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Development

GATEKEEPER SERIES

123

CLIMATE CHANGE AND DEVELOPMENT LINKS

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2006

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EXECUTIVE SUMMARY

Until recently, climate change was viewed largely as an environmental concern, of little relevance to development policy-makers or practitioners. Likewise, development approaches have been given less attention within the climate change community, who instead favour natural science approaches focusing on reducing greenhouse gas emissions. This paper describes the independent evolution of climate change and development discourses, and provides some explanation as to why the two fields have operated largely independently from one another. The recent initiatives to strengthen links between the climate change and development communities are also described. These are of particular importance as climate change impacts will significantly affect national development. Climate change experts can no longer ignore the fact that most climate change impacts will fall predominantly on the world's poorest people. Likewise, without addressing climate change issues, much development policy and practice will be wasted. Alternative development pathways will influence the capacity of communities and countries to adapt to climate change and will also determine future greenhouse gas emission pathways.

The authors make some specific recommendations for particular groups of actors:

- International donor agencies need to assess the extent to which their investment portfolios in developing countries might be at risk due to climate change and take steps to reduce that risk.

- Developing country governments need to understand the extent to which they may be vulnerable to climate change and take steps to reduce vulnerability (and enhance adaptive capacity) of the most exposed sectors and populations.

- Vulnerable communities (and NGOs and other agencies working with those communities) must also understand the extent to which they may be vulnerable to climate change and to take steps to reduce their vulnerability (and enhance adaptive capacity), eg. through micro-insurance schemes.

- Less developed country countries should implement their National Adaptation Programmes of Action (NAPAs).

- All conscious citizens of the world must understand their own contribution to the problem of climate change and their capacity to reduce emissions and support those most vulnerable to unavoidable impacts.

CLIMATE CHANGE AND DEVELOPMENT LINKS

Saleemul Huq, Hannah Reid and Laurel A. Murray

INTRODUCTION

The problem of human-induced climate change first came to the attention of the global public and international policy makers when the Intergovernmental Panel on Climate Change (IPCC) published its first assessment report in 1990. This drew attention to the significant increases in atmospheric greenhouse gas concentrations observed over the last 150 years (i.e. since the start of the industrial revolution).

However, despite the magnitude of its likely impacts on the least developed countries, until recently climate change has been viewed largely as an environmental concern, of little relevance to development policy-makers or practitioners. Likewise, development approaches have been given less attention within the climate change community, who instead favour natural science approaches focusing on reducing greenhouse gas emissions. This paper explores why this separate evolution has occurred, and what it means for our attitude towards development and our struggle to reduce the impacts of climate change on the most vulnerable nations.

WHY MUST CLIMATE CHANGE AND DEVELOPMENT BE BETTER LINKED?

The link between climate change and development should be obvious. Climate change impacts will significantly affect national development, particularly amongst the world's poorest communities. In turn, alternative development pathways will determine future greenhouse gas (GHG) emissions and influence the capacity of communities and countries to adapt to climate change. As Huq *et al.* (2002) comment, "*For either process to work, each must reinforce the other*". Re-integrating these two policy areas is a significant but important challenge.

Man-made climate change is the result of increasing GHG emissions caused by development factors such as economic growth, technology, population and governance. The evidence for climate change impacts on both natural and human systems is increasing (Table 1).

Table 1. Examples of (likely to very likely) impacts from projected changes in extreme climatic events

Projected changes in extreme climate phenomena during the 21st Century	Representative examples of projected impacts
Simple extremes Higher maximum temperatures, more hot days and heat waves over nearly all land areas	• Increased incidence of death and serious illness in older people and urban poor • Increased heat stress in livestock and wildlife • Increased risk of damage to several crops
Higher (increasing) minimum temperatures: fewer cold days, frost days and cold waves over nearly all land areas	• Decreased cold-related human morbidity and mortality • Decreased risk of damage to several crops • Extended range and activity of some disease vectors
More intense precipitation events	• Increased flood, landslide, avalanche and mud-slide damage • Increased soil erosion • Increased flood run-off
Complex extremes	
Increased summer drying over mid-latitude continental interiors and associated risk of drought	• Decreased crop yields • Decreased water resource quantity and quality • Increased risk of forest fire
Increased tropical cyclone peak wind intensities, mean and peak precipitation intensities	• Increased risk to human life, risk of infectious disease epidemics • Increased coastal erosion • Increased damage to coastal ecosystems and coral reefs
Intensified droughts and floods associated with El Niño events in many different regions	• Decreased agriculture and range-land productivity in drought-prone and flood-prone regions
Increased Asian summer monsoon precipitation variability	• Increased flood and drought magnitude and damages in temperate and tropical Asia

Source: Intergovernmental Panel on Climate Change (IPCC), Third Assessment Report, 2001

Unsustainable development is the underlying cause of climate change, and development pathways will determine the degree to which social systems are vulnerable to climate change (Table 2).

