5

Agricultural policies in developing countries

Marketing and stabilization, subsidies, and policy reform

Governments throughout the developing world want to provide the poor with an adequate diet and to promote a more productive and efficient agricultural sector. But, as Chapter 4 has shown, their general economic policies, as well as taxes on farm outputs, tend to create a bias against agriculture. A reexamination of development strategies and of the excessive taxation of farm outputs should be high on the agenda for policy reform.

At the same time, it is important to review the price stabilization, consumer subsidy, and input subsidy programs through which governments try to offset the bias against agricultural producers and to assist low-income groups. Because the net benefits of these types of programs are low in practice—as will be brought out in this chapter—they need to be redesigned or reduced considerably in size. The resources thus saved can be used for more productive purposes, including the many useful services that governments provide in agriculture. World Bank experience indicates that agricultural investment, when carefully designed and implemented, is no less productive than investment in other sectors. The rate of return can be, and has been, very high. The benefits from agricultural investments are sensitive, however, to the policy environment within which private markets operate. The types of reform discussed in Chapter 4 and in this chapter are important in improving that environment. Many countries have recognized the interdependence between projects and policies and have undertaken significant reforms. The trend toward policy reform in developing countries is reviewed at the end of this chapter.

Marketing and stabilization

Governments seeking ways to influence producer and consumer prices often establish public sector marketing agencies. Usually, the intent is to assist agricultural producers by preventing "monopolistic" private traders from exploiting them. But, in practice, marketing is an intrinsically difficult task for public agencies to perform well. This section looks at the performance of these agencies.

Public sector marketing

The form, legal status, and range of functions carried out by public agencies vary from country to country. In India, public corporations at both the national and state levels buy and distribute food. In Mexico, a large state monopoly controls imports, domestic procurement, and the distribution of a wide range of agricultural goods. In contrast to those organizations dealing in a variety of commodities, many marketing agencies—with or without monopoly positions—handle only one commodity. Statutory monopolies, or marketing boards, are commonly used to control the purchase and export of individual crops, both in Africa and elsewhere.

Governments often justify their involvement in marketing with the argument that the private sector is inefficient and can be monopolized by a small number of traders. There is little evidence that this is generally true. Various studies have compared the efficiency of private and public sector marketing. In Kenya, the public sector charged 15 to 20 percent more for marketing maize and beans than did the private sector. Other studies have compared seasonal price changes in private markets with the cost of storage, and price differences between regions with the cost of transport. Data from Ghana and Nigeria, for instance, revealed seasonal price rises that appeared to be close to the cost of storage, which suggests that private traders were not able to develop monopoly powers. Price

movements for goods traded in free markets in West African countries also support the proposition that efficient marketing channels help bind markets together.

In contrast, numerous studies have indicated that public sector marketing agencies can be relatively inefficient. Staffing is one problem. Key managers are often chosen for political reasons. Even if the top management is competent, it is often pressured into expanding staff for political reasons. Flexibility in staffing is often lacking. Competence and morale often deteriorate. Financial problems also are common. Funds may be inadequate or released at the wrong time. Public agencies also often have unrealistic and inconsistent mandates to generate government revenue, provide cheap food, and create employment.

Perhaps more important, public marketing agencies find it hard to handle the sheer complexity of markets, especially in areas dominated by smallholders. The agencies have to buy small amounts of food from tens of thousands, even millions, of widely dispersed farmers in places where communications are poor and where existing local markets vary from place to place and change quickly. Whereas farmers want to sell a bewildering variety of maize or millet of different origins, freshness, or fine shadings of taste and quality, each at a different price, state-organized systems usually offer only one or two prices for each grain. Some offer only one purchase price throughout the year and for all locations.

As complex centrally controlled systems are open to corruption, it is difficult for public agencies to adopt the differentiated pricing policies which are needed to promote efficient trade. But the costs of not doing so can be great. For example, when an agency offers a single price for all grades of a crop, farmers want to sell to it only their lowest quality grade. When the agency is in charge of exporting the crop, as in the case of the rice marketing board in Guyana, the low quality of its supplies discourages foreign buyers.

In most of sub-Saharan Africa, public sector marketing agencies have a legal monopoly over trade for a wide range of commodities, although the growth of parallel markets has limited their influence. Even when there is no legal monopoly, inadequately differentiated and inflexible prices undermine private sector trading; so do unrealistic trading margins. Private traders have been crowded out in many countries, from Colombia and Peru to Kenya and the Philippines.

Marketing problems are less severe when public marketing agencies are not subsidized or protected by legal monopolies. The government of Indonesia, for instance, encourages public estates to buy smallholder crops in order to guarantee farmers a "fair" price. In some cases the public estates coexist with private markets and influence their prices through competition. In many other countries (such as Sri Lanka in the case of rice) the public sector has been able to coexist and compete with the private sector. In both Indonesia and Sri Lanka, the private sector has proved more efficient and has increased its share of the market despite the subsidies that the public sector entities directly or indirectly receive.

Although they are often inefficient and costly, public marketing agencies nonetheless can provide useful services. Some export marketing boards have helped increase exports by exercising quality control, arranging shipping, and providing producers with technical advice and information. It is necessary to note, however, that these services do not require monopoly trading powers. Private exporters' or producers' associations could perform the same functions more efficiently.

