Background Paper*

CLIMATE CHANGE AND THE MOST VULNERABLE COUNTRIES: THE IMPERATIVE TO ACT

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INTRODUCTION

1. Over the coming decades climate change is projected to affect the lives of billions of people around the world. No region or country is immune to it impacts, however, the extent of vulnerability differs widely. Least developed countries (LDCs) and small island developing states (SIDS) are especially vulnerable, though every developing country, will face additional challenges to attain the United Nations Millennium Development Goals by 2015 (see UN 2007).

2. Combating climate change requires concerted action to adapt and mitigate the effects. Even the most stringent mitigation efforts will not be sufficient to alleviate the future impacts of climate change. Being prepared to address near-term impacts is therefore particularly important. However, over the long term unmitigated climate change would likely to exceed the capacity of natural, managed and human systems to adapt.

3. The Bali Action Plan and the ongoing climate change negotiations address enhanced action on adaptation, including the urgent and immediate needs of developing countries that are particularly vulnerable, further taking into account the needs of countries in Africa affected by drought, desertification and floods. It also reaffirms the provisions and principles of the United Nations Framework Convention on Climate Change (UNFCCC), in particular the principle of common but differentiated responsibilities and respective capabilities.

4. Developing and implementing adaptation strategies is most urgent following the projections in the IPCC Fourth Assessment Report (see IPCC 2007). Even a temperature rise of 1– 2.5°C will have serious effects, including reduced crop yields, spread of climate sensitive diseases such as malaria, an increased risk of extinction of plant and animal species, water stress, and increased risk of floods as glaciers retreat followed by drought and water scarcity. Over the course of this century, sea level rise will lead to the destruction of coasts worldwide with some small island States possibly facing complete inundation and some regions facing an increase in the severity and frequency of extreme weather.

5. Projected climate changes could not only have serious environmental, social and economic implications, but also implications for peace and security and migration. However, the specific impacts of climate change will depend on the climate variance and change it experiences as well as its geographical, social, cultural, economic and political

* This background paper draws heavily on the various chapters of the Fourth Assessment Report of the IPCC, in particular on the Contribution of Working Group II on Impacts, Adaptation and Vulnerability. It also draws on a publication of the UNFCCC Secretariat of 2008 entitled "Climate Change: Impacts, Vulnerabilities and Adaptation in Developing Countries".

situations. As a result, countries require a diversity of adaptation measures that reflect their unique circumstances.

IMPACTS AND VULNERABILITIES

6. Climate change is expected to affect the type, frequency and intensity of extreme wheather events, such as tropical cyclones (including hurricanes and typhoons), floods, droughts and heavy precipitation events, are expected to increase even with relatively small average global temperature increases. Changes in some types of extreme wheather events have already been observed, for example, increases in the frequency and intensity of heat waves and heavy precipitation events.

7. Climate change will have wide-ranging impacts on the environment, and on socio-economic and related sectors. Vulnerability to climate change is the degree to which these sectors are susceptible to, and unable to cope with, adverse impacts. Changes in rainfall patterns are likely to lead to severe water shortages and/or flooding. Melting of glaciers can cause flooding and soil erosion. Rising temperatures will cause shifts in crop growing seasons, which will have knock-on affects on food security and changes in the distribution of diseases putting more people at risk from diseases such as malaria and dengue fever. Temperature increases will potentially accelerate rates of extinction for many habitats and species. Particularly affected will be coral reefs. Increasing sea levels mean greater risk of storm surge, inundation and wave damage to coastlines, particularly in small island states and countries with low lying deltas. A rise in extreme wheather events will have effects on health and lives as well as associated environmental and economic impacts.

8. Adapting to climate change entails taking the right measures to reduce the negative effects of climate change (or exploit the positive ones) by making the appropriate adjustments and changes. There are many options and opportunities to adapt. These vary from technological options such as increased sea defenses or flood-proof houses on stilts, to behaviour change at the individual level, such as reducing water use in times of drought and using insecticide-sprayed mosquito nets. Other strategies include early warning systems for extreme events, better water management, improved risk management, various insurance options, biodiversity conservation and economic and fiscal framework that promote low-carbon growth.

Water

9. The impacts of climate change on water are key for all sectors and regions. Climate change is expected to exacerbate current stresses on water resources from population growth and economic and land-use change, including urbanization. Widespread mass losses from glaciers and reductions in snow cover over recent decades are projected to accelerate throughout this century, reducing water availability, hydropower potential, and changing seasonality of plant species in regions supplied by meltwater from major mountain ranges (e.g. Hindu-Kush, Himalaya, Andes).

10. Changes in precipitation and temperature lead to changes in water availability. A decrease in water runoff by 10-30 per cent is projected in some dry regions, dry tropics and some semi-arid areas due to decreases in rainfall and higher rates of

evapotranspiration. It is projected that by 2020, between 75 million and 250 million people in Africa alone will be exposed to increased water stress due to climate change (see UNFCCC 2007b).