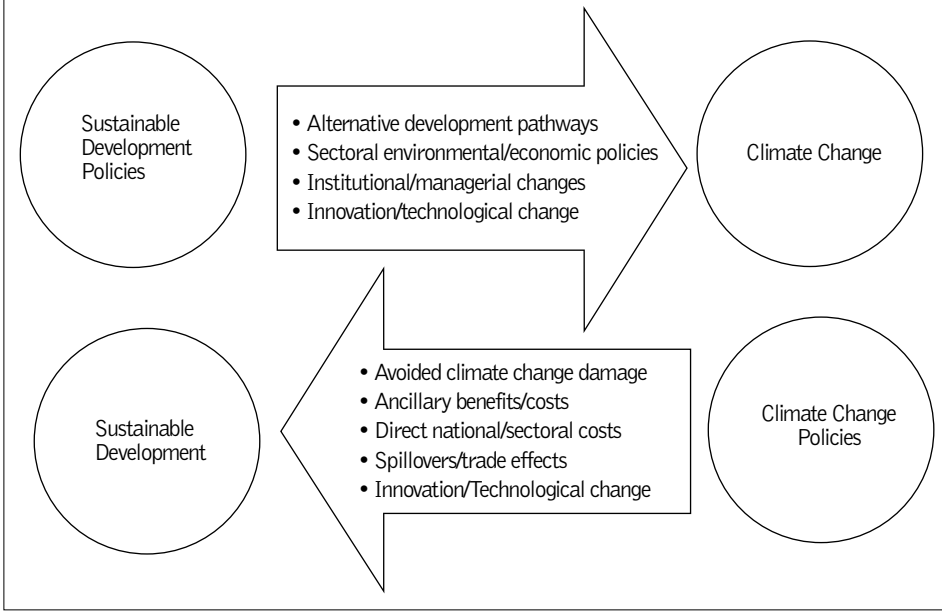
Climate change will have a direct impact on development in relation to climate-sensitive activities such as agriculture, and indirect consequences on social issues such as poverty and education (Figure 1; and Eriksen and Nœss, 2003). Furthermore, climate change is likely to exacerbate inequalities due to the uneven distribution of the costs of damage, necessary adaptation and mitigation efforts (Paavola and Adger, 2002). Climatic changes could lead to environmental scarcity in certain

Table 2: Examples of Factors that Influence Vulnerability

Institutional Factors	Economic Factors	Environmental Factors
• Informal skills • Local knowledge • Formal education, skills and technology • Informal networks • Formal security networks • Strength of local institutions	• Labour • Health • Access to natural resources • Access to communal natural resources, in particular biodiversity • Access to alternative economic opportunities	• Risky environments • Degraded environment • High dependence on climate-sensitive sectors and natural resources • Communal lands and resources

Source: Eriksen and Noess (2003: 11)

Figure 1: Link between climate change and development



Source: Swart *et al.*, 2003

regions, which could harm people's livelihoods and lead to migration or, in extreme situations, conflict between social groups. Conflict over transboundary water sharing between Sudan and Egypt has already been observed.

There are many examples where specific development projects may be jeopardised by climate change. For example, in 1985 a glacial lake outburst in Nepal destroyed a newly completed World Bank funded hydropower dam. Such incidents demonstrate the clear need to consider the impacts and vulnerabilities of climate change

on current and planned development programmes. This need for 'climate proofing' applies to small (such as microcredit schemes) and large (such as infrastructure construction) development projects alike.

THE SEPARATE EVOLUTION OF CLIMATE CHANGE AND DEVELOPMENT POLICY

So why haven't the two areas been working well together? There are two main reasons, which we discuss in turn: (1) the domination by two separate disciplines; and (2) the different scales (both temporal and geographic) at which the problems are perceived.