Governments have an important role to play in encouraging efficient markets. They can assist competition, but creating public monopolies to offset the threat of private ones does not do this. The

Table 5.1 Price instability indices, 1964–84

Commodity	*International price*	
	1964–84	*1974–84*
Sugar	90.8	51.5
Cocoa	37.3	34.1
Rice	33.0	21.9
Coffee	32.0	37.7
Palm kernels	27.5	32.5
Wheat	24.3	16.9
Tea	21.7	23.6
Jute	21.2	26.8
Soybeans	20.8	9.9
Beef	16.7	11.3
Corn	16.6	15.6
Rubber	16.1	14.0
Sorghum	15.6	13.6
Cotton	14.3	10.7

Note: Index =

$$\sqrt{\frac{1}{N}\Sigma\left(\frac{P_t - \bar{P}_t}{\bar{P}_t}\right)^2}$$

where P_t and $\bar{P}_t$ are actual and exponential trend values, respectively, and N is the length of the period. Prices are mainly from the London and New York markets, and they are deflated by the manufacturing unit value (MUV) index (1984 = 100).
Source: MacBean and Nguyen, "Commodity Price Instability" (background paper).

record of public marketing agencies suggests that physical trading in agriculture is a task better performed by competitive private markets. When public marketing is unavoidable, it is important to institute policies that do not discourage private sector participation.

Stabilization

Prices of agricultural commodities are expected to vary more than the prices of industrial products for three reasons: agricultural markets are vulnerable to climatic changes; the short-run responsiveness of supply and demand to changes in prices is usually less in the case of agricultural products than it is in industrial markets; and the output of most crops is necessarily seasonal. As shown in Table 5.1, world market prices of the major agricultural products have indeed fluctuated. The indices shown measure the average deviation from the price trend in any particular year. Thus, the 1974–84 index for cocoa means that one can expect the price in a typical year to be 34 percent above or below the trend value for that year. The indices in the table were compared with those for a large number of manufactured products for the same periods: in the majority of cases the indices for manufactured products were lower than 10, and they seldom came close to 20.

The variability of agricultural commodity prices explains why governments in developing countries often try price stabilization schemes to protect farmers from large price falls and consumers from large price increases. When greater price stability leads to greater income stability, farmers benefit from reduced risks. These benefits, however, are extremely hard to estimate in practice, even though it is generally accepted that farmers are at least moderately "risk averse"—that is, they are willing to accept a somewhat lower average income stream for the sake of greater stability (see Box 5.1). Consumers and industrial users of agri-

Box 5.1 Risk aversion in agriculture

Farming is risky in that returns in any given year can be much above or below the average levels. Farmers are said to be risk averse if they prefer a stable income stream to an unstable one even if their average incomes are somewhat lower with the stable stream. Measures that stabilize farm incomes without lowering the average incomes should, then, benefit farmers and possibly encourage them to produce more.

The importance of income-stabilizing policies depends on how strongly risk averse the farmers are and on the nature of the risks they face. Economists have attempted to estimate the extent and importance of farmers' risk aversion in several developing and industrial countries. The investigations have relied on two general approaches: (a) statistical examinations of farmers' input and output decisions in the face of variable prices or returns and (b) interviews and experiments with controlled gambles intended to identify individual attitudes toward risk.

One statistical study, which investigated the effects of revenue variability on the acreages planted with grains in the San Joaquin Valley in California, found that increased price fluctuations around a given average price had a small but negative effect on acreages. Another study compared the actual use of fertilizers by farmers in Puebla, Mexico, with an estimate of the profit-maximizing use. While different farmers displayed different degrees of risk aversion, on average they would have required 11.2 percent more income in order to accept a 10 percent increase in the variability of their incomes. With respect to controlled experiments and interviews, a notable set of experiments with games of chance was carried out on rural households in Maharashtra and Andhra Pradesh, India. Unlike many such experiments, the controlled gambles involved payoffs of the same order of magnitude as those at risk in households' economic decisions in farming. Attitudes toward risk varied widely among individuals when the stakes were low, but at payoff levels in the neighborhood of monthly labor incomes risk aversion was widespread.

Estimates of risk aversion vary widely, and no quantitative guidelines are available. All that can be said is that moderate risk aversion is widespread among farmers and therefore farmers will benefit if price stabilization schemes actually lead to stable income streams without much of a drop in average income levels. Nonetheless, such benefits—even if they could be quantified in particular cases—will tend to overstate gains to farmers, since what matters is their total income and its variability rather than the income from a particular crop. Farmers typically adopt risk-reducing strategies in planning their cropping and nonfarm activities, and they can also use formal or informal capital markets to smooth out income variations. The true gains from income stabilization schemes are therefore extremely difficult to measure and can easily be overstated. One should thus be wary of price stabilization schemes promoted on the grounds of farmers' risk aversion.

cultural raw materials can also be similarly risk averse.

But it is possible to overstate the benefits of stabilization. Farmers, for example, can lose rather than gain if incomes fluctuate because of variations in crop yields and outputs—stable prices can then destabilize incomes. It is also possible that, on average, the unit costs of raw materials for an agro-industry will be less if prices fluctuate than if they are stable. Moreover, farmers, consumers, traders, and industrial users can reduce the risks they face by diversifying their activities, by using capital markets, by storing products, and by sharing risks through purchase and sales contracts.

Stabilization is a particularly complex task for any government to undertake, and its costs can be very high. The mechanisms and costs of price stabilization depend on whether the commodity is internationally traded. The discussion below is confined to traded goods.

FOOD CROPS. Stabilization of the prices of staples—such as wheat, rice, and maize—is a major concern in many developing countries, where the poor spend a large proportion of their income on these foods. In many cases these staples are imported. What will happen if unrestricted private foreign trade is permitted without any border measures, and how can stabilization measures be introduced?

In the absence of trade duties and quotas, domestic prices are determined by world prices at the country border, the exchange rate, and domestic marketing margins. Private traders can and do import and store. Private markets can also manage risks in other ways:

- Farmers can adapt their cropping patterns, crop choices, and input uses to reduce the risks of income fluctuations; consumers can adapt their consumption patterns by substituting different items of food; agro-industries can smooth out cost fluctuations by using the capital market and by storing their inputs.
- International futures markets can be used to hedge risks, and options markets can be used to provide insurance. These special types of markets—explained in Box 7.2 in Chapter 7—are limited at present, but their growth would be promoted if developing countries were willing to use them.

