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Agricultural Growth, Poverty, and the Environment: Introduction

Many developing countries have achieved impressive growth rates in agriculture in recent decades. Asia, for example, which was threatened by hunger and mass starvation in the 1960s, is now self-sufficient in staple foods even though her population has more than doubled. Yet, in spite of this success, serious concerns remain for the future. First, hunger and malnutrition persist in many countries, often because past patterns of agricultural growth were insufficient or failed to adequately benefit the poor. Second, expected increases in agricultural demand associated with population growth and rising per-capita incomes will require continuing increases in agricultural productivity. Yet, there is increasing evidence that yield growth is slowing while the prospects for further expanding cropped and irrigated areas are limited. Third, growing environmental problems associated with agriculture could, if not checked, threaten future levels of agricultural productivity as well as impose serious health and environmental costs at the national and international levels.

There are two basic types of environmental problems associated with agriculture. Most of the successful breakthroughs in productivity have occurred in more favored agroecological zones and have been based on intensive use of irrigation water, fertilizers, pesticides, and other modern inputs (e.g., the Green Revolution). Agriculture based on intensive use of modern inputs is prone to mismanagement that leads to environmental degradation. Many of the environmental problems associated with the overuse of modern inputs are not restricted to developing countries, but are also problematic in industrial countries. On the other hand, where governments have neglected to intensify agricultural production through the use of modern technology, their population growth has worsened poverty and hunger and has driven rural people to expand cultivation into less favored, often environmentally fragile areas, such as forests, hillsides and wetlands, and to reduce fallow periods to the point where soil fertility is declining.

Continued agricultural growth will be a necessity, not an option, for most developing countries. Further, this growth must be achieved on a sustainable basis so as not to jeopardize the underlying natural resource base or to impose costly externalities on others. It must also be equitable if it is to contribute to the alleviation of poverty and food insecurity. These three goals (growth, poverty alleviation and environmental sustainability) are not necessarily complementary, and their simultaneous achievement cannot be taken for granted. Much depends on the specific social, economic, and agroecological circumstances. But a high degree of complementarity is more likely to be achieved when agricultural development is (a) broadly based and involves small and medium-sized farms, (b) market-driven, (c) participatory and decentralized, and (d) driven by productivity-enhancing technological change that does not degrade the resource base. Such growth can reduce food prices whilst increasing farm incomes; it is employment-intensive, and increases the effective demand for nonfood goods and services, particularly in small towns and market centers. By reducing poverty and promoting economic diversification in rural areas, it also relieves livelihood demands on the natural resources base.

The requirements for broad-based agricultural development are reasonably well understood, and should not be forgotten in the contemporary quest

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for environmental sustainability. Since they are so important, they are briefly reviewed below.

Back in the 1950s and 1960s, policymakers and agricultural-development experts were primarily interested in agricultural growth, and the lessons that emerged from that experience can be summarized as the five 'I's for agricultural growth.

Requirements for agricultural growth (the five 'I's)

1. *Innovation*. Need strong national agricultural research and extension systems (both public and private) to generate and disseminate productivity-enhancing technologies.
2. *Infrastructure*. Need good rural infrastructure, particularly roads and transport systems.
3. *Inputs*. Need efficient delivery systems for agricultural services, especially for modern farm inputs, agroprocessing, irrigation water, and credit.
4. *Institutions*. Need efficient and liberalized markets that provide farmers with ready access to domestic and international markets. Also need effective public institutions to provide key public services where these cannot be devolved to the private sector.
5. *Incentives*. Need conducive macro-, trade, and sector policies that do not penalize agriculture.

In the 1970s and 1980s, policymakers and development experts began to focus on ways of using agricultural development to reduce poverty and food security as well as to contribute to growth. The lessons that emerged from that era can be summarized as follows. In addition to the five 'I's, the following six 'equity modifiers' to agricultural growth are required.

Equity modifiers for poverty-alleviating agricultural development

1. Broad-based agricultural development should be promoted. There are few economies of scale in agricultural production (unlike processing and marketing); hence, targeting family farms is attractive on equity and efficiency grounds. There is a need to ensure that small and medium-sized farms receive priority in publicly funded agricultural research and extension, and in marketing, credit, and input supplies.
2. Land reforms, particularly market-assisted redistribution programs, may be necessary, where productive land is too narrowly concentrated among large farms.
3. Investments in human capital, such as rural education, clean water, health, family planning and nutrition programs are essential for improving the productivity of poor people and increasing their opportunities for gainful employment.
4. Women play a key role in farming and ancillary activities, and warrant targeted programs in agricultural extension and education, as well as credit and small business assistance programs.
5. All rural stakeholders (and not just the rich and the powerful) need to participate in the prioritization of public investments from which they are expected to benefit or help finance.
6. The rural nonfarm economy should be actively encouraged. It is not only an important source of income and employment in rural areas, especially for the poor, but it benefits from powerful income and employment multipliers when agriculture grows. In many countries, these potential multiplier effects are constrained by investment codes and related legislation that discriminate against small, rural nonfarm firms.

