

IMPACT ASSESSMENT DISCUSSION PAPER NO. 26

THE IMPACTS OF IFPRI'S GLOBAL RESEARCH PROGRAM ON THE SUSTAINABLE DEVELOPMENT OF LESS FAVORED AREAS

John English
Mitch Renkow

Director General's Office

International Food Policy Research Institute

2033 K Street, N.W.

Washington, D.C. 20006-1002

Tel: (202) 862-5600

Fax: (202) 467-4439

Email: IFPRI@cgiar.org

November 2007

Impact Assessment Discussion Papers are externally peer reviewed. They are to stimulate discussion and critical comments. It is expected that most Discussion Papers will eventually be published in some other forms, and that their content may also be revised in the process.

CONTENTS

ACKNOWLEDGEMENTS.....	v
EXECUTIVE SUMMARY	vii
1. INTRODUCTION	1
2. PROJECT BACKGROUND	2
3. THE COUNTRIES OF CONCENTRATION	6
4. ACHIEVEMENT OF OBJECTIVES.....	14
5. PERCEPTIONS OF THE INFLUENCE, VALUE, AND IMPACT OF THE PROGRAM.....	16
6. TANGIBLE INDICATIONS OF IMPACT AND VALUE	20
7. CONCLUSIONS AND LESSONS LEARNED.....	23
8. IMPLICATIONS	29
REFERENCES	31
ANNEX 1—PEER-REVIEWED JOURNAL ARTICLES, RESEARCH REPORTS, BOOK CHAPTERS AND DISCUSSION PAPERS.....	34
ANNEX 2—WORKSHOP PROCEEDINGS, POLICY BRIEFS, AND NEWSPAPER ARTICLES	41
ANNEX 3—2002 WORKSHOP ON POLICIES FOR SUSTAINABLE LAND MANAGEMENT IN THE EAST AFRICAN HIGHLANDS.....	43
ANNEX 4—2004 WORKSHOP ON POLICIES FOR IMPROVED LAND MANAGEMENT AND AGRICULTURAL MARKET DEVELOPMENT IN THE ETHIOPIAN HIGHLANDS	48
ANNEX 5—UGANDA 2002 WORKSHOP.....	49
ANNEX 6—STRATEGIES FOR SUSTAINABLE LAND MANAGEMENT IN THE EAST AFRICAN HIGHLANDS.....	51
ANNEX 7—LIST OF CONTACTS.....	53

ACKNOWLEDGEMENT

We gratefully acknowledge the careful reading and perceptive comments of Derek Byerlee, Dana Dalrymple, and Joachim von Braun on earlier drafts of this paper. John Pender's insights and knowledge of the GRP-5 program were incredibly valuable to us. We thank him for his willingness to share them with us, as well as for helpful comments on an earlier draft. Special thanks are also extended to Ericka Carcamo and Luis Alberto Torres Cruz for logistical support. Finally, we thank Jock Anderson for shepherding this process along masterfully from beginning to end.

EXECUTIVE SUMMARY

This report assesses the impact of IFPRI's Global Research Program on The Sustainable Development of Less-Favored Areas ("GRP-5"). Initiated in 1998, the stated objectives of the research program were (a) to provide empirical evidence on appropriate development strategies and public investments for improving the well-being of individuals living in less-favored areas (LFAs); and (b) to assess the appropriate targeting of various public investments to favored versus less-favored areas. The program's research activities generally were confined to addressing the first of these objectives.

The GRP-5 research was primarily undertaken in Ethiopia, Honduras, and Uganda, using quantitative livelihoods and bio-economic modeling approaches to studying constraints and opportunities for poor households in less-favored areas (LFAs). In the first section of the report, we place this research program in the context of the body of work conducted within the CGIAR that has investigated the appropriate allocation of various public investments between favored and less-favored agroecological zones.

The second section of the report provides a brief overview of the program's research activities within each of the three countries of emphasis, along with the various research outputs. These research activities extended work on resource degradation and land management that IFPRI had been involved in prior to the initiation of GRP-5. Major workshops held in each country were the principal venues for dissemination of the research findings. A primary goal of these workshops was to influence individuals in positions of authority to act upon those findings, either in terms of instituting formal policies or programs, or fostering follow-up research more directly geared to implementation. The workshops were, however, by no means the only outputs from the program. Besides the workshop papers a wide range of publications was generated by the program including dissemination briefs, research reports, papers in journals (including special editions containing a series of papers generated by the project and related research), and a book published in 2006 entitled *Strategies for Sustainable Land Management in the East African Highlands* (Pender, Place, and Ehui 2006a).

The third section of the report briefly reviews the extent to which the GRP-5 research program achieved its stated objectives. In Honduras, the operational approach concentrated exclusively on LFAs and was therefore incapable of addressing the basic issue of the appropriate allocation of resources and development effort between favored and less-favored areas. The research in both Uganda and Ethiopia did include areas of both high and low agricultural potential, and produced some results comparing the impacts of similar interventions in different agroecological domains; but the primary emphasis remained on LFAs. In part, this was no doubt related to financial constraints limiting the geographic extent of the projects' fieldwork. But additionally, it may well reflect the practical difficulties of reconciling research themes of general interest within the CGIAR and the broader donor community (i.e., geographic allocation of research and investment funds) with exigencies of engaging local policymakers whose interest lay in

understanding the opportunities and constraints conditioning the appropriate development strategies for different types of less-favored lands.

The report's fourth section discusses the study team's findings, based on field visits to Ethiopia, Honduras, and Uganda, regarding perceptions of the influence and impact of the GRP-5 research activities. There was general agreement that IFPRI's approach to the research was rigorous, well-conceived and well-executed, and that the information generated is highly useful as a description of the realities of agricultural households in LFAs. IFPRI researchers were uniformly praised for the care with which data collection efforts were undertaken and the rigor with which those data were analyzed. The training aspect of the research was generally acknowledged by those involved in the programs. This included both the formal graduate training and interaction with students and faculty staff at local academic institutions. Finally, there was widespread sentiment that the research had succeeded in drawing attention to, and contributing to policy debates surrounding, poverty issues in LFAs. IFPRI's research is widely held to have established important baseline information for use in monitoring changes that may occur if and when policy initiatives are undertaken in the future.

Some shortcomings were identified as well. Concerns about analytical methods were expressed by some (primarily non-economists). Others indicated that there was insufficient follow-up for the wider policy community or the general public after the high-profile summary workshops that presented the research findings, and that the academic nature of the research outputs was not directly relevant to policymakers. Finally, significant concern was expressed about substantial lags—upwards of three years—between the time the research was completed and the time the main research reports were published.

The final sections of the report discuss tangible indications of impact on policy in the countries of emphasis. The GRP-5 work's primary contribution was as a benchmark. There is a widespread sentiment among those with experience of the GRP-5 research program in the participating countries that it generated a useful and much-needed description of the socioeconomic conditions within which poor households operate in less-advantaged regions. This information has been of value in subsequent follow-on research in terms of problem definition, research focus, and (in some cases) site selection. It has also been useful in the design and implementation of some rural development projects as well.

There was considerable variation in the extent to which the research program had a direct impact on policy or related programs. In the case of Uganda, the preliminary findings of IFPRI's research were, at least for a time, fairly closely linked to the government's agricultural priority-setting process. In the case of Ethiopia, in the early years of the research work there was a close relationship between the research team, a local university and the regional Bureau of Agriculture. As a result, research findings did inform state level policies and programs. But, as these relationships weakened over time, and particularly once the research work was completed, this influence waned. In Honduras, the high degree of collaboration between IFPRI researchers and their

PRONADERS partners appeared to have set the stage for translating research results seamlessly into government policy. Unfortunately, the change in government midway through the data collection phase of the project altered the situation irrevocably.

A number of factors are identified as contributing to the difficulty of translating the research findings into actionable policies and policy outcomes. First, there are several different audiences for research of the sort reviewed here, including the broader research and donor communities, the in-country policy community, and field practitioners. The information demands for each group are by no means the same, and in some cases there may in fact be little overlap. Second, the intellectual culture at IFPRI favoring academic research suitable for publication in scholarly journals can limit the relevance of the research to policy makers (and also to field practitioners). Third, limited on-site representation significantly restricts IFPRI's ability to influence policy debates.

In summary, the assessment team was left with the conclusion that the sort of research conducted under GRP-5 has significant potential usefulness to other follow-on research, as well as for the design of projects aimed at improving the well-being of smallholders in LFAs. But, it is far more difficult to see clear links to policymakers who approach their jobs with their own particular agendas. This in no way diminishes the value of the research per se, but it certainly calls into question its sustained influence on the policymaking process.

1. INTRODUCTION

IFPRI's Global Research Program on The Sustainable Development of Less-Favored Areas ("GRP-5") was initiated in 1998 to investigate potential pathways of development for residents of agroecologically fragile or otherwise economically disadvantaged rural areas. The program evolved out of prior research conducted by IFPRI's Environment and Production Technology Division staff (and others) on land management and livelihoods strategies among households in less favored areas (LFAs), particularly in Central America. The emphasis on LFAs was motivated by IFPRI research in India and China that suggested the possibility that public investments in those areas yielded higher marginal benefits (in terms of poverty alleviation and agricultural productivity) vis-à-vis investments in more favored areas. The focus on land management reflected widespread political attention to global environmental issues (e.g., desertification) in which problems of resource degradation and poverty appeared to be inextricably bound together.

This study assesses the impacts of the GRP-5 research program. In pursuit of this assessment, the study team met with the principal investigators and others at IFPRI headquarters, reviewed the written outputs of the research, and conducted field visits to the main countries of emphasis. Field interviews concentrated on the perceptions of those directly or indirectly involved with the planning, implementation, and follow-up of the research, as well as current and former government officials with varying degrees of familiarity with it.

The report is laid out as follows. In the following section we discuss how the GRP-5 program fits into a larger body of work conducted within the CGIAR that has investigated the allocation of public investments between favored and less-favored agroecological zones. Next, we summarize the research activities and research outputs within each of the three countries of emphasis. Following a brief review of the extent to which the GRP-5 research program achieved its stated objectives, we discuss our findings regarding perceptions of the program within the countries of emphasis—its influence on policy, programs, and other research. We then report on tangible indications of impact on policy. Our report concludes with a summary of our findings and their implications. Annexes to the report provide a list of publications that have emerged from the research program, as well as a list of contacts interviewed by the study team.

2. PROJECT BACKGROUND

The Emphasis on Less-Favored Areas

Determining the optimal mix of research activities to meet poverty alleviation goals is an enduring issue within IFPRI, the CGIAR system, and the donor community as a whole. There is little question that most of the research conducted in CGIAR centers is at least potentially pro-poor (Lipton with Longhurst 1989). However, there remains substantial uncertainty as to how the centers—individually and collectively—might best reduce poverty throughout the Third World.

One long-standing debate revolves around the effects on various populations (particularly the poor) of different allocations of research effort between less-favored and more-favored production environments.¹ At the heart of this debate is the fact that most, but by no means all, of the major success stories produced by CGIAR centers have occurred in irrigated or assured-rainfall areas—most notably, the rapid increases in rice and wheat yields registered during the Green Revolution. On one side of the debate are those who argue that there has been systematic under-investment in less-favored production environments—to the detriment of the large group of impoverished people within those areas. Others counter that investment in less-favored areas historically has been low *precisely because* the returns to those investments are low, and that diverting research resources away from favored production environments would do more harm than good overall.

The optimal balance of public investments between more-favored and less-favored areas has been a long-standing issue of interest within the CGIAR. Beginning with the work of economists at CIAT during the 1970s (Scobie and Posada 1978), various research efforts have sought to understand the effects on various populations of different allocations of agricultural research effort between less-favored and favored production environments. In the late 1980s, both IRRI and CIMMYT engaged in large projects on the distributional impacts of technical change when that technology adoption is geographically limited.² All of these research efforts generally supported maintaining a strong emphasis on research strategies oriented toward favored production

¹ The categorization of a production environment as “less-favored” generally is based on the biophysical and agronomic characteristics affecting agricultural production. For example, CIMMYT researchers characterized as “marginal” an area “in which irremediable climatic or soil conditions limit yields to less than 40 percent of potential yields as defined by temperature and available solar radiation” (Morris, Belaid, and Byerlee 1991). More commonly, whether not a particular location is irrigated tends to be an important “default” used to characterize agroecological zones.

² The IRRI work consisted of a set of seven country studies in South and Southeast Asia (David and Otsuka 1994). They focused heavily on labor markets as the medium by which the benefits of technology adoption in favored production environments are transmitted to the poor. The CIMMYT studies were carried out in Pakistan and Kenya (Renkow 1993; Karanja, Renkow, and Crawford 2003). These used a simulation-based, multi-market approach to examine the income and income distributional effects implied by various scenarios of regionally differentiated technology adoption.

environments on both efficiency and (global) equity grounds (David and Otsuka 1994; Renkow 2000). The work conducted in the 1980s additionally indicated that in many situations government investments in infrastructure and institutional reform would likely yield significantly larger and more rapid benefits to the poor in less favored areas (LFAs) than would investments in agricultural research targeted to those areas—especially where nonagricultural sources of income are relatively important.

Roughly concurrent with the IRRI and CIMMYT studies, Peter Hazell and Shenggen Fan of IFPRI conducted research on the relative returns to investments in agricultural research and infrastructure spending in India and China (Fan, Hazell, and Haque 2000; Fan, Hazell, and Thorat 2000; Fan, Zhang, and Zhang 2002). This research used aggregate (district-level) data to estimate econometrically the marginal effects of these investments on incomes and poverty in favored versus less favored areas. Hazell and Fan concluded that for both India and China the marginal benefits of investments in agricultural research and infrastructure in less favored areas exceeded the marginal benefits of comparable investments in favored areas.

