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HOW CAN AGRICULTURE RESEARCH MAKE A DIFFERENCE IN COUNTRIES EMERGING FROM CONFLICT?

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SUMMARY

Conflict is the most common cause of food insecurity. Foreign aid to countries emerging from conflict often allows a funded but brief window for the confirmation-testing and diffusion of agricultural innovation in affected areas. This paper asks the question: what lessons has agricultural research learned through its involvement in this process in countries emerging from conflict? Drawing on experience from Afghanistan and other countries, this paper documents some cases in which it has been possible to inject an element of simple hypothesis testing, often in farmer-managed trials, into post-conflict plans leading to useful lessons. Agricultural researchers need to be cognizant of this approach so that the practice becomes more widely used and lessons recorded for future use.

INTRODUCTION

Post-conflict countries require substantial humanitarian, rehabilitation and reconstruction assistance over a long period to regain their food security and reduce poverty. Besides taking lives, war destroys food and water supply sources/systems. Market structures and formal institutions are critically weakened. In addition to the direct and indirect disruptive effects on agriculture, longer-term environmental effects may linger from land mining, deliberate flooding, the degradation of soil from chemical warfare and the uncontrolled exploitation of natural resources.

For all conflicts, as for natural disasters, the most important impact is human suffering. The losses in agricultural output, means of production and infrastructure seem insignificant in comparison. But these material losses are important because they undermine the ability of conflict survivors to subsist and recover (FAO, 2000).

Unfortunately conflict is all too frequent and was rated by FAO in 2005 as the most common cause of food insecurity (FAO, 2005). The number and scale of conflict-related, food security emergencies is increasing, and the role of human-induced disaster in escalating a natural crisis, such as drought, to a food security emergency has grown in importance over the past decade. The proportion of food emergencies that can be considered human-made has increased over time. Conflict and economic problems were cited as the main cause of more than 35% of food emergencies between 1992 and 2003, compared to around 15% in the period from 1986 to 1991. More

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than half of the countries where under-nourishment is most prevalent experienced conflict during the 1990s (FAO, 2005). The nature of conflicts has also evolved from a predominance of international state-sponsored conflicts to an increasing frequency of decentralized, often self-financing, conflicts involving a local opposition group against the government. In the latter case, the strife is primarily rural based affecting the rural economy and markets more than in an international conflict.

'*A peaceful and stable environment in every country is a fundamental condition for the attainment of sustainable food security*', according to the World Food Summit Plan of Action (FAO, 1996). The rehabilitation of agriculture is a central condition for development, reducing poverty, preventing environmental destruction and for reducing violence (de Soysa *et al.*, 1999) and also for providing food security. So the regeneration of the agricultural economy is fundamental to any recovery, as agriculture is the dominant occupation in poorer developing countries. It is well recognized that agriculture is also potentially the engine of rural growth and that agricultural research plays a crucial role in providing the innovations necessary for such growth and development. Given its importance in the fabric of the developing world, agriculture is included as part of the planned post-conflict continuum from emergency aid through rehabilitation and into development.

It is a massive task to rebuild agriculture in countries affected by conflict and/or natural disasters. This is largely because agriculture is not just crop and livestock production, but is much broader and intimately interlinked with other sectors, such as transport, marketing, pesticide, fertilizer and irrigation equipment industries, infrastructure and human resource development, farmers' organizations, policy and property rights, and others.

The attention given through aid to countries emerging from conflict usually allows a funded, but often all-too-brief, window for the confirmation testing and diffusion of agricultural innovation in affected areas. In this effort, agriculture researchers are often called to play a role as part of a team comprising other more development-oriented partners. This presents both an opportunity and a challenge to researchers. The opportunity is simple: to test and diffuse new innovations widely among the severely marginalized and at the same time to contribute substantially to improved food security and poverty alleviation. The challenge is much more complex. For example, the identification of entry points that combine increases in production with poverty reduction. Agricultural research is normally conducted in a more stable context than that typically present in countries emerging from conflict. It uses the scientific methodology of hypothesis generation and testing, and research quality is monitored by means of peer review. In research in countries emerging from conflict the quality of science is a major issue, and as a consequence the research is rarely published. But it is important to address the issue positively: are there aspects of our science (techniques and methodologies) robust enough to be useful in post-conflict circumstances? What are they and how can they be used? What are the lessons in agricultural research learned in this process that are to be shared for use elsewhere? Or can agricultural research make no immediate contribution in countries emerging from conflict? This paper aims to stimulate discussion on these issues.