An unregulated system can, of course, cause fluctuations in the availability of foreign exchange, and the need to make large outlays for imports in periods of high world prices cannot be ruled out. Governments can reduce such risks by holding greater amounts of foreign exchange reserves, by using international capital markets, or by using the Compensatory Financing Facility (CFF) of the International Monetary Fund (see Chapter 7).

The use of these mechanisms will not, of course, make domestic prices more stable than international prices. If greater stability is sought, trade interventions become necessary. Thus, import tariffs can be used to keep domestic prices higher in periods of low prices, and import subsidies or rebates can be used to keep domestic prices lower when world prices are high. Such a scheme is all that would be necessary for a traded good; no public buffer stocks would be required. It is important to note that while these schemes might be simpler and less costly to operate than buffer stocks, they are not without cost. As seen in Chapter 4, trade interventions involve efficiency losses which can become large as tariffs and rebates are increased.

In the case of food, however, developing countries typically do not follow schemes of this sort. Instead of using import tariffs or rebates, governments establish trade monopolies; instead of relying on private storage, they run public buffer stocks. In some countries (Brazil, for example) specialized agencies operate buffer stocks, while in others (Mexico and India, for example) the stabilization function is combined with other functions—in particular, the provision of consumer subsidies in urban areas.

Practices vary in other ways too. In many South Asian and Latin American countries, imports are used sparingly to add to stocks, while more liberal policies are followed elsewhere, as in Indonesia. For any given size of buffer stock, the choice between domestic procurement and imports is critically important in controlling costs. For example, in the case of India, great savings might be possible by increasing the use of trade, as discussed in Box 5.2.

The chief costs involved in a buffer stock operation are the costs of storage facilities and interest charges. Because of inefficiencies in public operations, the multiplicity of objectives that public agencies may be required to pursue, and the fact that governments often seek degrees of stabilization that necessarily entail losses, public agencies often need subsidies—both direct cash subsidies and indirect subsidies in the form of low interest rates on loans (see Box 5.2).

Subsidization of public buffer stock operations crowds out private storage activities and leads to much larger public stocks—and higher costs—than

Box 5.2 Food-grain buffer stocks and price stabilization in India

The last two decades have witnessed a marked turnaround in India's food-grain sector. In the mid-1960s India's food-grain economy was in severe crisis, and the country was heavily dependent on imports of wheat, which were financed primarily through the P.L. 480 food assistance program. Since then the situation has gradually improved, and impressive increases in food output have been brought about by a combination of large investments in irrigation, introduction of high-yielding grain varieties, and increases in farm prices. In addition to its efforts to increase food-grain output, the government has tried to ensure the availability of food grains to low-income consumers at stable subsidized prices.

To do this the Indian government, through the Food Corporation of India (FCI) and other state agencies, runs one of the largest food distribution systems in the world. Typically, the government purchases a part of the domestic marketed surplus of grain, monopolizes external trade, adds to or depletes existing buffer stocks, and sells the resulting supply through special "fair price shops." In a normal year the government sells about 10 percent of the total grain consumption; the figure rises to about 15 percent in a drought year. The system has succeeded in providing greater price stability for consumers than would have existed otherwise.

Despite the benefits to producers and to those consumers who have access to fair price shops, the costs of running the system have been a source of continual concern. In the 1960s and early 1970s, when India was a substantial grain importer, the food distribution system operated with relatively low buffer stocks in order to moderate import needs. In recent years the size and therefore the costs of holding buffer stocks have increased dramatically. India is currently reported to be holding more than 30 million tons of grain as buffer stocks, equal to more than two years of sales from the fair price shop system. The large buffer stocks have accumulated not necessarily because of a conscious decision to hold stocks at this level, but as an unintended effect of other factors. The growth in food-grain output has outstripped growth in demand because the government has repeatedly raised the procurement price.

A study conducted by the Birla Institute of Scientific Research in India as early as 1977–78, when the buffer stock was about 12 million tons, showed that the total subsidy to the FCI was Rs6.75 billion (about 44 percent of total sales). Of this, Rs5.66 billion represented direct cash subsidies, about 60 percent of which was intended to cover the costs of buffer stock operations. Owing to the increase in the size of the buffer stock, the direct cash subsidies grew to about Rs11 billion in 1984–85.

The rising costs of buffer stock operations have led to a search for measures to improve the cost effectiveness of the system. A study by the International Food Policy Research Institute, reviewing the options prior to 1983, suggested that the same objectives of the wheat program could be met at about a third of the actual costs by increasing the reliance on international trade. A more liberal import policy would have allowed drastic reductions in the size of the buffer stock needed to meet the same stabilization objectives. While factors other than storage costs are relevant in deciding on the size of the buffer stock, this study indicates the importance of examining the increased use of international trade as an alternative to large domestic buffer stocks.

otherwise would occur. Especially when the agency is also responsible for subsidized food distribution in urban areas, the subsidies can be very large. They can also vary with fluctuations in domestic harvests and in international prices. This is one reason why public agencies can be forced to procure food at less than market prices; this naturally leads to restrictions on private internal trade. These policies defeat the objective of assisting domestic farmers. Restrictions on internal trade—which have been practiced not only in Africa but also in China and India—lead, like restrictions on international trade, to higher instability in prices. Three additional problems that tend to arise frequently are:

