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Using adaptive capacity to gain access to the decision-intensive ministries

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13.1 Introduction

The Conference of the Parties (COP) of the Framework Convention on Climate Change (UNFCCC) has begun to focus its attention on establishing mechanisms by which the incremental costs of adaptation to long-term climate change by developing countries might be supported by developed countries through their contributions to one or more adaptation funds. Meanwhile, the Intergovernmental Panel on Climate Change (IPCC), for the Fourth Assessment Report (AR4), has continued its interest in the interface between adaptation to climate change and climate variability, on the one hand, and sustainable development, on the other. Notwithstanding significant effort to promote cross-fertilization across these interests, it is not obvious that either process will, without some guidance, allow climate issues to gain access to the deliberations that are conducted behind the closed and sometimes locked doors of what might be termed the "decision-intensive ministries" – the ministries within which development planning is conducted and by which development policies are implemented. This short paper offers some thoughts (hypotheses, really) about how the climate community might use the emerging links between researchers' understandings of how adaptations work and practitioners' understandings of how attractive development might be promoted.

Of course, it is not the case of that decisionmakers concerned with development issues do not recognize the possibility that climate change may cause harm over the long term. The doors are closed primarily because the decisionmakers already have full plates. They worry about how to promote economic growth and productivity gains. They worry about the implications of lowering trade barriers. They are concerned about equity issues and the distribution of resources across their societies. They focus on better provision of health services and education. They try to take sustainability into account, but their primary objectives involve promoting as much near-term progress as possible. It is no wonder that the long-term implications of climate change seldom appear high on the list of the multiple stresses to which they must respond. Nonetheless, planners ignore climate at their own risk, especially when long-term investment decisions can lock their economies into specific development trajectories from which it could be expensive to deviate.

Section 13.2 begins with a brief review of the conclusions about adaptation offered in the Third Assessment Report (TAR) of the IPCC and the degree to which its emphasis on site-specific and path-dependent factors continues to hold. The fundamental lesson for the research community is that the answer to a question like "Will this adaptation work here or there?" is an empirical issue – sometimes it will and sometimes it will not. An equally brief review of some significant contributions to the recent economics literature, described in Section 13.3 because they focus on issues of interest in the decision-intensive ministries, suggests that this sort of "it depends" conclusion is nothing new to them. Moreover, Section 13.3 notes that the factors that determine their questions about whether a particular policy or program will promote economic growth or reduce poverty (e.g.) are the same factors upon which the relative efficacy of adaptation depends. This convergence of experience across researchers and practitioners is then used, in Section 13.4, to suggest

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strategies for opening the doors through which climate issues must pass if they are to become part of mainstream development planning. Some concluding remarks try to provide some context to the overall discussion.

13.2 The state of knowledge about adaptation in 2004

The authors of Chapter 18, in their contribution of Working Group II to the Third Assessment Report of the IPCC (2001), included four fundamental insights among the points that they wanted to emphasize.

1. The vulnerability of any system to an external stress (or collection of stresses) is a function of exposure, sensitivity, and adaptive capacity.
2. Human and natural systems tend to adapt autonomously to gradual change and to change in variability.
3. Human systems can also plan and implement adaptation strategies in an effort to reduce potential vulnerability or exploit emerging opportunities even further.
4. The economic cost of vulnerability to an external stress is the sum of the incremental cost of adaptation plus any residual damages that cannot be avoided.

The Chapter 18 writing team was also careful to note that even systems which might face similar climate-induced stresses would, by virtue of their location and their level of development, confront the future manifestations of climate change from extraordinarily dissimilar socio-economic circumstances.

In addition to this now obvious diversity in socio-economic context, the TAR also recognized that any system's environment varies *idiosyncratically* from day to day, month to month, year to year, and decade to decade (see Mearns *et al*. [1997] or Karl and Knight [1998]). It follows that changes in the mean conditions that define those environments could actually be experienced most noticeably through changes in the nature and/or frequency of variable conditions that materialize across short timescales, and that adaptation necessarily involves reaction to this sort of variability. This is the fundamental point in Hewitt and Burton (1971), Yohe *et al*. (1996), Downing (1996), and Yohe and Schlesinger (1998). Some researchers, such as Smithers and Smit (1997), Smit *et al*. (1999, 2000) and Downing *et al*. (1997), have used the concept of "hazard" to capture these sorts of stimuli, and have claimed that adaptation is warranted whenever either changes in mean conditions or changes in variability have significant consequences. For most systems, though, changes in mean conditions over short periods of time fall within a "coping range" – a range of circumstances within which, by virtue of the underlying resilience of the system, significant consequences are not observed (see Downing *et al*. [1997] or Pittock and Jones [2000]). There are limits to resilience for even the most robust of systems, of course. It is therefore critically important to understand the boundaries of systems' resilience; how, exactly, are the thresholds determined beyond which the consequences of experienced conditions become significant?

