

Strengthening science–policy dialogue in developing countries: a priority for climate change adaptation

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Key decisions are being made on future adaptation to climate change in developing countries this month in Copenhagen. Climate change is a source of multiple natural hazards: people in developing countries are over 10 times more vulnerable to fatality from climate-related natural disasters, and are affected disproportionately by the corresponding economic losses (Schipper and Pelling, 2006). Of particular importance, therefore, will be decisions taken on the structures and institutional arrangements to fund and deliver climate change adaptation (CCA) at the international level, and mechanisms to integrate CCA principles and approaches into developing country policy processes. While some countries at the sharp end of climate change have made significant progress, CCA does not command such high-profile political attention elsewhere, particularly in the least developed countries where institutional weaknesses may also be the greatest. It is thus crucial that CCA moves up the agenda in developing countries and is mainstreamed into policy processes.

Incorporating scientific knowledge into policy is a challenge. A recent study (Jones et al., 2008) highlights a number of key tensions and challenges in incorporating science, technology and innovation (ST&I)-related knowledge effectively into policy dialogue in developing countries. The study, published as an ODI working paper and funded by SciDevNet and the UK Department for International Development (DFID), included an international survey with more than 600 developing and developed country stakeholders, key informant interviews with 30 global experts, and

six country case studies. As one of the first studies to provide a comprehensive overview of Southern perspectives on the interface between science and policy, it offers crucial insights for the promotion of effective CCA policy. This background note summarises these insights, using examples related to CCA in developing country contexts. It focuses, in particular, on the critical role of knowledge intermediaries in brokering understanding between researcher and policy communities, but also among the general public, in advancing effective and context-sensitive CCA policy strategies.

Promoting evidence-informed CCA policy in developing countries

Incorporating scientific knowledge and expertise into policy dialogue on CCA is a complex and multilayered undertaking. Understanding future climate shifts is a matter for environmental and meteorological science, requiring robust and fine-grained modelling and measurement. And understanding the potential impacts of such shifts in developing countries requires interpretation of that information in relation to a wide range of areas, including: food security and agriculture, natural resource management, ecosystems and biodiversity, infrastructure and human health. For each of these, additional scientific inputs and expertise are required in order to map not just the hazards but also the vulnerability of the physical and social systems that will be affected. Scientific and social scientific expertise is also required to inform the discussion of potential adaptation options, such as disaster risk reduction (DRR) measures to manage hydro-meteorological risks, including dykes and dams to mitigate flooding, or the feasibility and socio-economic implications of changing practices,

such as introducing crop varieties that are more resistant to climate variability.

Capacity/institutional weaknesses

Overall, our findings highlight the poorly institutionalised communication of scientific information for evidence-informed policy-making in developing countries. Limited uptake of ST&I knowledge in development policy dialogues and decision-making processes is the result of systemic obstacles, including: low levels of scientific understanding by policy-makers (64% of survey respondents), limited openness by politicians to using ST&I information (61%), limited dissemination of research findings (59%), a lack of incentives for the use of ST&I in development policy-making (56%) and a lack of institutional channels for the incorporation of ST&I information into policy (44%).

This may be a particular problem in relation to CCA, which has yet to become a major policy issue in many countries, owing to a general lack of awareness among policy-makers about climate change risks and how these relate to development priorities. Moreover, environment ministries, which often house the only policy-makers mandated to work on CCA, are rarely ‘fit for purpose’ for the challenges posed by CCA (Bird, 2008). They tend to be politically marginal and under-resourced, and often face significant political economy constraints to implementing environmental policy, including resistance by elite groups with vested interests. Key issues such as DRR are often dealt with by disaster management and civil defence bodies, which tend to lack dedicated funding and the requisite expertise and mandate to work on longer-term issues of adaptation.

Our survey further indicated that many policy-makers, other than those in environment and health ministries, rarely use scientific advice or research to inform the conceptualisation, formulation or implementation of policies (Jones et al., 2008) at national or sub-national level. It is likely that this is because of a lack of understanding of the relevance of the range of scientific knowledge to public policy priorities in areas such as agriculture or infrastructure, which results in science being used most frequently to legitimate policy decisions rather than to inform policy formulation processes.

