulnerable to climate change. The recorded impacts include shifting species ranges and composition, and climate-induced warming can change ecosystem functioning.

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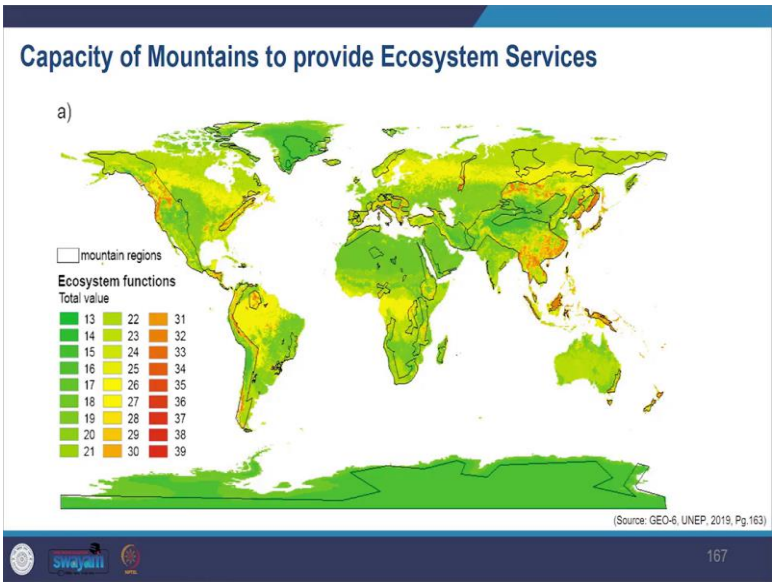

In the figure given you may see an ecosystem function that Mountain provides with warm colors showing the high value of the services.

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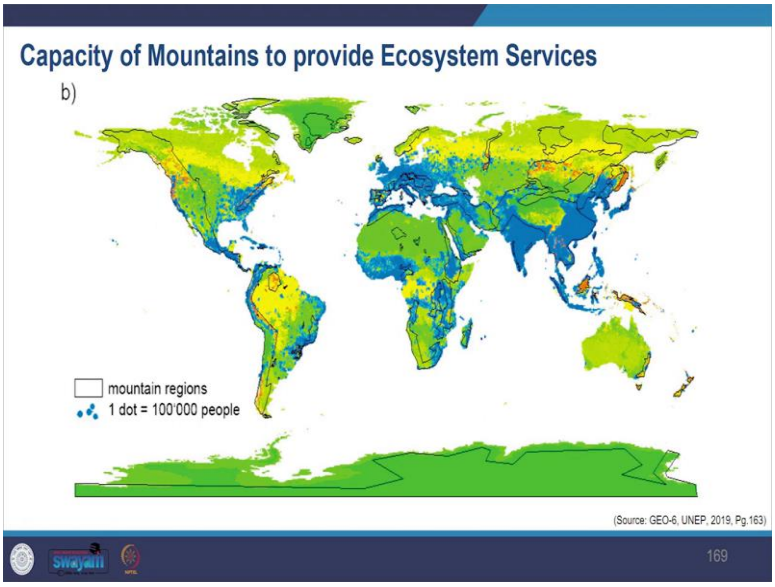

In the following image, you can see the pollution density indicating the demand for the ecosystem service.

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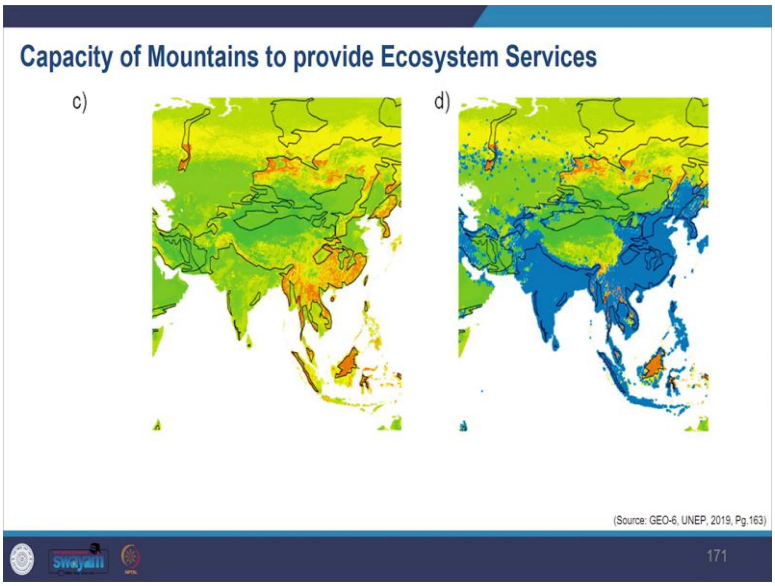

In the following image, you can see the contrast of the supply and demand of the ecosystem placed side by side look at India as per the analysis, the supply is low and the demand is high. As per the report, most mountain areas today are under human pressure including the tropical and, Central Asian Mountain biodiversity hotspots. The Himalayas it is with approximately nineteen thousand species have been documented as highly vulnerable to climate change.

Looking the impact of the loss of biodiversity and degradation of mountains, it will lead to reduced natural contribution to people in both mountains and lowlands will result in changes in air quality and climate regulation. For example, less greenhouse gas will be controlled. It will cause loss of food security, medicinal plants, and water quality and provision and increased exposure to risk associated with landslides, sedimentation of rivers, and flooding, modifying their livelihoods and land cover to the local communities.

Glacier loss also impacts water security many of our population particularly in South Asian countries depend upon the flow of rivers from the Himalayas. There is now a look at the polar region. Polar regions act as a sink for many anthropogenic pollutants Reports show that the biodiversity in the Arctic and Antarctic region is under particular stress. There is a decline in many native species there is an increase in temperature Massive species, especially in the sub-Antarctic and Antarctic Peninsula are major pressures, industrial development, pollution, and local disturbances present extra pressure.