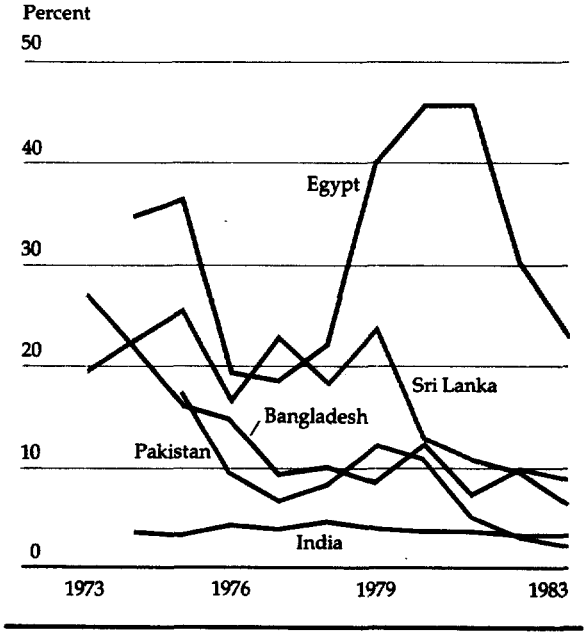
- As distinct from pure price stabilization, governments also try to guarantee a floor price for farmers. It is extremely difficult to judge how floor prices are to be set. Usually, references are made to the cost of production, but this varies at the margin with the production level; the question becomes how much domestic production is desirable. Mistakes occur frequently. By setting procurement prices too high, the public agency may end up buying massive stocks, as happened recently in India (with wheat) and Brazil (with maize).
- Since public agencies can receive subsidies, considerations of profitability do not determine the difference between floor and ceiling prices. Floor and ceiling prices—and a public agency's ability to implement them—vary in practice from season to season because of conflicting pressures from different interest groups, fluctuations in the budgetary subsidies available, and changes in the trade and

exchange rate policies of the country. The net result can be greater instability in domestic prices. A comparison of annual domestic and world price movements for the 1967–81 period for grain in thirty-seven developing countries indicated that domestic prices were not significantly more stable than world prices in many cases.

- With sufficient subsidization, complete price stability is feasible, and it is not uncommon for governments to maintain the same consumer price throughout the year. This can be enormously expensive, not only in terms of budgetary costs but also in terms of the distortions introduced in production and consumption patterns.

The objectives of stabilizing food prices and providing farmers with floor price guarantees present hard choices for any developing country. When guaranteed prices are set too high and stabilization is carried too far, governments in developing countries are likely to end up imposing higher costs on the economy than world price instability in itself would. Inefficient implementation of policies aggravates the problem. Greater priority should be given to moderating stabilization and producer support objectives, to bringing about stability and predictability of the public policy regime, and to encouraging private sector operations.

Figure 5.1 Food subsidies as a percentage of total government expenditure in selected developing countries, 1973–83



EXPORT CROPS. Prices of exportable raw materials and beverages can, in principle, be stabilized by variable export taxes and subsidies. Export subsidies are generally not used explicitly, but occur implicitly through changes in the profit margins of marketing boards. Sometimes the only measure used is a variable export tax that is waived when world prices become too low. But public buffer stocks and floor price policies are also used in connection with export crops and lead to the same types of problems discussed earlier.

Simplicity is as much a virtue in this case as in the case of basic staples. Papua New Guinea's buffer fund provides a good example (see Box 5.3). The desirability of promoting private sector stabilization and risk management functions deserves special emphasis in the case of export crops because farmers and traders in these sectors are often more commercialized and better organized than those in traditional crop sectors. However, the history of marketing board operations in Africa and elsewhere suggests that the stabilization objective can gradually give way to the objective of raising revenues at the expense of the producers. It also suggests that the marketing boards inhibit the emergence of efficient private markets.

Consumer subsidies

Governments in many developing countries try to provide essential foods to the poor at low and stable prices. Stable food prices help overcome so-called transitory food insecurity—the fact that the poor may not have enough to eat if the cost of food suddenly rises or their incomes suddenly fall. But stable food prices may not be enough to guarantee adequate food supplies for the poorest of the poor. Consumer subsidies on basic foods have, therefore, been used to overcome chronic food insecurity—the long-term inadequacy of the poorest people's diet. Such investment in improved nutrition is an investment in a country's most important asset—its human capital. This section explores the paradox that, while governments may be right to make these investments, they may go about it in the wrong way.

While food subsidy programs are common in the developing countries, they differ widely in the foods they cover and the people they aim to benefit. The way they are funded varies too, but in most countries the costs have been shifted back to farmers in the form of low farm prices. This has been accomplished through export taxes in food-exporting countries, through legal marketing mo-

Box 5.3 Papua New Guinea's buffer fund

Until 1977 the government of Papua New Guinea paid farmers who grew three main export crops—copra, coffee, and cocoa—a price based upon their costs of production. Official agencies worked out a price that would generate a return to smallholders at least equal to the minimum rural wage and adopted it as the official support price. The stabilization scheme for copra has operated on this basis since its inception. But the government has changed the cocoa and coffee schemes and plans to change the one for copra soon.

Two problems caused the government to rethink its cocoa policy. First, world prices remained far above minimum prices and it became apparent that though the farmers had a guaranteed minimum price, it was rarely effective; the scheme in effect taxed them by depressing the average price they received. Second, the cost of production proved to be a dubious criterion for setting the support price because the cost varies widely among farms and because such a system interferes too greatly with market signals. If the floor price were set low, it would discourage the efficient development of the industry; if it were set too high, the government would run into financing problems and end up supporting an industry of uneconomically large size. The government therefore decided to gear the price-stabilization scheme more closely to world prices. This was done by shifting the target price from a level based on the cost of production to a ten-year moving average of world prices, adjusted for inflation. A new program was set up in which farmers received a subsidy or had to pay a tax equal to half the difference between the ten-year average and the world price. Producer price fluctuations thus split the difference between fast-changing world prices and slower changes in the moving average.

This scheme has three advantages. First, since the Cocoa Board regulates the price only by taxing or subsidizing the export price, it does not need to get directly involved in the buying or selling of the crop. The subsidies and taxes are passed on through private traders. Second, it avoids some of the fiscal and monetary drawbacks of other schemes. The buffer fund based on the tax subsidy system is self-financing, so it does not destabilize the government's spending plans. Third, the cocoa program does not require physical stockpiling.

