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Invited paper prepared for presentation at the International Association of Agricultural Economists Conference, Gold Coast, Australia, August 12-18, 2006

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Drought: Economic Consequences and Policies for Mitigation Global Overview[1]

Jock R. Anderson[2]

Abstract

The natural variation in climate around the world means that periods of severe shortfall of rainfall are inevitable, and sometimes occur on a large geographical scale. Human settlements have adapted to this reality in many different ways, including the development of agricultural systems that feature variously robust aspects in the face of drought. As climates change under the influence of modified atmospheric composition, it seems likely that many parts of the world will face increased incidence of drought and thus more challenging tasks for farm managers, managers of non-farm enterprises that are sensitive to drought, national policy makers and, last but not least, households in rural areas that are close to subsistence levels even in non-drought seasons. The agricultural economics profession must continue to contribute to better dealing with all these challenges.

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[1] Prepared for an Invited Paper Session on Drought convened by Sushil Pandey, IRRI, at the IAAE Conference, Gold Coast, Queensland, August 12-18, 2006. This paper was intended to include reactions to the other papers in this Session but at this delivery of June 19, the other papers are not yet to hand, and hence this version is still a draft. But this delay provides an opportunity to react to the tragedy in the Horn of Africa, where today some 11 million people are affected, a sad reminder of the contemporary relevance of this issue, and the seeming inadequacy of even well-planned early-warning and associated response mechanisms (ODI, 2006).

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Introduction

I was born into a farming community regularly afflicted by drought, some 500 km north-west of this Conference site, and so developed a mind-set of "drought tolerance", a theme to which I will return later. I did not attempt to explore the economics of drought until arriving at Armidale at the end of the major 1965 drought some 500-2000 km south-west of the site (e.g., Officer and Dillon, 1965; Rickards and Anderson, 1967; Byerlee and Anderson, 1968; Anderson, 1971; Anderson and Hardaker 1973) and since then could hardly let go of the theme in one way or another (e.g., Anderson, 1979; Anderson, 1988).[3] It is thus a privilege to be able to hear the presentations in this session, and to share a few accumulated prejudices if not insights. My approach is nostalgic, if not idiosyncratic. My rationale is that there is much readily available general advice on drought (e.g., Wilhite, 2000, at length and, in short form, in World Bank (2005). A further readily accessible note is Esikuri (2005), who points to the World Bank having invested nearly $10b in over 100 projects on aspects of drought planning, relief and recovery.

Let the main message in these notes be up front. In an earlier review of related phenomena I concluded with this thought: "Rural areas will always be subject to the incidence of unpredictable, risky events in their natural, social and economic environments. Mechanisms for helping individuals and communities to deal with these have improved over time in many countries but their adoption and active use varies greatly around the developing world. It is thus appropriate for all strategic considerations

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[3] The alert reader will note that, notwithstanding Google and other such modern conveniences, self-citation is seemingly less costly than penetrating the depths of the literature.

of rural development to make an explicit assessment of the adequacy of prevailing arrangements and available options for risk management and coping, in order that the vulnerability of the rural poor be addressed and minimized" (Anderson, 2001, p. ix). This still applies with force to dealing with drought in particular. But for focus and space reasons, the policy issues surrounding safety net provision in drought-prone areas are little taken up here, having been well dealt with by Barrett (2005) in the previous Conference. My exception will be some commentary on the Indian situation.

The primary point of departure here (reflecting that of one of the Fathers of the IAAE; K.O. Campbell, 1973) is that droughts are a normal feature of many environments and those affected by them should recognize this aspect of reality and plan accordingly, so that dealing with drought is largely a private matter involving diverse decisions about diversification, enterprise and technology choices, staged management of inputs, insurance trading options, credit management, and good tactical and strategic decision making in general. Each of these topics could easily and justifiably be a stand-alone Conference paper in this session. There are, however, cases of market failure when public intervention may be justified, and these are touched on in the selected themes broached below.

Intervention by government in drought management

The public good likely to be most pertinent to private management of drought is the provision of cogent information. Traditionally, this has been part of the rationale for establishing meteorology agencies and, in more contemporary terms, investing in studies of climate change and relevant adaptation phenomena. A similar rationale applies to investing in knowledge generation and transfer concerning agricultural and business

management practices. An unresolved question is the adequacy and effectiveness of such investments in many parts of the world.