The findings of Hazell, Fan, and their collaborators regarding larger relative returns to investments in LFAs contrasted markedly with prior research on the subject. They were not uncontroversial, particularly the conclusion that significant reallocation of agricultural research resources to target less-favored areas was warranted. The work has been subjected to four main sources of criticisms. First, Hazell and Fan did not appear to have accounted for geographic spillovers of agricultural research in the form of adoption in LFAs of varieties developed for favored production environments. Their econometric analysis sought to link location-specific income and poverty outcomes to prior investments by regressing income and poverty measures against modern-variety (MV) adoption and other variables. MV adoption would appear to be a weak indicator of research impacts because many of the MVs adopted in LFAs had in fact been developed (and widely disseminated) in favored areas and had subsequently been adopted by farmers in other agroecological zones. Attributing positive outcomes of such “spilled over” varieties to agricultural research targeted to less favored agroecological zones is an inference that is questionable at best.

Second, concern was expressed as to how successfully Hazell and Fan were able to manage the difficult problem of taking data reported on the basis of political boundaries and reformulating it on the basis of agroecological zones. Substantial evidence indicates that isolating the geographic distribution of poverty can be quite sensitive to a variety of data management choices (Palmer-Jones 2003; Kelley and Parthasarathy Rao 1995). Moreover, at least in India the higher payoffs in rainfed areas were found in medium-rainfall zones and **not** in low-rainfall zones—a distinction that tended to be glossed over by designating both areas as “less-favored.”

Third, Hazell’s and Fan’s analyses did not adequately account for differences in costs of developing new agricultural technologies for less-favored production environments vis-à-vis technologies for more favored environments. In effect, theirs was a benefits study, rather than a careful study of the relative costs and benefits of alternative

research allocations between the areas. This latter criticism is germane to other analyses conducted by CGIAR researchers as well.

Finally, there is of course no guarantee that findings concerning relative returns to alternative public investment strategies in one country are relevant to another country. This would seem to be particularly important here, given that national agricultural research and extension systems of China and India are substantially larger, more extensive and more effective than is the case in most LDCs. In this regard, the GRP-5 research represents something of a test of the transferability of the findings for India and China to smaller countries with agricultural research systems that are at a lower level of institutional development.

On the basis of these critiques, substantial controversy—even skepticism—has dogged Hazell’s and Fan’s research findings from the outset. Nonetheless, significant donor interest accompanied the promise of “win-win” scenarios whereby poverty alleviation goals could be achieved *in conjunction with* maximizing agricultural output (Fan and Hazell 1999). In addition, donor interest was intensified by growing political attention to global environmental issues (e.g., desertification) in which problems of resource degradation and poverty appeared to be inextricably bound together—attention that provided an additional imperative for the CGIAR system to focus more directly on LFAs.

Project Objectives

This was the context in which IFPRI’s global research program on Sustainable Development of Less-Favored Lands (“GRP-5” in the language of the IFPRI’s planning process) came into being. GRP-5 was initiated in 1998. The program’s justification was explicitly laid out in IFPRI’s Third External Review (TAC Secretariat 1998):

Past agricultural development strategies have predominantly emphasized irrigated agriculture and “high potential” rainfed lands in the attempt to increase food production and stimulate economic growth. This strategy has been spectacularly successful in many countries and was responsible for the Green Revolution. But at the same time, large areas of less-favored lands have been neglected, and with rapid population growth, these lands have become or are becoming major areas of rural poverty, food insecurity, and resource degradation. About 500 million people now live in less-favored lands and, if current conditions persist, this number could increase to more than 800 million people by 2020. It is becoming increasingly clear that, on poverty and environmental grounds alone, more attention will have to be given to less-favored lands in setting priorities for policy and public investments.

Corresponding to this view of the importance of orienting a greater share of development assistance to LFAs, the GRP-5 research program was established to explore the appropriate level of investment in LFAs and the kinds of investments that should be made (TAC Secretariat 1998):

The objectives of the proposed research are to provide empirical evidence on (1) the productivity, poverty, environmental, and food security consequences of targeting agricultural investments, including agricultural research, to less-favored agricultural areas compared to more favored areas; and (2) the appropriate development strategies for different types of less-favored lands.

To meet these objectives, it was decided to organize research around several themes (IFPRI 1999, pp. 63–64):

“Theme 1. Econometric analysis of secondary data at the county and district level within selected countries to quantify the productivity and poverty-reducing effects of public investments in different types of agricultural lands. This work would enable exploration of the trade-offs in returns between incremental investments in irrigated and rainfed lands.

“Theme 2. Multidisciplinary research undertaken in partnership with other CGIAR and national research centers of strategies for sustainably intensifying agriculture in several important areas of less-favored lands. This research has three major components. First, cross-sectional and historical studies of community experiences in developing countries and managing their agriculture and natural resources were to be conducted, particularly contrasting community experiences in finding successful and unsuccessful development pathways and identifying the technological, socioeconomic and policy factors that determine the pathways that particular communities select.... Second, bio-economic models of watersheds and communities are constructed in order to simulate the consequences of alternative policy or technology changes. Third, typologies of less-favored lands were constructed and GIS data bases generated to enable aggregation from the community-level studies to regional or national levels.

“Theme 3. Because of the growing need to monitor resource degradation in less-favored lands, IFPRI began new research on developing and testing indicators and resource monitoring systems that not only flagged emerging problems but also shed light on the causes of observed changes in resource conditions and the kinds of policy interventions needed to correct any serious problems.

“Theme 4. Macro-trade and agriculture sector policy reforms can have profound effects on farmers’ behavior, farm incomes, and sustainable resource management in less-favored areas. Research, in collaboration with (IFPRI’s) Trade and Macroeconomics Division, to model these linkages emphasizes ways in which market liberalization policies might need to be modified to cushion any negative effects on the poor in less-favored regions.... Collaborative research on both these issues is currently ongoing with ICARDA and national teams in several countries in the West Asia and North Africa region.”

3. THE COUNTRIES OF CONCENTRATION

As has been noted, the work undertaken under GRP-5 evolved out of earlier work at IFPRI. During the 1980s and 1990s there was increasing concern in the development community about the impact of population growth and development on the environment. One major concern was the continuing expansion of the area under agricultural use that had resulted primarily from population growth. Particular attention centered on the movement of populations into semi-arid areas that seemed to be the sites of increasing droughts, especially in Sub-Saharan Africa, resulting in environmental degradation often referred to as “desertification”. Similar concerns were raised over pressures on steeply sloping lands in more humid areas, such as Central America.

By the mid-1990s IFPRI had been engaged in studies on resource degradation in fragile lands in Central America (primarily in Honduras) and had been invited by Swiss aid to assist in research on land management issues in Ethiopia, where they (the Swiss) had supported an earlier major study by FAO that had indicated a significant level of land degradation in the highland areas. Given the apparent level of general interest in the development community, IFPRI decided to group these efforts under the overall banner of “Sustainable Development of Less-Favored Areas”. Based on knowledge and contacts from earlier work, and to cover a range of agroecological conditions, it was decided to concentrate effort initially in East Africa (Ethiopia and Uganda) and in Central America.

Honduras

IFPRI initiated collaborative research with CIAT and IICA in the hillsides of Central Honduras in the mid-1990s under the aegis of one of its multi-country projects (“MP9”). That work used community-level surveys to delineate a set of “development pathways”—common patterns of change in livelihoods strategies (Pender 2004). The research sought to understand the implications of various development pathways on both poverty outcomes and sustainable land management. The results suggested four main factors underpinning local comparative advantage: agronomic potential, market access, population density, and the presence (or lack thereof) of local community organizations.

The GRP-5 work in Honduras grew out of that community-level research. The goal was to build on that work—again, with the objective of identifying strategies and formulating policy recommendations for achieving poverty reduction goals while simultaneously promoting sustainable land management. But the project was considerably more ambitious. Its focus was on individual (household-level) livelihoods strategies, and the geographic scope was substantially larger. Whereas the earlier study had concentrated on areas in Central Honduras in reasonably close proximity to the capital city, the new project surveyed 374 households in 95 villages scattered throughout the country. These villages represented a wide range of agroecological conditions, farming systems, population densities, infrastructure availability, and levels of market access.

The timing for initiating the research was propitious. In the aftermath of the national devastation wrought by Hurricane Mitch in 1998, there was considerable interest in Honduran policy making circles for making a serious effort to effect rural poverty alleviation throughout Honduras—especially in hillside areas where poverty was (and is) especially pervasive. A National Program for Sustainable Rural Development (PRONADERS) was created within the Ministry of Agriculture, and two of its principals—Efrain Diaz and Jacqueline Chenier—were full partners in the design and implementation of the survey research. Financial support for the project was arranged with the European Union, and the Wageningen University and Research Center (WUR) came aboard as a research partner with IFPRI.

Largely at the behest of the PRONADERS collaborators, a participatory component was incorporated into the project. A national planning workshop meeting was held in March 2001, during which representatives of IFPRI, WUR, the Government of Honduras, various NGOs, and other stakeholders came together to identify key research issues and key regions within which to conduct the research (Jansen 2005). Local workshops were then held in each of the four designated regions, at which time study sites were selected, local leaders were briefed on the project, and local concerns were discussed. Data collection activities occurred between November 2001 and May 2002. These included participatory diagnostic surveys conducted in each village to ascertain community-level constraints and organizations, and household surveys administered by a local consulting firm.

In 2003, four regional workshops and a national policy workshop were again held, this time to share preliminary findings and to discuss them with policymakers. Principal conclusions presented at that time (and in subsequent publications and research reports listed in Annex 1) included the following:

- Five basic livelihoods strategies that were identified reflected comparative advantages conferred on households by a combination of agroclimatic, market access, and population density;
- Small farms were more receptive to training and extension in land conservation practices, but packages of technologies and practices for effecting conservation were limited, especially for coffee and livestock producers; and
- Education, soil fertility, and market access had strong, positive effects on earnings.

These findings underlay the study's primary policy recommendations:

- A call for more investment in education (in large part to assist poor hillside dwellers to be integrated more readily into nonagricultural economic activity);
- Improvement and enhancement of extension and training in soil conservation techniques, and development of technologies suited to very small plots in environmentally fragile agroecological environments;

- Greater effort toward development of technologies for improving soil fertility as well as promoting cultivation of (more profitable) non-traditional crops;
- Increased investment in infrastructure in hillside areas, both to supply basic services to households (water, electricity, health services, and communications) and to reduce transactions costs of market participation.

Two factors had an important effect on the degree to which the Honduras study would influence government policies with respect to hillside dwellers. First, national elections in 2002 led to a huge turnover in government. One important manifestation of this government turnover was that IFPRI's key partners within PRONADERS were replaced by individuals much less concerned with hillside agriculture in general (and poor, smallholders in hillside areas in particular). Thus, IFPRI lost its major government "sponsors" even before the data had been analyzed.

Second, the study's findings did not lend themselves to specific, targeted recommendations that could be readily translated into particular government actions or place-based policies favoring LFAs. Rather, the study's results generally indicated either a need for further research (for example, to develop technology packages or techniques appropriate to smallholders in the hillsides); or a need for investments in education and physical infrastructure that seem as likely to facilitate out-migration as fostering greater opportunity within LFAs. This lack of specificity in policy recommendations speaks to the heterogeneity of circumstances of (and opportunities available to) hillside dwellers, and the attendant lack of "easy and straightforward solutions to the poverty problem in the rural hillside areas in Honduras" (Jansen et al. 2006, p. 94).

East Africa Region

IFPRI started work in 1996 with the International Livestock Research Institute (ILRI) and other regional partners to plan and implement research on this topic in the East African highlands. In early 1997, a regional workshop was held in Addis Ababa at ILRI, cosponsored by ILRI, IFPRI, the African Highlands initiative, and the Soil, Water and Nutrient Management Program of the CGIAR, to discuss problems of less-favored areas, particularly related to land degradation, and to develop an agenda for policy research on priority research areas that were identified.

The workshop indicated that:

- The key land management problem areas were soil erosion, soil fertility depletion, overgrazing and deforestation; and
- The key policy issues identified as related to these land management problems were the impacts of land policies, market policies, infrastructure, research, extension, conservation measures, and decentralization/governance.

Based on that workshop and several subsequent planning workshops at national and sub-national levels in Ethiopia and Uganda, IFPRI and ILRI initiated a program of

policy research on sustainable land management in partnership with universities, national agricultural research institutes, ministries and bureaus of agriculture, finance and planning in those countries, university partners from Europe and the United States, and other collaborators.

Ethiopia

1997-2002. The resulting work in Ethiopia was initially concentrated in Tigray province, working with Mekelle University, starting in 1997, with some additional work in Amhara and Oromiya starting in 1998.

A key hypothesis underlying much of the research was that the prospects for sustainable land management in any particular location depend upon the development pathways that may be pursued there, and that these development pathways depend in turn upon a range of factors determining comparative advantage of different locations. These include the biophysical factors affecting agricultural potential, access to markets and infrastructure, population density, households' endowments of natural capital (e.g., land quality and quantity), human capital (e.g., labor force, education, farming experience, knowledge about alternative farming practices, and gender composition of household), physical capital (equipment and livestock), financial capital (savings and access to credit), social capital (e.g., participation in organization, reputation and relationships in the community), policies and programs involved at the local level (e.g., technical assistance programs, credit programs, food aid and anti-poverty programs, land redistribution or other land policies), and local institutions affecting natural resource management (e.g., land tenure, local regulations, and by-laws on use of communal land or other resources).

Drawing upon the findings of this initial work and related activities in Uganda and Kenya, a major regional conference was held in 2002 to review the initial results. The papers presented at the conference outlined a series of findings, summarized in Annex 3. The papers presented at the conference are also listed in Annex 3 to illustrate the range of work undertaken by the project at this time. The findings amply demonstrated the complexity of the factors affecting the livelihoods and land management, and the diversity of responses to any given factor in the East African Highlands. Three general lessons were drawn.

First, the research indicated that population pressure and poverty do not appear to be insurmountable constraints to promoting improved livelihoods and more sustainable land management. The research showed that high population density, small farm sizes, lack of livestock or other assets often have a small and insignificant impact on land management and incomes. Rather, it was found that these constraints are overcome by the functioning of markets for land, labor, animal power and other productive inputs. Finding pathways out of potential downward spirals of land degradation, low agricultural productivity, poverty, and food insecurity requires identifying socially profitable investments (public and private) and then facilitating these investments, with a primary focus on enabling the factor markets to function and to ensure farmer access to markets for products and needed inputs.

