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Viewpoints

The *Natural Resources Forum* is running a special series related to the themes for the United Nations Commission on Sustainable Development in its 2006/2007 cycle. The Viewpoints in this issue will focus on adaptation measures which relate to one of these themes — climate change.

Experts address the question:

How can we maximize the impact of adaptation measures to support sustainable development?

Sustainable development will be a reality only when adaptation to climate change is internalized and becomes a way of life for all citizens, sectors and stakeholders. We can institutionalize it and legislate it, even deny it all we want, but unless people buy into the reality of the negative impacts of climate change on all that we hold dear and all that we deem necessary — water, agriculture, tourism, life itself — there can be no sustainable development.

In essence, adaptation is a survival issue. True, we may not be sure of what exactly is causing the present climate variability, and certain climatic phenomena cannot be explained. Some people question the relevance and even the existence of climate change. There are sceptics who doubt even that global warming exists. Thus, a state of uncertainty exists about likely future weather conditions, which makes planning difficult.

What is certain, however, is that the extreme weather events that we are now experiencing are becoming more violent and more frequent, a trend likely to continue into the foreseeable future. Despite uncertainty, there are things we can do. Many ‘no regrets’ options can be embraced and undertaken now. These include: build stronger and safer houses; stop building on ocean beaches; and stop cutting down mangroves. We can also build energy-efficient houses and make more use of energy-efficient materials and renewable sources of energy. “We” here refers to all citizens, as we are all stakeholders in survival, sustainability and success. Adaptation to climate change must be a shared and consensual decision, taken and implemented by everybody.

Adaptation measures will be fully effective only if people and institutions, local, regional and global, work together to increase the resilience of their societies, while simultaneously reducing vulnerability and risks associated with climate change. Sustainable development is not a project. It is a process. It has to be continuous, linking

people of different generations everywhere in a common cause. If we are to escape the horrors predicted for the day after tomorrow, we must concentrate on the day before tomorrow: today. We have to spread the good news, celebrate the small victories and continue the research and sharing of scientific information that will help us to map out tomorrow. We have to manage the present as the precondition to a very unpredictable future.

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The impacts of anthropogenic climate change in developing countries are expected to be felt mostly through an increased frequency and intensity of extreme weather events, such as storms, floods and droughts. International climate policy, however, has so far focused only on adaptation to incremental changes in the average climate. At best, policies for disaster risk reduction in developing countries are targeted at coping with current climate extremes, and climate variability. However, existing policies do not sufficiently address the long-term effects of changes in the frequency and magnitude of weather extremes, which is exactly what climate adaptation aims to achieve. Current risk reduction practices in agriculture, coastal protection and energy provision could address adaptation to climate change, as they are already based on expectations of climate and weather extremes. For instance, new standards for coastal protection, such as dike construction and flood risk zoning, could be easily implemented by combining seasonal and long-term climate information with existing modeling and planning capacities. One of the important

challenges for donors and the scientific community is to develop a convincing analysis of the benefits of integrating long-term climate perspectives into current disaster risk reduction practices. But in order to be really effective, such risk reduction policy also needs to be better integrated within development policy and land-use regulations.

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People living in rural areas, particularly those belonging to the poorer segments of society, are the ones who primarily feel the adverse impacts of natural hazards. These are set to become more and more frequent and increasingly devastating as a consequence of climate change. A crucial aspect of sustainable development is effective adaptation to the consequences of such hazards. Indeed, in the context of adaptation, international cooperation and appropriate national policies are essential, both for informing the public and for financial, institutional, and technological support. However, in order to maximize the impact of other adaptation measures, the capacity and resilience of hazard-prone communities must also be enhanced. This way, communities can plan and develop their own responses.

A recent study on community approaches to flood management in Bangladesh, India and Nepal has come up with concrete proposals for how rural people can be organized, their adaptive capacities and resilience built up so that they can cope with natural disasters with minimum outside support. People need to be motivated and assisted to organize themselves for effective self help during threatening climatic events, particularly extreme events. Key elements in this approach include: establishing a community organization that can formulate and implement local adaptive measures; identifying gaps and weaknesses in existing responses to natural hazards; designing and conducting training programmes and other activities to build disaster preparedness; and liaising with government and other agencies for assistance as necessary. Such a community organization is expected to remain in place permanently, to renew itself from time to time through motivational programmes, and be ready to take action when a major natural hazard is imminent.

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Human, economic and environmental costs of disasters, especially those related to water — such as heat waves,

storms, floods and droughts — are increasing rapidly. For developing countries, such costs currently surpass receipts from Official Development Assistance (ODA). Climate impacts on hydrological systems and livelihoods now threaten to undo decades of development efforts, as have some recent droughts and storms.