The new priority for environmental sustainability that has emerged in the 1990s does not negate the need for agriculture to continue contributing toward growth, poverty alleviation and increased food security; it is just that agriculture is now required to do this in ways that do not degrade the environment. To achieve this will still require the five 'I's and the six equity modifiers listed above (there are no shortcuts here), but some new requirements or, if you will, environmental modifiers for sustainable agricultural development, are now required. These modifiers have yet to be fully worked out and tested through development experience, a process that, in many ways, is still at the research and design stage. Many of the papers included in this special issue of *Agricultural Economics* provide valuable conceptual and empirical contributions toward the needed understanding, but clearly much additional research remains to be undertaken. At this stage of development, my own best guess of the required environmental modifiers is as follows.

Environmental modifiers for sustainable agricultural development

1. Give greater priority to backward regions in agricultural development, even though many of these may be resource poor. Given rapid population growth and limited nonfarm opportunities, agricultural growth is the only viable means of meeting the food and livelihood needs of growing populations in these areas for the next few decades without excessive out-migration that adds to already overloaded urban slums. Failure to do so will lead to worsening poverty and further degradation of hillsides, forests, and soils. This will require additional resources for agricultural development and not a diversion of resources from the continuing need to increase productivity in favorably endowed agricultural regions.
2. Agricultural research needs to give greater attention to sustainability features of recommended technologies, to broader aspects of natural resource management at the watershed and landscape levels, and to the problems of resource-poor areas.
3. Ensure that farmers have secure property rights over their resources. This does not necessarily imply that government should invest in ambitious land-registration programs. In many cases (e.g., Sub-Saharan Africa), the indigenous tenure systems still work surprisingly well, and are better able to meet equity needs and recognize multiple-user rights than fully privatized property rights systems.
4. Either privatize common property resources or, where this is not desirable (e.g., because of externality benefits or for equity reasons), strengthen community management systems.
5. Resolve externality problems through optimal taxes on polluters/degraders, regulation, empowerment of local organizations, or appropriate changes in property rights. Note that free-market prices will not always be the best; externalities may require optimal tax or subsidy interventions.
6. Improve the performance of relevant public institutions that manage and regulate natural resources (e.g., irrigation and forestry departments). Devolve management decisions to resource users, or groups of users, wherever possible. This also requires transfer of secure property or use rights.
7. Correct price distortions that encourage excessive use of modern inputs in intensive agriculture (e.g., remove subsidies on fertilizers and pesticides, charge full costs for irrigation water and electricity). It may still be necessary to subsidize fertilizers in backward regions, where current use is low and soil fertility is being mined.
8. Establish resource monitoring systems to track changes in the condition of key resources, educate farmers about the environmental effects of their actions, and delineate and protect sites of particular environmental value.

Conclusions

Past patterns of agricultural growth have sometimes led to negative environmental effects and to continued poverty and food insecurity among rural people, even as they have met national food needs and contributed to export earnings. But this is not an inevitable outcome of agricultural growth. Rather, it reflects inappropriate economic incentives for managing modern inputs in intensive farming systems, insufficient investment in many heavily populated backward areas, inadequate social and poverty concerns, and political systems that are often biased against rural people. With appropriate government policies and investments, institutional development, and agricultural research, there is no reason why agricultural development cannot simultaneously contribute to growth, poverty alleviation, and environmental sustainability.

The papers in this special issue of *Agricultural Economics* were selected from among the best contributed papers presented at the XXIII International Conference of Agricultural Economists held in Sacramento, California, from August 10-16, 1997. While the selection process was driven by criteria other than the specific theme of this special issue, nevertheless, the papers included reports on recent conceptual and empirical research on a number of issues that are directly germane to the development of appropriate agricultural development strategies for the future. There are three types of papers in this special issue: papers relating primarily to the design, uptake, and impact of agricultural technologies; papers primarily concerned with equity issues; and papers primarily concerned with environmental issues. Most of the

papers address linkages between their primary subject and the achievement of other social and environmental goals, and several papers also discuss how greater complementarity between goals can be achieved. I am pleased to have been able to play a part in the selection and editing of these papers, and wish to express my thanks to Joachim von Braun, Stan Johnson, and George Peters, who were critical partners in this venture.

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