Second, the research highlighted the importance of farmers having access to reliable information about profitable economic opportunities and technologies suited to their circumstances. Third, it was found that credit can help promote more sustainable development and land management if it is used to promote profitable livelihood opportunities and technologies as, for example, had been observed in central Kenya. However, credit can be risky for farmers, especially if used to promote application of fertilizer or other risky inputs in drought-prone environments, or where a marketing system hardly exists. In the latter case, any production above the subsistence requirements may flood the thin local markets, leading to lower prices and, potentially, an inability to repay the credit.

Overall, the research indicated that there are many opportunities to promote improved livelihoods and land management in the East African Highlands. The prospects for breaking out of the downward spiral of land degradation, low productivity and poverty are good, but the task is not simple or easy. Changes in policies, programs and institutions would be needed that are well suited to the comparative advantages of different areas in the East African Highlands. Recognizing that the same intervention can have different impacts in different circumstances but that complementary interventions need to be bundled together to be most successful, tradeoffs among desirable outcomes are often likely to occur. By recognizing and taking into account such realities, policy makers and development agencies would be better able to achieve results that are in line with the potential of the land and its peoples.

2001–04. Building on the key finding of the first phase of work regarding the centrality of factor markets in addressing the problem of resource degradation under population pressure, the subsequent research in Ethiopia included a focus on the operation of the labor markets and product markets in the country. This research project was initiated in 2001, financed by the Netherlands government, IFPRI and Wageningen University and Research Center.

The project's specific objectives were to (i) identify the key factors influencing market development and land management in the Ethiopian highlands and their implications for agricultural productivity, sustainability and poverty; (ii) identify and assess policy, institutional and technological strategies to promote more productive, sustainable, and poverty-reducing market development and land management; (iii) strengthen the capacity of collaborators in the Ethiopian highlands to develop and implement such strategies, based upon policy research; and (iv) increase the awareness of the underlying causes of market development and land degradation problems in the Ethiopian highlands and promising strategies for solving the problems.

The findings of this phase of the work were discussed at a second region-wide workshop in Addis Ababa in 2004. The papers presented are listed in Annex 4. The principal findings were that (i) land degradation and limited market development constrain agricultural productivity, food security and poverty reduction in the Ethiopian Highlands; and (ii) earlier policies had promoted improved agricultural production in many areas, but (a) impacts were not positive everywhere, especially in drought-prone areas; (b) success in some areas was undermined by collapsing prices after bumper

harvests, because of the thinness of local markets; and (c) vulnerability to famine continued to be widespread.

Uganda

The Uganda project began in January 1999 with a planning workshop sponsored by IFPRI, the Makerere University Faculty of Agriculture (MUFA) and the Ugandan National Agricultural Research Organization (NARO), with participants also from a number of other interested organizations. The project was a collaborative effort of IFPRI, MUFA, NARO, the Ugandan Agricultural Policy Secretariat, and the Center for Development Research of the University of Bonn, with financial support from the governments of Germany, Norway and the United States.

The focus of the project was much broader than in Ethiopia, covering most of Uganda, excluding insecure, lowland and dryland areas in the north. Seven of the nine generally accepted farming systems in the country were represented within its framework.

The long-term goal was to contribute to improved land management in Uganda, in order to increase agricultural productivity, reduce poverty, and to ensure the sustainable use of natural resources. The immediate goal was to help policy makers identify and assess policy, institutional and technological strategies to improve land management in Uganda. Specific objectives were to: (i) identify the factors affecting land management and its linkages to agricultural productivity, poverty and sustainability; (ii) identify the causes and implications of major current and potential development pathways in Uganda; (iii) identify and assess strategies to promote more productive, sustainable and poverty-reducing development pathways and land management methods; (iv) strengthen the capacity of collaborators in Uganda to develop and implement such strategies; and (v) increase awareness of the underlying causes of land degradation problems in Uganda, along with promising strategies for solving those problems.

A wide range of research activities were undertaken, including: (i) characterization of the land degradation problem and development of hypotheses using secondary information, field visits and interviews with officials and community representatives; (ii) market surveys to identify market structure and responses to structural adjustment policies; (iii) community surveys and resource mapping to identify development pathways, their causes and implications for land management; (iv) household surveys to assess impacts of policies and other factors on land management; (v) farm-level soil characterization and experimental work to better understand farmers' options and the implications of alternative land management practices; and (vi) household and market models to explore the potential impact of alternative policy, institutional and technological strategies.

The timing of the research was fortuitous in that the Government of Uganda undertook a major review of agricultural policies and programs in 2001–02 under the Programme for Modernization of Agriculture (PMA). The initial findings of the GRP-5

research were an important input to this review, particularly in the area of land and resource management (Dr. Wilberforce Kisamba-Murerwa, personal communication).

Initial progress in the research program was reported at a national workshop, and the major results at a second workshop held in 2002. The range of work undertaken is indicated by the listing of papers in Annex 5. The research confirmed that land degradation is a major problem in Uganda, contributing to stagnant or declining agricultural productivity. The initial causes of soil fertility depletion and productivity decline include declining use of fallow and increased commercialization of agriculture, without sufficient recycling and addition of nutrients or protection of the soil from erosion, leaching and other sources of nutrient loss. Underlying these proximate causes may be many factors, such as population pressure, poverty, lack of access to roads, other infrastructure and markets, limited farmer awareness of appropriate technologies, land fragmentation and tenure insecurity. Conclusive evidence that population growth or high population density was the main reason for land degradation was not found; farmers adapt to population pressure by intensifying adoption of inputs such as manure and fertilizer, where they can, and by other adaptations such as seeking off-farm sources of livelihood. In many cases, lack of farmer awareness of appropriate technologies appeared to be an important constraint to improved land management. The research indicated that agricultural extension programs were associated with adoption of many improved land management practices.

Other Work

As noted earlier, work was initiated on the links between macroeconomic factors and potential policy reforms and farmers' land management behavior was initiated in collaboration with the International Center for Research on Arid Lands (ICARDA). For IFPRI this was led by researchers in both the Environment and Production Technology Division and the Trade and Macroeconomics Division. Although this work was linked to the GRP-5 program, these links were tenuous. The manager of the GRP-5 program never had any management control over this work, and seemingly had minimal interaction with it. If anything, this illustrates the looseness of the boundaries of the overall program.

In addition to the work directly carried out by IFPRI on the primary countries of concentration, some additional work has been linked to the GRP-5 research program, primarily through publication of monographs. Examples include a program of work, jointly sponsored by the World Bank and the Indian Council of Agricultural Research, on watershed management in less favored lands in India (Kerr, Pangare, and Pangare 2002); and a project on natural resource monitoring systems in Costa Rica (Hazell, Chakravorty, Dixon, and Celis 2001).

General

The major workshops held in Honduras, Ethiopia, and Uganda were the principal venues for dissemination of the research findings within the countries of concentration. A primary goal of those workshops was to influence individuals in positions of authority to act upon those findings, either in terms of instituting formal policies or programs, or

fostering follow-up research more directly geared to implementation. In pursuit of this goal, papers and policy briefs were provided to conference attendees, and media outreach efforts were undertaken to “market” research findings via television, radio, and newspapers.

The conferences were, however, by no means the only outputs from the program. Besides the workshop papers a wide range of peer-reviewed publications was generated by the program (listed in Annex 1). These included journal articles (including articles published in special editions containing a series of papers generated by the project and related research), research reports, book chapters and working papers. The overall work undertaken in East Africa has been summarized in a book of papers published in 2006, *Strategies for Sustainable Land Management in the East African Highlands*, the chapters in which are listed in Annex 6. This extensive set of peer-reviewed publications represents a substantial contribution to the scholarly literature on economic development in LFAs. In addition, research findings were disseminated to lay audiences via policy briefs that were provided to stakeholders at several workshops in Ethiopia and Uganda, as well as through media outreach activities in all three countries of concentration. These are listed in Annex 2.

The collaborating institutions are unanimous in expressing their belief that their experience in jointly carrying out a major program of research with an experienced, high-quality institution such as IFPRI was valuable in itself. In particular, they valued the opportunity to participate in a major program of interdisciplinary research of the sort that their own institution would have found difficult to organize. This issue is discussed further in the following sections.

4. ACHIEVEMENT OF OBJECTIVES

Although the purpose of this report is to review the impact of the GRP-5 research program, some assessment of its outcome may be useful. A starting point for such an assessment is to ask whether it achieved its stated objectives.

These objectives, noted in Section 2, bear repetition here: “The objectives of the proposed research are to provide empirical evidence on (1) the productivity, poverty, environmental and food security consequences of targeting agricultural investments, including agricultural research, to less-favored agricultural areas compared to more favored areas, and (2) the appropriate development strategies for different types of less-favored lands.”

It is clear that the program of work described in the previous pages did not entirely encompass these objectives. There was far more emphasis on the second objective, appropriate development strategies for LFAs, than the first, ascertaining the appropriate balance between investments in less-favored and more-favored areas. In Honduras the operational approach concentrated exclusively on LFAs, and was therefore incapable of addressing the first objective. The research in both Uganda and Ethiopia did include areas of both high and low agricultural potential, and produced some results comparing the impacts of similar interventions in different agroecological domains. These suggested that different types of investments were needed for high-potential versus low-potential areas, but provided no real guidance for the prioritization of such investments. Be that as it may, the primary emphasis in East Africa remained on LFAs.³

In part, this was no doubt related to financial constraints limiting the geographic extent of the projects’ fieldwork. But additionally, it may well reflect the practical difficulties of operationalizing the Research Themes listed on page 5. Those themes appear to implicitly assume that the primary audiences for the research to be development scholars, other member organizations of the CGIAR, and the broader donor community, for whom the project would provide guidance on the allocation of research and investment funds. However, once the research got underway and had to operate in a country context, the emphasis appears to have evolved subtly as attention shifted to engaging policymakers whose interest lay in understanding the opportunities and constraints conditioning the appropriate development strategies for different types of less-favored lands.

This shift was also accompanied by an emphasis on sustainable land management, rather than on returns to investment. This alters the potential audience for the work as well, since land management involves a range of technical, scientific issues in addition to

³ Additionally, concurrent with, but separate from, the GRP-5 program activities, work was conducted by other researchers in IFPRI’s Environment and Production Technology Division comparing the effects of different types of government expenditure on agricultural growth and rural poverty in both favored and less-favored areas of Uganda (Fan, Zhang, and Rao 2004).

the mainly economic issues implied in the statement of objectives. In East Africa, this meant that the research effort was strongly multidisciplinary, involving technical specialists as well as social scientists, and utilizing physical as well as social science research methods. This had positive as well as negative implications, as discussed further below, but it certainly increased the complexity of planning, implementing, and presenting the results of the research.

Strictly speaking, then, the program did not fully achieve its objectives. The basic issue of the appropriate allocation of resources and development effort between more-favored versus less-favored areas was left unresolved.

5. PERCEPTIONS OF THE INFLUENCE, VALUE, AND IMPACT OF THE PROGRAM

The study team conducted brief field visits to the main countries of emphasis—Ethiopia, Honduras, and Uganda—in early 2007. Given the broad nature of the research program, it was decided to concentrate on the perceptions of those directly or indirectly involved with its planning, implementation and follow-up, as well as current and former government officials with varying degrees of familiarity with the project. There were some problems in discussing this work, partly because it had been some time since much of the field work was undertaken, but also because GRP-5 was not necessarily the only IFPRI activity going on in the country at the time. As a result, some interviewees' comments were directed to the entire span of recent and on-going IFPRI research projects.

Strengths

Research Methods and Analytical Rigor

There was general agreement that IFPRI's approaches to the research and the analytic framework were rigorous. In East Africa, some respondents indicated a view that this was the first time such rigor had been applied to this research area, particularly in the context of cross-disciplinary research. In this context, for example, soils people directly involved said that while the results in their area (i.e., soils) were not in themselves a surprise, the value for them was in putting the analysis in a framework that linked it to broader development issues. They appreciated that this could be used to capture policy makers' attention, something which they had seldom experienced before. For a statistician, similarly, the work helped his organization get experience in collecting and analyzing household-level data in a wider framework than before and, in particular, to include biological and other natural-resource-related data with which it had had no previous experience. More generally, the opportunity to collaborate with an organization of IFPRI's caliber boosted the morale of university researchers, and may well have augmented university administrators' efforts to secure resources for their institutions.

In Honduras, there is a widespread agreement among those with knowledge of the GRP-5 research program that the research was well-conceived and well-executed, and that the information generated is highly useful as a description of the opportunities and constraints facing agriculture households in different hillside areas. IFPRI researchers were uniformly praised for the care with which data collection efforts were undertaken and the rigor with which those data were analyzed.

Training

The training aspect of the whole exercise was generally acknowledged by those involved in the programs. Four Ethiopian students linked to the GRP-5 research were

trained through the Wageningen University-IFPRI RESPONSE program. Two additional Ethiopian students, who completed their Ph.D.'s at the Norwegian University of Life Sciences in development economics, received support for their dissertation research from GRP-5 research projects and substantial mentoring and advice from the GRP-5 project leader. Two Ugandan and two German Ph.D. students were recruited for and supported by the GRP-5 research project in Uganda, in collaboration with the Center for Development Research of the University of Bonn (ZEF). All but one of the students completed their dissertations and have published their results with the assistance of GRP-5 researchers. In addition, several Masters level students have participated in projects with GRP-5 researchers or benefited from access to data the research generated. Several young faculty in Ethiopia and Uganda have also received training and support from GRP-5, leading to several co-authored publications.

Training was provided not only to collaborators and enumerators. For example, the GRP-5 project leader (in collaboration with ILRI personnel) developed and taught a short course on statistical methods of data analysis at Mekelle University that was attended by many professionals from various government departments as well as faculty and students of Mekelle University. In Uganda and Ethiopia, GRP-5 researchers provided training workshops on the datasets that the project generated and on statistical methods of analyzing them to government officials and researchers. Beyond this, GRP-5 researchers provided numerous guest lectures at Makerere University in Uganda, and served as external examiners for several student theses.

