

Interaction and Interdependence in Agricultural Development

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There is an increasing world-wide recognition of the need to improve food production and the income of small farmers in the developing countries. These concern pressures particularly upon scientists working with tropical root crops. Root crops are often a mainstay in the diets of some of the poorest rural people and hence the scientists working with root crops are key figures in the battle to improve their standard of living. The world needs more efficient production of these commodities to meet food and feed demands, to boost farm incomes and to generate rural employment. There is no doubt that tropical root crops are important to commerce. To millions of small farmers they may literally be essential to survival.

In a number of countries, particularly in Sub-Saharan Africa, Indonesia and some areas of Latin America, root crops are particularly significant in the diet, especially for low income people. Available data indicate that on a per capita basis the production of root crops has been a moderately declining food source, thus increasing the demand for cereals.

Commenting on this situation, the International Food Policy Research Institute has said: "In the drive to increase production in developing countries, it is essential to see to it that the small farmer and the landless laborer participate. Many subsistence small landholders and laborers are also underfed and increasing their production is the major way to increase their food intake. Further, agriculture is the major sector of the economy in most developing market countries and improving productivity and purchasing power of those engaged in agriculture is for most developing countries the route to sustained economic progress."

Changes in development direction which reflect these concerns have been increasingly evident since 1975 when the World Bank directed massive resources to an attack on rural poverty. Such changes are evidenced in the kinds of projects being funded as well as the magnitude of funds available. For example, seventy percent of agricultural and rural development projects for which the World Bank approved \$3.27 billion in 1978, contain an element for the small farmer.

As another example, the International Fund for Agricultural Development, which came into being as a result of the World Food Conference, has raised more than one billion dollars to be used in grants and loans to help the rural poor in the poorest of the food deficit countries. Finding ways to use this money that will effectively help the target groups is a job in itself.

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Development emphasis which calls for greater attention to small farmers has a number of important implications for agricultural scientists, including those who work with root crops. In fact, the root crop specialist may be particularly involved because so many small farmers include these crops in their farming systems.

My belief that basic changes will come in the research approach stems from the fact that most of the projects which are intended to help the small farmer are designed to deal with the whole agriculture of an area, not just with single commodities. The interactions and interdependencies which will result from this emphasis will profoundly affect the participants in development at all levels. Research will be in the center of these changes.

The area development projects which are widely favored by national governments and donor agencies alike may deal not only with agriculture but also with industry, public health and education, and similar factors. Even when they deal only with agriculture, however, these projects involve more interactions among individuals and agencies than most of us have dealt with before. It is not possible for any one group to do it alone, for the elements of a farming system are highly interdependent. Scientists of different disciplines have demonstrated the great value of working together in commodity teams. They must now develop even broader working relationships.

The area or regional development approach is not a recent invention. Even before they undertook commodity production programs on a national basis, many developing countries had initiated projects to address the food, welfare, and income problems of people living and working in a specific area. They continue to do so. Unfortunately, there is often little involvement of the national agricultural research system in such projects even though increasing agricultural productivity is the essential ingredient to success.

The failure of certain projects and the less-than-total success of others may be directly associated with the lack of effective participation of agricultural scientists and agricultural research system at critical stages. In some cases, the defined area management has established its own research unit apart from the national system. This may reflect a feeling that the scientists in the national program are too narrowly focused to meet the needs of the defined area campaigns. Recently a leading member of the staff of the Asian Development Bank stated to me emphatically that managers of national research systems are not nearly as important to development as are the leaders of regional development programs, irrigation districts, etc. If this be so then changes in the research system are imperative.

Most small farmers exist on a limited base of usually poor land without ready access to inputs, credit, or technical assistance. Their farming pursuits are diverse, consisting of many crops frequently mixed in simultaneous or consecutive plantings--- both annual and perennial --- as well as a few pigs, poultry, and other animals.

Such farmers use few draft animals, other sources of power, or even labor-saving tools. The daily chores of providing fuel and water absorb much of the available family time and energy. Key labor and decision-making responsibilities are divided between men and women, and the division varies greatly by community.

Situations such as this --- and they are many --- demand unusual approaches to and research on a wide range of factors. These may be biological, economic, engineering, social and political. The farmer, his family and his community, as well as the crops and animals produced, become units of study. The process of developing and introducing new technology will influence significantly whether it will be accepted, used and actually benefit those for whom it was intended.

Given the central place root crops may have in such farming systems, those who do research and those who administer it must be concerned with at least the following sets of possible interactions:

- Of scientists in multidisciplinary research on a specific commodity in a team approach such as the international centers have demonstrated.
- Of scientists with farmers to identify production-limiting problems and to work out with them acceptable solutions; to learn what the farmers actually do and why they do it.
- Of biological scientists with social scientists to identify and seek understanding of the socio-economic constraints and how these might be removed.
- Of scientists working on one commodity with those working on others grown in association.
- Among the commodities making up the small farm production system.
- Between farm production, the market place, and consumers relating to supply, quality and price.
- Of the research and development program with the socio-economic-political goals of the country.
- Among the soil, climate, insect, disease, and other physical aspects of the production environment.

