

Biodiversity and Climate Change – General issues

Today, every country in the world has to deal with various global environmental challenges such as climate change (CC), biodiversity degradation, water resources degradation, ozone layer depletion, soil degradation and desertification, and persistent organic pollutants, etc. These interactive environmental challenges directly affect human life and socio-economic development. Amongst those, CC and biodiversity degradation are usually considered the most serious environmental issues either at national or international level.

Global climate change

Over the past few decades, socio-economic activities in every sector such as energy, industry, agriculture, forestry, transportation has produced a huge amount of green-house gases (e.g CO₂, N₂O, NO, CH₄, and H₂S) which cause global climatic systems and global environmental conditions to change unexpectedly. Since 1850, the Earth has warmed 0.74° C and it is projected to warm 1.4-6.4° C by 2100, the highest increase within the last 10,000 years. Meanwhile, precipitation has increased by 5-10% globally. As a consequence, polar ice has melted rapidly, leading to sea levels rising at a rate of about 70-100 cm/year.

Climate change has altered environmental condition at a global scale, and Vietnam is amongst the countries expected to suffer worst impacts of this phenomenon.

Biodiversity degradation

Biodiversity plays a very important role in natural ecosystems and for human being. However, this precious natural resource has been seriously degraded due to a range of human activities. Natural ecosystems such as tropical rain forests have been over exploited or heavily destroyed, and the rate of extinction of species is accelerated. Consequently, various by-products of these ecosystems such as water source regulation, anti-erosion, waste conversion, environment cleaning, nutrient cycling, and natural disaster impacts mitigation are declining or even lost. For this reason, human economic systems, especially that of developing countries such as Vietnam, will decline due to losses of natural resources and environmental values.

The interlinkages between Climate Change, Biodiversity and Sustainable Development

Biodiversity and CC are intimately linked, and both of them directly or indirectly affect the development of nature and human society.

Biodiversity affects the ability of terrestrial ecosystems to capture atmospheric carbon, their rates of evapotranspiration and temperature, all of which affect climate at local and global levels. Ecosystems, especially agricultural ecosystems (cultivation, animal husbandary) and forests, emit green-house gases which are the main factor that make up climate change. On the other hand, some ecosystems, especially the forests help in regulating climate and uptake of CO₂ through photosynthesis, thus help reduce the amount of greenhouse gases in the atmosphere.

CC's impacts on human beings and biodiversity are highly complex. Some significant impacts are sea level rise, global warming, changes in annual cycle of bioclimate (total number of days with average temperature < 20°C decreases, total number of days with average temperature >25°C increases, total heat amount increases, lowest temperature level increases), degradation (quantity and quality) of water resources, increasing frequency and intensity of natural disasters (i.e. flood, flash flood, drought, erosion, landslide).

For Vietnam, sea level rise will threaten wetland ecosystems of the country's largest river deltas, inhabited by age-old communities with many poor people. These areas are of particular importance since they have high potential of agricultural production, and also have many natural habitats for indigenous species, including natural protected areas and biosphere reserves.

Increased temperature will alter the distribution and structure of biomes: tropical species will decline in coastal ecosystems and will move to higher latitude in terrestrial ecosystems; structure of food chains and food webs within ecosystems will also be altered. The climatic range of many species will move poleward or upward in elevation from their current locations. For instant, for the mid-latitude region (24-60°), climatic zones may shift 150-550km pole-wards.

CC affects inland water-bodies (i.e. rivers, lakes, swamps, etc.) by altering water regimes, water level, and climatic condition (precipitation, storm, flood, drought, El-Nino). In particular, the increasing frequency and persistence of storms and droughts will lead to the decline of bio-productivity of crop plants, extinction of indigenous species, and large damages to economics. Changes in ecological condition will also cause malnutrition, fatal disasters, and infectious disease with high rate of fatality.

An important factor emerging in CC's impact assessment is the "inert" of climatic system, which is the slow change of climate system towards the irreversible point where significant change happens. Due to this "inert" property of the climate system, even when atmospheric concentration of green house gases is stable, global warming and sea level rise will keep on going for the following decades and centuries, irrespectively.

For Vietnam, it is predicted that coastal zones, water resources, and biodiversity will be the region/sectors to suffer worst impacts of CC.

Recommendations

- CC and Biodiversity degradation are serious environmental issues challenging development within all countries in the world. Therefore, all sectors/levels of state management must be aware of the seriousness of these issues, and propose solutions to mitigate and adapt to climate change impacts, and to conserve biodiversity.

- Although Vietnam has joined many international conventions relating to CC and biodiversity and has achieved significant results in this field, these issues still need more concern at national level, where they are integrated into national strategies in general, and not only limited to natural resources and environment sector.

- National Action Plan on Biodiversity Conservation should focus on developing mitigation activities corresponding with CC scenarios such as protecting genetic resources for agriculture and forestry, sustainable management and development of watershed-forest, shifting the varieties regime of crop plants with suitable varieties (i.e. thermally tolerant, drought tolerant), and adjustment of protected area planning in low-lands. Afforestation, reforestation, improved forest management and avoidance of deforestation activities need to be enhanced for reduction of green house gas emissions, mitigation of natural disasters, and conservation of land and water resources.

- In the field of environment protection and sustainable development, especially activities relating to CC and biodiversity conservation, it is important to be fully aware of the integrated, inter-sector and community-based approach in every step of state management, from policy planning to policy implementation. It is also important to develop comprehensive and synchronous solutions (i.e. institution, policy, planning, plan, technology, etc.) to CC and biodiversity conservation, where capacity building, raising awareness and international cooperation must be prioritized at an appropriate level.

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