Documentation of Conditions in Less-Favored Areas

In Honduras, there was widespread sentiment that the GRP-5 research had succeeded in drawing attention to poverty issues in the hillsides. Workshops were generally (although not uniformly) regarded as having played an important role in this process, as were the research reports that were produced. Documentation of the multiplicity of livelihoods strategies pursued by poor hillside households, as well as the factors constraining households in pursuit of those livelihoods strategies, was also cited as an important contribution to policy debates over poverty alleviation. IFPRI's research is widely held to have established important baseline information for use in monitoring changes that may occur if and when policy initiatives are undertaken in the future. Respondents indicated that prior to IFPRI's research such information was largely absent, and that this information is valuable to NGOs in framing and designing projects for smallholders. Finally, several representatives of multilateral aid agencies indicated that the information generated by results of IFPRI's research had contributed significantly to their planning processes (e.g., as an input to the most recent World Bank Country Assistance Strategy for Honduras).

Shortcomings

When invited to indicate shortcomings and gaps, a range of issues was raised. The ordering in which these are presented is more determined by ease of the discussion, rather than the depth of concern (which is difficult to gauge).

Analytical Method

Concern about analytical method was most commonly expressed by non-economists, and also by some respondents who implied that they and their groups had gotten little from the research. They responded to inquiries by furrowing their brows and then saying something like “that was the study that was led by economists, wasn’t it?” They seem to have participated in meetings but largely tuned out what was presented because they did not see the analytic framework as generating anything of use to them. These individuals gave the impression that they did not really understand the study’s analytic framework and the nature of the conclusions. This general sentiment was only followed up by a few of them, who elaborated somewhat. Two anecdotes exemplify this:

- A soil scientist commented along the following lines. “As a soil scientist, when we have done a study we ground truth or test the conclusions before we consider recommending them to farmers. At least, we demonstrate the new technology in the field conditions so that farmers etc. can see and judge the results before they try to implement them.” The implication seemed to be that economists did not appear to have done that. There were also a few comments that indicated that some felt that some of the linkages ‘shown’ by the study were pretty flimsy and that the policy or practical implications were not clear.
- Another individual expressed concern that some of the relationships analyzed in the models were not operational in practice. For example, the analysis might show that variable A was significantly linked to dependent variable X. But, the scientist claims that, operationally, variable A has to be linked to variable B. It cannot be varied independently. If A and B are considered as a single variable, the nature (or cost-effectiveness) of the link to X might be considerably different.

Dissemination of Results

Another point raised more widely by those indirectly linked to the project was that there was insufficient follow-up for the wider policy community or the general public after the high-profile summary workshops that presented the research findings. The activity seemed to have rather fallen from the radar screen. In East Africa, the workshop papers were academic in nature and in some cases rather impenetrable to those not in the relevant discipline. There was a lack of material that explained things in more lay terms—or, at least, they had not seen any.

In Honduras, concerns were expressed that the final workshop had presented preliminary results, and that it would have been desirable to have had another workshop or set of workshops to present the study’s final results. (In reality, however, the additional analysis that followed the final workshop led to only minor changes in the study’s findings.)

Timeliness of Reporting

The volume of published material generated by the research program and listed in Annexes 1 and 2 was unusually extensive. Getting this shear volume of papers into the public domain is a major undertaking and, perhaps inevitably, there were time lags that led to some materials taking more time than desirable to seen the light of day.

In Honduras, there was a substantial lag between the time the research was completed and the time the main research report came out. The research was largely ended in 2003, yet the English version of the IFPRI Research Report presenting the study's results came out in the latter half of 2006 (Jansen et al. 2006). The Spanish version only became available in 2007 and, perhaps more importantly, is only available online.

There was a similar lag in publishing results of the Ethiopian work. The field research largely ended in July 2003, and an East African Regional workshop was held in Addis Ababa in 2004, as reported above. But it was not until 2006 that the English language version of the major book publication on the East African work, *Strategies for Sustainable Land Management in the East African Highlands*, was published.

Insufficient Involvement

In Ethiopia and Uganda, some of those on the fringes of the exercise—for example, individuals who had some advisory committee role, but were not directly involved in implementation—wished that their organization could have been brought into a more substantive role in order to gain some of the benefits conferred by direct participation in the design and implementation of the study. In a sense, this concern this reflects an overall view of the enterprise that was positive, rather than negative.

Relevance of Academic Research for Policymaking

Various respondents offered a view that IFPRI's work was too academic to be relevant to policymakers. In particular, several individuals questioned the real-world relevance of research describing constraints faced by households in LFAs without offering tangible examples of how those constraints might be ameliorated.

6. TANGIBLE INDICATIONS OF IMPACT AND VALUE

Setting a Benchmark Standard

The GRP-5 work's primary contribution was as a benchmark. There is a widespread sentiment among those with experience of the GRP-5 research program in the participating countries that it generated a useful and much-needed description of the socioeconomic conditions within which poor households operate in less-advantaged regions. This information has been of value in subsequent follow-on research in terms of problem definition, research focus, and (in some cases) site selection. It has also been useful in the design and implementation of some rural development projects—for example, the Rural Land Management (PAAR) and Project Access to Land (PACTA) projects in Honduras. Finally, some sentiment was expressed that the work had succeeded in drawing attention to poverty issues in LFAs and the desirability of reducing that poverty (although this latter assessment depends on who you talk to, and in some ways may have been more wishful thinking than accurate depiction of reality).

Influencing Policy

The experience of the project suggests that the extent to which a research program influences policy is largely due to factors over which the program has little or no control. In particular, the influence on policymaking is largely a matter of timing that cannot be planned except in exceptional circumstances—especially when a program of research requires five years or more to come to fruition. In the case of the Uganda PMA, there was, at least for a time, a fairly close link between research and policymaking which drew upon the preliminary findings of IFPRI's research, but this was only a possibility, rather than a given, when the research program started. In the case of Ethiopia, research work was concentrated in Tigray and, particularly in the early years there was a close relationship between the research team, Mekelle University and the Tigray Bureau of Agriculture. As a result, research findings did inform state-level policies and programs. But, as these relationships weakened over time, and particularly once the research work was completed, this influence waned. In Honduras, the high degree of collaboration between IFPRI researchers and their PRONADERS partners appeared to have set the stage for translating research results seamlessly into government policy. Unfortunately, the change in government midway through the data collection phase of the project altered the situation irrevocably.

In Ethiopia, there has been a close link between the IFPRI work and World Bank project activity. In particular, based on GRP-5 work, IFPRI has assisted in the development of a Sustainable Land Management project that is currently under preparation and is to be financed by the Global Environment Facility (GEF). This is designed to scale up promising approaches to land management that, to date, have only been undertaken at a pilot scale in Ethiopia. In addition, the work done on agricultural markets fed into additional work undertaken to prepare an operation that is establishing a

commodities exchange in Addis Ababa and which forms a component of a World Bank-financed project.

General Citation

The large number of publications that have emerged from the GRP-5 research represents a distinct addition to the general body of knowledge in a variety of research areas. A review of the Social Sciences Citation Index reveals at least 95 citations of the various peer-reviewed publications listed in Annex 1. Many of the citations are from studies that focused on either Ethiopia, Honduras, or Uganda. But others are not, an indication that the GRP-5 research is beginning to be useful to researchers exploring broader research questions that extend beyond the countries of emphasis.

Particularly in Ethiopia, the IFPRI work has been widely cited as a reference, particularly with respect to land and water management issues, but also in relation to broader agricultural development issues. In part the latter reflects the somewhat blurred line between work undertaken as part of the GRP-5 exercise and under other IFPRI research programs, based at the office on the Addis Ababa campus of ILRI. This blurring also affects responses to queries about IFPRI work, since to those not directly involved in the research program the boundary has no meaning and, therefore, the respondent may be unaware of the provenance of the work.

In Honduras we uncovered no tangible evidence of research impacts in the form of citations in government planning or strategy-setting documents. However, citations in large strategy documents issued by both the World Bank and UNDP suggest some impact on the thinking of important players in multilateral community (World Bank 2006; Barros, Carvalho, and Franco 2006). It is worth noting, however, that the same World Bank official who spoke highly of the value of IFPRI's research also noted with some bitterness that the research findings had not meaningfully entered policy discussions within the Honduras government.

International Public Goods

In several areas noted throughout this report, the GRP-5 research contributed international public goods in the form of positive knowledge and network externalities which, while difficult to quantify, merit reiteration. The training activities noted in the previous section represent one such contribution. These encompassed individuals whose formal graduate training was directly linked to the project, as well as a larger group of individuals who benefitted from their exposure to data collection activities, statistical analyses, or *ad hoc* lectures on research methods conducted by IFPRI researchers.

The input of the GRP-5 project to regional research networks in East Africa and Central America represents another type of international public good that emerged from the project. Beyond the presentation of research results, the regional and national conferences and workshops that brought together a number of researchers and stakeholders also fostered the sorts of collegial interactions likely bear fruit in the future in terms of spawning further collaborative efforts.

Finally, the project's research outputs provide valuable inputs to the continuing debate over allocation of public investments to LFAs *vis-à-vis* favored areas. For example, articles by GRP-5 researchers figured prominently in a Special Issue of *Food Policy* devoted to LFAs. Additionally, the project's focus on local comparative advantage and associated development pathways represents a distinct innovation to the thinking of policy makers and donors with regard to tailoring development strategies to different agroecological zones and socioeconomic environments.

7. CONCLUSIONS AND LESSONS LEARNED

The Background to Policy Research in the Countries of Concentration

Scientific research on physical or biological problems related to, say, plant physiology or genetics is not much impacted by the economic, social or political environment in which it is conducted. However, research on policies, or research intended to influence the design of policy, is very much dependent on the socioeconomic environment in which it is conducted. The primary countries in which the GRP-5 research was undertaken are characterized by very different, social, economic and political conditions.

Honduras. Honduras is a lower-middle income country, with a multi-party democracy. The government changes every four years. While some turnover of political appointees and civil servants accompanies such turnover in virtually every country, Honduras is extreme—wholesale firings are the norm. This applies both to the national government and to local (*municipio*-level) government as well. Interestingly, it does not seem to matter whether or not the same party is voted out of power or maintains control of the government (it is essentially a two party system). This leads to incredible discontinuity with respect to efforts to design and implement policies, as well as a wholesale jettisoning of the previous strategies and policies.

The GRP-5 project was designed and initiated in about 2000, a period of rebuilding after Hurricane Mitch. The devastation that that event caused created favorable conditions for a serious effort to effect rural poverty alleviation throughout Honduras, and especially in the hillsides (where poverty is particularly widespread). Unfortunately, with the 2002 national election a new government came to power that was far less interested in poverty alleviation in general (and poor households in the hillside areas in particular). This posed a formidable—and, to date, insurmountable—barrier to the transformation of the research findings into any meaningful government policy.

Uganda. The present government in Uganda came to power in 1986 following a civil war that overthrew the government of Milton Obote, who himself had removed Idi Amin in an earlier coup. The present government has been headed by Yoweri Museveni since the civil war. Prior to 2006, parliamentary and presidential elections were held within a system of “no-party” democracy, with all candidates standing as independents. A referendum in 2005 approved the provision for political parties, and in the 2006 election President Museveni was again returned to power. There has been reported intimidation of opposition parties, notably in the run-up to the 2006 election, but there is a tradition of open debate of issues, a factor in the successful campaign against HIV/AIDs in the 1990s.

GRP-5 research in Uganda was initiated in 1999. In 2001, the Ministry of Agriculture (MOA) initiated a major review of agricultural policy, the “Policy for Modernization of Agriculture” (PMA). The GRP-5 research had not, at that point,

produced formal results, but its preliminary findings did inform the production of the PMA, particularly in the area of sustainable land management. Contact was maintained between the project and the MOA, so that the project's subsequent findings were drawn upon in the evolution of programs linked to the PMA.

Ethiopia. The current Ethiopian government also came to power following a civil war, overthrowing a communist government in 1991. Under the leadership of Meles Zenawi, it has operated a de facto single party rule, although other parties are permitted and opposition members sit in Parliament. But, following disputed elections in 2005, opposition in general has been suppressed. The Ethiopian government generally operates in an authoritarian manner, and there is little opportunity for open discussion of policy issues. In principle, considerable powers have been devolved to four major (and five minor) regions; but in practice, policy independence is greatly circumscribed.

The Targets for Policy-Related Research

Policy research on topics such as poverty alleviation and sustainable land management has multiple targets: (a) the broader research and donor communities (both national and international); (b) the policy community within the country where the research is being conducted; and (c) field practitioners (e.g., extension professionals) who work directly with farmers. Field visits for this assessment have shown that this creates a number of problems that may not be satisfactorily resolvable.

1. There are inherent conflicts between the needs of these three target communities

Researchers want material that provides additional knowledge in their field—usually in the form of research papers. Policymakers want material that frames, or illuminates policy options in straightforward terms and in a form that fits in with an ongoing policy debate. And practitioners want material that relates to their field experience and indicates likely results (and operational requirements) of implementing the practices or systems studied. The important characteristics of these needs are rigor; clarity and timeliness; and practicality.

That is a pretty formidable range of preferences and attributes to satisfy from one starting point and/or in one shot. The GRP-5 program was only able to satisfy them to some degree and this outcome does raise a question as to whether, either deliberately or implicitly through the choice of research topic and method, IFPRI attempted to cover too broad a range in one research program.

2. The link to policy outcomes is difficult to develop

In East Africa, the major links of the program were with the academic community. In the past few years, the academic community in Ethiopia has not been as well plugged into policy dialogues as many may have liked, and an independent community of autonomous 'think tanks' that might interact on an ongoing basis is evolving only slowly. If the objectives of a proposed research program include directly influencing policy in a particular country or countries, it would seem advisable to assess whether they have a think-tank community that can provide follow-up in policy debates

when the time is ripe. Individuals come and go, but institutions are longer lasting. IFPRI-type research takes time, and a well-connected academic can be ‘on the outs’ when research yields results.