Disaster relief policy, or sometimes the lack of it, represents a significant opportunity for public intervention, long the subject of policy analysis. There has been a tendency for emotion and public outcry to drive a process that leads governments to intervene in ways that, with the wisdom of hindsight, are demonstrably ineffective and distorting of individual incentives to plan more carefully for the bad situations that are inevitable. Such planning would naturally include selective purchase of insurance contracts, as discussed by Hardaker et al. (2004), with the predictable negative consequences for broad participation in formal insurance markets. It is worth recalling, from time to time, that the world is indeed a risky place, and the extent of resultant costs can be considerable (as nicely set out by Sushil Pandey et al. today [see also Mogaka et al., 2006 for costs in Kenya]). If governments rush to bail people out of the effects of otherwise-insurable natural disaster risks whenever there is political clamor to do so, development of commercial insurance markets will be fatally compromised. Just where governments should seek to position themselves relative to the insurance market in sharing responsibilities has long been on the research agenda of public policy (e.g., Kunreuther et al., 1978) and continues to be today, with novel mechanisms being proposed and piloted (e.g., Hess and Syroka, 2005).

Perhaps India (at least in Andhra Pradesh) is one of the best places now to look for cutting edge analysis and experience with novel mechanisms driven by strong concerns by the State Government to get policy right (e.g., South Asia Environment and Social Development Department, 2005). But India may also be the country with the

greatest "industry" devoted to drought "recovery". For me the most insightful excursion into this comes not from an agricultural economist but a distinguished journalist (Sainath, 1996) in a collection of assays titled enticingly "Everyone loves a good drought". He articulates most instructively (and entertainingly) a saga of rent-seeking, massive government failure, and bureaucratic misadventure (my words, so better for me to share some of his): "Drought is, beyond question, among the more serious problems this country faces. Drought relief, almost equally beyond question, is rural India's biggest growth industry. There is little relation between the two. … Even when it goes to scarcity areas, those most in need seldom benefit from it. The poor in such regions understand this. That's why some of them call drought relief *teesra fasi* (the third crop). Only they are not the ones to harvest it" (p. 317). … [After detailing some of the squabbles and power-plays to corner the drought relief resources] "Donor governments love emergency relief. It forms a negligible part of their spending, but it makes for great advertising." (p. 322) "There are two kinds of drought: the real and the rigged." (p. 324). He follows up with some specific human tragedies that illustrate failures of interventions that sound officially good but are not uncommon in their overt ineffectiveness in the reality of poverty-oriented programs in the developing world.

To step back now from the realities of Indian policy implementation, a distinguishing mark of a potentially good policy is one that swings into action as needed, without requiring (or even allowing) political largesse, and yet provides no disincentives for affected producers to do the best that individually they can to plan for and manage their own natural-disaster (e.g., drought) experiences as they unfold. Australia, for instance, now has such a system in place for droughts (DPRTF, 1990), after a long

history of at best questionable interventions (Butler and Doessel, 1979), such as in fodder and livestock markets, under the rubric of assisting producers in their drought management. The update today by Greg Hertzler et al. in this regard is useful indeed. The long experience of India with its food for work programs should also be mentioned as perhaps the best example of a sustained program that has worked well in assisting the poor through tough times (Ravallion, 1999), notwithstanding the above-noted skepticism of Sainath (1996).

Development agencies are increasingly getting involved in providing assistance to prepare for and recover from natural or man-made disasters (including droughts) that can result in great human and economic losses. For example, the World Bank's Disaster Management Facility was established in July 1998, to provide leadership in introducing disaster prevention and mitigation practices into the Bank's development efforts. To date, efforts have been concentrated on urban aspects of disaster zones but, in principle, rural areas will also receive attention of the Facility as its program develops.[4]

Poorly planned development can turn a recurring natural phenomenon into a human and economic disaster. Any effective strategy to manage disaster risk must begin with an identification of the hazards and what is vulnerable to them. This involves information on the nature and extent of risk that characterizes a particular location, including information on the nature of particular physical hazards obtained through hazard assessments, as well as data on the degree of exposure of a population to such hazards. In this way informed decisions can be made about where to invest and how to design sustainable projects that will withstand the impacts of potential disaster events, a

[4] Various activities, including those pertaining to the vulnerability of rural infrastructure to climatic variability, are available at www.proventionconsortium.org.

task made all the more formidable by the changing nature of some risks, such as the possible (increasingly measured, e.g., Fu et al. 2006) effects of the Enhanced Greenhouse Effect. A more complete understanding of the full economic, financial and social impacts of disasters on a country also helps to demonstrate the importance of including risk reduction measures in development plans. There is, however, far to go in coming to such understanding in many of the developing world's drought-prone situations.

Disasters result when an extreme natural or technological event coincides with a vulnerable human settlement. Reducing disaster risk requires that all stakeholders change their perceptions and behavior to place a higher priority on safety in planning and development. Effective risk reduction involves mitigation measures in hazard-prone areas, especially in developing countries. In addition to employing scientific and technical knowledge, risk reduction may also involve overcoming the socioeconomic, institutional and political barriers to the adoption of effective risk reduction strategies and measures in developing countries. This may be accomplished thorough projects analyzing the possible roles of government, non-government, and private-sector organizations in risk reduction, workshops aimed at heightening the awareness of stakeholders of the threat of drought and what can be done about it, and educational and training activities that increase the understanding of policy makers, decision makers and practitioners about disaster management. In recent years there has been considerable effort devoted to better understanding the options available to pastoralists, particularly the relatively mobile groups of Africa (e.g., Scoones, 1994; Breman, 1995; McCarthy et al., 2004).