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CONFLICT CAUSES AND INTERVENTION PLANNING

Understanding the causes of conflict is fundamental to post-conflict planning. Economic factors play a central role in the onset of violent conflict. Some conflicts are fuelled by disputes associated with access to and control of natural resources. The political system and the capacity of the state are also important, especially in those countries undergoing transition and typically vulnerable to violent conflict (Zaur, 2006). A framework for the design of agricultural development in a post-conflict context has been proposed by Zaur (2006), which tracks the effects of agricultural development onto the causes of conflict. In the design phase of post-conflict activities, it should be remembered that the term 'rehabilitation' indicates a static model and conservative thinking that will have as its goal a return to the pre-conflict situation (Longley *et al.*, 2007). A return to the old ways is often not politic.

Up-to-date information is critical to post-conflict planning. But this is always problematic in post-conflict situations. Pre-conflict information and experience can be found in-country. Technical information from similar agro-ecological conditions may be available from neighbouring countries with similar agro-ecologies or from elsewhere in the same country, but this type of information needs to be modified by post-conflict need assessment, which is vital to pinpoint conflict damage and changes. Thomson *et al.* (2003) provide a useful example of such a need assessment of the livestock and feed sector in Afghanistan in a rapid diagnostic survey of 183 villages in 2002. The assessment not only detailed widespread livestock loss but also, importantly, considered the implications of various different approaches to restocking. The importance of seed security assessments is discussed in the section on seed (see below).

In designing post-conflict action there is a real opportunity to trial innovations. Possible tension between external donors and local involvement with their often divergent agendas also has to be managed throughout the process, noting that, on the one hand, government structures are weak after a conflict and yet, on the other hand, innovations need to be assessed by local government and community groups for ownership to have any chance of long-lasting success.

Post-conflict intervention is often designed with a mono-dimensional focus. But as mentioned earlier agriculture must be considered more broadly than just production. Consideration of seeds and seed systems, agronomic and diversification options, and the overarching subject of human capacity building follow.

SEEDS

The most common intervention issue in post-conflict projects is seed and how to ensure the immediate availability, access, and the subsequent continuity of supply of appropriate seeds. The logic is clear: communities affected by disaster should be given the means to grow their own food (Sperling *et al.*, 2008). In this context the seed security framework is useful for outlining the three key seed components of availability, access and quality (Remington *et al.*, 2002). A recent review of seed aid indicates that the widespread assumption of seed unavailability in a crisis usually does not hold up under scrutiny and emphasizes that it is access to seed – rather than its unavailability – which

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is usually the problem. Availability is defined as to whether sufficient seed is available in the right place and time. Access is a parameter specific to farmers and communities and it depends on assets and whether farmers have the cash or connections to buy or barter seed (Sperling *et al.*, 2008). Seed aid is by its nature action-oriented and the review has brought welcome reflection to the issue and proposed broadly appropriate responses *after* the characterization of seed problems. The importance of a brief seed system security assessment has been highlighted and the methodologies are available in Sperling *et al.* (2008).

The most commonly used seed system intervention is direct seed aid whereby quality seed is procured from outside the affected region for delivery to farmers. This short-term response addresses problems of seed unavailability and is recommended in those specific cases of total crop failure and/or displacement of farmers. It is, however, often used more broadly. In contrast, of particular value are the market-based approaches to seed aid based on vouchers/cash and seed fairs to resolve seed access problems (see section on markets below).

For direct seed aid, crop and cultivar are among the first choices to be made. Emergency seed aid can be significantly enhanced through the use of pre-conflict information from agricultural research on adaptation and suitability, often available from varietal trials. In this context the unique role of the International Centres, which are non-profit and politically neutral institutions and lead relevant trans-boundary programmes, must be highlighted. Those Centres with a crop mandate also maintain important plant genetic resources collections of local landraces, wild relatives and progenitors of agriculturally useful species which are held in trust under the International Treaty for Plant Genetic Resources for Food and Agriculture. The Centres lead international testing networks on mandate crops, the pre-conflict results of which can be of major importance in accessing and/or fast-tracking the multiplication of seed stocks to kick-start local seed systems. Dramatic examples of success in this regard include Rwanda and Uganda in Africa and Afghanistan and Cambodia in Asia. In each case historical knowledge from prior agricultural research enabled rapid post-conflict multiplication of improved seeds and the initiation of suitable varietal testing programmes. Rwanda was particularly noteworthy because it illustrated the role of earlier research in choosing appropriate quality seed and of researchers in finding available such seed (Buruchara *et al.*, 2002). Thereafter research on seed diversity was conducted as an integral part of the aid effort and revealed that farmers had preserved their bean agro-biodiversity despite the conflict (Sperling, 1997).