In Honduras, the situation was different. The groundwork for the project was laid with extensive input of key government personnel (particularly, the principals of PRONADERS) as well as members of the NGO community and other field practitioners. The high degree of collaboration between IFPRI researchers and their PRONADERS counterparts appeared to have set the stage for translating research results into government policy in as seamless a manner as possible. Unfortunately, the change in government midway through the data collection phase of the project dramatically altered that arrangement.

3. *The analytical framework needs to be relevant for the target it is intended to influence*

IFPRI’s GRP-5 research was largely conducted within an economic framework, reflecting the predominance of economists in its design and implementation. Most physical scientists and practitioners find this type of approach hard to follow. Work on ‘sustainable land management’ is presumably intended to provide guidance to field practice as well as policy. As important, any policies suggested by the research are likely to need the support of practitioners if they are to be adopted. However, if practitioners are to absorb, support, or operationalize results, the results need to be derived from a framework that is understandable by the practitioners, or can at least be explained in their terms. Thus, it may be advisable when researching this sort of topic to solicit input from agronomists, agricultural engineers, or livestock people at the beginning of the research design process. While this might complicate matters early on, it could help broaden support for policy recommendations later.

IFPRI’s Starting Point

The intellectual culture of IFPRI favors academic research, but this limits its relevance to policymakers. As a general matter, IFPRI is staffed with people who conduct good scholarly research that is publishable in high-quality journals. There is a widespread presumption among development professionals that the structure of incentives within IFPRI is such that publication of research in peer-reviewed journals, monographs, and chapters in edited volumes is much more highly regarded and rewarded than outreach activities. In this sense, the culture at IFPRI strongly resembles that of an Agricultural Economics Department at a U.S. Land Grant university.

It would be unfair to criticize Research Fellows for responding to the incentives they face. Moreover, the academic nature of the research (both in its approach and visibility in peer-reviewed agricultural economics journals) no doubt facilitates its influence on other academic research. Nonetheless, there is an apparent imbalance between the product they are most comfortable supplying and the products that would be demanded by interested policymakers.

The Nature of IFPRI's Follow-up

Limited on-site representation restricts IFPRI's ability to influence policy debates. In Honduras, IFPRI has no in-country field office. There is a staff member based in the region who interacts regularly with others in the multilateral community. But it does not appear that he has much connection to the professionals in the Ministry of Agriculture—a situation that is more a function of lack of interest on the part of the Ministry staff than of lack of effort on the part of the IFPRI staff member.

The office in Uganda is small, essentially a minimal administrative staff, and is part of an establishment maintained by a group of CGIAR partners. There is a bit of a conundrum here, as a major success of the research program in Uganda was getting a number of local agencies not very familiar with one another to work together in a rigorous way under IFPRI's general leadership. However, the fact that there was not a primary local institution meant that the experience was not institutionalized. But that means that the experience is becoming a wasting asset.

Representation is greatest in Ethiopia, where IFPRI maintains an office (including professional staff) on ILRI's campus. But despite the presence of these on-site professionals, their ability to participate in ongoing debates is limited if they are no longer working on the main topic of interest. There may also be some danger in locating a unit in a major CGIAR campus, as these often have the air of an international enclave. In retrospect the assessment mission detected a certain standoffishness in the comments heard in Ethiopia implying that the effort was seen as a foreign rather than local enterprise.

Implications for Allocation of Public Investments to Favored versus Less-Favored Areas

As noted earlier, the GRP-5 research was far more oriented toward the objective of identifying promising development strategies for LFAs than the objective of ascertaining the appropriate balance between investments in less-favored and more-favored areas. Nonetheless, “lessons learned” reviews of the research findings provide insights useful to continuing debates over the appropriate allocation of public investments between favored and less-favored areas (Pender, Place, and Ehui 2006b; Pender 2004).

In both East Africa and Honduras, the GRP-5 research suggests that while socially profitable investment opportunities exist in LFAs, those opportunities are likely to vary greatly from one location to another due to substantial spatial variability in local comparative advantage and dominant development pathways. Moreover, a general sense emerges that successful interventions in LFAs are more likely to require institutional changes (both local and national), are more likely to feature soil and water conservation technologies, and are not likely to feature more intensive use of external inputs on high-value crops.

Taken together, these general findings underscore the difficulties of finding solutions for LFAs. Clearly, there are few if any “low-lying fruit” for donors and

governments to pluck in their quest for such solutions. More to the point, the sorts of “win-win” policies and investments in LFAs alluded to by Hazell and Fan in their analyses of India and China would appear to be difficult to identify and substantially location-specific in Honduras, Ethiopia, and Uganda.

Summary Conclusion

Weighing the impact on poverty alleviation of alternative interventions—be they agricultural research and resultant technological products, infrastructure investments, or government programs geared toward non-agricultural activities—requires a careful assessment of the following three questions:

1. Where do the poor live?
2. What types of income-generating activities do they engage in?
3. How do particular interventions alter the returns to resources owned by household members?

With regard to the first of these questions, the focus on highland areas in Honduras and Ethiopia appears to have been an excellent choice. The large share of those nations’ poor living in highland areas renders them a useful geographical locus for poverty alleviation research. With regard to Uganda, poverty incidence appears to be widely distributed geographically, and hence the national focus of the research appears to have been appropriate as well.

With regard to the second of these questions, the studies’ asset-based, quantitative livelihoods approach seems to have been similarly sensible. Indeed, the study team’s sense is that the GRP-5 projects’ primary contribution lies in having developed remarkably in-depth information on precisely that question. Secondarily, but not incidentally, the rigor with which the econometric analysis was conducted would seem to have established an important benchmark for other research employing a quantitative livelihoods framework.

In terms of identifying specific interventions for altering returns to household resources, IFPRI’s GRP-5 research seems to have had much less success. IFPRI is limited in its ability to provide tangible products for alleviating poverty. Rather, IFPRI’s comparative advantage would seem to lie in identifying technology gaps and market failures constraining poor households, and then providing advice to policy makers on how to bridge those gaps or correct those market failures. Such advice might take the form of recommendations for research activities, infrastructure investments, or other market development interventions that would either create new opportunities or reduce transactions costs of engaging in existing opportunities. All of the studies surveyed here attempted to generate such advice, but the dearth of available, “on the shelf” interventions—coupled with the inherent difficulties of ameliorating constraints in less-favored areas—meant that the studies’ recommendations tended to lack focus and/or point toward the need for additional research.

In summary, the assessment team was left with the conclusion that the research conducted under GRP-5 has significant potential usefulness to other follow-on research, as well as for the design of projects aimed at improving the well-being of smallholders in LFAs. But, it is far more difficult to see clear links to policy makers who approach their jobs with their own particular agendas. This in no way diminishes the value of the research per se, but it certainly calls into question its sustained influence on the policymaking process.

8. IMPLICATIONS

In the view of the assessment team, the experience of the GRP-5 research project raises important issues related to IFPRI's role and potential impact.

In a number of places, this report has illustrated the conflict IFPRI faces between pursuing research of general interest in development policy (i.e., the tradeoff between investments in less versus more favored areas) and research into issues of specific interest in a particular country (i.e., sustainable land management and the determinants of household livelihoods strategies within LFAs). In the abstract there may be considerable overlap between these two kinds of research activity; however, when research is actually to be undertaken on the ground, decisions have to be taken to keep the topic within the limits of the research method chosen, and the budgetary and other limitations. If considerable effort is taken to meaningfully incorporate local input into research design (as exemplified in this case through the use of local workshops), then local priorities are likely to prevail over the larger, general research priority. In the case of GRP-5, the consequence was that the research shed little light on the appropriate targeting of investments to different types of locations.

One of the reasons for pursuing close local involvement is to increase the likelihood that the research will be relevant to local policy concerns and lead to their resolution. However, the Honduras experience dramatically illustrates that involvement at the outset is no guarantee of local interest when the research is completed. Conversely, in the Uganda case, circumstances arose where, without anticipation, the project's findings became important to government in formulating an agricultural development program. A substantial, multicountry research program like GRP-5 is based upon issues of international interest, and will extend over a considerable period of time. As a result, it will be very much a matter of chance whether the conditions are propitious at the conclusion of the project for the results to be relevant for immediate policy concerns.

This raises three thorny issues of great relevance to the design and management of IFPRI's policy research. First, how far should the design of the research be modified to reflect local interests when, as seen in this case, this is likely to dilute the extent to which the research can answer the primary questions that led to the research being set in train?

Second, how much attention should be paid to ascertaining the suitability of the local environment for policy focused research? Key to resolving this question is the extent to which the local policy making nexus is active and open enough to ensure that there is a reasonable chance that any policy relevant results will be inserted into the relevant debates.

Finally, should IFPRI station researchers at a local collaborating institution in order to, among other objectives, facilitate linkages to local policy making process and hence a meaningful role in policy debates? This could take the form of supporting major, long-term research of the type undertaken in Ethiopia, or be more akin to short-term

projects responding to immediate policy issues such as IFPRI's support of research at Bunda College Malawi between 1996 and 2000. Absent a physical presence of individuals who can promote and explain research results to individuals instrumental in the policymaking process, the connection between research findings and actual policies would appear to be tenuous at best.

REFERENCES

- Barros, R., M. Carvalho, and S. Franco. 2006. *Pobreza rural: Magnitud y determinantes*. Tegucigalpa: UNDP.
- David, C. C., and K. Otsuka, eds. 1994. *Modern rice technology and income distribution in Asia*. Boulder CO: Lynne Rienner Publishers.
- Fan, S., L. Zhang, and X. Zhang. 2002. *Growth, inequality, and poverty in rural China: The role of public investments*. Research Report 125. Washington, DC: International Food Policy Research Institute.
- Fan, S., and P. Hazell. 1999. Are returns to public investment lower in less-favored rural areas? An empirical analysis of India. EPTD Discussion Paper 43. International Food Policy Research Institute, Washington, DC.
- Fan S., P. Hazell, and T. Haque. 2000. *Role of infrastructure in production growth and poverty alleviation in rural India*. Washington, DC: The World Bank.
- Fan, S., P. Hazell, and S. K. Thorat. 2000. Government spending, growth, and poverty in rural India. *American Journal of Agricultural Economics* 82(4): 1038–1051.
- Fan, S., X. Zhang, and N. Rao. 2004. Public expenditure, growth, and poverty reduction in rural Uganda. DSGD Discussion Paper 4. International Food Policy Research Institute, Washington, DC.
- Hazell, P., U. Chakravorty, J. Dixon, and R. Celis. 2001. Monitoring systems for managing natural resources: Economics, indicators, and environmental externalities in a Costa Rican watershed. EPTD Discussion Paper 73. International Food Policy Research Institute, Washington, DC.
- IFPRI. 1999. *IFPRI: Medium-Term Plan*. Washington, DC: International Food Policy Research Institute.
- Jansen, H. G. P. 2005. Resumen de los Talleres del Proyecto ‘Políticas de Desarrollo Rural y Uso Sostenible de Tierras en Areas de Ladera en Honduras (IFPRI-WUR-PRON)’. EPT Workshop Summary Paper 16. International Food Policy Research Institute, Washington, DC.
- Jansen, H. G. P., J. Pender, A. Damon, and R. Schipper. 2006. *Rural development policies and sustainable land use in the hillside areas of Honduras: A quantitative livelihoods approach*. Research Report 147. Washington, DC: International Food Policy Research Institute.

- Karanja, D. D., M. Renkow, and E. Crawford. 2003. The welfare effects of maize technologies in marginal and favored regions of Kenya. *Agricultural Economics* 29(3): 331–341.
- Kelley, T. G., and P. Parthasarathy Rao. 1995. Marginal environments and the poor: Evidence from India. *Economic and Political Weekly* 30(4): 2494–2495.
- Kerr, J., with G. Pangare and V. Pangare. 2002. *Watershed development projects in India: An evaluation*. Research Report 127. Washington, DC: International Food Policy Research Institute.
- Lipton, M., with R. Longhurst. 1989. *New seeds and poor people*. Baltimore, MD: Johns Hopkins University Press.
- Morris, M. L., A. Belaid, and D. Byerlee. 1991. Wheat and barley production in rainfed marginal environments of the developing world. Part 1 of CIMMYT World Wheat Facts and Trends: Wheat and Barley Production in Rainfed Marginal Environments of the Developing World. Mexico, DF: International Maize and Wheat Improvement Center.
- Palmer-Jones, R. 2003. Agricultural growth, poverty reduction and agroecological zones in India: An ecological fallacy? *Food Policy* 28:423–431.
- Pender, J. 2004. Development pathways for hillsides and highlands: Some lessons from Central America and East Africa. *Food Policy* 29: 339–367.
- Pender, J., F. Place, and S. Ehui, eds. 2006a. *Sustainable land management: Lessons from the East African highlands*. Washington, DC: International Food Policy Research Institute.
- Pender, J., F. Place, and S. Ehui. 2006b. Strategies for sustainable land management in the East African highlands: Conclusions and implications. In *Sustainable land management: Lessons from the East African highlands*, eds. J. Pender, F. Place and S. Ehui, pp. 378-415. Washington, DC: International Food Policy Research Institute.
- Renkow, M. 1993. Differential technology adoption and income distribution in Pakistan: Implications for research resource allocation. *American Journal of Agricultural Economics* 75(1): 33–43.
- Renkow, M. 2000. Poverty, productivity, and production environment: A review of the evidence. *Food Policy* 25: 463–478.
- Scobie, G., and R. Posada. 1978. The impact of technical change on income distribution: The case of rice in Colombia. *American Journal of Agricultural Economics* 60: 85–92.

TAC Secretariat. 1998. *Mobilizing science for global food security. Third external review of IFPRI*. CGIAR-SDR/TAC:IAR/98/2. Rome: Consultative Group on International Agricultural Research.

World Bank. 2006. *Honduras country assistance strategy*. Tegucigalpa: The World Bank.