11. The negative impacts of climate change on freshwater systems outweigh its benefits. Areas in which runoff is projected to decline face a reduction in the value of the services provided by water resources. The benefits of increased annual precipitation in some areas, including wet tropical areas, are likely to be tempered by the effects of increased extreme weather events, rainfall variability and flood risk. Freshwater availability in Central, South, East and South-East Asia, particularly in large river basins, is projected to decrease due to climate change. Population growth and higher standards of living will increase demand of freshwater which could adversely affect more than a billion people by 2050 (see IPCC 2007).

12. Available research suggests a significant future increase in heavy rainfall events in many regions, including some in which rainfall is projected to decrease. The resulting increased flood risk poses challenges to society, physical infrastructure and water quality.

Food

13. Impacts of climate change on food production and security are geographically diverse. Crop productivity is projected to increase slightly at mid- to high latitudes. At lower latitudes, especially in seasonally dry and tropical regions, crop productivity is projected to decrease for even small local temperature increases between 1-2°C, which would increase the risk of hunger. For example, it is projected that crop yields could increase up to 20 per cent in East and South-East Asia while they could decrease up to 30 per cent in Central and South Asia by the mid-21st century. Taken together, and considering the influence of rapid population growth and urbanization, the risk of hunger is projected to remain very high in several Asian developing countries. For many African countries agricultural production, including access to food, is projected to be severely compromised by climate variability and change. Some African countries could experience a reduction of yields from rain-fed agriculture by up to 50 per cent by 2020. In drier areas in Latin America, climate change is expected to lead to salinisation and desertification of agricultural land. Productivity of some important crops is projected to decrease and livestock productivity to decline, with adverse consequences for food security.

Coasts

14. Coasts are projected to be exposed to increasing risks, including coastal erosion, due to climate change and sea level rise. The effect will be exacerbated by increasing human-induced pressures on coastal areas. By the 2080s, many millions more people than today are projected to experience floods every year due to sea level rise. The numbers affected will be the largest in the densely-populated and low-lying megadeltas of Asia and Africa while small island developing States (SIDS) are especially vulnerable.

Industries, settlements and societies

15. The most vulnerable industries, settlements and societies are generally those in coastal and river flood plains, those whose economies are closely linked with climate-sensitive resources, and those in areas prone to extreme weather events, especially where rapid urbanization is occurring. Poor communities can be especially vulnerable, in particular those concentrated in high-risk areas.

Health

16. The health status of millions of people is projected to be affected through, for example, increases in malnutrition; increased deaths, diseases and injury due to extreme weather events; increased burden of diarrhoeal diseases; increased frequency of cardio-respiratory diseases; and the altered spatial distribution of some infectious diseases.

Ecosystems

17. The impacts of climate change on ecosystems also represent a key vulnerability. The resilience of many ecosystems is likely to be exceeded this century by an unprecedented combination of climate change, associated flooding, drought, wildfire, insects, ocean acidification, and other global change drivers, including land-use change, pollution and over-exploitation of resources. Over the course of this century, net carbon uptake by ecosystems is likely to peak by mid-century and then weaken or even reverse, thus amplifying climate change. Approximately 20-30 per cent of plant and animal species are likely to be at increased risk of extinction if temperatures rise more than 1.5-2.5°C. In Latin America, by mid-century, increases in temperature and associated decreases in soil water are projected to lead to gradual replacement of tropical forest by savanna in eastern Amazonia. Semi-arid vegetation will tend to be replaced by arid-land vegetation. There is a risk of significant biodiversity loss through species extinction in many areas of tropical Latin America.

LDCs and SIDS

18. The least developed countries (LDCs) and the small island developing States (SIDS) are highly vulnerable to the impacts of climate change and already feeling its impacts. In particular the climate of SIDS is influenced by large ocean-atmosphere interactions such as trade winds, El Niño and the monsoons. Small island developing States are characterized by the concentration of large settlements with associated economic and social activities at or near the coast. In SIDS, arable land, water resources and biodiversity are already under pressure from sea level rise. Increases in population and the unsustainable use of available natural resources add further problems. Tropical storms and cyclones cause storm surges, coral bleaching, inundation of land, and coastal and soil erosion with resulting high-cost damages to socio-economic and cultural infrastructure (see UNFCCC 2007c).

ADAPTATION

19. Although uncertainty remains about the extent of climate change impacts, in many developing countries there is sufficient information and knowledge available on strategies and plans to implement adaptation activities now. However, developing countries have limitations in capacity making adaptation difficult. Limitations include both human capacity and financial resources.

20. The most effective adaptation approaches for developing countries are those addressing a range of environmental stresses and factors. Strategies and programmes that are more likely to succeed need to link with coordinated efforts aimed at poverty alleviation, enhancing food security and water availability, combating land degradation and reducing loss of biological diversity and ecosystem services, as well as improving adaptive capacity. Sustainable development and the Millennium Development Goals are a necessary backdrop to integrating adaptation into development policy.