The Coffee Industry Board operates its buffer fund somewhat differently because it has an additional role to fulfill. Papua New Guinea is a member of the International Coffee Organization (ICO) and must control exports to ICO consumer countries in accordance with the ICO's quota system. If domestic production exceeds Papua New Guinea's quota (plus any sales to non-ICO consumer countries), the difference is held in domestic stocks financed by the fund. The fund, therefore, needs sufficient resources to finance stockholding for several years. If funds get too low, no subsidies are paid whatever the world price. Otherwise, the coffee scheme is similar to that for cocoa: whenever the world price falls below 90 percent of its ten-year average, a subsidy is paid equal to half the difference between the two prices, and whenever the price rises above its ten-year average, a tax is levied equal to half the difference.

nopolies which pay low prices for domestically produced food crops, and through sales at low prices of imported food.

As seen in Chapter 4, these measures depress food production and can be very costly if maintained over long periods. An alternative is to shift the burden of food subsidies to the general taxpayer. Governments can then raise farm prices and use budget revenues to subsidize consumer prices. However, when the difference between the high producer price and the low consumer price becomes sufficiently large, it is difficult to prevent the subsidized commodity from being sold back to the government at the higher producer price. In this case, subsidies may be needed on processed commodities. This is not always feasible. Even when it is, efficiency losses will still be implicit in consumer subsidy programs. While these losses may be more widely dispersed throughout the economy, they do not disappear—especially when, as shown in Figure 5.1, consumer subsidy programs account for large shares of government expenditures.

Food subsidy programs have other costs. Official pricing systems usually respond slowly, if at all, to changing market conditions. Price changes, which happen continuously in free markets, usually require complicated bureaucratic procedures and consultations. Sudden changes in market conditions can result in rapid increases in budgetary costs. The high world prices of 1972–74 had a dramatic impact upon the food subsidy budgets of Bangladesh, Korea, Morocco, Pakistan, Sri Lanka, and Tanzania. The stability of official prices was achieved at the cost of instability elsewhere: in the fiscal deficit or in the balance of payments as the subsidy burdens shifted to other activities competing for foreign exchange.

Some of the costs of food subsidy programs be-

come readily apparent when an overvalued exchange rate or consumer subsidies increase consumption of imported foods at the expense of goods that are produced locally. Per capita consumption of wheat products and rice in West Africa grew at an average annual rate of 8.5 and 2.8 percent, respectively, between 1966–70 and 1976–80. Consumption of traditional foods has either barely grown (by 0.27 percent for maize) or declined (by 1.5 percent for millet and 1.69 percent for sorghum). Such changes in diet were partly connected with increasing incomes and urbanization. But the main reason was that urban consumption was implicitly subsidized by overvalued exchange rates which made imports appear cheap in comparison with domestically produced coarse grains. While the international price of rice was three times that of sorghum, in West Africa it was rarely more than twice as much and sometimes only the same. The price of wheat flour in Côte d'Ivoire and Nigeria was about the same as that of maize, while in developing countries with free trade policies wheat flour often cost more than twice as much as maize. The strong correlation between wheat imports and real bread prices in Table 5.2 shows the effects of exchange rate overvaluations and consumer pricing policies.

The benefits of food subsidy programs are harder to estimate than the costs because it is difficult to measure social gains objectively. Granted this, however, the programs may not benefit recipients in the way intended. Consider attempts to help unskilled workers in towns by providing cheap food. This may pull in more unskilled workers from the countryside and eventually reduce urban wages to parity with the level of rural ones. If part of the burden of these programs is shifted back to agriculture by depressing farm prices, rural wages will be reduced, which will harm unskilled workers in both rural and urban areas. This is what happened in Thailand, where rice prices were depressed for the benefit of urban consumers.

The rural poor (small farmers, small traders, and unskilled workers) tend to be dispersed, unorganized, and politically inarticulate. Urban elites (organized labor, the middle class, the military, and public sector employees) are typically organized and powerful. When governments intervene to set the price of a commodity, political decisionmaking tends to take over, so that prices are determined by the relative power of the interested parties. Budgetary limits often mean that only a part of total supplies will be available at the subsidized official price. If so, the more powerful urban groups tend

Table 5.2 Trends in bread prices and consumption and imports of wheat, selected years, 1969–81
(average annual percentage change)

Country group	*Real bread price, 1970–80*	*Wheat, 1969–71 to 1979–81*	
		Per capita consumption	*Per capita imports*
Algeria, Bolivia, Egypt, Ethiopia, Guatemala, Iran, Iraq, Mexico, Zaire	Less than −5.0	3.5	11.7
Brazil, Dominican Republic, El Salvador, Gambia, Ghana, Kenya, Paraguay, Tanzania	−3.0 to −5.0	3.2	4.9
Burundi, Cameroon, Ecuador, India, Kuwait, Libya, Malawi, Pakistan, Panama, Saudi Arabia, Somalia, Sudan	0.0 to −3.0	2.1	−1.9
Burkina Faso, Côte d'Ivoire, Hong Kong, Korea, Mauritius, Singapore, Turkey, Uruguay, Zambia	0.0 to 3.0	0.7	−3.7
Colombia, Costa Rica, Thailand, Venezuela	3.0 to 5.0	0.1	−4.4
Argentina, Bangladesh, Burma, Indonesia, Malaysia, Peru, Philippines, Senegal	More than 5.0	0.1	−11.5

Source: CIMMYT 1983.

Box 5.4 Food subsidy reform in Sri Lanka

Sri Lanka has a long history of food subsidy programs. Food rationing was instituted in 1943, and food subsidies for the whole population were continuously in effect for the following three decades. Governments of differing political persuasions continued to support the subsidies in order to encourage political stability and social equity.

For the most part, the programs provided cheap rice, with occasional subsidies on wheat flour, sugar, and powdered milk. The original rice ration of four pounds per person was distributed universally at between 40 and 70 percent of the market price. In the mid-1970s one pound was provided free, and two were available at about a 30 percent subsidy. Rationed rice was typically providing about 20 percent of total caloric intake. But in 1969–70, for each additional calorie consumed by those who did not have a nutritionally adequate diet, thirteen went to people with enough to eat or substituted for commercial purchases. More than half the benefits went to middle- and upper-income families.