Politicisation of science

Despite the acknowledged need for increased engagement between ST&I researcher and policy-maker communities, interaction between the two is prone to political obstacles. A lack of openness by politi-

cians to ST&I information in policy decision-making was the second most cited barrier to the uptake of scientific knowledge (61% of all respondents: 66% of researchers and 54% of policy-makers). While this may reflect capacity limitations or vested interests in some instances, policy-makers are often elected on the basis of particular policy pledges and may, therefore, feel that their democratic legitimacy rests upon supporting a particular piece of legislation, irrespective of new information.

From a political economy standpoint, such instrumentalism may be understandable, given the lack of clear and fixed accountability measures to monitor research use. Country case studies revealed that politicians will often implement research evidence only partially, gloss over caveats in order to legitimise policy decisions, or release only those results they support. For example, research into genetically modified varieties of cotton in India was highly politicised, with some political factions painting the scientists involved as ‘puppets’ of a Western ‘totalitarian’ science. This resulted in the government disregarding scientific knowledge, pushing some state governments to ban biotech cotton varieties based on flawed evidence of agronomic failure. The end result for the poor was negative, with biotech seeds were produced and spread on the black market without safety checks (Herring, 2007). Similarly, economic interests may have an adverse affect on scientific integrity by delaying or withholding research results and having a direct or indirect influence on the content of results. For example, pharmaceutical companies have, in a number of cases, threatened to sue academics whose work shows negative consequences of their products, delaying or halting publication (Rosenstock, 2002). Such tactics are used to exploit scientific uncertainty and deflect attention from what is known and from the actions that would credibly follow from that knowledge.

In other instances, research may be undertaken for political reasons. For example, environmental research is often used to depoliticise natural resource issues by ‘projecting an illusion of natural resources that require better management and enhanced legislation to ensure that poor people benefit, while overlooking highly political struggles over environmental control and rights to resources’ (Waldman, 2005). In Honduras, environmental issues were framed around a ‘crisis narrative’, essentially blaming poor people’s behaviour and lifestyles for the mismanagement of public goods. This discursive approach ignored the fact that environmental resources often form the basis of material wealth, which leads to questions of power, inequality and the role that elites play in environmental degradation.

Mismatch between timescales and incentives

The narrow focus and long timescales of scientific research relative to political priorities constitutes another important source of tension, particularly given the immediacy yet breadth of action required by CCA. The most important challenges to ST&I knowledge access identified by respondents in the ODI study related to the quantity, timeliness and depth of information provided, as well as the amount of time taken to locate and absorb relevant findings. This is an even bigger challenge for climate change agendas in developing countries: it is now clear that the impacts of climate change will weigh most upon developing countries, yet adaptation research and availability of evidence remain dominated by the industrialised north (van der Zaag et al. 2008).

Furthermore, timescales and goal horizons are very different for policy-makers and researchers. Elected policy-makers are held accountable – at least in theory – by their constituents, so must fulfil short-term policy goals and provide tangible solutions to problems. Forest management, for instance, requires decisions about ecosystem preservation and sustainable resource use over the short term, but scientific research may take years to ascertain accurately the effects of how the forest is used. Conversely, scientific research operates on a timescale dictated by the research process of hypothesis testing, making it difficult to appropriate scientific research findings in a

timely fashion in policy decisions. In order to address this, several expert informants surveyed advocated the importance of institutionalising long-term planning in order to improve the uptake of science into policy. A good practice example is the UK Climate Impacts Programme, which used four potential future scenarios of the socio-economic landscape of the UK in 50 years time as a common basis around which local and regional actors can coordinate research on how they will be affected by climate change.

This need for policy-makers to deliver short-term results is also manifested in the desire among survey respondents from developing countries for more information specific to their particular policy context, rather than internationally applicable research findings, even though the latter are better rewarded in academic fora. For example, in order to develop effective health policy, reliable data are needed on the social and environmental factors linked to climate change that influence the transmission of malaria. Rising temperatures are extending the habitats of mosquitoes that carry the malaria parasite, shifting the latitude and altitude boundaries for malaria transmission, while higher rainfall is creating larger breeding grounds for mosquitoes in some contexts (Dickson, 2008).

