

CORE ELEMENTS FOR AN AGRICULTURAL DEVELOPMENT

1. Investment in high-return activities

In traditional agriculture, with little change in relative prices, technology, or institutions, there seldom are opportunities for investment in agricultural activities that provide returns above the low equilibrium level prevailing in the society. Now, in a world of rapid change in relative prices, agricultural technology, and institutions, less developed nations have many new opportunities to invest in more productive agricultural activities.

The modern agricultural production function emphasizes that production is usefully viewed as a result of investments that either (1) increase the productivity of land and other physical resources; or (2) increase the productivity of labor. With the rapid growth in the biological, chemical, physical, and social sciences over the last three centuries and the recent increasing application of this knowledge to agricultural production and marketing, immense new opportunities for high-return investments in the agricultural sector of less developed nations have opened up. These opportunities are mostly obtained through material, design, and capacity transfer of agricultural technology and scientific knowledge from other nations.

2. Investment in Applied Research

The development of productive national research on agricultural technology and institutional change in the public and private sectors is a fundamental requirement for accelerating the rate of agricultural development. The location-specific nature of agricultural production almost always requires some adaptive research, for technological, institutional, and economic reasons, to more rapidly identify new profitable technologies. Technological issues requiring research relate to the often different conditions of the growing environment, especially the soils, the climate, and pests.

The following sequence of the three phases of technology transfer is likely to be most productive in less developed nations. In the first phase, direct transfers, testing, and wide distribution of profitable technologies accelerating agricultural development from abroad

would occur. Such material transfers include plant and animal materials, mechanical equipment, and pesticides. In the second phase, the nation would develop the capacity to design and manufacture new technologies the use of blueprints, textbooks, and other research materials obtained abroad. This phase requires significant investments in laboratories, library computers, researchers, extension personnel, and local production capacity.

3. Investment in Human Capital

Strategic investments in human capital for agricultural development include the following two. First, primary education is needed for farmers and their families to attain verbal and mathematical literacy and, as soon as possible, relevant secondary formal or nonformal education. This education would include especially (1) the basic principles of biology, chemistry, and physics as they apply to agriculture; (2) production economics and farm accounting; and (3) an understanding of rural, national, and international economic and social development. This investment would enable farmers to provide leadership in agriculture and rural areas and to respond to new economic opportunities, increasing both their allocative efficiency and the rate at which they adopt more productive technologies and institutions.

And second, for selected individuals, programs are needed at the university level to train researchers and administrators who would continuously create economic opportunities for increased productivity in agriculture through the development of more productive technology, institutions, and government policy. The education needed varies from increasing abilities to operate a marketing organization to training for postgraduate degrees, as the nation shifts from largely material transfers of agricultural technologies to design transfer to capacity research capabilities in appropriate subsectors of agriculture.

Complementary investments in extension and communication systems are also needed to strengthen the links between researchers and government administrators, on the one hand, and farmers, on the other, so that productivity increases on farms can be accelerated.

These investments should increase communication skills and the knowledge of how to design and evaluate more productive extension and other communication activities.

4. Complementarity among Investments

A wide range of investments becomes available in all less developed nations for the growth of agriculture. Farmers and private decision makers seek investments that will increase income most rapidly. To achieve such growth, government decision makers need to invest in those projects with the highest rates of return, based on benefit-cost or other economic analysis. A particular challenge to governments is to increase the average productivity of investments of public resources through careful attention to complementarities in investment projects. Investment complementarities arise in (1) agricultural areas; (2) time sequences; and (3) backward and forward marketing linkages to farming.

The economic theory of complementarity of inputs in production demonstrates that careful attention to these relations can lead to much higher rates of growth and higher rates of return on investments in agriculture. Examples of complementary investments include (1) relating land ownership surveys, land leveling, and the rationalization of farm boundaries to irrigation investments; (2) relating plantation development and forest clearing to investments in plantation crop technology or market development; and (3) relating investments in rural infrastructure (transportation and communication) to farm needs so that farm costs are reduced, enabling expansion of agricultural production.

Complementary production relations in an agricultural area are incorporated in many package programs for input supply. When farmers receive the most profitable mix of inputs, higher private and social returns may be obtained from the use of limited development resources. The investment of government resources in such package programs has been widespread in less developed nations, including the Indian package program of the 1960s, the BIMAS program in Indonesia, which began in 1965, the Masagna 99 program in the Philippines, the minimum package program in Ethiopia in the 1970s, and the Puebla project in Mexico. Bad experiences with package programs have also occurred when they were poorly designed or executed and were hence unproductive.

The economic complementarities that arise from sequences of investments are illustrated by the following four points drawn from Mosher (1981, p. 30). (1) New agricultural technology should be available before investment is made increase credit availability. (2) Improved roads may often be required before more productive inputs, such as fertilizer, can be used profitably and paid for through farm marketing's. (3) Adaptive research on farmers' fields to identify & productive technologies should precede increases in extension and communication, (4) Irrigation investments will usually be more productive if research on irrigated crops and effective irrigation management has already been carried out. Government planning and investment decisions that ignore these sequences will slow growth.

The economic complementarity of backward and forward linkages also deserves careful attention. Agricultural development can be viewed as the process of encouraging the evolution of a more productive agricultural system. Activities in the different parts of the system are often to some extent complementary, so that the rates at which the various parts of the system increase productivity will affect the whole system. Thus, appropriate balance in investments in both backward linkages to agriculture (input production and marketing) and forward linkages of product marketing can have large effects on the rate of agricultural growth. Improving these linkages very often requires considerable investment in infrastructure (which includes not only roads but communications and government agricultural policy and administrative personnel).