ANNEX 1

PEER-REVIEWED JOURNAL ARTICLES, RESEARCH REPORTS, BOOK CHAPTERS AND DISCUSSION PAPERS

ETHIOPIA

Benin, S., M. Ahmed, J. Pender, and S. Ehui. 2005. Development of land rental markets and agricultural productivity growth: The case of Northern Ethiopia. *Journal of African Economies* 14(1): 21–54.

Benin, S., B. Gebremedhin, M. Smale, J. Pender, and S. Ehui. 2003. Determinants of cereal diversity in communities and on household farms of the Northern Ethiopian highlands. EPTD Discussion Paper 105. International Food Policy Research Institute, Washington, DC.

Benin, S., S. Ehui, and J. Pender. 2003. Policies for livestock development in the Ethiopian highlands. *Environment, Development, and Sustainability* 5 (3–4): 491–510.

Benin, S., S. Ehui, and J. Pender. 2004. Policies affecting changes in ownership of livestock and use of feed resources in the highlands of Northern Ethiopia. *Journal of African Economies* 13(1):166–194.

Benin, S., and J. Pender. 2001. Impacts of land redistribution on land management and productivity in the Ethiopian highlands. *Land Degradation and Development* 12: 555–568.

Benin, S., and J. Pender. 2006. Collective action in community management of grazing lands: The case of the highlands of Northern Ethiopia. *Environment and Development Economics* 11(1): 127–149.

Benin, S., M. Smale, B. Gebremedhin, J. Pender, and S. Ehui. 2005. Determinants of cereal diversity on household farms in the highlands of Northern Ethiopia. In *Valuing crop biodiversity: On-farm genetic resources and economic change*, ed. M. Smale. Wallingford, UK: CAB International.

Benin, S., M. Smale, J. Pender, B. Gebremedhin, and S. Ehui. 2004. The economic determinants of cereal crop diversity on farms in the Ethiopian highlands. *Agricultural Economics* 31(2/3): 197–208.

Desta, L., M. Kassie, S. Benin, and J. Pender. 2001. Land degradation in the highlands of Amhara region and strategies for sustainable land management. Livestock Policy

Analysis Program Working Paper 32. Addis Ababa, Ethiopia: International Livestock Research Institute.

Gebremedhin, B., J. Pender, and S. Ehui. 2003. Land tenure and land management in the highlands of Northern Ethiopia. *Ethiopian Journal of Economics* 8(2):47–63.

Gebremedhin, B., J. Pender, and G. Tesfaye. 2003. Community natural resource management: The case of woodlots in Northern Ethiopia. *Environment and Development Economics* 8(1): 129–148.

Gebremedhin, B., J. Pender, and G. Tesfaye. 2004. Collective action for grazing land management in crop-livestock mixed systems in the highlands of Northern Ethiopia. *Agricultural Systems* 82(3): 273–290.

Gebremedhin, B., M. Smale, S. Benin, J. Pender, and S. Ehui. 2005. Determinants of cereal diversity in villages of Northern Ethiopia. In *Valuing crop biodiversity: On-farm genetic resources and economic change*, ed. M. Smale. Wallingford, UK: CAB International.

Gebremedhin, B., and S. Swinton. 2002. Sustainable management of private and communal lands in Northern Ethiopia. In *Natural resources management in African agriculture*, eds. C. B. Barrett, F. Place, and A. A. Aboud. New York: International Centre for Research in Agroforestry and CABI Publishing.

Hagos, F., J. Pender, and N. Gebreselassie. 1999. Land degradation in the highlands of Tigray and strategies for sustainable land management. Socioeconomic and Policy Research Working Paper 25. Addis Ababa, Ethiopia: International Livestock Research Institute.

Holden, S., S. Benin, B. Shiferaw, and J. Pender. 2003. Tree planting for poverty reduction in less-favoured areas of the Ethiopian highlands. *Small-scale Forest Economics, Management and Policy* 2(1): 63–80.

Holden, S., and B. Shiferaw. 2004. Land degradation, drought, and food security in a less-favoured area in the Ethiopian highlands: A bioeconomic model with market imperfections. *Agricultural Economics* 30: 31–49.

Holden, S., B. Shiferaw, and J. Pender. 2001. Market imperfections and land productivity in the Ethiopian highlands. *Journal of Agricultural Economics* 52(3): 53–70.

Holden, S., B. Shiferaw, and J. Pender. 2004. Nonfarm income, household welfare, and sustainable land management in a less-favoured area in the Ethiopian highlands. *Food Policy* 29: 369–392.

Holden, S., B. Shiferaw, and J. Pender. 2005. *Policy analysis for sustainable land management and food security: A bioeconomic model with market imperfections*. Research Report 140. Washington, DC: International Food Policy Research Institute.

Jagger, P., and J. Pender. 2003. The role of trees for sustainable management of less-favored lands: The case of Eucalyptus in Ethiopia. *Forest Policy and Economics* 3(1): 83–95.

Jagger, P., J. Pender, and B. Gebremedhin. 2005. Trading off environmental sustainability for empowerment and income: Woodlot devolution in Northern Ethiopia. *World Development* 33(9): 1491–1510.

Okumu, B., N. Russell, M. A. Jabbar, D. Colman, M. A. Mohamed Saleem, and J. Pender. 2004. Economic impacts of technology, population growth, and soil erosion at watershed level: The case of the Ginchi watershed in Ethiopia. *Journal of Agricultural Economics* 55(3): 503–523.

Pender, J., and M. Fafchamps. 2006. Land lease markets and agricultural efficiency in Ethiopia. *Journal of African Economies* 15(2): 251–284.

Pender, J., and B. Gebremedhin. 2004. Impacts of policies and technologies in dryland agriculture: Evidence from Northern Ethiopia. In *Challenges and strategies for dryland agriculture*, ed. S. C. Rao. CSSA Special Publication 32. Madison, WI: American Society of Agronomy and Crop Science Society of America.

Pender, J., B. Gebremedhin, S. Benin, and S. Ehui. 2001. Strategies for sustainable agricultural development in the Ethiopian highlands. *American Journal of Agricultural Economics* 83(5): 1231–1240.

Tefera, B., G. Ayele, Y. Atnafe, M. Jabbar, and P. Dubale. 2000. Nature and causes of land degradation in the Oromiya region: A review. Socioeconomics and Policy Research Working Paper 36. Addis Ababa, Ethiopia: International Livestock Research Institute.

HONDURAS

Alwang, J., H. G. P. Jansen, P. B. Siegel, and F. Pichon. 2005. Geographic space, assets, livelihoods, and well-being in rural Central America: Empirical evidence from Guatemala, Honduras, and Nicaragua. DSGD Discussion Paper 19. International Food Policy Research Institute, Washington, DC.

Barbier, B., and G. Bergeron. 2001. *Natural resource management in the hillsides of Honduras: Bioeconomic modeling at the micro-watershed level*. Research Report 123. Washington, DC: International Food Policy Research Institute.

Jansen, H. G. P. 2005. Motores de crecimiento rural sostenible y reducción de la pobreza en Centroamérica: Estudio de caso de Honduras. San Jose, Costa Rica: World Bank Proyecto RUTA.

Jansen, H. G. P. 2005. Resumen de los talleres del proyecto 'Políticas de Desarrollo rural y Uso Sostenible de Tierras en Areas de Ladera en Honduras (IFPRI-WUR-PRON). EPT Workshop Summary Paper 16. International Food Policy Research Institute, Washington, DC.

Jansen, H. G. P., J. Pender, A. Damon, and R. Schipper. 2006. *Rural development policies and sustainable land use in the hillside areas of Honduras: A quantitative livelihoods approach*. Research Report 147. Washington, DC: International Food Policy Research Institute.

Jansen, H. G. P., J. Pender, A. Damon, W. Wielemaker, and R. Schipper. 2006. Policies for sustainable development in the hillsides of Honduras: A quantitative livelihoods approach. *Agricultural Economics* 34(2): 141–153.

Jansen, H. G. P., A. Rodriguez, A. Damon, and J. Pender. 2003. Determinantes de estrategias comunitarias de subsistencia y el uso de prácticas conservacionistas de producción agrícola en las zonas de ladera en Honduras. EPTD Discussion Paper 104. International Food Policy Research Institute, Washington, DC.

Jansen, H. G. P., A. Rodriguez, A. Damon, J. Pender, J. Chenier, and R. Schipper. 2006. Determinants of income-earning strategies and adoption of conservation practices in hillside communities in rural Honduras. *Agricultural Systems* 88(1): 92–110.

Jansen, H. G. P., P. B. Siegel, J. Alwang, and F. Pichón. 2005. Geography, livelihoods, and rural poverty in Honduras: An empirical analysis using an asset-base approach. Paper presented at the Conference on Poverty, Inequality, and Policy in Latin America, University of Goettingen, Germany, 14 July.

Jansen, H. G. P., P. B. Siegel, and F. Pichón. 2005. Identifying the drivers of sustainable rural growth and poverty reduction in Honduras. DSGD Discussion Paper 19. International Food Policy Research Institute, Washington, DC.

Pender, J. 1999. Rural population growth, agricultural change, and natural resource management in developing countries: A review of hypotheses and some evidence from Honduras. EPTD Discussion Paper 48. International Food Policy Research Institute, Washington, DC.

Pender, J. 2001. Rural population growth, agricultural change, and natural resource management in developing countries: A review of hypotheses and some evidence from Honduras. In *Population matters: Demographic change, poverty, and economic growth in developing countries*, eds. N. Birdsall, A. Kelley, and S. Sinding, chapter 12. Oxford: Oxford University Press.

Pender, J. 2004. Development pathways for hillsides and highlands: Some lessons from Central America and East Africa. *Food Policy* 29: 339–367.

Pender, J., and S. Scherr. 2002. Organizational development and natural resource management: Evidence from Central Honduras. In *Property rights, collective action, and technologies for natural resource management*, eds. R. Meinzen-Dick, A. Knox, F. Place, and B. Swallow, pp. 207–239. Baltimore, MD: Johns Hopkins University Press.

Pender, J., S. Scherr, and G. Durón. 1999. Pathways of development in the hillsides of Honduras: Causes and implications for agricultural production, poverty, and sustainable resource use. In *Tradeoffs or synergies? Agricultural intensification, economic development, and the environment*, eds. D. R. Lee and C. B. Barrett, pp. 171–196. Wallingford, UK: CAB International.

UGANDA

Jagger, P., and J. Pender. 2001. Markets, marketing, and production issues for aquaculture in East Africa: The case of Uganda. *Naga (ICLARM Quarterly)* 24(1–2): 42–51.

Jagger, P., and J. Pender. 2003. Impacts of programs and organizations on the adoption of sustainable land management technologies in Uganda. EPTD Discussion Paper 101. International Food Policy Research Institute, Washington, DC.

Nkonya, E., C. Kaizzi, and J. Pender. 2005. Determinants of nutrient balances in a maize farming system in Eastern Uganda. *Agricultural Systems* 85(2): 155–182.

Nkonya, E., J. Pender, C. Kaizzi, K. Edward, and S. Mugarura. 2005. Policy options for increasing crop productivity and reducing soil nutrient depletion and poverty in Uganda. EPTD Discussion Paper 134. International Food Policy Research Institute, Washington, DC.

Nkonya, E., J. Pender, and E. Kato. 2007. Who knows, who cares? The determinants of enactment, awareness, and compliance with community natural resource management regulations in Uganda. *Environment and Development Economics*, forthcoming.

Nkonya, E., J. Pender, E. Kato, S. Mugarura, and J. Muwonge. 2005. Who knows, who cares? Determinants of enactment, awareness, and compliance with community natural resource management bylaws in Uganda. CAPRI Working Paper 41. International Food Policy Research Institute, Washington, DC.

Nkonya, P., J. Pender, P. Jagger, D. Sserunkuuma, C.K. Kaizzi, and H. Ssali. 2004. *Strategies for sustainable land management and poverty reduction in Uganda*. Research Report 133. Washington, DC: International Food Policy Research Institute.

Pender, J. 2004. Econometric methods for measuring natural resource management impacts: Theoretical issues and illustrations from Uganda. In *Natural resource management in agriculture: Methods for assessing economic and environmental impacts*, eds. B. Shiferaw, H. A. Freeman, and S. Swinton. Wallingford, UK: CAB International.

Pender, J., P. Jagger, E. Nkonya, and D. Sserunkuuma. 2004. Development pathways and land management in Uganda. *World Development* 32(5): 767–792.

Pender, J., E. Nkonya, P. Jagger, D. Sserunkuuma, and H. Ssali. 2004. Strategies to increase agricultural productivity and reduce land degradation: Evidence from Uganda. *Agricultural Economics* 31(2/3): 181–195.

Pender, J., S. Ssewanyana, K. Edward, and E. Nkonya. 2004. Linkages between poverty and land management in rural Uganda: Evidence from the Uganda National Household Survey, 1999/2000. EPTD Discussion Paper 122. International Food Policy Research Institute, Washington, DC.

Rücker, G. R., S. Park, H. Ssali, and J. Pender. 2003. Strategic targeting of development policies to a complex region: A GIS-based stratification applied to Uganda. ZEF-Discussion Papers on Development Policy 69. Center for Development Research (ZEF), Bonn.

OTHER

Ehui, S., and J. Pender. 2005. Resource degradation, low agricultural productivity, and poverty in Sub-Saharan Africa: Pathways out of the spiral. In *Proceedings of the twenty-fifth international conference of agricultural economists, Durban, South Africa, 2003*, eds. D. Colman and N. Vink. International Association of Agricultural Economists, Blackwell Publishing.

Hazell, P., U. Chakravorty, J. Dixon, and R. Celis. 2001. Monitoring systems for managing natural resources: Economics, indicators, and environmental externalities in a Costa Rican watershed. EPTD Discussion Paper 73. International Food Policy Research Institute, Washington, DC.

Hazell, P., P. Oram, and Nabil Chaherli. 2002. Managing droughts in the low-rainfall areas of the Middle East and North Africa. EPTD Discussion Paper 78. International Food Policy Research Institute, Washington, DC.