Domination by separate disciplines

Until recently, climate change and development communities operated largely independently of one another, in both research and policy (Swart *et al.*, 2003). There are a number of possible reasons for this. From a conceptual standpoint, the two fields are dominated by separate disciplines: climate change by the natural sciences and development by the social sciences (Cohen *et al.*, 1998). In the 1980s, natural scientists first brought the problem of global warming to light, and since then, the political process that surrounds climate change, largely through the United Nations Framework Convention on Climate Change (UNFCCC – Figure 4), continues to rely on the science community to inform policy.

In contrast, the development community is made up of a multitude of social sciences trying to identify and describe the social, political and economic obstacles to development. Environmental problems (such as natural resource scarcity, land degradation and pollution) are recognised as impediments to development, but climate change has largely escaped notice. This may be because climate change has been defined as a 'science' problem, not a social one. Those involved in the climate change discourse are often climate scientists and modellers, but those involved in the mainstream development discourse (e.g. development practitioners) operate in very different spheres (Figure 2).

Climate change science is generally most robust on issues related to emissions and mitigation which tend to have less direct relevance for poverty alleviation, poor communities and development. The scientific knowledge of the impacts (of human induced climate change) is less certain. For example, much is known about enhanced atmospheric temperatures and associated heat waves, but these probably affect poor communities less than climate related events such as floods, droughts and cyclones (Figure 3) for which the links with climate change are more tenuous.

Figure 2: Key actors involved in climate change and development discourses in the North and South

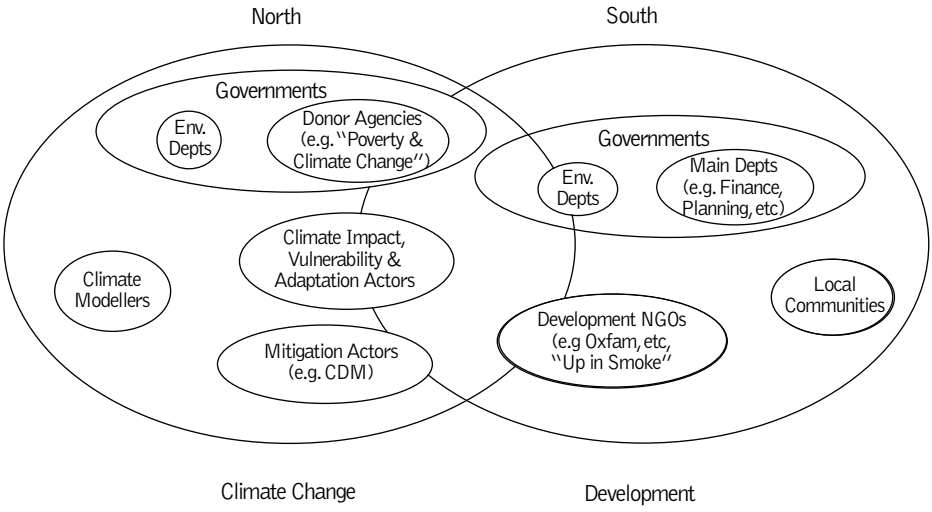
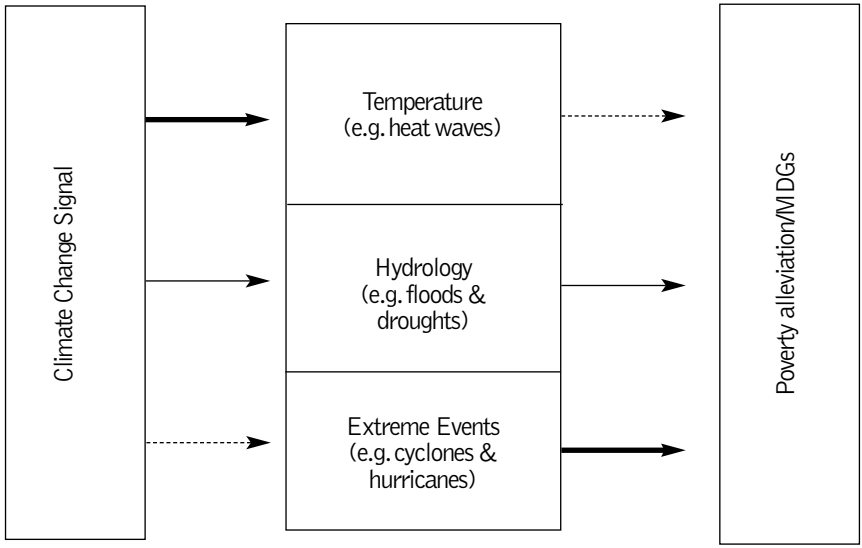
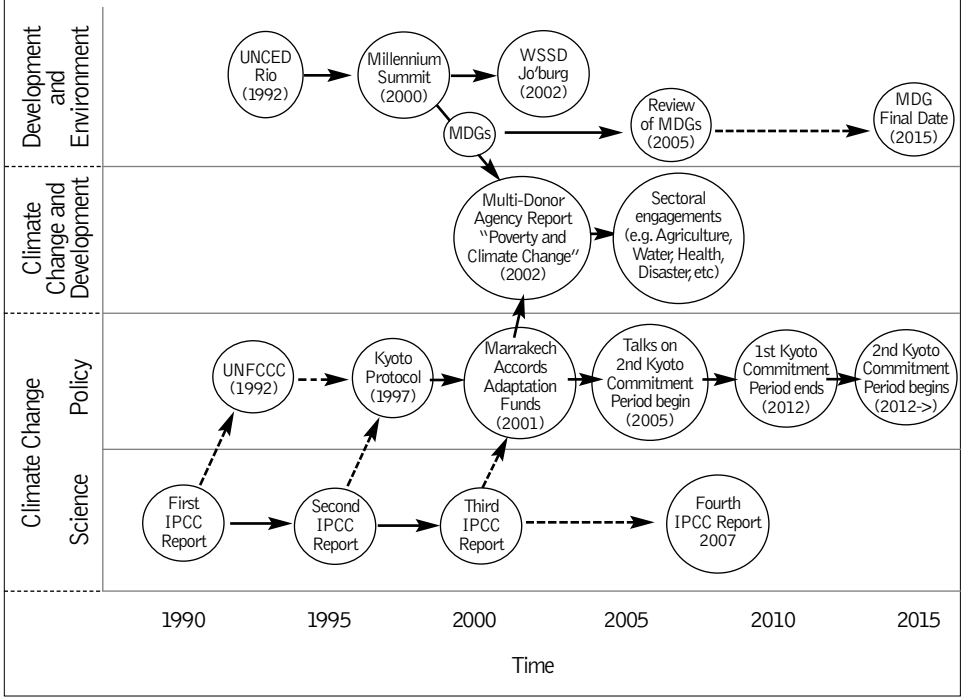