5. Domestic Prices that Reflect Resource Costs

The economic reason for reducing constraints on prices is the law of comparative advantage. It demonstrates that per capita incomes and rates of growth will generally be higher with more flexible prices and trade, both internationally and in regions of a nation. Thus, constraints on trade, including those caused by significantly overvalued or undervalued exchange rates, slow growth.

The importance of economic flexibility reflects both the need to respond to changing international markets and the need for domestic economic growth, Hence, governments should focus on ways to facilitate rapid responses by the agricultural and other sectors to

internal and external price changes. However, a common government response to changes in prices, especially in important agricultural products, is to attempt to control the change. Such control may be useful in preventing shocks and in easing adjustments in an economy over the short run. However, once put in place, controls often remain too long, increasing the cost of food and agricultural products. Distorted prices will reduce growth by causing both overinvestment in agricultural activities that produce low social returns and underinvestment in those farming and marketing activities that would increase growth more rapidly. Also, control mechanisms often increase marketing costs. If, however, price-controlling mechanisms have little influence on market prices, then resources expended in the controlling activities are wasted.

6. Maximizing the Limited Contributions of international Aid

In most less developed nations, international aid can potentially provide complementary resources that could greatly accelerate growth. These possibilities range widely, depending upon the needs and agricultural development conditions in a particular nation. In the early stages of development, international activities that facilitate the material transfer of technologies to the agriculture of less developed nation could provide very high returns. Over the longer run, aid can make strategic contributions of complementary training and institution building. Examples include (1) improving experiment stations, agricultural colleges and universities, and agricultural extension and communication systems; and (2) augmenting economic and other social science research capabilities to improve the performance of agricultural policy, project planning, and institutional change.

However, international aid generally increases by only a small percentage the investment resources available to the nation. Thus, national agricultural growth will depend primarily on how productively these resources are invested. Aid that is poorly invested may have little effect on growth. Low aid impact can result from poor performance in identifying and formulating productive agricultural investment projects due to a lack of professional capacity domestically or poor performance by the international personnel involved in project design. At worst, dealing with an excess of international aid activities can absorb too large proportion of the scarce professional and managerial talent available in a less

developed nation, preventing it from focusing on activities that would have more impact on development.

7. Moderating Undesirable Income Distribution Effects

The package of policies and investments that the governments of less developed nations implement in agriculture will often greatly influence income distribution. In the short run, income distribution is affected by taxes, price controls, and subsidies, and in the longer run it is affected by changes in the productive assets controlled by individuals. To take two examples, subsidies for fertilizers and for machinery, if derived from taxes on other sectors, increase the income farmers who use these inputs. But when the prices of food grains are held below market prices, farmers are taxed by reducing their incomes in order to increase the real income of urban dwellers through low food prices. Although income transfers achieved through such policies may be desired by a government, economic theory demonstrates that both subsidies and taxes usually distort the growth of the industries affected, causing them to be less productive than they could be and thus slowing national economic growth.

The kinds of agricultural investments made by governments, and to a lesser extent by the private sector, can greatly influence the productive assets controlled by different individuals and groups in society and hence the distribution of income. Grabowski (1981) pointed out that there is often a direct link between the pattern of government investment in technological and institutional change and political influence. Thus, for example, changes in these investments may “require increase in the power and influence of farmers with small farms, relative to those with large farms, on government decisions concerning rural research and credit priorities. This could possibly be accomplished through land reforms or, a less radical solution, the organization of small farmers into groups which could put pressure on government agencies to recognize and respond to the small farmers”.

Two investment strategies illustrate differing impacts on income distribution. In one, an aristocratic government interested primarily in the growth of large farms and thus in increasing the bimodal nature of agriculture might in the following: (1) importing and producing those biological, chemic mechanical technologies that increase the productivity

of crops and livestock grown on large farms; (2) increasing the availability of large tractors and machinery at low cost in order to reduce labor costs; (3) increasing the availability of subsidized irrigation water for large farms through irrigation projects provide water below cost to these farmers; (4) improving institutional arrangements for input and product marketing and for credit that serve large farms (5) designing extension services and formal education relevant to agriculture accessible primarily to the families who work large farms. This portfolio of agricultural investments would increase the productivity, comparative advantage and income of persons on large farms relative to those on small farms and rural laborers. It also is likely to cause slower national economic growth other investment patterns.

8. Enhancing Government Performance

Governments of less developed nations have immense opportunities to respond creatively to the problems and opportunities of development by increasing performance. Low capabilities of government may greatly slow development. Governments of whatever persuasion have the opportunity to provide effective leadership, improved management, and education for their citizens, to help them deal with the social and economic changes ahead. Specifically government development requires improved performance in the political, research, planning, and executive functions.

In the past, with slowly changing social and economic environment Nations have had little need for economic analysis and planning of possible ties and investments, for the most profitable investments would usually same as before. In contrast, in the dynamic world environment of today governments of less developed nations must greatly increase their ability to deal with the economic and social implications of changes in relative prices and new investment opportunities in technology, institutions, and human capital, in order to use their national resources most effectively. Hence, the availability to government of highly trained researchers and policy analysts can increase the returns to development investments and the extent to which government policies facilitate or slow desired development. And finally, the performance of all personnel in carrying out government activities greatly affects the productivity of all government functions and, hence, the overhead costs of development.

