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BOOK REVIEWS

Watershed Development in Asia: Strategies and Technologies.
By JOHN B. DOOLETTE and WILLIAM B. MAGRATH (eds). World Bank Technical Paper No. 127. (World Bank, Washington, D.C., 1990.) Pp. 227, ISBN 0-8213-1606-0

At the time this review was written (November 1991), Australian newspaper and television reports carried graphic coverage of devastating and deadly floods in Ormoc, Leyte, Philippines, said to be the result of deforestation of the hinterland. This World Bank report was written in recognition of the linkages between upland productivity/environmental conditions and downstream impacts such as flooding and sedimentation. Significant increases in migration to the upland areas has exacerbated the situation which perhaps exemplifies the need for an environmentally conscious approach to development.

Cynics might claim that today's uplands represent tomorrow's lowlands, but the short-term human consequences (thousands killed in Ormoc, and extremes of poverty of the upland farmers trying to eke out an existence on severely degraded slopes) and the long-term uncertainty over the magnitude of the consequences of the degradation make the problem worthy of significant world attention.

This technical paper comprises six chapters by World Bank staff and consultants to:

illustrate methodological approaches to project analysis, summarize the state of the art on solutions to technical problems and discuss institutional and social processes that bear heavily on the viability of watershed management projects. (p. vii)

Fourteen percent of land in Asia can be categorised as upper watershed, while 39 per cent is lower watershed. Of the region's rural population of 1.6 billion, 65 per cent live in these upland watershed areas. Two fundamental approaches to erosion control in the uplands are identified: earthmoving, and agronomic-type management practices.

The World Bank's experience with conservation projects in the region has led it towards:

greater use of vegetative, cultural and farming systems — related conservation treatments that are, overall, more effective and more amenable to a wider range of tenure categories. (p 26)

The conclusion on this topic in the report is that agricultural productivity in upland areas can be intensified in an environmentally sound and sustainable manner. Upland smallholders are typically poor with insecure tenure, and require direct short-term benefits from any in-

novations to their systems — but potential interventions of this type do exist.

Other chapters in the document include a review of literature on costs/effectiveness of various erosion control techniques, effect of erosion on crop yields, tenure aspects and budgets on a case study for controlling erosion with Vetiver grass. There is a listing of all past and present World Bank projects in this area.

One is left with the overriding impression that scientific studies in this area have produced a diverse range of results, and that, when combined with consideration of the socio-economic/tenurial constraints, the way forward at the farm level of intervention is by no means clear, despite the glimmers of optimism in the report.

There may be better scope on the broader brush agricultural policy/agricultural research resource allocation front to promote the use of less erosive management practices (trees, grazing versus cropping) on the hilly lands. It is likely that, as Asian income levels increase, demand will rise disproportionately for less erosive non-food crops which appear to be more effectively grown in the hilly lands.

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Agricultural Commercialization, Nutrition, and the Rural Poor: A Study of Philippine Farm Households. By HOWARTH E. BOUIS and LAWRENCE J. HADDAD. (Lynne Rienner Publishers, Boulder and London, 1990.) Pp. xvi + 191, ISBN 1-55587-206-9.

This is a report of one of a series of research studies undertaken over the past few years by the International Food Policy Research Institute (IFPRI) on the production, income, consumption and nutrition effects of agricultural commercialisation in low-income countries. The study described in this book was located in the southern part of Bukidnon Province on the Philippine island of Mindanao. The analysis is based on data collected from a stratified sample of households engaged in either corn or sugar production, and with differing forms of access to land and employment.

Although the commercialisation of agriculture is vital for overall economic development, the benefits can be very unevenly distributed. In particular, there has been a lively debate about the effects of commercialisation on the consumption patterns of the affected rural households, and hence on the nutritional status of the members of those households, especially young children. Economists have commonly argued that the income elasticity for food of poor people is relatively high; hence, the increased incomes that they can earn from more commercial production should translate readily into improved nutrition. Nutritionists, among other commentators, have generally been

less convinced, and have pointed to possible deleterious effects of agricultural commercialisation on nutrition through a variety of mechanisms such as reduced household food security, more pressures on the time of mothers, and substitution of foods of lower nutritional quality for subsistence foods.

It was in an effort to clarify these issues that IFPRI developed the series of studies, one of which is described in this book. These studies might best be described as 'economic epidemiology'; the aim is to use mainly cross-section data to identify the impact of commercialisation on human nutritional status, and also to gain an understanding of the *processes* linking causes to effects in the specific situations studied. Such an understanding is necessary to be able to devise effective policy interventions to mediate any undesirable effects of commercialisation at these and other locations.

The book begins with a good review of the relationships between government policy, agricultural commercialisation and human nutrition in low-income countries. A description of the study, including data collection and analysis, is then presented in a logical, step-by-step way. After an explanation of the research design, some descriptive data are presented on changes in land tenure patterns, and on the two production systems studied (corn and sugar).