Figure 3: Climatic aspects of relevance to poverty alleviation and the robustness of the climate change impacts science



Note: Strength of arrows in first set indicates strength of association of climate change with impacts; in the second set it indicates level of relevance of impacts on poverty alleviation.

Figure 4: Co-evolution of the climate change (science and policy making) and development/environment domains and their linkages



Originally, the link between climate change and development was clearly drawn. In 1992, the United Nations Conference on Environment and Development (UNCED) produced Agenda 21 and the Rio Declaration, both of which made explicit the intractable connection between climate change and sustainable development. Going back even further to 1987, the seminal Brundtland Report, *Our Common Future*, cited climate change as a major environmental challenge facing development. And yet, since then, climate change and development fields have evolved separately. Some climate-development publications date back to 1998, but such work is unusual. Whilst a few development organisations, such as CARE International, have incorporated climate change into their development projects for some years, the development community as a whole has largely ignored the affect climate change impacts will have on development goals.[1]

1. In contrast, there is a wealth of development literature addressing climate variability, such as disaster risk reduction research (Yamin and Huq, 2005). Work on climate variability does not always translate for climate change policy, but is still important, as climate variability is expected to increase in certain regions due to climate change.

Figure 4 shows the co-evolution of the different domains of debate and discourse. It demonstrates that in recent years, climate change and development have begun to link up more. This began with the publication of the report on *Poverty and Climate Change* by 10 of the leading bilateral and multilateral development funding agencies (Sperling, 2003). This was followed by similar efforts in the different development sectors, such as human health (WHO, 2004), agriculture, disaster management (Red Cross/Red Crescent, 2002) and water resource management. Different actors, such as the development and environmental non-government organisations (see Simms, *et al.*, 2004), became increasingly involved.

The scale of the problem

Many development practitioners view climate change as a long-term problem that does not compare with more urgent concerns such as food security, HIV/AIDS or pollution. Much climate change discourse is based on long-term projections generated by the Global Circulation Model (GCM) that typically run up to 100 years, and in the case of sea level rise, for several hundred years. In contrast, most development scenarios are much shorter term. For example, most Millennium Development Goals are set for 2015.

Another obstacle is differing geographical scales. Climate change science is continuously improving; however, until recently, most literature could not confidently predict impacts at the regional or local level. While regional models are increasingly robust, development work requires more certainty at the local or even national scales.