Kerr, J., G. Pangare, V. L. Pangare, and P. J. George. 2002. *Watershed development projects in India: An evaluation*. Research Report 127. Washington, DC: International Food Policy Research Institute.

Kerr, J., and J. Pender. 2005. Farmers' perceptions of soil erosion and its consequences in India's semi-arid tropics. *Land Degradation and Development* 16: 257–271.

Pender, J., and O. Mertz. 2005. Soil fertility depletion in Sub-Saharan Africa: What is the role of organic agriculture?" In *Global development of organic agriculture: Challenges and promises*, eds. N. Halberg, H. F. Alrøe, M. T. Knudsen, and E. S. Kristensen, pp. 215–240. Wallingford, UK: CABI Publishing.

Pender, J., F. Place, and S. Ehui. 1999. Strategies for sustainable agricultural development in the East African highlands. EPTD Discussion Paper 41. International Food Policy Research Institute, Washington, DC.

Ruben, R., M. H. Kuiper, and J. Pender. 2006. Searching development strategies for less-favoured areas. *Netherlands Journal of Agricultural Sciences* 53(3/4): 319–342.

Ruben, R., and J. Pender. 2004. Rural diversity and heterogeneity in less favoured areas: The quest for policy targeting. *Food Policy* 29: 303–320.

Ruben, R., J. Pender, and A. Kuyvenhoven. 2004. Editorial: Development strategies for less-favoured areas. *Food Policy* 29: 295–302.

Ruben, R., J. Pender, and A. Kuyvenhoven. 2007. Introduction. In *Sustainable poverty reduction in less-favoured areas*, eds. R. Ruben, J. Pender, and A. Kuyvenhoven. Wallingford, UK: CAB International.

ANNEX 2

WORKSHOP PROCEEDINGS, POLICY BRIEFS, AND NEWSPAPER ARTICLES

Workshop Proceedings and Summaries

Benin, S., J. Pender, and S. Ehui. 2003. Policies for sustainable development in the highlands of Amhara region: Overview of research findings. In *Natural resources degradation and environmental concerns in the Amhara National Regional State, Ethiopia: Impact on food security*, ed. T. Amede. Proceedings of the Natural Resource Management Conference, July 24–26, 2002, Bahir Dar, Ethiopia. Addis Ababa: Ethiopian Society of Soil Science.

Benin, S., J. Pender, and S. Ehui. 2002. Policies for sustainable land management in the East African highlands. Summary of papers and proceedings of the conference held at the United Nations Economic Commission for Africa, Addis Ababa, Ethiopia, April 24–26, 2002. EPTD Workshop Summary Paper 13 and ILRI Socioeconomics and Policy Working Paper 50. International Food Policy Research Institute, Washington, DC.

Gebremedhin, B., J. Pender, S. Ehui, and M. Haile. 2003. Policies for sustainable land management in the highlands of Tigray, Northern Ethiopia. Summary of papers and proceedings of a workshop held at Axum Hotel, Mekelle, Ethiopia, March 28–29, 2002. EPTD Workshop Summary Paper 14 and ILRI Socioeconomics and Policy Working Paper 54. International Food Policy Research Institute, Washington, DC.

Jabbar, M., J. Pender, and S. Ehui (eds). 2000. Policies for sustainable land management in the Ethiopian highlands. Summary of papers and proceedings of a national seminar held at ILRI in May 2000. EPTD Workshop Summary Paper 9 and ILRI Livestock Policy Analysis Program, Socioeconomic and Policy Research Working Paper 30. International Food Policy Research Institute, Washington, DC.

Jagger, P., and J. Pender (eds.). 2001. Policies for improved land management in Uganda. Summary of papers and proceedings of a workshop held at Hotel Africana, Kampala, Uganda, June 25 and 27, 2001. EPTD Workshop Summary Paper 10. International Food Policy Research Institute, Washington, DC.

Jansen, H. 2005. Resúmenes de los talleres del proyecto ‘Políticas de Desarrollo y Uso Sostenible de Tierras en Áreas de Ladera en Honduras’ (IFPRI-WUR-PRONADERS). EPTD Workshop Summary Paper 16. International Food Policy Research Institute, Washington, DC.

Nkonya, E., D. Sserunkuuma, and J. Pender. 2002. Policies for improved land management in Uganda: Second national workshop. EPTD Workshop Summary Paper 12. International Food Policy Research Institute, Washington, DC.

Pender, J., R. Ruben, M. Jabbar, and E. Gabre-Madhin. 2005. Policies for improved land management and agricultural market development in the Ethiopian highlands. Summary of papers and proceedings of a workshop held at the Ghion Hotel, Addis Ababa, Ethiopia, February 19 and 20, 2005. EPTD Workshop Summary Paper 17. International Food Policy Research Institute, Washington, DC.

ANNEX 3

2002 WORKSHOP ON POLICIES FOR SUSTAINABLE LAND MANAGEMENT IN THE EAST AFRICAN HIGHLANDS

Major Findings

Underlying Determinants of Comparative Advantage

Factors influencing agricultural potential (e.g., climate, altitude, topography, soils) have substantial but, sometimes, unexpected impacts on livelihood strategies, land management, productivity, and resource outcomes.

Access to markets and roads has substantial positive impacts on livelihood strategies, land management, and incomes in Kenya, but more limited and mixed impacts in Ethiopia and Uganda.

Access to irrigation increases the intensity of crop production but does not directly affect productivity or land degradation in Ethiopia.

Population pressure and small farm sizes generally contribute to agricultural intensification, as argued by Boserup and her followers. Population pressure also affects livelihood strategies to some extent, favoring crop production over livestock production at high population densities, but has mixed or limited impact on income and land degradation, depending on the context.

Impacts of Policies Programs and Institutions

Lack of farmer awareness of improved land management technologies is a key constraint limiting adoption in many places; hence extension and other technical assistance programs have had important impacts. These impacts are more limited where programs have promoted technologies that are not well suited to the biophysical and socioeconomic environment, however.

Technical assistance programs may also benefit farmers by promoting activities other than crop production and land management. The extent to which programs have done this and their effectiveness varies greatly, however.

Credit availability has had mixed impacts on livelihoods and land management. Generally, where credit has been used to enable investment in higher value activities and profitable technologies, it has contributed to improved outcomes. By contrast, where it

has promoted less profitable activities and technologies, outcomes have not been as favorable.

Local organizations have significant but varied impacts on livelihood strategies and land management.

Land tenure has mixed or insignificant impacts on land management, productivity, and resource conditions.

Education affects land management, livelihood strategies and outcomes in complex ways, and trade-offs among objectives of agricultural intensification, improved incomes and sustainable land use are apparent.

Impacts of Households' Livelihood Strategies and Endowments

Farmers' choices of livelihood strategies substantially influence their land management decisions and welfare and resource outcomes. Welfare outcomes are generally better for households pursuing livelihoods beyond food crop production (e.g., cash crops, dairy, tree products, and nonfarm activities), while there are mixed impacts of livelihoods on resource conditions, with trade-offs between income and resource outcomes common.

Gender differences have important implications for livelihoods and land management in Ethiopia, but less so in Kenya and Uganda.

Livestock can have substantial positive impacts on livelihoods, land management, and income, though these impacts vary substantially over time and space and some trade-offs are apparent.

Impacts of Land Management Practices

Inorganic fertilizer use is profitable in some areas of the highlands, particularly areas of higher rainfall and better soils, and is having substantial impact on agricultural production in those areas. In areas of poorer soils or lower rainfall, fertilizer is generally less profitable and not widely adopted.

Alternative low-external input soil fertility management technologies yield higher returns than inorganic fertilizer in many cases.

The profitability of alternative land management practices is not universal, however.

Several low external input land management technologies also contribute to improved resource conditions, though this is not universal.

Soil and water conservation investment sets are often complementary to improved soils fertility management practices, but substitution between investments and fertility management also occurs.

Papers Presented

“Policies for Sustainable Land Management in the East African Highlands: Research Background, Objectives, Conceptual Framework, and Activities,” by John Pender (IFPRI)

Development Domains in the East African Highlands

“Development Domains in East Africa and a Spatially-Based Strategic Planning Framework for Sustainable Land Use in Uganda,” by Stanley Wood and Simon Bolwig (IFPRI)

“Village Stratification for Policy Analysis: Multiple Development Domains in the Ethiopian Highlands,” by Gideon Kruseman and Girmay Tesfay (WUR), John Pender (IFPRI), and Berhanu Gebremedhin (ILRI)

Development Pathways and Land Management in the East African Highlands

“Livelihood Strategies and Land Management Practices in the Highlands of Tigray,” by John Pender (IFPRI), Berhanu Gebremedhin (ILRI), and Mitiku Haile (Mekelle University)

“Development Pathways and Land Management in Uganda,” by Ephraim Nkoya, John Pender and Pamela Jagger (IFPRI), and Dick Sserunkuuma (MUFA)

“Development Pathways in Medium-High Potential Kenya: A Meso-Level Analysis of Agricultural Patterns and Determinants,” by Frank Place and R. Zomer (ICRAF); R. Kruska, P. Kristjanson, and S. Stall (ILRI); and E. Njuguna (Government of Kenya)

Development Pathways and Land Management: Case Studies

“Land Degradation, Investment, Information, and Incentives in Kenya’s Lake Victoria Basin,” by Brent Swallow and Justine Wangila (ICRAF)

“Agricultural Land Management by Households in the Highlands of Kenya,” by Frank Place and Fridah Mugo (ICRAF), Jemimah Njuki (CABI) and Festuis Murithi (KARI)

“Land Management Problems and Potentials in the Lakeshore Intensive Banana-Coffee Farming System,” by Dick Sserunkuuma (MUFA)

Factors Influencing Land Management—Ethiopia

“Policies Affecting Land Management, Input Use, and Productivity: Land Redistribution and Tenure in the Highlands of Amhara Region,” by Samuel Benin (ILRI)

“Livestock, Livelihood and land Management Issues in the Highlands of Ethiopia,” by M. Jabbar, M. Ahmed, Samuel Benin, Berhanu Gebremadhin, and Simeon Ehui (ILRI)

“Community Natural Resource Management in the Highlands of Ethiopia,” by Berhanu Gebremadhin (ILRI), John Pender (IFPRI), and Girmay Tesfay (WUR)

“Interregional Comparisons of Agricultural Production Efficiency in the Ethiopian Highlands,” by Simeon Ehui, Zeleka Paulos, Ayele Solomon, Samuel Benin, and Berhanu Gebremadhin (ILRI)

Factors Influencing Land Management—Uganda

“The Role of Micro-Credit in Addressing Land Degradation in Uganda,” by Grace Akello (Government of Uganda)

“Dynamics of Maize Market Integration in Post-Liberalized Uganda,” by Shahidur Rashid (IFPRI)

“Motivating Smallholder Investment in Sustainable Land Management: Emerging Roles for NGOs and CBOs in Uganda,” by Pamela Jagger and John Pender (IFPRI)

Factors Influencing Land Management and Food Security—Other Countries

“Land Tenure Systems and their Implication for Food Security and Sustainable Development in Africa,” by Josue Dione (UNECA)

“Macro-economic and Sectoral Policies and Their Influence in Land Use and Management: Some Lessons from Southern Africa,” by Isaac Minde

Impact of Land Management Practices

“Integrated Resource Management for Improving Land Productivity in the Ethiopian Highlands,” by Jens Aune, Dereje Teklehaimanot, and Balesh Tulema (NORAGRIC)

“Impacts of Land Management Options in Western Kenya and Eastern Uganda,” by R. Delve and J. Ramisch (IITA)

“Soil Organic Matter and its Relationship to Soil Fertility Changes in Uganda,” by Henry Ssali (NARO, Uganda)

Modeling Impacts on Alternative Policies and Technologies

“Policy Analysis for Sustainable Land Management and Food Security in the Ethiopian Highlands: A Bio-economic Model with Market Imperfections,” by Stein Holden and Bekele Shiferaw (Agricultural University of Norway), and John Pender (IFPRI)

“Credit Policy and Intensification in Mixed Crop-Livestock Systems: A Modeling Perspective,” by Mohamed Ahmed and Simeon Ehui (ILRI), and Paul Preckel (Purdue University)

“Land Improvement and Technology Diffusion in Uganda: A Bio-economic Multi-Agent Approach,” by Johannes Woelcke, Thomas Berger, and Soojin Park (ZEF)

ANNEX 4

2004 WORKSHOP ON POLICIES FOR IMPROVED LAND MANAGEMENT AND AGRICULTURAL MARKET DEVELOPMENT IN THE ETHIOPIAN HIGHLANDS

Agro-Ecological and Bio-Economic Analyses of Land Management in Ethiopia

“Policies and Technologies for Sustainable Land Management in the Ethiopian Highlands,” by Ruerd Ruben and Gideon Kruseman (WUR), and Girmay Tesfay (Mekelle University)

“Agro-Ecological Analyses: Production Potentials for Tigray Region,” by Herman van Keulen and Huib Hengsdijk (WUR)

“Soil Nutrient Flows and Integrated Nutrient Management in the Northern Ethiopian Highlands,” by Assefa Abegaz (Mekelle University)

“Impacts of Policy and Livelihood Strategies for Poverty Reduction and Sustainable Land Use in Tigray: Results of a Bio-Economic Model,” by Gideon Kruseman (WUR)

Performance of Grain Markets

“Structure and Conduct of Grain Marketing in Ethiopia,” by Wolday Amba (AEMFI, Ethiopia) and Eleni Gabre-Madhin (IFPRI)

“Characterizing Grain Traders,” by Eleni Gabre-Madhin (IFPRI) and Wolday Amha (AEMFI)

“Spatial Efficiency of Maize and Wheat Markets in Ethiopia,” by Asfaw Negassa and Robert Myers (MSU), and Eleni Gabre-Madhin (IFPRI)

Performance of Livestock Markets

“Livestock Markets in the Ethiopian Highlands: Changes in Structure and Conduct Since 1991,” by Samuel Benin (IFPRI), and Mohammad Jabbar and Simeon Ehui (ILRI)

“Trader Behavior and Transaction Costs in Live Animal Marketing in Ethiopian Highlands Markets,” by Mohammad Jabbar (ILRI) and Samuel Benin (IFPRI)

ANNEX 5

UGANDA 2002 WORKSHOP

List of Papers

“Development Pathways and Land Management in Uganda: Causes and Implications,” by John Pender, Pamela Jagger, Ephraim Nkonya (IFPRI), and Dick Sserunkuuma (MUFA)

“A Spatially Based Strategic Planning Framework for Sustainable Land Use in Uganda,” by Stanley Wood and Simon Bolwig (IFPRI)

“Alternative Growth Scenarios for Ugandan Coffee to 2020,” by Liangzhi You and Simon Bolwig (IFPRI)

“Potentials and Constraints to Coffee Development: Aiding the Coffee Replanting Program,” by Ronnie Babigumira, Ephraim Nkonya, and Simon Bolwig (IFPRI).