In addition, as CCA requires highly contextualised evidence and policy recommendations, there is a need to rethink more traditional modes of ‘pure’ scientific research disseminated from independent research institutions to government. Survey results showed strong support for greater engagement of researchers with policy debates, with a sizeable number of developing country policy-makers (49%) asking for scientists to provide opinions and advocate policy positions in addition to research findings. This was corroborated by a number of key informant interviewees, who indicated that analysis of potential social, political and economic implications of research would increase effectiveness in reaching policy audiences. Policy-makers often have to think about short-term human poverty as much as longer-term environmental issues. For example, environmental research in Zambia illustrates the damaging effects of deforestation, but there has been no policy directive to address this, most probably because wood serves as a cheaper source of fuel for most poor households (Mwambwa, in Jones et al., 2008).

Box 1: The framing of CCA

The development of effective policy solutions is heavily influenced by problem definition or framing. Framing of the CCA challenge remains highly contested, especially between developed and developing country actors. A ‘natural hazard perspective’, drawing on Western science, sees the vulnerability of individuals as created through external events and biophysical changes, such as floods. By contrast, the ‘social vulnerability perspective’ looks at causes internal to society namely the socio-economic, political and cultural factors that lead to differing social risks for segments of the population. These opposing framings lead to different policy priorities, with CCA seen as either a matter primarily of technical interventions led by experts and professionals, such as flood early warning systems, or a matter of reducing underlying vulnerability through empowerment and building capacities and political voice. The approaches cannot easily be reconciled, given opposing perspectives about the nature of ‘risk’, as something to be calculated scientifically versus something involving perceived dangers (Bauer, 2008). In the Indian context, biodiversity initiatives have struggled to find a strong foothold, as they have emphasised ‘the flora and fauna protection paradigm’ without sufficient attention to the livelihoods implications for local people living in the centres of biodiversity (Biermann, 2001).

Tensions between technical and democratised knowledge

Understanding the impacts of climate change and putting in place policies to adapt to these changes are not scientific challenges alone. In particular, there is a pressing need to incorporate local knowledge into

policy, and to develop CCA policy in an inclusive and participatory way. For centuries, communities have developed their own ways of coping with climatic variability and extreme weather events, and it is important to build on, rather than replace, this intimate local knowledge of the environment. For example, in Africa and Asia farmers cope with extreme events by practising a range of techniques, such as intercropping and crop diversification, use of home gardens, diversification of herds and incomes and shifts in land use (e.g. from livestock to game farming), as well as conservation strategies including terracing, surface water and groundwater irrigation (UNFCCC, 2007).

Indeed, a significant body of work on agricultural extension champions the value of indigenous technical knowledge of the land, and the need to build on this rather than simply ‘transferring’ Western scientific understandings to local populations (Jones et al., 2009). As well as providing an intimate understanding of the local environment, such knowledge and practice are better embedded in an appreciation of what is feasible to implement, and culturally or politically appropriate. Thus, what is needed is not necessarily new knowledge but creative facilitation of the uptake of existing knowledge and innovation. For instance, Kenyan agricultural research institutes worked with farmers to organise seed fairs to distribute local varieties to replace dependency on post-disaster distribution. In so doing, they set in place structures that allowed for better utilisation of indigenous knowledge (Huq et al., 2005).

However, deep tensions often surface in attempts to integrate these two knowledge bases. There are often clashes between different paradigms of knowledge, methods of validation and explanatory frameworks (Brown, 2007). This tension can be seen in the different ways of framing the issue of climate change risk and adaptation (Box 1).

The importance of knowledge intermediaries

Central to the challenge of mainstreaming CCA in developing country policy processes is the need to improve the channels for incorporating science into policy, ensuring that scientific knowledge is effectively shared with policy-makers in a timely and relevant manner. Participatory and deliberative processes can strengthen the science–policy interface, bringing together key stakeholders to combine different types of evidence, incorporate diverse opinions and ground decisions in relevant, feasible and implementable advice (Culyer and Lomas, 2006).

In this vein, public participation is enshrined in several high-level policy documents on climate change. These include Article 6 of the 1992 UNFCCC, which calls on parties to promote and facilitate ‘public participation in addressing climate change and its effects and developing adequate responses’, and the third report of the Intergovernmental Panel on Climate Change (IPCC), which argues that ‘Active participation by concerned parties, especially to ensure that actions match local needs and resources’ is a key condition for improving adaptation policy. Mainstreaming CCA in developing country policy processes depends, at present, on National Adaptation Programmes for Action (NAPAs), which are designed to be country driven, to incorporate multiple stakeholders and to provide opportunities to catalyse attention to the science–policy interface through Southern-initiated research projects and capacity building (Osman-Elasha and Downing, 2007).