STEPS IN THE RIGHT DIRECTION

Progress has been made to bring the climate change and development communities closer together, largely through the efforts of key non-government organisations (NGOs) and developing countries. The 2002 World Summit on Sustainable Development brought renewed attention to the climate-development nexus, and lobbying by NGOs and developing countries has led to increased political interest in the climate change negotiations since 2001. In 2002, the major donor agencies released the paper *Poverty and Climate Change* at the eighth Conference of Parties (COP8) of the UNFCCC held in Delhi, India. This marked a major shift by the development community to incorporate climate change into their thinking. The report stated that "*[c]limate change is a serious risk to poverty reduction and threatens to undo decades of development efforts*" (Sperling, 2003). Many international development organisations have since

launched projects to address climate change, and working groups have been formed to bridge the gap between climate change and development communities. The Working Group on Climate Change and Development is a coalition of roughly 20 environment and development NGOs (Simms *et al*., 2004), and Stop Climate Chaos is a similar grouping.

Research organisations such as the Climate Change Knowledge Network, The Energy and Resources Institute (TERI), the Stockholm Environment Institute (SEI), the Institute of Development Studies (IDS) and the International Institute for Environment and Development (IIED) have all expanded climate research to include development issues. For example, the livelihoods approach in development research has now been incorporated into climate studies to assess vulnerability (for example, see Burton *et al*., 2003). This has improved thematic links between poverty and climate vulnerability.

Despite these efforts, most government agencies in developing and least developed countries, and most local-level development groups, still do not adequately incorporate climate change into their development activities. Some sectors and ministries in poorer countries have made more progress than others. For example, the Higher Council for Environment and Natural Resources (HCENR) in Sudan recognises that Sudan is highly vulnerable to climate impacts, in particular drought; and that "*much of Sudan's vulnerability stems from low adaptive capacity – a result of poor development and poverty*". It is therefore exploring how to incorporate climate change issues into Sudan's Poverty Reduction Strategy Process (PRSP) (personal communication, Balgis Elasha, 2005). In poorer countries in general, the agriculture and food security sector, water managers and planners and those planning for disasters have done more than their counterparts in other development sectors to 'climate proof' their national policies and planning processes. For example, the Bangladesh Comprehensive Disaster Management Programme is shifting from relief provision to risk reduction in its efforts to mainstream climate change considerations into national planning (personal communication, Thomas Tanner, 2006). But other sectors such as coastal zone management, urban planning, health, infrastructure development, security, energy policy, forest management and biodiversity conservation have made little headway in this regard (Huq *et al*., 2003). Even where climate change pilot projects have been initiated, subsequent action to incorporate findings and lessons into national and local level development is often limited.

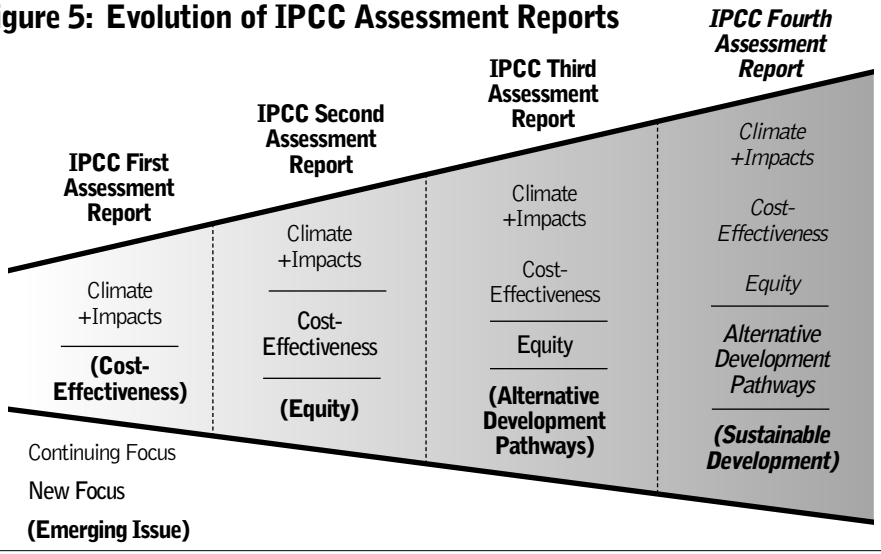
THE CHALLENGES AHEAD

Integrating climate change and development at the policy level

The UNFCCC and Kyoto Protocol both require that climate change be tackled within the wider context of sustainable development. However, the research community has been slower to explore these wider linkages between the issues than the political arena. Climate change negotiations are still dominated by concerns about reducing emissions amongst industrialised nations (mitigation), and few attempts have been made to operationalise climate change into the wider development agenda. Some parties to the negotiations also fear that attention on development linkages will detract from efforts to reduce emissions and divert scarce funds to more general development projects (Swart *et al*., 2003).