21. Adapting to climate change will entail adjustments and changes at every level – from community to national and international. Communities must build their resilience, including adopting appropriate technologies while making the most of traditional knowledge, and diversifying their livelihoods to cope with current and future climate stress. Local coping strategies and traditional knowledge need to be used in synergy with government and local interventions. The choice of adaptation interventions depends on national circumstances. To enable effective adaptation measures, governments as well as non-government organizations, must consider integrating climate change in their planning and budgeting in all levels of decision making.

Sectoral adaptation

22. Sectoral adaptation measures look at actions for individual sectors that could be affected by climate change. For example, in agriculture, reduced rainfall and higher evaporation may call for the extension of irrigation; and for coastal zones, sea level rise may necessitate improved coastal protection such as reforestation. Multi-sectoral adaptation options relate to the management of natural resources which span sectors, for example, integrated management of water, river basins or coastal zones. Cross-sectoral measures also span several sectors and can include, among other things, improvements to systematic observation systems; science, research and development and technological innovations such as the development of drought-resistant crop varieties or new technologies to combat saltwater intrusion.

Local coping strategies

23. Local coping strategies are an important element of planning for adaptation. Climate change is leading communities to experience climatic extremes more frequently and traditional knowledge can help to provide efficient, appropriate and time-tested ways of advising and enabling adaptation to climate change.

Needs and concerns for adaptation identified by countries

24. In considering how vulnerable countries and communities might best adapt to climate change and so reduce their vulnerability, part of the solution involves the use of technology and its transfer. Some of the priority adaptation needs identified by LDCs in their National Adaptation Programmes of Action (NAPAs) include:

- improved forecasting for farming, extreme events and disaster management;
- improved water management for drinking and agriculture;
- improved food security through crop diversification, developing and introducing drought, flood and saline tolerant crops;
- coastal zone management including coral monitoring and restoration and improving coastal defences through afforestation, reforestation, set-back areas and vegetation buffers;
- improved health care through flood shelters and assistance shelters as part of community emergency preparedness programmes;
- capacity-building to integrate climate change into sectoral development plans.

FUNDING

25. Additional funding is vital in order for developing countries to plan for and implement adaptation plans and projects. A basic conclusion of the Stern Review is that the costs of inaction far outweigh the costs of strong and urgent action on climate change by at least five to one (see Stern 2006).

26. A study undertaken for the UNFCCC estimates that in 2030 the adaptation funds required are: USD 14 billion for agriculture, forestry and fisheries; USD 11 billion for water resources; USD 5 billion for human health; USD 11 billion for coastal zones; and USD 8 –130 billion for infrastructure (see UNFCCC 2007). Thus, the investment and financial flows needed for adaptation are likely to be tens of billions of dollars per year several decades from now and could be more than USD 100 billion per year. Other studies (see World Bank 2006; Oxfam 2007) also estimate adaptation costs at tens of billions of dollars per year.

27. All countries need to adapt to climate change, and this will be costly. The lack of funding available for adaptation is a large impediment to implementing adaptation plans. Without sustained funding, adaptation runs the risk of not being effectively addressed, and largely limited to “reactive” funding, such as short-term emergency relief. This would be unsupportive of sustainable development and ultimately prove to be very costly.

28. The Bali Action Plan underlines the importance of enhanced action on adaptation, supported by financial resources and technology transfer. Under the Convention the Least Developed Countries Fund (LDCF) and the Special Climate Change Fund (SCCF) provide funding for adaptation. The operationalization of the Adaptation Fund under the Kyoto Protocol marks an important step, but meeting adaptation funding needs will require additional resources from other sources such as bilateral and multilateral funding from governments, national and international organizations and agencies.

CONCLUSIONS

29. Incorporating or integrating adaptation to climate change into planning processes is a necessary strategy for sustainable development over the long term. In many developing countries there are difficulties in integrating adaptation concerns into national policy due to low staff capacity for planning, monitoring and evaluation; poor data on adaptation options and lack of mechanisms for information sharing and management across sectors; and limited awareness of adaptation among stakeholders and the population. Sustainable development in the context of climate change is a particular challenge for SIDS, particularly as they have been among the first to experience the direct effects of climate change.

30. As climate change increases the potential for climate related risk, it is also important that risk management and risk reduction is incorporated into adaptation planning at all levels, and that climate change is incorporated into disaster and risk management activities (Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters).

31. Given that many countries may experience similar effects from climate change, sharing experience can broaden knowledge on how to address the adaptation challenges. In this regard South-South and North-South cooperation on adaptation is an effective tool for promoting the implementation of adaptation measures. There is still considerable scope and opportunity for regional and international collaboration.

32. Climate change requires a global framework for international cooperation. Adaptation action is a vital part of this framework. Actions to enable adaptation to climate change pose opportunities to promote sustainable development. Developing countries require resources in order to promote these actions. A successful framework must directly involve assistance for adaptation in developing countries, particularly small island developing States and least developed countries, given that they will disproportionately bear the brunt of climate change impacts.

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