In the late 1970s, as economic growth slowed partly because of high welfare expenditures at the expense of investment, the cost of the programs became too great. As the government tried to hold down the cost of providing the ration, the procurement price from domestic producers was kept low, which discouraged local rice production. As a result, the burden on the balance of payments increased as more than 30 percent of the supplies were imported in the late 1970s. In 1977 the new government undertook a comprehensive program of economic reform which included a significant realignment of the exchange rate, the decontrol of prices, and the opening of rice marketing to private traders. This provided a great boost to production, but the government also took measures to assist poor consumers during the transitional period. Initially, the government limited eligibility for food subsidies to lower-income groups only. In 1979, food rations were replaced with food stamps, and the programs were restricted to households with annual incomes below Rs3,600 ($240). While a household survey conducted in 1978–79 indicated that only 7.1 percent of the population lived in such households, it appears that almost one-half of the population managed to get food stamps. Nonetheless, the beneficiaries were generally from the bottom half of the population in terms of income.

By holding the nominal value of the subsidies constant, the government ensured that the real cost of the food subsidies would gradually decline without causing abrupt losses of benefits. Government spending was shifted from welfare programs toward investment. By 1984, food subsidies accounted for only 4 percent of government expenditures, compared with 19 percent in 1978 and 23 percent in 1970.

The process has not been without its reversals and problems. But the government has been sufficiently encouraged to consider a new round of reforms to improve the targeting of the food stamps and raise their value.

to get the cheap food first, and the others end up buying more expensive food on parallel markets.

Reforming consumer subsidy programs, though desirable, is not easy. Such reform often raises food prices for the urban poor, who in some cases depend on subsidized food. Without some means of dealing with this problem, needed reforms may not be implemented or, if implemented, may not stick. Box 5.4 discusses one case in which food subsidy programs were reformed: that of Sri Lanka. It successfully avoided the problems that arise with too abrupt a change in policies.

Groups suffering from chronic malnutrition deserve support, and the least-cost way of supporting them through government programs is to institute much better targeting. For example, programs that restrict subsidies to the poorest region, or to the poorest neighborhoods in poor regions, can be cost-effective and well targeted. Subsidies can also be cost-effective when they are concentrated on food that is eaten mainly by the poor. A high proportion of subsidized grain in Bangladesh goes to urban areas. In 1973–74, the poorest rural households consumed 167 pounds of grain a year, per capita, 14 percent of which was provided as food-grain rations. Comparable income groups in urban areas consumed 263 pounds each, 90 percent of which was from food rations. The inequality of the distribution system, although less than in 1973–74, is still evident from the results of household surveys in 1982–83, with urban households receiving about twice the amount of subsidized grain received by rural households. As a possible means of targeting food rations more effectively, experimental subsidies for sorghum, a grain less preferred in urban areas than rice and wheat, were introduced in one urban and two rural districts. As expected, less than 5 percent of the urban households purchased the subsidized sorghum, but in rural areas more than two-thirds of the poorest families and

more than half of the lower-middle-income households bought it.

In Brazil, subsidies on cassava are likely to be more effective in helping the poor than subsidies on rice, bread, or maize. One study shows that a dollar of subsidy for cassava would generate 60¢ in benefits to low-income groups compared with 40¢ for maize, 23¢ for rice, and 18¢ for bread. While subsidies for sorghum or cassava may be a cost-effective way of helping the poor, they raise some potential problems. Many of the poorest people's foods are also used for animal feed. Subsidies intended to lower food costs for the poor may also lower production costs for livestock, and this, in effect, subsidizes the rich. Diversion of low-cost food to livestock feed has been a problem in both Egypt and Zimbabwe. Even if it happens on a small scale only, it is hard to generate net benefits from broadly based food subsidies once the administrative and distortionary costs of raising the necessary revenue are fully accounted for.

Many of these problems do not arise if subsidies are narrowly targeted to support nutritionally vulnerable groups, such as pregnant and nursing women, the very young, the sick, the very old, or the handicapped. Many governments have provided incentives for such schemes by offering tax advantages to nongovernment organizations. Direct government spending on well-defined target groups is also justified. The World Bank is supporting one such effort in Tamil Nadu, India, and the results look promising (see Box 5.5).

Producer support programs

Much of the growth in agricultural production in many developing countries is attributable to the expansion in irrigation (see Chapter 1). Between 1950 and 1983 the area under irrigation in developing countries more than doubled. Even though the rate of growth has slowed, about 3.2 million hectares are still being brought under irrigation each year, with Asia accounting for more than 40 percent of the growth. In parallel with this growth in irrigation, but not solely due to it, the use of such modern inputs as chemical fertilizers and machinery has also grown rapidly.

To bring about increased use of these inputs and of credit, governments in developing countries have generally followed a policy of subsidizing farm inputs. Increasing production has not been the only objective—improving the distribution of income in rural areas has also been important. But input and credit subsidy programs have run into

Box 5.5 Targeting economic assistance in Tamil Nadu, India

A successful project for helping nutritionally vulnerable children and mothers is now under way in Tamil Nadu in South India. A survey carried out by the state government in the early 1970s showed that half of rural families consumed less than 80 percent of their daily caloric needs. Approximately 50 percent of children between one and four years of age were classified as malnourished; 45–50 percent of child deaths were a direct consequence of malnutrition. The cost of treating nutrition-related diseases was around $5.5 million a year, or nearly one-third of the annual state expenditure for medical services. The government set out to improve this situation, especially for children under three years old. By 1980, twenty-five nutrition and feeding programs were operating at a total cost of $8.8 million. But their impact was less than it could have been, because they were not sufficiently targeted and were not monitored properly.