For the medium to long term and in the absence of prior information, gene banks and plant introduction are appropriate starting points as in the Seeds of Life programme in East Timor (da Costa *et al.,* 2003). Choices include whether to test on research stations (often unavailable or dysfunctional) and/or growers' fields, the nature and extent of farmer participation in the testing and the appropriate design of on-farm trials. 'Keep It Simple' seems an appropriate adage. Cambodia is another example where, the extended period of conflict and wanton destruction of records by the Khmer Rouge resulted in much of the applied research having to be redone. The translocation of farmers from one ecosystem to another also resulted in the loss

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of rice germplasm diversity. Some traditional rice varieties lost during this conflict were reintroduced from a collection in the germplasm centre at the International Rice Research Institute and later released as high yielding pure line selections suited to specific ecosystems (Nesbitt, 1997).

In a post-conflict situation neither the public nor the private seed sector is able to adequately serve the seed needs of small-scale farmers. To fill this vacuum, alternative longer-term approaches for seed delivery are being explored. The objective is to establish sustainable village-based seed enterprises to produce and market quality seed in selected communities (Bishaw and van Gastel, 2009). In village-based seed enterprises, seed production is farmer-based, and marketing schemes operate at the local level to ensure the availability and access to varieties and seeds by farmers in less favourable environments and remote areas. The system works primarily by organizing volunteer farmers into local seed production and marketing enterprises. These groups of farmers aim to generate income from their enterprise. The approach is useful as it combines the fulfilment of the seed need with a contribution to the broader rural economic and market development. But its sustainability will hinge on marketing and the redefinition of farmers as customers rather than beneficiaries (Christoplos, 2007).

AGRONOMY

Agronomic interventions need to be considered in parallel with seed decisions to exploit possible genotype × management interactions. What factors should be considered in the choice of agronomic innovations to be tested? Clearly evolving local context has to be considered in designing agronomic interventions. On the one hand, with weakened market infrastructure there is often limited availability of external inputs such as fertilizer and agricultural chemicals. This may strongly affect the programme. The availability of agricultural inputs can be increased through the use of vouchers and seed/multi-input fairs (see below, markets). However local circumstances may sometimes be beneficial to innovation. For example, in Iraq, perhaps surprisingly in an oil-producing country, the high local price of diesel fuel has stimulated strong grower interest in conservation tillage during on-farm testing in the Nineveh Governorate of Iraq in an on-going ACIAR project.

How can participation of growers be organized? Participatory research in peaceful situations is usually done through non-governmental organizations (NGOs). However, local NGOs are often unavailable or weak in the vacuum of post-conflict. Again what are the optimum trial designs for on-farm research in this context? Is there a role for the research station in this type of research? As always, short-term gains in productivity and economic return need to be managed to avoid longer-term environmental damage.

MARKETS

In considering how to support the livelihoods of rural communities affected by conflict, Longley *et al.* (2006) advocate support to the establishment of sustainable market-driven systems for agricultural service delivery as part of an overall effort to improve

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rural livelihoods. In reviewing the effects of disasters on seed security particularly in Africa, the resilience of local seed systems stands out in the face of crisis (Sperling *et al.*, 2008). In crisis periods seeds are generally available in local and regional markets, with the local grain markets of central importance as sources of seed. Given that seed access in crises – because of low cash availability and fractured social networks – rather than seed availability is often the problem, market-based approaches are increasingly being used. The distribution of seed vouchers coupled with the organization of seed fairs brings together a range of sellers from whom voucher holders may purchase seed (Remington *et al.*, 2002). The approach has been implemented in about 30, mainly African, countries by a wide range of organizations for both natural (drought and flood) and man-made (conflict) emergencies. The voucher/fair approach has been expanded to multi-input vouchers and input trade fairs allowing farmers access to a range of inputs, in addition to seed, such as fertilizer, tools, animal feed and small livestock (Dominguez *et al.*, 2004). Such inputs are vital prerequisites to many agronomic interventions. These market-based interventions are short term. For the longer term, village-based seed enterprises also follow a market-based approach to sustainable seed systems. Although the implementation of market-based approaches is often challenging in a post-conflict context and there is a need to ensure monitoring and impact assessment as part of the process, clearly the market-place is becoming increasingly perceived as central to post-conflict interventions (Longley *et al.*, 2006; Sperling *et al.*, 2008).