How does one determine the true worth of a change in technology which is introduced to small farmers? If a particular change is accepted by farmers, what factors were responsible for its success? A range of criteria must be considered. These criteria frequently are interdependent. Interaction with farmers will help to determine the priorities and interdependencies among them. Among the ways technology and farming systems may be evaluated are to the extent they:

- Increase yields of a given commodity
- Raise overall production
- Provide regular cash flow
- Improve diets for people living on and off the land
- Generate employment in the rural area
- Even out the labor requirement over the year
- Conserve natural resources
- Maximize use of available resources
- Permit and facilitate farmer decision making

But interdependence is important in even more significant ways with a range of implications from personal to national. Whatever your discipline, specialty, or assignment, your ultimate success in your job depends upon the performance of others and the synchronization of your efforts with theirs. They control your success just as you do theirs — you are interdependent.

In technology, the success in the farmer's field of a fertilizer responsive variety depends upon the availability of fertilizer and its appropriate use, among a host of other factors. Conversely, national fertilizer programs fail unless responsive varieties exist and farmers can get the seeds, fertilizers and other inputs.

Success of national commodity production campaigns depends upon many interdependent variables, including the research system that produces the technology, the public and private sector activities responsible for inputs, production assistance, transportation, marketing and processing. Further, all of these operate in a complex

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environment of public policies relating to land, prices, exports, imports, and subsidies. Nothing stands alone.

As basic as interdependence is as a concept, it is alarming how frequently it is overlooked, ignored, or taken for granted. If one is to engineer success, he must identify the relevant interdependencies and understand how they relate. He must think of these things as affecting the success of his own efforts and not merely as abstract ideas about which he is intellectually aware.

At the national level, it is important to recognize that we now live and operate in a globally interdependent world. While nations still seek to be self-sufficient in many ways, informed leaders recognize that countries must seek appropriate roles and stature in a world of accommodation and sharing. What we share generally is in short supply: not only energy, but food, and natural resources. Perhaps one of the greatest shortages, however, is that of people who are adequately prepared to face the challenge of developing and implementing solutions to basic and pervasive problems.

What does it mean to be globally interdependent?

It means as a nation, no country can remain isolated socially, culturally, economically or politically from the rest of the world. No nation can be self-sufficient in everything.

It means that as professionals engaged in research our responsibilities and opportunities are broader. In proposing decisions, or in making policies, our universe is bigger, our constituents more numerous and diverse, our messages more complex, and our channels of transmission more complicated. The research and production strategies a nation selects for any crop will have consequences for that and other nations.

It means as private citizens, our individual responsibilities are greater. We must be aware, be informed, and be prepared to act in appropriate ways. We cannot hide behind our disciplines, in our organizations or within our families or communities. Action cannot be continually postponed or left to the discretion or initiative of others. The time comes for each of us to act—purposefully and responsibly. The urgency of the times demands that we accept personal responsibility for leadership and action.

Agricultural development requires the world's best in knowledge and experience — both technological and managerial. Much of that expertise and development experience today resides in the developing countries. It is important that the developed and developing countries, as well as the technical assistance and donor agencies, recognize this. Further, more efficient ways of sharing this expertise among the developing countries must be found. The new federation of agricultural research directors which held its organizational meeting in New Delhi recently can be important in this regard.

The International Agricultural Development Service, in cooperation with other agencies and institutions, is engaged in a number of activities which address various aspects of these issues.

As a technical cooperation agency, IADS is working directly with some 12 countries in Asia, Latin America and Africa on the implementation of projects to strengthen national agricultural research systems. IADS has assisted in planning and appraising missions in several other countries.

Many of the people who make major decisions today about agricultural development are lawyers, bankers, businessmen, clergy and certain people from the military. IADS has mounted efforts to mobilize and produce literature on agricultural commodities and subjects written so they can be understood by non-specialists. These books and bulletins focus on how to achieve improvements in the production, processing and marketing of specific commodities. To date, the major problem with such literature has been in finding capable individuals, willing and with the time to prepare the manuscripts.

Work on two commodities in your field, potatoes and taro, is progressing slowly. The most recent addition to this literature deals with small farm development in the tropics. It is now in the process of being distributed worldwide.

Another major, continuing concern of IADS is in the further development of leaders and managers for national programs of various kinds, beginning with the important posts in the national agricultural research system. These efforts have two concerns. One is how can such people keep themselves up-to-date in scientific fields. The other is more pressing and universal: how can they improve their managerial capabilities? We expect to launch one or more specific programs in this area in the year ahead.

Finally, IADS has been gathering information about and seeking a greater understanding of the area development approach as a significant and complementary development strategy. In October, we will bring our staff together with leaders of the national research systems in the countries where we now are working. A number of resource persons with area development experiences will be included in this workshop. We will explore the roles of such projects, the principles associated with success, and most importantly, the implications of such projects for agricultural research. These implications, as this discussion has indicated, are of at least three types: the scope and methods of research involved; the organization and management of the research support, and the relationships with other organizations. We believe that some dramatic changes in research approach will take place in the coming decade.

It has been a privilege to have had this opportunity to interact with you, and because our success depends upon yours, I wish each of you the best of personal and professional triumphs in the years ahead. Thank you.

