Lessons from the Field

Jennifer Phillips
Bard Center for Environmental Policy and
The International Research Institute for Climate Prediction

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Introduction

In the early stages of learning how to use seasonal climate forecast information, we would often find ourselves in the field with people who insisted we discuss long term trends in climate change rather than seasonal variability. We patiently explained, again and again, that we were not here to discuss climate change but something completely different that had nothing to do with the large scale changes villagers observed, but was something "natural" that has been happening for thousands of years. Back in our hotels, as good scientists, we would discuss the possibility that people were perceiving long term trends in climate simply because so much in their world was changing, or that if there were real changes they were part of natural decadal or longer shifts in climate and just as likely to shift back in the next 15 years. But still, that this had nothing to do with our task, to encourage the adoption of seasonal climate forecasts so they could manage interannual climate variability, and how much harder it made our job that people were confusing the two concepts.

Six years, and many field visits later, we have come to a much more integrative view of the relationship between seasonal variability, climate change, and how individuals and communities utilize information to cope with climate. The primary lessons for discussion here fall into three categories: 1) The importance of seasonal variability as the primary manifestation of longer term climate change, and therefore the stimulator of human response and adaptation, 2) the role of resilience building in human adaptation to variability, even in the presence of skillful seasonal forecasts, and 3) the importance of processing of new information at the community level for building confidence and improving decision making.

Seasonal climate variability and response to long term change

As climate shifts to a new regime in response to a rise in greenhouse gases in the atmosphere, basic energy balance equations predict that mean global temperature will increase. However, means are a statistical notion simply summarizing the detail. It is the detail that humans experience. Our understanding is poor regarding how the detail of climate will change but both observational and model studies suggest that individual weather events and seasonal scale climate variability is likely to increase (Easterling et al,

2000; IPCC, 2001) and that amount and frequency of precipitation have already changed in several regions (Karl and Knight, 1998, Kunkel et al., 1999).

Human experience and response is measured on temporal scales of days to seasons, therefore the ways in which individuals and societies have adapted to climate reflects their response to event-based and seasonal scale variability, rather than to some idealized mean. Decision horizons are rarely longer than a human generation, and, especially in rural societies, decision making is focused on activities marked by cropping season. Therefore, adaptation to some notion of longer term change will none the less be driven by responses to individual events and expectation for the future reoccurrence of those events. The implication here is that improving our ability to respond to seasonal and event-based climate variability is likely to have payoffs in terms of longer term adaptation to climate change.

The roles of resilience and skillful forecasts

Much of the work in understanding how societies can make use of seasonal climate forecasts has focused on the role of "coping capacity", particularly among poor and vulnerable households (NRC, 1999). In this context, resilience against climate variability plays a central role and much has been written on it. An interesting aspect of this dialogue is that coping strategies have generally developed in the absence of a skillful forecast, and serve to support the individual or community after they have experienced an anomalous climate event. Ideally, skillful seasonal forecasts would render coping strategies useless since one would have been in a position to mitigate against damage of the climate extreme by use of the prediction. When there is a lack of foreknowledge regarding the anomaly in rainfall or temperature of the coming season, the appropriate response is to build, to the extent possible, resilience into the system such that extremes as buffered regardless of the direction of the climate anomaly.

One of the lessons of the past 6 years in applications of seasonal forecasts is that, first, there is no such thing as a perfect forecast, and second, that in fact the value of the knowledge provided even in a skillful forecast rarely shifts the odds more than 10 to 15 percentage points away from climatology for any one tercile. Thus, even with a really good forecast, resilience is a useful quality to be reinforced as part of the over all climate adaptation strategy. Seen this way, a climate forecast is mainly useful in deciding how to shape the strategy to reinforce resilience. For example, if one of the resilience-building strategies is crop diversification across plants and varieties that withstand a range of climate conditions, the forecast cannot single out an individual "best" crop to plant, but might provide a basis for shifting the distribution of crops and land allocated to them.

Diversification is manifest in numerous ways in rural livelihoods. In addition to crop type and variety, location of fields is often scattered in such a ways as to provide variation in slope, soil type, wetness, and aspect to the sun. Beyond the cropping system, a variety of additional products are often sold from the farm to help buffer income. Off farm labor is also utilized as a means of protecting against climate related losses. Another mechanism for building resilience is to develop reservoirs for key resources,

whether that means village-level granaries, water reservoirs, or building up organic matter in soils as a means of storing nutrients and improving water retention. All are adaptations to interannual climate variability, and the management of each can potentially be fine-tuned with the use of a seasonal climate forecast. By reinforcing and improving system resilience to event-based and seasonal climate variability, ability to handle the changes to come in longer-term climate is developed.

Information processing and building confidence in handling climate variability and change

A third, important area of learning that has evolved out of the field of seasonal forecast application involves two linked ideas. First, that when new information is introduced into an existing knowledge system, a framework for processing, integrating and utilizing (or discarding) that information needs to exist in order for it not to be ignored. And second, that the act of processing new climate information, and making it relevant to the decision making process may go far in building the confidence necessary to handle new and difficult climate challenges.

Well-developed knowledge systems regarding climate and climate response pre-existed the introduction of seasonal climate forecasts in many cultures and regions. Traditional forecasting schemes and a rich dialogue on climate issues certainly exist in Uganda and Kenya. Our work on developing radio-based climate information in local languages and affiliated climate discussion groups in Uganda has reinforced the idea that it is important to "enter" the existing dialogue, in local terms and language, as opposed to presenting climate information as "new" and substantively different from existing ideas and forecasting schemes (Phillips and Orlove, 2003). By placing the forecast on equal footing and allowing for the same critique or analysis as local information is subject to, decision makers are in a position to accept or reject, interpret or integrate into existing knowledge systems.

This process is often conducted in the context of public debate and dialogue in Uganda. This same dialogue, as was mentioned in the introduction to this comment, often includes discussion of climate change, of the breakdown of traditional forecasting schemes and of the uncertainties associated with what the future will bring. Over the three years we have been working in Uganda, we have noticed an increased confidence among decision makers with respect to climate management. To some degree this is a result of the success of two seasonal forecasts released by the Ugandan Meteorological Service to which communities responded with appropriate cautionary and contingency planning. Indeed, most of the responses were "win-win" in that they reinforced household resilience without putting the system at risk if the least likely climate outcome was to occur. For example, roofs were reinforced and extra fuel wood was stored in anticipation of greater than normal rainfall in 2002.

In addition to successful management of resources using seasonal forecasts, however, we believe that increased confidence regarding climate management is also a result of improved communication about climate in general, about climate variability, and about

choices individuals have for responding to variability. In addition to demystifying climate, the dialogue on options and responses serves to reinforce the idea that people are in control of their decisions. Reinforcing this confidence, and continuing the dialogue on options will serve to aid in adaptation to climate change.

Conclusions

Given that event-based and seasonal climate variability are, indeed, the components of climate through which individuals and societies will experience long term climate change, our ability to manage extremes at these short time scale will reflect how well we adapt. It has been argued here that seasonal forecasts are one more tool that can be used to fine-tune the strategies that have existed for millennia in coping with climate variability and change. But forecasts are likely to be most valuable if it is recognized that increased resilience through diversification and buffering systems is the primary mode of adaptation, with forecasts simply informing that process. Furthermore, the dialogue taking place among decision makers regarding climate and climate forecasts has and will continue to serve to build confidence that we can prepare ourselves for the challenge of climate change ahead.

References

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