In Chapter 7, dealing with incomes, expenditure and energy intakes at household level, the economic analysis begins. The important result is obtained of a large leakage between higher incomes and increased energy intakes — the income elasticity of household energy intake per adult equivalent is only 0.11 over the whole sample. In an appendix the authors indicate why income elasticities of food intake may have been overestimated in other studies. If such low elasticities are widespread, there are important implications for the design of policies to reduce under-nutrition, and some widely held views in organisations such as the World Bank about the importance of economic growth as a cure for the problems of hunger must be challenged.

The pre-school children studied were found, on average, to have energy intakes well below the recommended standards. Moreover, in the regression analyses dealing with individual energy intakes, presented in Chapter 8, the authors show that pre-school children benefit only marginally more than other (relatively better fed) family members from increases in income. That is, the share of increased food available going to pre-schoolers increases with income, but only slightly.

In Chapter 9, the analysis is extended to explore the impact of agricultural commercialisation on the nutritional status of the young children through data on their heights and weights. The results indicate low income elasticities of children's nutritional status of 0.05 and 0.10 for short- and long-run impacts, respectively. Moreover, in the sugar-growing households, the benefits of extra food energy at higher incomes are largely negated by the higher childhood morbidity. The reasons for the increased morbidity are not clear.

It is clear from this and related studies at other sites that the relationship between agricultural commercialisation and nutritional status of people in the affected households is very complex. Increased incomes did have the expected positive impact on nutrition in this area of Philippines, but the benefits were very small and were largely swamped for young children by unexplained differences in morbidity.

The authors conclude that the groups of people who were most seriously affected, from a nutritional viewpoint, by the introduction of sugar cane production in this area of Mindanao were those smallholders who, for whatever reasons, lost their land. Hence, a land reform would provide one means to reduce the number of under-nourished children. The fact that households elect to spend so little of any extra income on food for their children suggests a need for education, and the regression models show that formal education of women is more effective in this regard than nutrition education programs.

The 'low' income elasticities discovered should not be misinterpreted as suggesting that poverty reduction is not important as a cure for under-nutrition. An increase in annual income per capital of US \$182 for a household in the lowest expenditure quintile would be sufficient to raise energy intake to the recommended level. Yet even this modest increase represents a quadrupling of income for these poorest households, which, as the authors point out, is a distant prospect unless overall income growth is coupled with a move to greater equity. Moreover, simply improving energy intakes of young children will not be sufficient for a substantial improvement in nutritional status — something must also be done about the high morbidity. Subject to better evidence about the causes of this problem than is available from this study, it seems that improvements in community health and sanitary conditions, coupled with better health education, are needed.

Overall, this is an impressive, well-research investigation that adds one more important building block to the building of understanding of the complex but important relationships between economic growth and human welfare.

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Farmer First: Farmer Innovation and Agricultural Research.
By ROBERT CHAMBERS, ARNOLD PACEY and LORI ANN THRUPP
(eds). (Intermediate Technology Publications, London, 1989.)
Pp. 218, ISBN 1 85339 008 9 (hardback), 1 85339 007 0 (paper).

More than 20 years after the Green Revolution signalled the successful application of modern science in raising crop yields in the fertile, well-watered regions of the Third World, no comparable advances in agricultural technology have been achieved in less-favoured

Third World environments, such as India's Deccan Plateau, the uplands of Asia and Latin America, and most of sub-Saharan Africa. The editors of *Farmer First* argue that this discrepancy is in part due to the way agricultural research is organised. Agricultural research undertaken at research stations commonly involves one or few crops, controlled environments and easy access to inputs, conditions comparable to those on the majority of farms in the favoured regions. In contrast, in the resource-poor regions most farms are poor, farming systems generally complex in terms of the variety and mixtures of crops and animals raised, the local environments diverse, and production uncertainty high. As a result, conventional research does little to meet the technology needs of farms in the resource-poor regions.

This is a book about improving communication between poor Third World farmers and scientists, so that the design and process of selection of new agricultural technologies better reflects the knowledge, problems and priorities of poor farmers. The farmer, woman or man, and not the research station scientist, is regarded as the central experimenter responsible for choosing new technologies. This approach to technology design and choice is labelled 'farmer-first', and contrasted to the conventional 'transfer-of-technology' approach, where the farmer is a relatively passive recipient of new technology.

Farmer First presents papers and summaries of discussion from a workshop on 'Farmers and Agricultural Research: Complementary Methods', held at the Institute of Development Studies (IDS), University of Sussex, in July 1987. The workshop brought together research and extension workers involved in the development of farmer-centred research, and most of the book is devoted to detailed descriptions of the methods adopted to facilitate communication between farmers and scientists, and to put farmers' agendas first. In their preface and introduction, the editors are careful to emphasise that farmer-centred research complements, rather than replaced, research station and laboratory research, and that transfers of technology from laboratory and research station will always be needed. In this respect, the book's contrasting of 'farmer-first' and 'transfer-of-technology' approaches is unfortunately, since it de-emphasises the necessity for two-way communication.