Attempts to foster ownership using poverty reduction strategy papers (PRSPs) reveal important lessons for the complementary reforms that are needed alongside NAPAs. PRSPs put in place a kind of ‘process conditionality’, as part of which governments are obliged to debate policies openly in order to receive debt relief and other assistance. PRSPs have had some success mainstreaming and broadening poverty reduction efforts, helping create new spaces for domestic policy dialogue, where governments can be tackled by other national actors on what they are doing, or not doing, about poverty. However, improvements have generally fallen ‘far short of what is expected’ (Booth, 2005): consultations have often been shallow, with overall ownership and ‘buy-in’ narrow and technocratic, restricted to a small number of strategically well-placed public officials.

The NAPA process is already being criticised as detached from policy-making and conducted primarily by non-African consultants, removed from the concerns of civil society and local communities (Corbera et al., 2006). To address this, there is a need for improved alignment and embedding of NAPA processes within domestic politics and policy processes (including communication and engagement with politicians). This could come about by ensuring policy dialogues include a range of national actors in a way that also maintains the quality of their inputs, holding broad-based campaigns to support learning about NAPAs and climate change and strengthening informed public opinion through local media capacity building.

The ODI study findings suggested a wide consensus on the need for intermediary organisations to serve as knowledge brokers at the science–development policy interface and as capacity builders for both research-

ers and policy-makers. Creating or strengthening such knowledge brokers would be one way of working towards these complementary reforms. Multiple research institutes, international alliances and international NGOs are well placed and making forays into the role of intermediaries at the science–policy interface. This work is reflected largely in knowledge sharing, and the publication of CCA scientific research in policy-targeted formats, such as briefing papers and opinion articles produced by international research institutes ranging from ODI to the Tyndall Centre for Climate Change Research. However, CCA debates could stand to learn a good deal from the literature on how intermediary organisations can address the weaknesses of the science–policy interface (e.g. Choi et al. 2007), by facilitating communication, translation and mediation as follows.

Key lessons for science–policy intermediaries in developing countries

While there is strong agreement on the need for intermediaries, there is a lower level of consensus on the most effective roles for intermediaries to play (Jones et al., 2008). Strong support among ODI survey respondents for all possible roles of an intermediary indicated a largely unspecified need, suggesting the importance of piloting various activities that intermediaries could fulfil in different country and policy contexts (Figure 1). Some activities are ongoing (Box 2), but little is known about the mechanisms through which intermediaries would be most effective, beyond a need for greater networking and communication. Nevertheless, lessons emerged from our study on the functions that these intermediaries could carry out.

Audience-appropriate information targeting

First, it is critical to tailor information services and products to audience needs. Key messages need to be demystified and their relevance to policy considerations highlighted, by carefully considering operating language, objectives, timeframe, contacts and mediums of communication. In this regard, our survey findings suggested the highest demand for short synthesis-type products. Developing country respondents in particular selected the following as most useful: expert opinion articles on topics relevant to policy issues (87%), news items about other countries' approaches towards using ST&I to tackle development problems (81%) and policy briefs from authoritative sources (80%). Equally importantly, these must be targeted to different policy actors (in terms of the policy area of focus and level of government), and at different junctures of the policy cycle. These activities are particularly necessary given the widespread, cross-scale and cross-sectoral implications of climate change, on the one hand, and the generally weak capacity of many relevant ministries and sectors to incorporate scientific information into policy planning and implementation processes, on the other.

While this cannot be the onus of one single information provider, knowledge translators and brokers need to think strategically about how best to package information to meet these divergent needs, through either multiple information products or a single project designed to meet multiple needs. Given the systemic obstacles (low levels of scientific understanding among policy-makers, limited openness to research-based evidence by politicians, lack of incentives to use ST&I information and the need for institutionalised communication channels for scientific