In 1980 the government initiated a five-year project to combat and prevent malnutrition and to promote health. It provides nutrition and health care for children six to thirty-six months of age and for pregnant and lactating women. A special team of local community nutrition workers was trained to take the program into their villages, and they are supported in their work by women's working groups, averaging twenty-five women in each village. Children are weighed every month to determine how fast they are gaining weight. Those who are gaining weight too slowly are enrolled in a special ninety-day program in which they are fed daily in community centers. Their mothers are counseled on how to recognize early signs of malnutrition and what to do about it. Severely malnourished children receive double rations. Complementary health services are also provided. Prenatal health care is routinely available to pregnant women; mothers in special need get extra food to take home. Nutrition and health education are a crucial part of the project. This approach, by employing a sensitive but practical growth surveillance system to identify children who are nutritionally at risk, allows supplementary feeding to be highly selective and short-term—two features that enhance cost effectiveness and avoid long-term dependence on food assistance.

The project is now working in 9,000 villages of Tamil Nadu, benefiting around one million children and

many problems, including the large cost to the budget. This raises the question of whether it would not be better to eliminate or greatly moderate subsidies and use the resources thus saved for other purposes, such as reducing taxes on farm outputs. The main problems and issues that tend to arise in practice with input and credit subsidies are reviewed below.

Fertilizer subsidies

In many countries subsidies cover the whole range of inputs—from plows to pesticides. But fertilizer subsidies are very common. Rates of subsidy for fertilizers in the early 1980s were rarely below 30 percent of delivered cost and were in some cases 80 to 90 percent (in Nigeria, for example). Rates of 50 to 70 percent are common. In Saudi Arabia and Venezuela, farmers pay half the ex-factory or landed cost; urea is sold at 56 percent below cost in Sri Lanka and at 60 percent below cost in Gambia.

There has always been some skepticism about the usefulness of subsidies on fertilizers (or other inputs). Until about the mid-1970s, it was commonly thought that, while there might be some justification for *temporary* subsidies, longer-term subsidies would result in nonoptimal input use and output mixes. Recent analyses take fuller account of market imperfections and the existence of public objectives other than income maximization. This has led to a long list of arguments in favor of subsidies on fertilizers: to encourage learning by doing, to overcome risk aversion and credit constraints, to help poor farmers, to maintain soil fertility, to offset disincentives caused by taxing or pricing policies, or simply to increase output of priority crops. Taken together, this panoply of pro-subsidy economic arguments seems to present a formidable case for fertilizer subsidization. In fact, however, most of these arguments justify only temporary or small subsidies. And all of them ignore the negative institutional effects that almost always accompany fertilizer subsidization. For example:

- The learning by doing rationale is at best a reason for temporary subsidies, and it is probably not applicable in many places. Even in the least dynamic agricultural systems (for example, those in semiarid West Africa), fertilizers have been in use for at least a generation. Where there are functioning extension services, the fertilizer message enters general circulation after a few years. Even where services are poor, farmers have usually heard about what fertilizers can do or have ob-

more than 300,000 pregnant and lactating women. Participation rates in the project are unusually high; 80–95 percent of eligible children have taken part. About a quarter of them needed extra food at any one time, and 95 percent of those eligible took the supplements. Of those who received supplements, 65 percent showed adequate growth velocity within 90 days and a further 15 percent within 120 days; only 20 percent required extended supplementation.

The impact of the project has been monitored by comparing two blocks of villages, each with a population of 100,000. One block, the pilot block, benefited from the project; the other, the control block, was outside the project. After three years, this comparison revealed the following impact on nutritional status and on illness and mortality:

- Severe malnutrition decreased by 32 percent in the pilot block, but by only 12 percent in the control block.
- Moderate malnutrition decreased by 9 percent in the pilot block, but increased by 19 percent in the control block.
- The category of "normal status or mild malnutrition" increased by 20 percent in the pilot block and decreased by 5 percent in the control block.
- The average weight of children increased in the pilot block and decreased in the other. Nutritional advantages derived from the project were shown to persist through five years of age. At that age, children who had been in the project were heavier by 1.75 kilograms than children in other areas. The disease and mortality rates of children in the project also appeared to be falling.

Preliminary estimates suggest that the nutrition and communications components cost approximately Rs72 ($6.50) per child per year, or Rs0.20 ($0.02) per child per day. Expanded statewide, the total cost would be less than 1 percent of the state revenue budget. This compares favorably with the estimated costs of similar programs elsewhere in India. By targeting feeding to those at risk—when they need it—the food cost is significantly below that of most feeding programs aimed at children of preschool age. The project appears to offer a model for a cost-effective way of protecting the nutrition and health of the most vulnerable part of the population.

served their effects on nearby farms.

- Risk aversion, which leads farmers to use less than profit-maximizing levels of fertilizers, may justify a little subsidization in some regions but not much. Moreover, fertilizer use need not involve substantial increases in risk; for example, farmers apply top dressings of urea only after they are sure the crop is established. The impact of risk aversion, judged by the difference between how much fertilizer should be used and actual levels of use, is small. A World Bank study suggests that even when farmers are strongly risk averse, their fertilizer use will be at most 15 percent less than it would be if they were trying to maximize profits.
- Credit constraints arise out of capital market imperfections such as inadequate information flows, high transaction costs, and requirements for collateral. As a general rule it is better to eliminate the source of a problem than to compensate for it. The long-term solution for imperfection in rural credit markets lies in improving the operation of credit markets, not in subsidizing other inputs.
- The income distribution argument involves many empirical questions concerning the nature of demand for fertilizers across households classified by income level and the adequacy and equity of the rationing systems that often accompany subsidized input distribution. A study of fertilizer use in Senegal revealed that the benefits of subsidization went mostly to better-off farmers—those in better-watered areas. This is true more generally: those farmers benefiting most from irrigation also benefit most from fertilizer subsidies, and they often tend to be better-off farmers.
- The soil-enrichment and conservation arguments in favor of fertilizer subsidies do not stand up under close analysis. There may be a case for a temporary subsidy where population growth has accelerated and farmers may not learn about fertilizers fast enough to prevent severe damage to soil quality. But in the most vulnerable areas—the semiarid tropics—what is most often needed is the adoption of less expensive and better adapted organic fertilizers and the use of moisture-retaining methods, such as ridging to prevent rainfall runoff. Neither of these is encouraged by the existence of fertilizer subsidies, and such subsidies actually discourage the use of organic fertilizers. Moreover, there is some evidence that sustained use of chemical fertilizers can actually reduce fertility. In Burkina Faso, for example, sorghum yields declined after seven years of chemical fertilization, as a result of soil acidification, potassium deficiencies, and aluminum toxicity. Only by combining large applications of animal manure with chemical fertilizers was soil fertility maintained or improved.