Some of these critical boundaries are determined by physical properties, of course; but others are determined by socio-economic context and social preferences. Even across this bifurcation, the first TAR conclusion listed above has become a strong foundation from which to approach vulnerability analyses across a multitude of contexts. More specifically, adopting a slightly different emphasis provides the insight that any system's vulnerability to climate change and climate variability will be determined not only by *its exposure to the impacts of climate and its baseline sensitivity to those impacts*, but also by *its ability to cope with new sources of stress – i.e., its adaptive capacity*. This evolving approach exploits its recognition that all three of these factors, but perhaps most fundamentally the role of adaptive capacity in defining socio-economic thresholds of tolerance to climate-related stress, clearly depend on path-dependent and site-specific circumstances. To sort through the implications of this insight, Yohe and Tol (2002) have suggested that the determinants of adaptive capacity include:

1. the range of available technological options for adaptation;
2. the availability of resources and their distribution across the population;
3. the structure of critical institutions, the derivative allocation of decisionmaking authority, and the decision criteria that would be employed;
4. the stock of human capital including education and personal security;
5. the stock of social capital including the definition of property rights;
6. the system's access to risk-spreading processes;
7. the ability of decisionmakers to manage information, the processes by which these decisionmakers determine which information is credible, and the credibility of the decisionmakers themselves; and
8. the public's perceived attribution of the source of stress and the significance of exposure to its local manifestations.

This second-tier list of critical factors identifies some of the fundamental sources of diversity across paths and locations, and so it reinforces perhaps the most important conclusion from Chapter 18 of TAR:

> Current knowledge of adaptation and adaptive capacity is insufficient for reliable prediction of adaptations; it also is insufficient for rigorous evaluation of planned adaptation options, measures and policies of governments. [. . .] Given the scope and variety of specific adaptation options across sectors, individuals, communities and locations, as well as the variety of participants – public and private – involved in most adaptation initiatives, it is probably infeasible to

> systematically evaluate lists of adaptation measures; improving and applying knowledge on the constraints and opportunities for enhancing adaptive capacity is necessary to reduce vulnerabilities associated with climate change. IPCC (2001), p. 880

This is not to say that all is lost. The take-home message is simply that research has a long way to go if it is to come to grips with the diversity of the socio-political-economic environments that produce wide ranges of sensitivities and imply enormous variances in adaptive capacity.

Adger and Vincent (2004), in a contribution to the IPCC Expert Meeting on Uncertainty held in Maynooth, Ireland, in the spring of 2004, take this warning to the next step. They observed that uncertainty is pervasive and that adaptive capacity essentially describes the adaptation space within which decisionmakers might find feasible adaptation options. They continued to argue that diversity in context makes it easier to anticipate change in generic adaptive capacity than adaptation, per se, so that linking the determinants of adaptive capacity to drivers and therefore perhaps to the available policy levers can help explain why the "magic" works sometimes in some places, but not at other times in other places. Their argument conforms well with a "weakest link" hypothesis authored earlier by Yohe and Tol (2002): the overall capacity of a system to adapt to an external stress (be it climate-related or not), is a function of the weakest of the underlying determinants of adaptive capacity.

It follows that the question of whether adaptation X will work in place Y at time T is largely an empirical one; and the determinants of adaptive capacity provide researchers and decisionmakers alike with a list of factors to consider in their analyses of exactly why. Local decisionmakers will have the best information about what will or will not work, to be sure; but the research community can, by using the underlying determinants of adaptive capacity to organize their thoughts, find common lessons across a wide range of locations and contexts. They can even discover attractive links between the determinants of success in coping with climate change and climate variability, on the one hand, and success in achieving other policy goals (such as promoting sustainable development), on the other.

13.3 Some insights from the economics literature

To illustrate this point more explicitly, consider the literature examining the link between economic policy levers (such as opening an economy more completely to international trade) and domestic planning and policy objectives (such as increased productivity growth, improved general welfare in the short and long term, and reduced poverty). This literature has shown repeatedly that the answer to the question of "What works where?" in an economic development arena is also essentially empirical. It also suggests strongly that the determinants of success or failure in these areas map well onto the determinants of adaptive capacity recorded above. Finally, many studies which examine the relative efficacy of various economic interventions have confirmed, in entirely different contexts, strong variants of the "weakest link" hypothesis.

Lucas (1988), for example, argued in a widely cited paper that human capital externalities are large enough to explain differences between the long-run growth rates of poor and rich countries. Moretti (2004) built on the work of Lucas, as well as the contributions of others who struggled with some significant statistical problems, to concentrate attention on the productivity spillovers that can be expected from human capital. He hypothesized that these spillovers, if they existed at all, would make manufacturing plants located in cities with higher levels of human capital more productive in the sense of producing greater output from the same inputs. His hypothesis was confirmed empirically when he showed that plants located in US cities where the fraction of college graduates grew faster experienced larger increases in productivity and correspondingly larger increases in wages.

Guiso *et al.* (2004) expanded the scope of analysis when they explored the role of social capital in supporting the successful application of financial structures. Conducting empirical analyses on data compiled in Italy, they found strong evidence that social capital matters most when education levels are low and law enforcement is weak. Recognizing that their results were site-specific and path-dependent, they also wondered whether or not their results would apply to developing countries that were plagued by both low levels of human capital and diminished stocks of social capital. When they focused their attention on interaction effects, they noted that trust (the component of social capital that they could quantify) was much less important in regions where the court system was more efficient or when people were more educated. Since they argue that neither characteristic prevails across much of the developing world, they conclude that social capital is "to be very important in explaining the success (or lack thereof) of developing countries" (p. 553).