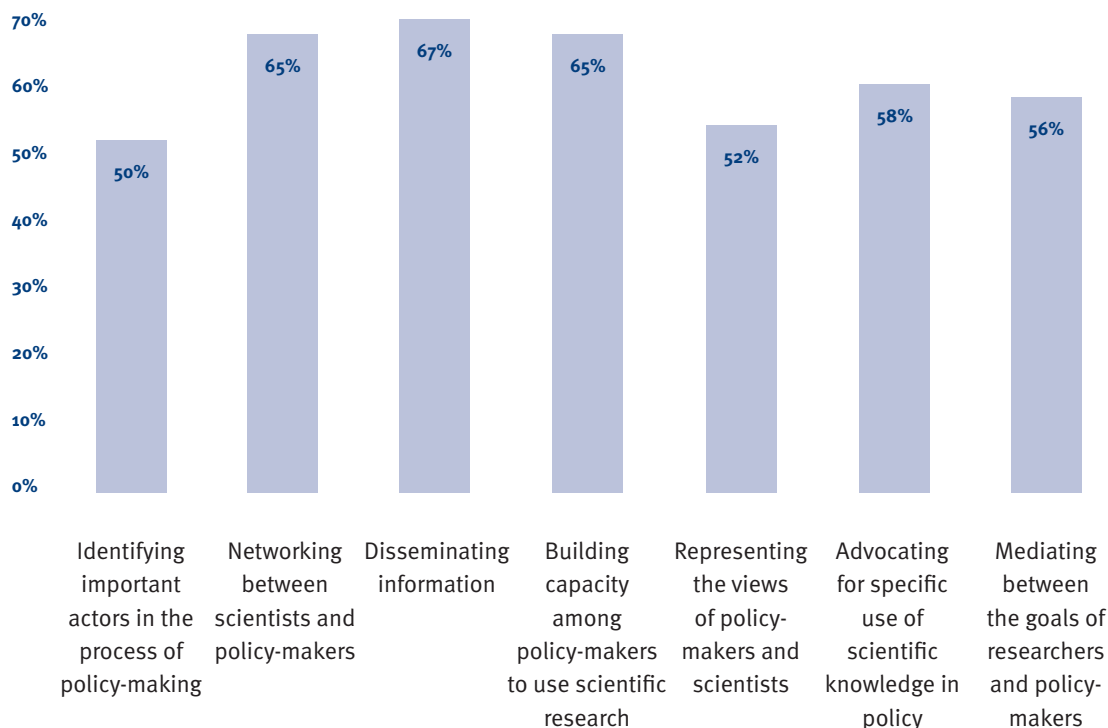
Box 2: Promoting more inclusive climate change dialogues

Participatory action research is increasingly gaining traction as a way to ensure, two-way processes of knowledge sharing between expert and non-expert communities. The DFID/IDRC Climate Change Adaptation in Africa programme is a prime example. This approach aims to engage local non-experts from the first stages of defining the research problem, generating a research policy process that is demand led, with clear policy relevance. Through the process of research, indigenous adaptation strategies and perspectives are mapped and brought into dialogue with scientific research.

A project under the Tanzanian Ministry of Natural Resources and Tourism, drawing on experiential and expert knowledge, has worked closely with traditional institutions at local level to revive the traditional conservation practice of enclosure, or *ngitili*, of the Sukuma people in Shinyanga to combat reduced productivity and soil erosion linked to relocation schemes, over-grazing, cash crop cultivation and deforestation. Farmers are engaging in agro-forestry using degraded croplands and rangelands, employing traditional village guards and conserving vegetation by closing off *ngitilis* for regeneration. In this way, they are providing livelihood resources that can be drawn on when environmental conditions deteriorate (Agrawal et al., 2008).

It is important to recognise, however, that indigenous perspectives are heterogeneous and that inclusive approaches must factor in consultations with a range of stakeholders, including adults and children, men and women and different ethnic or caste groupings. The Children in a Changing Climate (CCC) programme carried out participatory film making directed by children to create a call to action regarding their specific needs, such as protection from violence, abuse and neglect, for use within and across communities (IDS, 2009). Similarly, a marine mapping initiative in the Pacific Islands found that, although men were better at outlining boundaries and physical features of direct significance to planting and fishing, women were better placed to provide details of subtle changes to the reef over time and to work as a group to determine the extent of the last rainy period (WWF, 2004).

Figure 1: Most important roles for an intermediary organisation (all respondents)



Source: Jones et al. (2009).

information uptake), it appears essential that the role of intermediaries go beyond information provision. Although all potential roles were ranked highly, building capacity among policy-makers to use scientific research (65%) and networking between scientists and policy-makers (65%) were identified as critically important (Figure 1).

Promoting inclusive dialogue

Promoting greater interaction, discussion and deliberation between researchers, policy-makers and the general public is emerging as crucial for effective research uptake. Our survey and expert informants highlighted the particular importance of improving informed public participation regarding ST&I policy issues, given that public involvement can constitute a facilitating factor for developing evidence-based policy processes and stimulating demand for research evidence based upon local priorities (Box 2).