Many studies indicate that the Arctic will be ice-free in some over by 2050. The loss of sea ice will create major ecological shifts, and its impact can be several of you also see those decline in penguin population and Antarctica. So, we see how diverse our viral diversity is how it is under threat, and what changes activities are causing.

To summarize today's session. So today we looked at the meaning of biodiversity. We review the problems associated with biodiversities like the safe mass extension, its significance and benefit, and the concept of one health. We looked at the interconnections between people's biodiversity, ecosystem health, and

provisions of ecosystems and eventually, you are required to connect these while assessing environmental impact, we identified the key pressures on biodiversity, and through this understanding, you should be able to predict various impacts.

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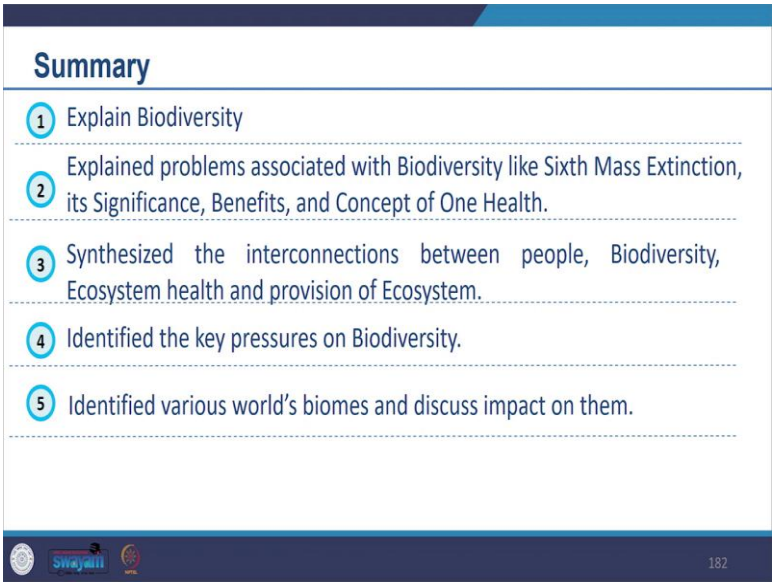

In today's session, we identified various World's Biomes and discussed impact on them and you should, alongside we may review the nature and intensity of environmental impact what we choose to assess, and what we do not choose to assess.

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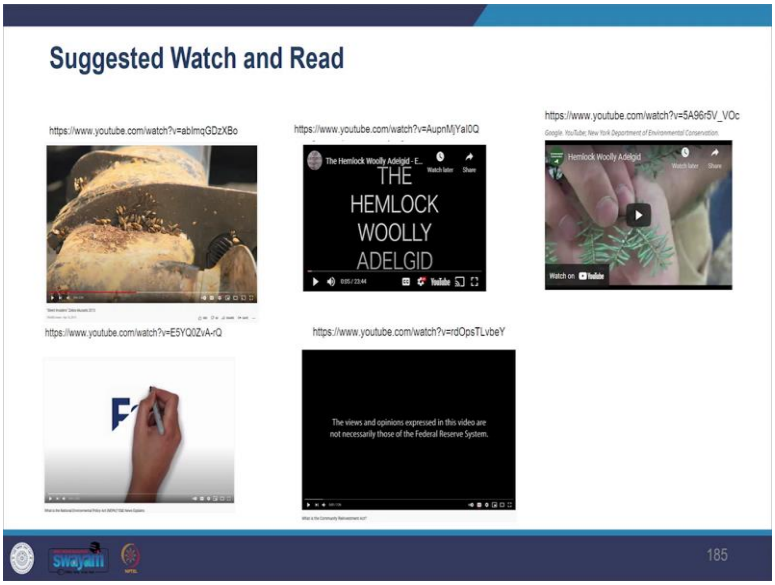

These were the references used for this particular session. Our coverage has been limited as per the scope of the subject additional resources to read and watch are provided to you.

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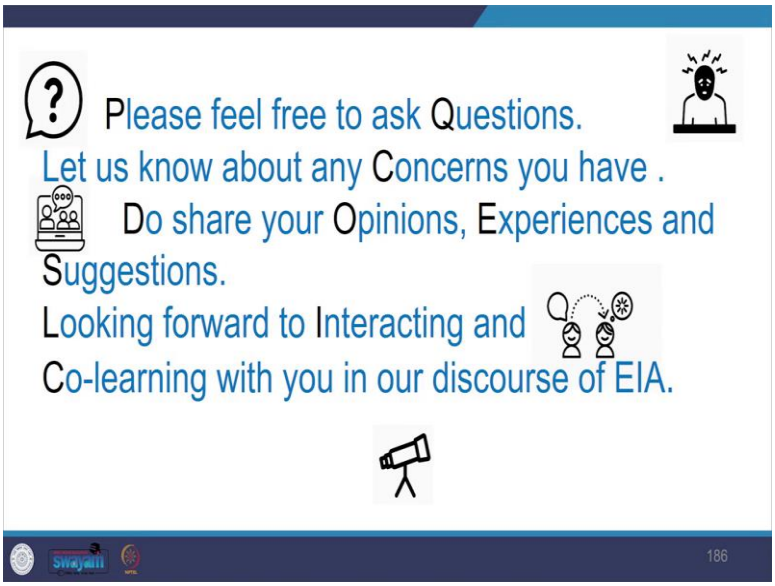

Please feel free to ask questions. Let us know about any concerns you have. Do share your opinions, experiences, and suggestions. Looking forward to interacting and CO learning with you in our discourse of VIP. Thank you