DIVERSIFICATION

Subsistence production may be a cornerstone of rural livelihood strategies, but it is not sufficient as a guarantee of survival. Increasingly it is understood that in rural societies the very poorest have little or no access to land and pursue livelihoods beyond and outside food production. Conflicts push *yeoman farmers* into the same category. Realizing the importance of stimulating post-conflict economic growth, some intervention programmes have aimed to directly stimulate alternative livelihoods. A classic case being the ongoing effort to replace opium poppy production in Afghanistan through for example the programme of research of the alternative livelihoods fund (RALF) supported by the UK's Department for International Development (ICARDA, 2005). The overall scope of RALF is applied research and promotion of natural resource-based livelihoods, including post-harvest processing and services, specifically directed at farmers and other rural stakeholders in areas currently affected by poppy production. RALF uses a competitive research grant mechanism to mobilize innovative ideas to develop and promote alternative livelihoods in Afghanistan, and is managed by ICARDA. The diverse issues being addressed by a wide range of national and international partners include the feasibility of organic exports from Afghanistan; the production and marketing of red meat, wool skins and hides; the potential of aromatic and medicinal plants such as mint and saffron; oilseed crop potential in northern Afghanistan; and the territorial approach to agro-enterprise development in the Hindu Kush.

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Reflections from Afghanistan also stress the importance of off-farm income to survival of the rural poor and the need to broaden thinking on agricultural rehabilitation and diversification to a livelihoods approach to address the complexity associated with how rural people use a variety of strategies to 'hustle' to survive (Christoplos, 2007).

CAPACITY BUILDING

The longest-lasting imprint of any post-conflict programme is in the staff training and the human capacity developed. In the aftermath of conflict or a natural disaster with foreign aid readily available the impetus is often on getting the job done rather than on rebuilding human capacity. The temptation is to work disconnected from weak local institutions. The most educated and qualified are employable elsewhere and often leave. This disconnected approach is often taken by international NGOs. Reinvigorating the system through training is absolutely vital. While the importance of the private sector in agriculture is often voiced, the reality is that it is necessary to work through and build the capacity of government institutions especially because government capacity is often so low to begin with. Much of the success in East Timor of the Seeds of Life programme, which is embedded within the Ministry of Agriculture and Fisheries, is attributable to this institutional linkage which fosters capacity building on a daily basis. Equally important is the need to build the capacity of local community-level organizations to be able to explore and access the new technologies and innovations that aid-supported programmes typically bring.

EQUITY

The development of an agricultural research programme which serves all farmers equitably has special significance in post conflict situations. Especially relevant in regard to poverty is the highly destabilizing effect of horizontal inequality, whereby *distinct groups* are disadvantaged economically within a population. Resources are often depleted and the burden of onerous farm duties is shouldered by an increased population of widows, many of whom have young families to care for. Should special emphasis be placed on developing labour saving and/or low input technologies or on research with the potential to provide the highest productivity gains?

SUSTAINABILITY

Agricultural research in post-conflict situations is not an element of humanitarian aid for emergency relief. It is a component of development aid aimed to create long-term sustainable growth in the rural areas. Long-term approaches are required to maximize outputs during periods of social calm, while improving physical infrastructure, establishing durable research systems and, most importantly, as mentioned above building capacity to manage the programme over a long period. Questions are often asked: is it worthwhile investing in a research programme with a limited funding time

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frame when major benefits of the research may accrue only after a longer period? These issues are doubly challenging in the face of periodic conflicts.

CONCLUDING REMARKS

The background context of this discussion is the pervasive insecurity and severe operational difficulties endemic in countries emerging from conflict that make agricultural research both hazardous and difficult. Under this scenario the paper asks: are there aspects of our science (techniques and methodologies) robust enough to be useful in post-conflict circumstances? Several cases where agricultural research has already played an important role in post-conflict situations have been reviewed in the paper. It is clearly possible to inject an element of inquiry – simple hypothesis testing, often in farmer-managed trials – in this context. It is critical that agricultural researchers involved in planning post-conflict agriculture are cognizant of this fact and seize the opportunities presented, because there are many questions that remain to be answered and lessons to be recorded for future use.

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