In this regard, deliberative processes are critical, with high demand for intermediaries to facilitate communication rather than relying on more passive forms of information provision (53% of all respondents called especially for face-to-face interactions), to lead on networking initiatives (87% of developing country researchers) and to provide guides on policy-making processes (75% of developing country researchers).

Policy-makers said they were more likely to use information if they felt engaged in knowledge production and deliberation processes.

However, debates on climate change are often highly politicised, given contested understandings of national and international equity in terms of access to natural resource assets. It is therefore crucial that fora for deliberation and participation are managed carefully, as the way questions are framed, the kinds of evidence drawn upon, the background of stakeholders involved and the ways in which the process is managed can facilitate or hinder the incorporation of different actors or perspectives (Brown, 2007).

Capacity building

Greater participation and deliberation go with efforts to build capacity among stakeholders. Although researchers were critical of policy-makers’ limited interest in and understanding of scientific research, many recognised that they could take steps to improve their engagement with the policy process. Some 33% admitted that they were dissatisfied with their knowledge and expressed a strong interest in improving related competencies, potentially through guides on processes and current policy concerns. Expert informants suggested that intermediaries could help bridge the gap by building capacity of researchers to respond

to current political agendas, build credibility and consider the potential applications and implications of research across sectors.

Both researchers and expert informants rated networking and online discussions highly as mechanisms to improve interaction, increase dissemination of research findings and improve credibility of scientific data in the eyes of policy-makers. By improving researchers' capacity to target findings to the relevant points in the policy cycle, knowledge-brokering organisations could help increase uptake of ST&I information into development policy. Key lessons in recent years have included rethinking the role of science–policy interface institutions to incorporate management services and active shaping of public policy analysis, rather than merely providing preparatory inputs and raising the profile of objective knowledge (Niederberger, 2005).

Climate change is occurring over long time horizons, so capacity-building initiatives also need to ensure that usual public policy pressures are balanced with an adequately long-term perspective. One option may be 'education for sustainable development' through curricula of schools or other educational institutions, to help future decision makers develop the skills and knowledge needed to understand and tackle issues such as CCA. Science–policy intermediaries could play a key role in this, or in reviewing the messages and content of such material. Recent work shows that education materials on CCA are often subject to significant 'politicisation', ignoring the substantial evidence on the anthropogenic causes of climate change and downplaying the challenges to sustainability posed by unconstrained globalisation and growth (Selby, 2007).

Conclusions and policy implications

In the follow-up to Copenhagen, one key challenge will be to ensure there is adequate support and institutionalisation of accountability mechanisms to mainstream CCA in developing country policy processes. Within this broader challenge, our analysis has highlighted the critical importance of developing innovative approaches to mobilise scientific knowledge for use in national policy processes, so policy-makers from a range of sectors as well as the general public can participate in and feel ownership of policy dialogue processes on CCA. Only with such multi-stakeholder buy-in are we likely to see substantial change in policy approaches and, most importantly, in grassroots-level behaviour.

Given the tensions inherent in linking science and policy and the particular complexities of climate

change issues – especially its strong focus on the future – strategic investments will be needed to tackle these challenges in an effective and context-sensitive manner. Our findings on the science–policy interface in the South highlighted as a particularly promising avenue the development of knowledge intermediaries to facilitate and broker more effective and inclusive policy dialogues. There appears to be strong demand for more specialised players and services here, although the precise role of knowledge intermediaries will need to be explored through piloting and empirical analysis of the strengths and weaknesses.

It is critical that donors, international agencies and domestic actors alike invest in such exploratory initiatives now: experience in other sectors suggests that building effective and credible intermediaries is a long-term and delicate process. Potential models could include embedding researchers within government agency hubs to filter and tailor scientific knowledge to key decision makers as new findings emerge; establishing citizen juries on proposed CCA options to ensure adequate and informed public participation; or developing clearing houses for new research on CCA themes that can overcome knowledge management barriers. What is essential is that the debate on the challenges of the science–policy practice interface be moved beyond the realm of the conceptual and theoretical towards robust empirical analysis, and that channels be established to share experiences within and across countries.