Meanwhile, Rozelle and Swinnen (2004) looked across transition experiences of central European countries from the former Soviet Union. They observed that countries which grew steadily a decade or more after implementing their economic reforms had supported the reforms by creating macroeconomic stability, reforming property rights, hardening budget constraints, *and* creating institutions that facilitate exchange and develop an environment within which contracts can be enforced and new firms can enter. Order and timing did not matter, but success depended on meeting all of these underlying objectives at some point in the transition – a clear manifestation of what could be deemed a variant of the previously described "weakest link" hypothesis.

Finally, Winters *et al.* (2004) reviewed a long literature from the past three decades that explores the likelihood that trade liberalization can reduce poverty. This literature is littered with contradictory conclusions and statistical problems, but these authors concluded that a positive effect depends critically upon the existence and stability of markets,

the ability of actors to handle changes in risk, access to technology, access to resources, competent and honest government, *and* policies that promote conflict resolution and promote human capital accumulation. The match between this list of characteristics required for success in promoting long-term growth, site-specific productivity gains, and improved equity (all concerns of the denizens of the decision-intensive ministries) and the determinants of adaptive capacity inspired by the TAR is strong. Both include references to strong and skilled governance, appropriate distributions of resources and access to resources, strong stocks of human capital, and overall stability. Just as in the climate arena, whether or not the links between an economic intervention (or an adaptation) and its desired outcomes are strong, weak, or actually run in a direction that is opposite to that predicted by theory or process analysis was found to be essentially an empirical question in nearly every instance.

13.4 Opening the doors to the decision-intensive ministries

A number of possible keys to gain access to the decision-intensive ministries can now be identified even though climate change may not be a fundamental concern in their deliberations (recall that these are the ministries within which development planning is conducted and by which development policies are implemented). These keys do not rely on the elevation of climate change in the list of stresses to which these ministries must respond. They depend, instead, on a commonality of underlying determinants for success – success in promoting the minister's objectives, to be sure, but also success in promoting the ability to cope with climate change and climate variability.

First of all, the precursors of sustained support of economic growth and improved well-being match the determinants of adaptive capacity quite well. The decision-intensive ministries are already familiar with these precursors, and they are already concerned with seeking ways of strengthened the "weakest links" that support the connections between policy implementation and success. The first key to bringing climate into their agendas is simply to convince decisionmakers in the development ministries that they are already working on these problems. Indeed, recognizing climate could provide them more ammunition when they negotiate for claims to scarce economic resources.

Second, the complexities of trying to predict what will work and what will not is an empirical issue in both contexts, but the critical ministries already have experience in coping with this complexity. Preparing and planning for adaptation by strengthening the determinants of adaptive capacity can simultaneously work as a hedge against climate impacts and as a means of improving prospects for sustainable development by supporting (for example) productivity growth (or at least adding to the insulation that protects productivity initiatives from external stress). Cast as a risk-reducing tool, improving adaptive capacity can also be seen as a tool to complement mitigation. This improves stability, and that improves productivity growth by making investment more attractive.

Finally, preparing for negotiations within the COP about adaptation and accessing the adaptation funds will require a thorough understanding of the state of the art of adaptation and the sensitivity of outcomes to the underlying determinants. The carrot of international support for adaptation efforts that will also promote growth is an incentive to be proactive in understanding how the empirical analyses will play out "in country" and what they mean for negotiations conducted at the highest levels of government.

13.5 Concluding remarks

None of the keys noted in Section 13.4 has been explored completely, at this point; but the evidence is certainly there to support a more thorough investigation of the associations on which they rely. Uncertainty in our ability to predict what will work, where, and when in our response to the climate problem is an empirical issue for which a significant number of case studies scattered across locations and sectors that span the variance of critical drivers will be required. This complication should not, however, discourage the attention of the decision-intensive ministries. They already know that the effectiveness of the policies that they contemplate all the time, such as opening trade or imposing environmental restrictions on industrial activity, may or may not work to increase productivity, improve general welfare (including equity considerations), or reduce poverty in a specific sector or across a specific region. Determining which of these policies will work is the equivalent empirical question with which they have some familiarity. Indeed, noting that the determinants of these more mainstream "adaptations" to other external stresses are the same as those for the capacity to adapt to climate stress suggests that they are already confronting exactly the same empirical question. Climate, therefore, is not a new issue to be added to an already clogged agenda. It is, instead, an additional incentive for the careful examination of how and why policies designed to promote productivity in an interdependent world might function.

Carefully designing the criteria by which applications to the various adaptation funds will be evaluated can open the doors to the critical ministries more quickly by offering another source of support for their initiatives. It is here, by suggesting ways of "mainstreaming" responses to climate risks into the development process, that the coincidence of underlying determinants can suggest how the global community might respond to calls by Ian Burton (2004) and others to close the "adaptation gap."

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