Free the influence of deforestation on malaria outbreak research proposal example...

Technology, Development

1. Observation and background information

One of the major agents of global environmental change is deforestation. Deforestation is a consequence of land use change which is often affected by both biophysical and socioeconomic factors. Human decisions heavily influence land use in response to global markets.

Geist and Lambin (143) noted that tropical forests are disappearing because of pressures coming from both local and regional scale having synergistic effects in different parts of the world. Human activities such as agricultural expansion, human population dynamics and agricultural policies have direct and indirect impact on forest cover change. Deforestation in the tropics is exacerbated because of the synergies of economic factors, institutions and national policies. Other factors such as those that promote agricultural expansion, wood extraction and infrastructure extension also press the environment.

Several studies have demonstrated how deforestation has affected the environment. Numerical experiments show a linkage between deforestation and changes in regional climate patterns.

A study on the Amazonian forest shows a clear link on how deforestation affects changes in climatic conditions. It has been noted that, during the dry season in the Amazon, there is a difference in response to local circulations between deforested area and savanna and forested area. This differential response is due to the variation in heating of different forestation (Negri et al. 1306). Deforestation has been also observed to influence the hydrological cycle of Western Mediterranean. Based on several deforestation experiments, regional climate models for the Western Mediterranean show

that there is a decrease in evaporation and precipitation rates during spring and summer. This reduction in evaporation and precipitation rates extends over the entire deforested zone.

2. Hypothesis

The impact of deforestation to the biotic components of the environment has been well-documented. Recent studies revealed that deforestation may cause major losses of epiphytes such as orchids, bromeliads and ferns. It has been also reported that the regenerative capacity of epiphytes are very slow. Epiphytes are sensitive to climate changes because of their tight affinity to atmospheric conditions. Given these conditions, epiphyte diversity may be adversely affected if the ambient temperature within the forest increases. There has been also a link showing how deforestation has resulted to habitat loss of several important species within the food chain. This consequently leads to the decrease of population of howler monkeys and birds to cite a few. In fact, forest disturbance poses a threat to ecological health, especially to mammals (the most sensitive group) (Sodhi et al. 103). Indeed, biodiversity is sensitive to forest disturbance. Aside from those cited impacts to biodiversity it is hypothesized that land-use changes vis-a-vis deforestation can promote an outbreak of vector-borne diseases such as malaria in all parts of the world.

3. Relevant Information

Of all the vector species found in the forest, mosquitoes quickly respond to fluctuations in climate changes due to deforestation. The survival, density and distribution of this species are heavily affected by a slight change in temperature, humidity and availability of suitable breeding site (Yasuoka and

Levins 450). Several studies were carried out in Kenya to illustrate the effects of deforestation on Anopheles species. Minakawa and colleagues (157) demonstrated in their study that the distribution of anopheline larva is significantly associated with land cover types and topographic features. That is, canopy cover has been significantly connected to the frequency of two Anopheles species, (An. gambiae and An. funestus). Further, clearing of riparian forest entails a possible improvement in the growth of the two Anopheles species in the Kenyan highlands.

The results of the study in the Kenyan highlands were further supported by Afrane and colleagues (974). That deforestation caused microclimate change in western Kenya affected the gonotrophic cycle of Anopheles gambiae. An increased in mean indoor temperature of 1. 8°C shortened the duration of the first and second gonotrophic cycle of An. gambiae by 1. 7 days (59%) and 0. 9 days (43%) respectively. Shorter gonotrophic cycle implies a higher biting frequency and capacity to be a vector. In deforested areas, the average indoor temperature of houses during rainy days is1. 2°C higher than those in the forested area. Similar to the results during the dry season, shorter gonotrophic cycle were also observed in sites with warmer temperatures. The evidence indicates that deforestation can enhance malaria transmission through the said factors.

Malaria is a disease caused by a protozoan parasite (Plasmodium falciparum). The protozoan completes its life cycle via the vector mosquito Anopheles that moves the protozoan parasite to the human host. With the prevalence of the disease in the tropics and sub-tropic region, the disease proves to be detrimental to human health all over the world. Frequent

outbreaks have been reported in the East African highlands (Minakawa 157). It has also been reported that rates of malaria remained high in the Southeast Asian, Sub-Saharan Africa and some parts of Latin America. Every year an estimated 2 million people all over the world die because of malaria. The incidence of malaria has increased since 1990 in less-developed nation. These elevated cases of malaria have been closely associated to areas with high levels of environmental degradation. Several theories suggested that agricultural export flows and resulting changes to the natural environment in underdeveloped nations may be the cause of malaria outbreak.

4. Conclusion

It has also been repeatedly emphasized that deforestation and biodiversity loss are the main factors that affect malaria rates.

There are various ways on how drastic changes in land use can promote vector-borne diseases such as malaria. When man-made aquatic habitats are made for cattle grazing, this favors the growth of Anopheles gambiae. Anopheles gambiae is known as the primary vector for the transmission of Plasmodium to the human body. The physical and chemical attributes of the mosquito breeding habitat can alter as changes in land-use also occurs. Besides the physico-chemical attributes of the habitat, changes in microclimate is also a possibility. And as a consequence, habitats well-exposed to sunlight favor mosquito larvae development and an increase in adult density of Anopheles gambiae. Anopheline ecology is also affected by natural selection. That is, mosquito larval predators are more prevalent in

natural swamps as opposed to those that are cultivated. The difference in habitats also dictates the distribution, survivorship and development of these Anopheles species. These factors greatly affect malaria rate in a particular area (Minakawa et al. 157).

Works Cited

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