“The Relationship between Socio-Economic Characteristics of Maize farmers and Household Food Security in Eastern Uganda,” by Stella Nagujja (MUFA)

“Land Management Programs and Potentials in the Lakeshore Intensive Banana-Coffee Farming System,” by Dick Sserunkuuma (MUFA)

“A Review of Land Use Change and Soil Degradation in the Southwestern Highlands of Uganda,” by Simon Bolwig (IFPRI)

“Ugandan Crop Market Development: Characteristics, Constraints and Opportunities,” by Ephraim Nkonya (IFPRI)

“The Dynamics of Maize Market Integration in Post-Liberalized Uganda,” by Shahidur Rashid (IFPRI)

“Information Asymmetry Among Output Traders, Processors and Farmers in Uganda,” by Edward Kato and Ephraim Nkonya (IFPRI)

“Determinations and Implications of Development Pathways and Land Management in Uganda,” by Ephraim Nkonya, John Pender, and Pamela Jagger (IFPRI), and Dick Sserunkuuma (MUFA)

“Soil Conservation Practices and Non-Agricultural Activities in the Southwestern Highlands of Uganda,” by Ephraim Nkonya (IFPRI)

“Common Property and Collective Action in Natural Resource Management: The Case of Doho Rice Scheme in Tororo District, Eastern Uganda,” by Dick Sserunkuuma

“Motivating Smallholder Investments in Sustainable Land Management: Emerging Roles for NGOs and CBOs in Uganda,” by Pamela Jagger and John Pender (IFPRI)

“Soil: Organic Matter and Its Relationship to Soil Fertility Changes in Uganda,” by Henry Ssali (NARO)

“Determinants of Nutrient Balances in Maize Plots in Eastern Uganda,” by Ephraim Nkoya (IFPRI) and Crammer Kaizzi (NARO and ZEF)

“The Potential Benefit of Velvet Bean (*Mucuna Pruriens*) and Nitrogen (N) Fertilizers in Maize Production on Contrasting Soils in Uganda,” by Crammer Kaizzi, Henry Ssali, and A. Nansamba (NARO); and Paul Vlek (ZEF)

“Modeling Approach to Identify Sustainable Land Management Techniques on Erosion-Affected Slopes,” by Almut Brunner, Gerd Ruecker, Soojin Park, and Paul Vlek (ZEF)

“Technologies for Improved Livelihood in Southwestern Uganda,” by Frank Place and Thomas Raussen (ICRAF), Wilson Bamwerinde, and Francis Alacho (NARO)

“Land Management and Technology Adoption in Uganda: An Integrated Bio-economic Modeling Approach,” by Johannes Woelcke, Thomas Berger, and Soojin Park (ZEF)

“Modeling Policy Impacts Using an Agriculture-Focused CGE Model,” by Hans Lofgren (IFPRI)

ANNEX 6

STRATEGIES FOR SUSTAINABLE LAND MANAGEMENT IN THE EAST AFRICAN HIGHLANDS

List of Papers

“Key Issues for the Sustainable Development of Smallholder Agriculture in the East African Highlands,” by Frank Place (ICRAF), John Pender (IFPRI), and Simeon Ehui (ILRI)

“Conceptual Framework and Hypotheses,” by John Pender, Simeon Ehui, and Frank Place

“Development Pathways in Medium- to High-Potential Kenya: A Meso-Level Analysis of Agricultural Patterns and Determinants,” by Frank Place, Patti Kristjanson, Steve Staal, Russ Kruska, Tineke de Wolff, Robert Zomer, and E.C.Njuguna

“Village Stratification for Policy Analysis: Multiple Development Domains in the Ethiopian Highlands,” by Gideon Kruseman and Girmay Tesfay (WUR), John Pender (IFPRI), and Berhanu Gebremedin (ILRI)

“Land Management, Crop Production, and Household Incomes in the Highlands of Tigray, Northern Ethiopia: An Econometric Analysis,” by John Pender and Berhanu Gebremedin

“Policies for Livestock Development in the Ethiopian Highlands,” by Samuel Benin, Simeon Ehui, and John Pender

“Strategies to Increase Agricultural Productivity and Reduce Land Degradation in Uganda: An Econometric Analysis,” by John Pender, Ephrain Nkonya, Pamela Jagger, Dick Sserunkuuma, and Henry Ssali

“Agricultural Enterprise and Land Management in the Highlands of Kenya,” by Frank Place, Jemimah Njuki, Festus Murithi, and Fridah Mugo

“Policies and Programs Affecting Land Management Practices, Input Use, and Production in the Highlands of Amhara Region, Ethiopia,” by Samuel Benin

“Community Natural Resource Management in the Highlands of Ethiopia,” by Berhanu Gebremedin, John Pender, and Girmay Tesfay

“Influence of Programs and Organizations on the Adoption of Sustainable Land Management Technologies in Uganda,” by Pamela Jagger and John Pender

“Zero Tillage or Reduced Tillage: The Key to Intensification of the Crop-Livestock System in Ethiopia,” by Jens Aune, Rahel Asrat, Dereje Teklehaimanot, and Balesh Tulema Bune (NORAGRIC)

“Land Management Options in Western Kenya and Eastern Uganda,” by Robert Delve (ICRAF) and Joshua Ramisch (ILRI)

“Policy Analysis for Sustainable Land Management and Food Security in the Ethiopian Highlands: A Bio-economic Model with Market Imperfections,” by Stein Holden and Bekele Shiferaw (Agricultural University of Norway), and John Pender (IFPRI)

“Sustainable Land Management and Technology Adoption in Eastern Uganda,” by Johannes Woelcke, Thomas Berger, and Soojin Park

“Strategies for Sustainable Land Management in the East African Highlands: Conclusions and Implications,” by John Pender, Frank Place, and Simeon Ehui

ANNEX 7

LIST OF CONTACTS

Honduras:

Miguel Angel Ayarza (CIAT)

Francisco Pablino Celaya (Mayor, Guinope, El Paraiso departamento)

Jacqueline Chenier (ANAFSAE)

Guillermo Dias (Mayor, Sabanagrande, Francisco Morazan departamento)

Efrain Diaz Arrivillaga (Private Consultant)

Hector Hernandez (Minister of Agriculture)

Atilio Ortiz (Ministry of Agriculture)

Ricardo Peña (Ministry of Agriculture)

Pablo Rodas (Central American Bank for Economic Integration)

Florencia Rodriguez (ESA Consultores)

Roduel Rodriguez (Private Consultant)

Dante Rossi (World Bank, Tegucigalpa):

Roberto Toledo (Counselor to the Minister of Agriculture)

Carlos Zelaya (FAO)

Ethiopia:

Dr. Gezaghegn Ayele (Ethiopian Development Research Institute [EDRI])

Dr. Mahmoud Yesuf (EDRI/Ethiopian Economic Policy Forum [EPPF])

Dr. Menale Kassi (EDRI/EPPF)

Dr. Berhanu Gebremedhin (ILRI)

Dr. Mohamed Jabbar (ILRI)

Dr. Eleni Gabre-Madhin (IFPRI)

Dr. Gete Zelleke (Former Head of Amhara Regional Agricultural Research Institute)

Dr. Belay Demessie (Former Head of Amhara Bureau of Agriculture)

Dr. Assefa Abegaz (University of Mekelle, Department of Agriculture)

Dr. Fitsum Hagos (Mekelle University)

Daniel Denano (Ministry of Agriculture, Land Management Division)

Dr. Abara (Ministry of Agriculture)

Herbert Acquay (World Bank/GEF)

Uganda:

Dr. Wilberforce Kisamba-Murerwa (Former Minister of Agriculture)

Dr. Mateete Bekunda (Makerere University, Faculty of Agriculture)

James Muwonge (National Bureau of Statistics)

Dr. James Magunda (National Agricultural Research Organization [NARO])

Dr. Drake Mubirau (NARO)

Dr. Henry Ssali (NARO)

Dr. Dick Sserenkuuma (Makerere University, Department of Agricultural Economics)

Prof. Zake (Makerere University, Department of Soils)

Dr. Peter Ngategize (Ministry of Finance)

Francis Byekwaso (NAADS)

Eugene Muramira (EPA)

Hon. Grace Akello (Former Minister of State for Northern Uganda Rehabilitation)

Dr. Madhur Gautam (World Bank)

Others:

Jeffrey Alwang (Virginia Tech University)

Hans Jansen (IFPRI)

Ernst Lutz (World Bank)

John Pender (IFPRI)

Ephraim Nkonya (IFPRI)

Robert Tripp (Private Consultant)

Paul Siegel (World Bank)

Nick Hooten (ILRI, Nairobi)

John English is a British resource economist who worked in various agricultural divisions of the World Bank, as well as its Environment Department, and more recently in its Operations Evaluation Department (now the Independent Evaluation Group).

Mitch Renkow is a Professor of Agricultural and Resource Economics at North Carolina State University. Previously, he served as a Rockefeller Foundation Social Science Research Fellow at the International Maize and Wheat Improvement Center.

IMPACT ASSESSMENT DISCUSSION PAPERS

26. **The Impacts of IFPRI's Global Research Program on the Sustainable Development of Less-Favored Areas**, *by John English and Mitch Renkow (September 2007)*
25. **Impact Assessment of Food Policy Research: A Stocktaking Workshop – Synthesis Report**, *by Jock Anderson, Maria Soledad Bos, and Marc J. Cohen (December 2005)*
24. **Regional Policy Networks: IFPRI's Experience with Decentralization**, *by Robert Paarlberg (April 2005)*
23. **Strengthening Food Policy Through Gender and Intrahousehold Analysis: Impact Assessment of IFPRI Multicountry Research**, *by Cecile Jackson (April 2005)*
22. **The Impact of the Food-for-Education Program in Bangladesh on Schooling Outcomes and Earnings and the Contribution of IFPRI Research**, *by James G. Ryan and Xin Meng (November 2004)*
21. **Impact Assessment of IFPRI's Research and Related Activities Based on Economywide Modeling**, *by Kym Anderson (December 2003)*
20. **The Impact of Economic Policy Research: Lessons on Attribution and Evaluation from IFPRI**, *by James G. Ryan and James L. Garrett (October 2003)*
19. **Impacts of IFPRI/ICARDA Policy and Property Rights Research on the Mashreq and Maghreb Project**, *by John H. Sanders and Hassan Serghini (October 2003)*
18. **Institutional Learning and Change in the CGIAR: Summary Record of the Workshop Held at IFPRI, Washington, DC, February 4-6, 2003**, *by Ronald Mackay and Douglas Horton (October 2003)*
17. **Evaluating the Impact of Agricultural Projection Modeling Using the IMPACT Framework**, *by James G. Ryan (February 2003)*
16. **The Impact of the International Food Policy Research Institute's Research Program on Rural Finance Policies for Food Security for the Poor**, *by Jeffrey Alwang and V. Puhazhendhi (December 2002)*
15. **Synthesis Report of Workshop on Assessing the Impact of Policy-oriented Social Science Research in Scheveningen, The Netherlands November 12-13, 2001**, *by James G. Ryan (March 2002)*

IMPACT ASSESSMENT DISCUSSION PAPERS

14. **The Production and Diffusion of Policy Knowledge: A Bibliometric Evaluation of the International Food Policy Research Institute**, *by Philip G. Pardey and Jason E. Christian (January 2002)*
13. **Impact of IFPRI's Policy Research on Resource Allocation and Food Security in Bangladesh**, *by Suresh Babu (February 2000)*
12. **A Review of Food Subsidy Research at IFPRI**, *by Curtis Farrar (January 2000)*
11. **Assessing the Impact of Policy Research and Capacity Building by IFPRI in Malawi**, *by James G. Ryan (December 1999)*
10. **External Impact Assessment of IFPRI's 2020 Vision for Food, Agriculture, and the Environment Initiative**, *by Robert Paarlberg (June 1999)*
9. **Returns to Policy-Related Social Science Research in Agriculture**, *by Bruce L. Gardner (May 1999)*
8. **Assessing the Impact of Rice Policy Changes in Viet Nam and the Contribution of Policy Research**, *by James G. Ryan (January 1999)*
7. **The Value of Economic Research**, *by David Zilberman and Amir Heiman (January 1999)*
6. **Policy for Plenty: Measuring the Benefits of Policy-Oriented Social Science Research**, *by George W. Norton and Jeffrey Alwang (December 1998)*
5. **Some Useful Methods for Measuring the Benefits of Social Science Research**, *by Henry E. Kilpatrick, Jr. (October 1998)*
4. **Adding Value through Policy-Oriented Research: Reflections of a Scholar-Practitioner**, *by C. Peter Timmer (October 1998)*
3. **A Proposal for Measuring the Benefits of Policy-Oriented Social Science Research**, *by Donghyun Park (August 1998)*
2. **Measuring the Benefits of Social Science Research**, *by Vincent H. Smith (July 1998)*
1. **IFPRI and the Abolition of the Wheat Flour Ration Shops in Pakistan: A Case-Study on Policymaking and the Use and Impact of Research**, *by Yassir Islam and James L. Garrett (December 1997)*