The IPCC is the main body responsible for assessing the literature on climate change. This body acknowledges that development may be the most effective policy framework to address climate change mitigation and is critical to the success of adaptation strategies. However, "*the IPCC's internalisation of these linkages has been rather halting and remains incomplete*" (Najam *et al*., 2003a). The IPCC was formed in 1988 and originally limited its study to the scientific, technical and economic aspects of climate change. As seen in Figure 5, the first two assessment reports only investigated the evidence for climate change, its impacts, and the cost-

Figure 5: Evolution of IPCC Assessment Reports



Najam *et al.*, (2003) "Integrating Sustainable Development into the Fourth Assessment Report of the Intergovernmental Panel on Climate Change", S11.

effectiveness of policy options (Banuri and Weyant, 2001). Indeed, the IPCC has often been criticised for neglecting the climate-development nexus. The Third Assessment Report went the furthest to address development linkages by including "*discussions about alternative development pathways and global sustainability (especially through its emphasis on scenarios)*" (Najam *et al*., 2003b).

The IPCC assessments have evolved gradually to introduce socio-economic analysis into climate research (Swart *et al*., 2003), and it is widely hoped that the upcoming Fourth Assessment Report, due in 2007, will integrate sustainable development into all aspects of the report and further explore the integration of development and climate change policies.

Resolving trade-offs between development and climate change

Development pathways, particularly in the world's poorest countries, can either increase or diminish the impacts and vulnerability of households and communities to climate change. Development activities therefore need to be included in climate research when assessing the vulnerability of the world's poor. For instance, diversification of livelihood sources, improved infrastructure, education and institutional strength all help to reduce vulnerability to climate change as well as encouraging socio-economic development. In this respect, climate change adaptation and development share many of the same goals to reduce social and environmental vulnerability.

However, many current development pathways could potentially increase climate change vulnerability in the pursuit of social and economic gains. Not all development outcomes are 'win-win' for development and climate change. Where the climate change and development agendas have conflicting interests, difficult trade-offs will need to be addressed (Klein, 2002; Burton and van Aalst, 1999). This is especially important when examining development projects that have a 'lock-in' character that may hinder a country or community's ability to cope with future climate change (Agrawala and Berg, 2002). For example, certain development plans may increase dependency on climate-sensitive resources, such as rain-fed agriculture, thereby increasing vulnerability. Development schemes can also lower adaptive potential. For example, many African countries, influenced by external donors, are reforming their water sector (including reforming water rights), which could reduce water access among the poor, and therefore increase their vulnerability to droughts.

Climate change research often uses the concept of 'winners and losers' when exploring future impacts. At the global, regional and local levels, certain sectors may expe-

rience positive or negative impacts to climate change. This is particularly apparent in the agricultural sector, where changes in rainfall distribution may favour certain agricultural sectors and harm others, depending on the region and specific crops/livestock. O'Brien and Leichenko (2000) have explored interactions between climate change impacts and economic globalisation and the notion of 'double exposure' has emerged. This is where the impacts of climate change and globalisation have a cumulative effect and essentially create 'double winners' and 'double losers' (e.g. where marginal livelihoods in rural India are compounded by recurrent droughts which will become worse with climate change). It raises important questions about equity and the effect development has on vulnerability and adaptive capacity. Negative climate change impacts can often put an additional burden on those communities and sectors that are already marginalised. Likewise, the negative impacts of climate change can potentially offset the benefits enjoyed in certain areas due to economic globalisation.

Mainstreaming and streamlining responses

Many local communities are already adapting to the impacts of climate variability and climate change on a daily basis. Their experiences can offer lessons for national governments wishing to support adaptation activities.

Climate change research and UNFCCC negotiations have traditionally focused on mitigation efforts to lower and stabilise GHG emissions, with less attention given to adaptation measures. However, it has become increasingly clear to researchers and policy-makers alike that the world will need to adapt to a changing climate. Even if industrialised countries significantly lower their emissions levels with immediate effect, a certain degree of anthropogenic climate change is inevitable due to the lag time in the global climate system. Policy-makers are beginning to acknowledge this reality and develop coping and adaptation strategies in response. Indeed, many industrialised countries such as Canada, the United States, the Netherlands and the United Kingdom are dedicating significant resources to protecting themselves against the negative impacts of climate change (although not always under the climate change banner). Adaptation is increasingly moving to the centre of an emerging research agenda (Burton *et al.*, 2002).