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References

- Agrawal, A., McSweeney, C. and Perrin, N. (2008) *Local Institutions and Climate Change: Social Development Notes*. Social Dimensions of Climate Change 113. Washington, DC: World Bank.
- Bauer, S. (2008) 'Competing Logics and Balancing Acts: "Mainstreaming" Climate Change Adaptation in Development Agencies'. Dissertation submitted for MSc.
- Biermann, F. (2001). Big science, small impacts in the South? The influence of global environmental assessments on expert communities in India, *Global Environmental Change*, 11, 297–309.
- Bird, N. (2008) *MDGs and the Environment: Are Environmental Institutions 'Fit for purpose'?* Opinion 110. London: ODI.
- Booth, D. (2005) *Missing Links in the Politics of Development: Learning from the PRSP Experiment*. Working Paper 256. London: ODI.
- Brown, V. (2007) 'Collective decision-making bridging public health, sustainability governance, and environmental management', in Soskolne, C. (ed) *Sustaining life on earth: environmental and human health through global governance*. Lexington Books.
- Corbera, E., Kosoy, N. and Martínez Tuna, M. 2006. Marketing ecosystem services through protected areas and rural communities in Meso-America: Implications for economic efficiency, equity and political legitimacy. Working Paper 94, Tyndall Centre for Climate Change Research.
- Culyer, A. and Lomas, J. 2006. "Deliberative Processes and Evidence-Informed Decision-Making in Health Care: Do They Work and How Might We Know?" *Evidence and Policy* 2: 357-71.
- Dickson, D. (2007) 'Africa Needs Better Data to Combat Global Warming'. Editorial. www.scidev.net/en/climate-change-and-energy/climate-change-in-africa.
- Herring, R.J. (2007) *Whose Numbers Count? Resolving Conflicting Evidence on Bt Cotton in India*. Qsquared Working Paper 44. Toronto: University of Toronto.
- Huq, S., Yamin, F., Rahman, A., Chatterjee, A., Xiu, Y., Wade, S., Orindi, V. and Chigwada, J. (2005) 'Linking Climate Adaptation and Development: A Synthesis of Six Case Studies from Asia and Africa'. *IDS Bulletin* 36 (4): 117-122.
- IDS (2009) *The Importance of Participatory Child-Centred Research for Climate Adaptation. Children in a Changing Climate*. Policy Briefing 13 (focus series). Brighton: IDS.
- Jones, N., Jones, H. and Walsh, C. (2008) *Political Science? Strengthening Science–Policy Dialogue in Developing Countries*. Working Paper 294. London: ODI.
- Jones, N., Romney, D., Jones, H., Walden, D., Mitra, S., Efa, N. and Fish, J. (2009) 'Conceptual Review on Innovation Systems Approaches and Their Use in Understanding Pro-Poor Innovation in the Renewable Natural Resources Sector'. ODI-CABI Report. London: ODI.
- Niederlander, A. (2005) 'Science for Climate Change Policy-Making: Applying Theory to Practice to Enhance Effectiveness'. *Science and Public Policy* 32(1): 2-16.
- Osman-Elasha, B. and Downing, T.E. (2007) 'Lessons Learned in Preparing National Adaptation Programmes of Action in Eastern and Southern Africa'. Policy Analysis Report. Oxford: ECBI.
- Rosenstock, L. (2002) 'Attacks on Science: The Risks to Evidence-based Policy'. *American Journal of Public Health* 92(1): 14-18.
- Schipper, L. and Pelling, M. (2006) 'Disaster Risk, Climate Change and International Development: Scope for, and Challenges to, Integration'. *Disasters* 30(1): 19-38.
- Selby, D. (2007) 'As the Heating Happens: Education for Sustainable Development or Education for Sustainable Contraction?' *International Journal of Innovation and Sustainable Development* 2(3/4): 249-267.
- Van der Zaag, P., B. Gumbo, N. Gunawardena and E. Rap, 2008. Climate, energy and environmental care - experiences with international research partnerships. Background paper prepared for the WOTRO/ISS/NUFFIC conference "Knowledge on the Move", The Hague, 26-28 February.
- Waldman, L. (2005) *Environment, Politics and Poverty: Lessons from a Review of PRSP Stakeholder Perspectives*. Brighton: IDS.
- WWF (2004) 'Tikina Wai Climate Change, Community Vulnerability & Adaptation Assessment Report'. www.wwfpacific.org/fj/climate-change/publications.asp.