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## **Greenhouse Gas Mitigation and Climate Change Adaptation: Some Policies for Nepal**

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Although Nepal is an extremely insignificant emitter of global carbon – emitting less than 0.1% of global emissions - it is burdened by a disproportionately high degree of vulnerability to the adverse effects of climate change. Nepal's exposures include the possibilities of increased GLOF (Glacial Lake Outburst Floods) phenomenon, the melting mountains syndrome, and decrease in agricultural production, increase in vector borne diseases, loss of important bio-diversity assets and change in the hydrological cycles and resulting effects. Given her limited financial resources, and a weak institutional capacity, the changing climate will likely reduce Nepal's GDP, increase the society's disease burden, and cause additional human deaths.

Most GHG emissions in Nepal result from transportation, manufacturing and agricultural activities. In addition, the massive deforestation that the country witnessed from the 60's to the 90's released a large amount of carbon into the atmosphere. However, lately, Nepal has been able to reduce the rate of deforestation, and in fact, in some cases actually increase the area of forest cover, thanks largely to the successful and innovative community forestry program, and aggressive efforts by Nepal government to conserve forested areas. According to a joint ADB and ICIMOD report, between 1996 to 2000, Nepal's forest cover increased from 6.2 million hectares to 6.8 million hectares<sup>†</sup>. This replenished forest area has provided additional carbon sink by capturing a significant amount of carbon which otherwise would have been emitted to the atmosphere.

In a poor country like Nepal, the gradual and long-term adverse impacts of climate change fail to grab priority attention when immediate problems including security, health, education, water supply, and localized pollution are highly visible demanding immediate attention. The not so obvious and gradual impacts of climate change, although severe in the long term, fail to compete with the everyday problems of underdevelopment. This is ironic, as the poor countries are more vulnerable and susceptible to the negative impacts of the climate change,

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<sup>†</sup> Environmental Assessment of Nepal, ADB, ICIMOD and Government of Nepal (2006). <http://www.adb.org/media/Articles/2006/10001-Nepal-environment/>

as they have weaker institutional and managerial capacity and lack adequate financial resources to organize effective adaptation programs.

Climate change will affect several sectors in Nepal. Most important impact will be in agriculture, such as, in land productivity and crop yields. Potential change in the hydrological cycle, for example, an early or late rain fall season, changes in the irrigation pattern and water supply and the changes in pollination and fertilization seasons, and natural biological cycle, can adversely affect the routine agricultural practices that farmers have perfected over the centuries. Other areas of concern where climate change is likely to negatively affect Nepal include deterioration of public health; more frequent flooding, change in weather patterns, and increase in the intensity and frequency of landslides and storms.

As a signatory of the Kyoto Protocol, Nepal can earn Carbon credits through the CDM<sup>‡</sup> window. It can sell them as Certified Emission Reductions (CER's)<sup>§</sup> to the countries who cannot meet their own carbon reduction levels. Nepal is in an excellent position to provide certified carbon credits to companies from annex I countries, by promoting clean energy projects that reduce the baseline carbon emission. The resources saved, and generated through these programs could be effectively utilized for adaptation programs.

Many locations in Nepal are particularly vulnerable to the effects of climate change. These areas include high altitude settlements, downstream agricultural lands, villages immediately below glacial lakes and settlements near lakes and rivers. To safeguard against drastic climate impacts, government and other institutions must establish adaptation measures and develop a hierarchy of adaptation approaches.

The natural system is largely reactive to the environmental changes induced by climate change. By contrast, human adaptation system can be anticipatory, where several policies can be formulated in advance, and

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<sup>‡</sup> Clean Development Mechanism (CDM): It is provided by Article 12 of the Kyoto Protocol, and is meant to financially help developing countries towards sustainable development. CDM permits industrialized countries to finance projects in developing countries, which can receive credits for reducing greenhouse gas emissions.

<sup>§</sup> Certified Emission Reductions (CERs): A unit of greenhouse gas emission reductions issued pursuant to the Clean Development Mechanism of the Kyoto Protocol, and measured in metric tons of carbon dioxide equivalent.

with minimum or even nil net social costs. The so called “no regrets policies” and “precautionary principles” can be incorporated into the menu of adaptive measures the government can formulate. If these policies are implemented, the net investment cost on climate related technologies can become zero if the medical, social, and environmental benefits of the changes are accounted for.

Adaptation policies must attempt to protect human health, ecosystems and the various economic systems in the country. Human health is likely to be adversely impacted by climate change primarily because of the increase in vector borne diseases. Nepal’s fragile eco-system can suffer significant damage due to the added impacts of climate change in addition to the existing environmental stressors. Governmental policies must include building public health capacities in a decentralized manner, creating a public awareness system to educate people of the possible epidemics, and establishing research and other activities to address such public health problems.

Government can consider several policy options to mitigate climatic impacts on agriculture. Such policies can include crop insurance, changing of crop patterns, and providing irrigation facilities. Public policy should also support furthering research on how crops can resist changes in hydrological cycle and shift in ambient temperatures, and growing season. Nepal will benefit from policy options that provide the country with cost effective means of producing clean energy. Further, it must build environmentally sound infrastructure projects. Nepal must enhance its afforestation and reforestation programs to increase the carbon sink capacity so that it can earn additional certified carbon credits for potential sales to global bidders.

It is also imperative for Nepal to invest resources in education and information dissemination related to the greenhouse gases, climate change and related mitigation and adaptation techniques and programs. As a highly vulnerable, largely mountainous, and primarily an agrarian society, Nepal must be proactive in enhancing its institutional and social capacity to deal with the gradual threat emanating from climate change.

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