The adaptive capacity of those affected by climate change ultimately depends on their access to economic, ecological, social and human resources including institutional structures, decision-making processes, information and public awareness. As such, development projects could either enhance or hinder the adaptive capacity of communities. Adaptation policies can only be effective if they are built into the wider development agenda, both in developed and developing countries. Following from

this, the concept of 'mainstreaming' has emerged to describe the full integration of climate change adaptation policies into national development programmes (Huq *et al*., 2003). For example, a significant climate change component has been incorporated into the Comprehensive Disaster Management Programme in Bangladesh (personal communication, Thomas Tanner, 2006). This recognises that climate change impacts constitute an increased disaster risk requiring specific attention; using the disaster lens gives anticipatory climate change adaptation greater impetus than when it is seen as a distant concern (Red Cross/Red Crescent, 2005).

Consistent integration into other development and poverty reduction policies, planning and activities can help ensure that adaptation policies don't work counter to development efforts—so-called 'maladaptation'. For example, many techniques and technologies exist that could facilitate adaptation to climate change, such as use of different seed varieties, crop types, cropping practices, water resources technology, soil and water conservation techniques, disease prevention and control technology. But it is important to ensure these technologies are used in ways that don't inadvertently increase vulnerability.

Likewise, many environmental problems require a common response, and the limited resources of many countries precipitate the need to find ways to streamline these resources to address all environmental problems together. For example, there are inherent links between biodiversity loss, climate change and desertification even though causal relationships may be hard to establish. And all three are environmental threats to sustainable development, especially in poor countries. The Joint Liaison Group between the three main environmental conventions – the UNFCCC, the Convention on Biodiversity and the United Nations Convention to Combat Desertification – was established with this in mind.

The concept of 'mainstreaming' has become increasingly prominent in climate policy and negotiations. However, there may be certain weaknesses to the approach, which should be explored in climate research. Mainstreaming climate change adaptation into development policy and planning may not give it the attention it merits in certain circumstances. Similar challenges have been faced with the mainstreaming of gender into development policy and planning in recent years.

Funding adaptation policies

Just as mainstreaming adaptation into the wider development agenda is essential, it is also politically necessary. Developing countries will not fully participate in

UNFCCC negotiations or implement national climate change mitigation and adaptation policies if there are no clear development benefits for them. This is particularly true for countries such as India, Brazil and China, which are becoming major greenhouse gas emitters as their economies grow (Adger *et al*., 2003).

The UNFCCC has produced three key funds for financing adaptation policies: the Special Climate Change Fund, the Adaptation Fund and the LDC Fund (Box 1). Individual countries will also fund their own mitigation and adaptation projects at

Box 1: Evolution of Adaptation and Development in the UNFCCC and Kyoto Protocol Negotiations

COP6 in Bonn, Germany (July 2001) established three new funds: the Special Climate Change Fund (SCCF), the Least Developed Countries Fund and the Adaptation Fund.

COP7 in Marrakech, Morocco (October-November 2001) prompted the formation of the LDC Expert Group. The COP also laid out the objectives of the three new funds. The SCCF will finance activities relating to climate change in the areas of adaptation, technology transfer, energy, transport, industry, agriculture, forestry and waste management. The LDC Fund will support the preparation of National Adaptation Programmes of Action (NAPAs) for LDCs. Lastly, the Adaptation Fund will be financed from the 2% charged on all Clean Development Mechanism projects and other sources of funding to fund adaptation initiatives.

COP8 in Delhi, India (October-November 2002) produced the Delhi Declaration, which reaffirms the importance of development and poverty eradication. It calls for policies and measures specific to national circumstances, and integration of climate change objectives into national sustainable development strategies. The COP proceedings also refuted the perceived divide between environment and development agendas.

COP10 in Buenos Aires, Argentina (December 2004) brought to light the difficulties of funding adaptation projects in the context of development. At present, the Global Environment Facility (which administers UNFCCC funds) will only finance projects with a core focus on adaptation. Adaptation projects with additional development benefits will not receive full-cost funding, even though in practice most adaptation projects are built on or embedded in larger national or local development projects. Co-financing from development and donor agencies would therefore be required, which puts an additional burden on poor countries seeking funds.