The cost escalation is due mainly to the compounding nature of risks, as a consequence of population growth, settlement patterns, economic development and climate change.

Yet, the Millenium Development Goals, and thus sustainable development policies, do not take the increasing risks or climate variability and change into account. Neither are the impacts of climate variability and climate change sufficiently considered in water sector development and management plans. Instead of planning for adaptation measures occurring through government-driven National Adaptation Programmes of Action (NAPA) or Integrated Water Resources Management (IWRM) actions, societies are now undergoing pervasive, socially driven ‘adaptive processes’ that occur below the radar screen of governments and organizations. Policymakers endorse this age old reality, and stimulate poverty-reduction policies and strategies to encourage economic and occupational diversification away from rain-fed agriculture.

The rising trend in costs related to disasters must be reversed. One way to accomplish this is to adopt the ‘safety chain’ concept. This concept advocates combining structural (dams, dikes and reservoirs) and non-structural measures that include early warning systems, spatial planning giving room for water, risk spreading through insurance schemes and solidarity funds, and awareness raising about risks through the media. The ‘safety chain’ concept encourages economic innovations such as public–private partnerships with investment opportunities.

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The two key methods for addressing climate change are mitigation and adaptation. With regard to mitigation, initiatives such as the Kyoto Protocol, national greenhouse gas inventories, and global climate models have created a rich and rapidly growing pool of data for measures to mitigate climate change impacts.

However, adaptation has not benefited from a similar development in systematic data collection, enrichment, dissemination and utilization. This gap in data availability and utilization concerning climate change adaptation measures has severely limited efforts to maximize the impact of such measures to support sustainable development, particularly in developing countries and small island developing States (SIDS) which are severely threatened by the effects of climate change.

Existing and new data on climate must be combined with geographic and economic data to create decision-support tools for adaptation. These tools should be made widely available to local and regional planners and disaster managers, along with a common framework for data application. Examples of required risk management and adaptation decision-support tools include: impact scenarios for coastal hazards (storm surge, wave, wind); models for impact on key sectors, such as agriculture, fishing, and tourism; land-use and wetlands-use determinants; and evacuation and relocation models for affected communities. Data sharing and user education must accompany these tools to ensure equal access for least developed countries (LDCs).

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Linking adaptation to sustainability is particularly difficult, since necessary measures may be unpopular with respect to both the adaptation process and sustainability goal. Steps to enhance sustainability and policies toward climate change adaptation can be expensive, and pose challenges to stakeholder habits and practices, as well as many of their deeply held interests, values, and notions of entitlement. In this type of situation, where there is a serious discrepancy between stakeholders' understanding and willingness to change, and a scientifically supported policy goal, it is exceedingly difficult to persuade scientists to engage in the messy world of practice, and to convince practitioners to take on a new, unwieldy, and politically contentious issue. For scientists, such situations are uncomfortable, as they feel that their credibility and independence may be jeopardized, should they speak up. For practitioners, there are already too many fires to put out — well known from daily experience. Why should practitioners take on something new that would make their job even harder?

Part of the answer may lie in experts from academia and from government/business mutually building a relationship with each other and with the public, carefully and patiently. Dialogue needs to be ongoing. It needs to be frank and to respect others' needs and points of view, and be conducted in formal and informal settings. Scientists must demonstrate the relevance of scientific knowledge to decisions at hand. Scientists must provide effective responses — within the limits of credible science — to the needs of decision-makers in a timely fashion. Over time, this will

build trust and support practitioners on the difficult path to sustainability. It is high time for academic institutions to set the incentives right for scientists who feel called to do so.

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Landscapes are an ecological matrix of patches, boundary types, barriers and networks. Matrix heterogeneity is controlled by flows of species and genes, energy, nutrients and water. Under climate change this matrix will buffer the effects of changes in precipitation, temperature, hydrology and biodiversity.

Much of the focus of biodiversity conservation has been on National Parks and other protected areas. Protected areas are considered important for biodiversity conservation by the Convention on Biological Diversity, but faced with the effects of climate change and increasing environmental uncertainty, protected area managers must use this buffering effect of the matrix to imbue protected areas with resilience against such changes.

The ecosystem approach focuses on integrating ecological functions and societal benefits to implement ecosystem management actions. This approach also enables the role of emerging ecosystems — new combinations of species arising through human action and environmental change — to be an important consideration in framing novel techniques for protected area management in the face of climate change. In sum, managing protected areas in the landscape matrix, using the ecosystem approach is the best mechanism currently available to allow adaptation to, and mitigation against, the effects of climate change.

The Matrix Alliance*

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