Following the introduction, the Workshop papers and discussion summaries are arranged in four sections, each concentrating on a particular theme. Part 1 is devoted to evidence of experimentation and innovation by farmers, and part 2 to strategies for identifying farmers' problems and priorities. In part 3 workshop participants describe ways in which farmers can participate in agricultural research. The papers in part 4 address the implications for research and development institutions and for agricultural development policy of putting farmers first. Each section contains considerable descriptive detail, based on Workshop participants' individual experiences. Readers interested in the farmer-first approach, but not in the details of particular project, need read only the preface, introduction, the brief editors' summary at

the beginning of each section, and Chambers' concluding paper (section 4.4).

Part 1 reminds this reviewer of T. W. Schultz's view, in *Transforming Traditional Agriculture*, of Third World farmers as 'poor but efficient'. The examples of successful farmer experimentation and innovation in Part 1 demonstrate that, given an array of new farming technologies, poor farmers are capable of selecting and adapting technologies to suit their and their families' needs under varying ecological and social circumstances, most of which are treated as givens on the research station. Thus, the editors argue, research must be directed at providing baskets of choices, not packages of practices, and extension at assisting adaption rather than adoption of technology.

The case studies of farmer participation in parts 1, 2 and 3 describe a wide variety of methods for promoting researcher-farmer cooperation and communication in agricultural research. No single research method is deemed superior, but the Workshop participants did agree on some features of successful farmer participatory research. Researchers must respect farmers as people and desire to learn from them; research teams should be multidisciplinary, including both natural and social scientists, and teams should include both sexes, in recognition of women's roles in farming and in households.

Parts 1 to 3 suggest the potential of farmer-first technology development to improve conditions in the resource-poor Third World. By contrast, the discussion of institutions and policy action in part 4 suggest the barriers to official adoption of a farmer-first approach. The only papers on changes in national research arrangements designed to take more account of small farmers' experience and problems come from India. The changes described are modest; more on-farm training for research scientists, more emphasis on multidisciplinary research and more on-farm experiments. In contrast to the projects reported in parts 1-3, there was no strong emphasis on learning from farmers, and no move to give farmers some control over research priorities.

The major deficiency of *Farmer First* is that, having shown the promise of farmer participatory research, it fails to adequately explain why it has only been adopted at isolated sites across the resource-poor Third World. This was not the task of the IDS Workshop, but it is a severe handicap for a book intended to spread the message. Ironically, for a book emphasising the importance of farming systems, there is, the final paper by Chambers excepted, almost no examination of the wider social and political systems within which decision on agricultural research organisation are made. In particular, there is no examination of the social and political context of the participatory research projects described in the book, so that their relationship to national agricultural research programmes and their social and political status as pilot projects is obscure. The reader is told that many of them are special projects undertaken in cooperation with national agricultural research organisations, and most draw on expatriate expertise, so it is not clear whether they could be multiplied on a large scale.

Institutional biases against the farmer-first approach, and supporting the conventional role of scientists in designing new technologies, are recognised in the discussion of institutions. The conventional approach is more consistent with the values and behaviour of scientific professionals pursuing their careers, and with the desires of bureaucrats to centralise decision making and to standardise and simplify problems and solutions. According to Chambers, for national agricultural research systems to undertake genuine farmer-centred research, they must change in three ways: first, they need to decentralise control over expenditures and provide more time and resources for staff to spend time with farmers; second, they need to reward extension and research staff for finding farmer innovations, and to be able to provide information and materials to meet local demands; and third, they must provide incentives for professionals to devote their careers to farmer-first research. Recognising this to be a tall order, Chambers recommends beginning the process with special government projects, non-government organisation and Third World farmers' organisation — roughly what is happening now. Just how the national research organisations are to be converted to farmer-first research remains unclear at the end of the book.

A basic problem in properly meeting the technology needs of poor, complex, diverse and risk-prone agriculture is that it is expensive on a per-unit-output or per-farm basis — too expensive for the private sector, and still expensive for national research organisations redesigned according to Chambers' prescription. Of course the payoff in terms of the welfare of farm families in resource-poor regions is likely to be high, but in most of the Third World poor farmers have little political clout. Without some means of empowering farmers in the resource-poor regions, and consequently creating incentives for the nation's scientists and bureaucrats to respond to their technology needs, it seems likely that farmer participatory research will continue to be confined to special projects, aid projects and non-government organisation.

Economists interested in rural development should read this book for its detailed descriptions of methods for improving communication between poor farmers and scientists. It will also provoke salutary questioning of the organisation structures within which most development specialists work. *Farmer First* will also be useful as a reference in agricultural development courses because it provides a people-oriented perspective on Third World farming systems. However, the book fails to make a strong case for the farmer-first approach to technology design, essentially because it addresses only the benefits of farmer-first, and neglects its costs.

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