

Global warming and loss of biodiversity

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A brief about the richness of Biodiversity in Indonesia.

Indonesia has an important position in terms of global biodiversity, since it is one of the ten countries with the richest biodiversity, often known as *megadiversity country* (Primack et al. 1998). Indonesia is estimated to have 90 ecosystem types, from snow peaks at Jayawijaya, alpine, sub-alpine, montane to lowland rainforests, coastal forest, grasslands, savannah, wetlands, estuaries, mangrove and marine and coastal ecosystems, including sea grass and coral reefs to deep sea ecosystems. Although it covers only 1.3% of the total landmass in the world, Indonesia harbors very high fauna species diversity, as outlined below (Mittermeier. 1997):

- About 12% (515 species, 39% endemic) of the total mammal species, second in the world.
- 7.3% (511 species, 150 endemic) of the total reptile species, fourth in the world.
- 17% (1531 species, 397 endemic) of the total bird species, fifth in the world.
- 270 species amphibians, 100 of which are endemic, sixth in the world.
- 2827 invertebrate species.

Furthermore, Indonesia has 35 primate species (ranking fourth in the world, 18% of which are endemic) and 121 butterfly species (44% endemic). Perhaps Indonesia is the only country after Brazil and maybe Colombia that has the highest freshwater fish diversity, about 1400 species (Mittermier. 1997).

Climate change and biodiversity.

Global warming is right now widely accepted that it is happening. Increasing earth's temperature, climate change, sea levels etc were noticed in the last decade. Greenhouse effect was usually blamed as the cause of those changes. Increasing the emission of greenhouse gasses like carbon dioxide (CO₂), methane (CH₄), dinitro oxide (N₂O), and chlorofluorocarbon (CFC) trap the solar energy in the atmosphere. The increased use of fossil fuel in many industries such as power industries, transportation

and any other industries has resulted in increasing CO₂ level. On the other hand, the reducers of CO₂ were tent to reduce from year to year.

International Panel on Climate Change (IPCC) predicted that if there was not any effort globally to reduce the emission of greenhouse gasses the earth's temperature will increase about 5.8°C in 2100. If the prediction is really occurred, most ecosystems would possibly not able to adapt with. Increasing the temperature of 2°C above the average temperatures, will increase the number of ecosystem that unable to adapt with and will increasing the extinction (loss) of biodiversity. Global warming has certainly affected species' distributional ranges, the timing of breeding, migration, flowering, and so on and increase in scarcity. Thomas et al. (2004) estimated that 18 and 35% of plant and animal species will be committed to extinction by 2050 due to climate change. Extinction of flora and fauna will increase, and also the migration of fauna and pest would be taken place. The impact of increasing earth's temperature on coral would be easily noticed, since coral is much more sensitive to the increase of sea temperature. The increase of 1°C of sea temperature may cause the coral experiencing stress and bleaching that eventually dead.

Extinction of species is a complex process that affected by many factors. This matter has become a long serious debate, however, it was still poorly understood. This also likely the same with the case of impact of global change on biodiversity, it has also become long and hot debate, however the results are contentious. Some people argue that species have managed to survive even in a worse climate change in the past and that current threats to biodiversity are simply overstated.

The impact of climate change on global biodiversity has been reported (Thomas et al., 2004) by analyzing the distributions of 1103 species of animals and plants from various parts of the world. They matched up the geographical distribution of each of these 1103 species with the climatic conditions in these areas. The study showed that 15-37 percent of those species are likely to go extinct based on the best projections of future climate change. Moreover, in many cases, the climate currently occupied by a species was expected to disappear entirely, and in other cases, there was no geographic overlap

between where the species currently occurs and where the climatic conditions will remain suitable. In the last cases, the species would have to move or potentially face extinction.

In what aspects the climate change affects biodiversity?

The influence of climate change in species might be through many ways including the expansion or contraction of habitat; increased incidence of disease and invasive species; changes in environmental conditions; failure of ecological relationships with other species, like the loss of critical pollinators for a certain plants and shifts in food availability. Migration of certain species in response to the climate change would also possibly occur. Human activities such as fragmenting, converting, and destroying habitats of many species have forced many species to do migration. The effects of the climate changes on biological diversity are still need to be studied more thorough and detail, so that an accurate forecast of its effect could be clearly elucidated.

Indonesia is the world's largest and most densely populated archipelago, comprising of approximately 17,000 islands and more than half of those islands are permanently inhabited. The richness of biological diversity in Indonesia is undoubtedly recognized, and as a mega-diversity or hotspot of biodiversity in the world. Indeed the fact that Indonesia is reach with biodiversity in term of gene, species and ecosystem, however, the rate of its loss is also quite high. The high rate of biodiversity loss has made many international conservation agencies prioritizes Indonesia and set as global priority for actions to conserve biodiversity. The richness of biodiversity in Indonesia is facing problems of rapid degradation due to rapid landscape change, land slide, floods, pollution and over harvesting etc. Loss of biodiversity continuously unabated across the country although the increase of awareness in conserving biodiversity taken place institutionally and individually. Economic decline of Indonesia that directly relate to the increase the number of poor people has also partly support the degradation. Poor people mostly dependent on biological resources for their livelihoods, and on the other hand, they suffer the most from the impacts of the degradation of biodiversity and environmental services.

Many factors leading to biodiversity loss in Indonesia: 1). Habitat loss and fragmentation; 2). Habitat degradation; 3). Overexploitation; 4). Extinction; 5). Deforestation, 6). Bushfire, and 6). Climate change.

What the role may be taken by SIB?

Although the effect of global warming on biodiversity is somewhat debatable, at least the fact is generally accepted that global warming is happening. SIB could take apart in solving the problems related to biodiversity along with the global change. There are at least two distinct kinds of actions should be taken:

a). Long-term actions, such as reducing emissions of greenhouse gases, through decreasing use of fossil fuels, decreasing or even stop deforestation and increasing re-forestation. Researches related to the climate change on biodiversity, the used of biodiversity as sources of active compounds, biodiversity conservation as well as barcoding of biodiversity are very important aspects.

b). Short-term action, such as by designing an appropriate nature reserve would be very useful in conserving biodiversity.

References

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