One notable illustration of such efforts in confronting drought risk, mentioned here hopefully to complement those discussed today by Gautam, is the Kenya Arid Lands

Resource Management Project (1996 to 2003), which featured considerable institutional development to better deal with drought in Eastern Africa. It is fortunate that much of the policy analyses and perspectives underlying this novel project have been recorded in a published set of essays (Morton, 2001). The value of early warning systems is especially highlighted, and with the advent of contemporary monitoring and sensing technologies, early warning of the onset of drought is increasingly feasible and effective, even if not for advance prediction (e.g., Anderson 2005). Responding to such information is, of course, another matter and depends on the state of infrastructure for facilitating the movement of livestock (including strategic water points), the depth of markets (marketing infrastructure enhancement was another Project feature) and the quality of contingency planning at all levels (especially community, another Project focus).

In the development agencies there are many other novel endeavors underway in disaster mitigation and intervention, not all of course to do with drought, which tends to be the Cinderella disaster, in spite of the reality that at any given moment vast tracts of the world are affected by drought of one degree or another. The exceptions when droughts become Ugly Sisters tend to be when agencies such as Oxfam or WFP activate press coverage of major calamities in which large numbers of people face hunger or starvation, as recently the case in Niger. But then, as there, it is often too little too late!

Other public goods from agricultural research

Taking a broad view of the scientific possibilities, there are many different important themes to be pursued in agricultural research, as well articulated by Winslow et al. (2004), for instance, but here I wish to focus on just one, namely drought tolerance in

crops. My advocacy for the development of drought-tolerant (DT)[5] crops has been long and enduring (e.g., Anderson 1974, 1991), so it is pleasing to be able to observe that this topic is now receiving accelerating attention, such as in Indian rice research, for instance (Marker Assisted Selection Lab 2003), although in many instances it is happening rather late relative to perceived opportunities. Improved drought tolerance has long been among the broad set of breeding objectives in conventional crop improvement efforts, such as reviewed at length in Anderson and Hazell (1989) and more compactly by Anderson and Hazell (1994, pp. 324-325), and much worthy progress has been made (e.g., ICARDA, 2005), as illustrated indirectly, for instance, by Doug Gollin's recent (not yet published) review of stability progress … (and value thereof) … in CIMMYT's wheat improvement work with its developing partners.

But there are exciting new possibilities of really significant advance by using modern genetic modification techniques (e.g., Sawahel 2004), and hence of major gains in drought tolerance in coming decades, presumably aided by modern methods in crop modeling (e.g., Wallach et al., 2006). There has been much discussion of forging appropriately targeted and funded new alliances between public entities and the private sector owners of the most promising genes to bring to new crop improvement efforts (e.g., Doering, 2005). Others here at this Conference (e.g., colleagues from IFPRI/ISNAR, VPI, Rutgers, …) are engaged in proposals to initiate projects involving novel public-private partnerships in this domain, so it seems that the anticipated gains in such work are distant, particularly given the long period required not only to create potential cultivars with such characteristics but also to get them approved through the

[5] I only recently discovered this acronym, from Carl Pray, in some work he is planning with the Rockefeller Foundation on measuring progress in nearly 10 y of work on DT rice in Asia. I was nurtured on the idea that DT referred to the *delirium tremens* of excessive ethanol intake.

increasingly demanding biosafety registration processes. Even a decade could be an optimistic estimate of the time it will probably take. One indication of the speed of progress on this theme in recent times is given by comparing the InterDrought I and II conferences.[6] The issues involved in setting up such productive public-private partnerships in crop improvement are surely complex and doubtless difficult but hopefully the pre-Conference workshop on biotechnology will have cleared some of the mud from the water by the time this session is convened. Maybe something of the ilk of the Gates Foundation is required to break the apparent logjam. Otherwise relevant agencies, such as the international finance institutions, constrained as they are by precautionary donor agencies, are too coy about direct engagement with GM research to get involved in the supportive way that they might.

Conclusion

The future has usually been like the past but in the case of drought management this may not hold, eventually, as the possibilities for better policy and responsive and responsible actions by government in drought "management" seem bright, and the technological possibilities that may ease the pain of many (but surely not all) droughts are encouraging, if still distant and uncertain. There are surely useful roles for agricultural economists to help on all these fronts of dealing with the drought-coping aspect of the human condition.

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[6] This may be a harsh judgment, especially if one compares progress in agricultural economics between successive IAAE Conferences but see www.plantstress.com/id2 and try projecting the situation to be revealed at the next such conference in China in 2009.

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