COP11 in Montreal, Canada (November-December 2005) finally adopted the Marrakech Accords, which enable the operation of the different international funds for adaptation (the LDC Fund and SCCF under the UNFCCC, and the Adaptation Fund under the Kyoto Protocol). The Montreal meeting was also the first Meeting of the Parties (MOP1) after the coming into force of the Kyoto Protocol. One important new element of discussion was the issue of raising funds for the Adaptation Fund from other flexible mechanisms besides the adaptation levy on the Clean Development Mechanism alone.

home and abroad. These projects should ideally be congruent with development objectives and have additional socio-economic gains. However, a major challenge in fund management is the need to separate out the additional costs of climate change adaptation from 'business as usual' development activities, and the difference between vulnerability to climate change and other vulnerabilities. This poses many practical challenges but is often politically necessary in order to distinguish between the responsibility (and hence liability) of industrialised countries to pay for the damage they have caused, and funds donated under the banner of philanthropy.

Currently, the most promising UNFCCC vehicles for integrating climate change and development policies are the formation of National Communications (submissions by parties to the UNFCCC on all aspects of implementation) and the National Adaptation Programs of Action (NAPAs). The NAPAs are specific to the LDCs, which are amongst the most vulnerable countries to climate change. They offer an opportunity to assess and prioritise climate adaptation actions within existing development goals. Although only a handful of countries to date have completed and submitted their NAPAs, the experience has already proved effective in both raising awareness of climate change and development links as well as in identifying and prioritising adaptation projects and activities.

Climate change has traditionally received little attention from international donor organisations and governments. A review of 136 projects in Africa funded by the German donor (GTZ) found no references to climate change (Klein, 2001). International organisations such as the International Monetary Fund and World Trade Organisation give little consideration to climate issues in their projects. However, in recent years, donor organisations and governments have increasingly begun to incorporate climate change into their development programmes (Agrawala, 2004). Key organisations and donors such as the World Bank, GTZ, the Norwegian Agency for Development Cooperation (NORAD), the United Kingdom Department for International Development (DFID), and Canadian International Development Agency (CIDA) are now investigating the linkages between climate change and development assistance.

The Organisation for Economic Co-operation and Development (OECD) launched a six-country project in 2002 to explore the potential for mainstreaming adaptation into development assistance (OECD, 2003). This revealed the magnitude of development assistance and aid in sectors potentially affected by climate risks. In Egypt and Bangladesh alone, from 1998 to 2002 between US$1-2 billion was

directed towards sectors affected by climate change and climate variability. As much as 50-65% of development aid in Nepal was given to climate-sensitive sectors.

CONCLUSIONS

This paper clearly demonstrates the need for the climate change and development communities to improve communications and find ways to work together. It underlines the relevance of climate change issues to development policy-makers and practitioners, and it likewise stresses the need for climate change experts to increase the level to which climate change impacts, particularly on the world's poor, are incorporated into their discourses and planning. Some steps have been made to bring the development and climate change communities together. These need to be built on and improved so that development efforts are not wasted, and the impacts of climate change on the world's poor are both acknowledged and taken responsibility for.

It is vital to the success of both development and climate change policies that climate change be incorporated into development programmes at international, regional, national and local levels. As argued by Newell (2004), "*[p]olicy integration is perhaps the greatest contribution that governments can make towards providing climate protection and it is also potentially the least economically costly*". This means that climate change should not simply be delegated to environmental programmes and ministries, but incorporated into all levels and branches of government.

Some specific recommendations for particular groups of actors are as follows:

- International donor agencies need to assess the extent to which their investment portfolios in developing countries might be at risk due to climate change and take steps to reduce that risk.
- Developing country governments need to understand the extent to which they may be vulnerable to climate change and take steps to reduce vulnerability (and enhance adaptive capacity) of the most exposed sectors and populations.
- Vulnerable communities (and NGOs and other agencies working with those communities) must also understand the extent to which they may be vulnerable to climate change and to take steps to reduce their vulnerability (and enhance adaptive capacity), eg. through micro-insurance schemes.
- Less developed country countries should implement their National Adaptation Programmes of Action (NAPAs).
- All conscious citizens of the world must understand their own contribution to the problem of climate change and their capacity to reduce emissions and support those most vulnerable to unavoidable impacts.

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The NR group receives funding from the Swedish International Development Cooperation Agency.

ISSN 1357-9258

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