Apart from the foregoing considerations, special arguments are often put forward to encourage fertilizer subsidy policies. It is often thought that fertilizer subsidies are needed as a part of a fiscal package to minimize the efficiency cost of raising a given amount of revenue from farmers. If a government wants to tax smallholders and the only feasible method is a tax on their marketed surplus, the best way to raise a given amount of revenue may sometimes involve subsidizing fertilizers to boost production and the volume of marketed surplus. Such an argument needs to be treated with caution. First, the revenue targets should be examined carefully rather than taken for granted. Second, the subsidy and tax rates may change radically over time, so that rapid policy changes will be required. Third, it assumes that subsidizing fertilizers can offset the negative production response to low producer prices—an assumption that is questionable at best. Even when a subsidy can be justified in special cases, the large and indiscriminate subsidies often seen in practice are not warranted.

Fertilizer subsidies are typically provided through public distribution systems. Apart from the inefficiencies that may be entailed in these systems, the distribution policies discourage potential private suppliers, such as traders, shopkeepers, transporters, local artisans, and large farmers. The most significant long-term cost of subsidy programs may indeed lie in the obstacles they put in the way of private suppliers, whose services are essential to transforming backward farm economies. Some of the problems that arise with public monopolies of fertilizer distribution are:

- Fertilizers marketed by the public sector often arrive too late to be used to maximum effect. The reasons for late delivery vary from country to country, but some are often inherent in public sector marketing itself. The agency involved may not know what its budget is until relatively late in the crop cycle. Where there is a central tendering agency for all government purchases, the process is time-consuming. Distributing fertilizer in small quantities to widely dispersed farmers can be extremely demanding. Where the public sector dominates the transport system, the task often strains its capacity.
- Government suppliers offer few varieties of fertilizer, although particular crops or soils need particular kinds of nutrient. Governments often charge all users the same price, whatever their lo-

cations. They offer very few alternatives in nutrient mix. In Cameroon, for example, only three types of fertilizer were imported in the early 1980s: ammonium sulfate, NPK 20-10-10, and urea. But specific crops and specific regions (soils) have more finely defined needs. The "shotgun-type" approach nonetheless provides NPK 20-10-10, say, for both coffee and maize, in humid forest zones and semiarid regions. In much of the Sahel, the fertilizer mix most commonly recommended for millet and sorghum is based on the available cotton complex fertilizer. Some indication of the level of waste involved in these unrefined approaches is found in a study in Senegal that compared optimal nutrient requirements with the standard compound fertilizer. The study indicated that about 20 percent of the cost of fertilizer could have been saved with no negative effects on physical productivity. And this does not take account of the full gains possible from the use of more varied combinations of nutrients.

- In many cases all of farmers' demand cannot be met at subsidized prices. This leads to rationing. Who gets how much fertilizer then depends on the rationing process. Typically, the allocation process favors the bigger farmers and thus negates whatever equity benefits might otherwise have accrued.
- The rationing process also leads to erratic fluctuations in the actual cost of obtaining fertilizers, and this hinders the learning process. Even when farmers do learn the best uses of fertilizers, the feedback to public agencies is often slow and imperfect. For example, in Burkina Faso the extension services continue to recommend that compound fertilizers devised for cotton also be used for millet and sorghum, despite evidence that the long-term effects on yield are likely to be negative.

The difficulties discussed above also arise in the case of pesticides. Subsidies on pesticides can radically change the relative profitability of chemical-intensive as opposed to labor-intensive control programs for pests. For example, it has been shown that pests in cotton fields in Egypt can be controlled by (a) choosing planting times that avoid peak pest seasons, (b) adding fuel oil to the irrigation water on the preceding crop, (c) hand-picking egg masses from cotton plants, (d) carefully monitoring insect infestations to guide the timing and extent of chemical spraying, and (e) burning infested bolls at the end of the season. Rice farmers in South China have also reduced their use of pesticides by adopting pest-resistant varieties, raising insect-eating ducks in paddy fields, releasing predatory insects and bacterial pathogens, and carefully monitoring pest populations. These techniques substitute labor and other inputs for chemical inputs. Heavy subsidies on pesticides geared to encouraging pest control can have costly and unanticipated impacts on the choice of techniques used to accomplish this goal. Especially in labor-abundant countries, it may be a waste of resources to encourage the substitution of chemical pesticides for human labor.

Mechanization subsidies

Many developing countries promote agricultural mechanization. Very large implicit subsidies arise when overvalued foreign exchange rates are combined with preferential allocation of rationed foreign exchange for mechanical inputs, a policy pursued at one time or another by countries as diverse as Colombia, Egypt, India, and Pakistan. Often, farm machinery receives preferential tariff treatment compared with what a uniform revenue tariff on all agricultural and industrial inputs would warrant. In Colombia in the early 1960s, for example, the 2 percent import duty and the 3 percent sales tax on imported tractors were small in relation to the degree of overvaluation of the currency, while in Peru the import duty on tractors, at 20 percent, was still lower than the average tariff on imports and far below the percentage by which the currency was realigned in 1967. In some cases agricultural income tax provisions provide another subsidy by allowing farm machinery to be used as a tax shelter. This is most often done via accelerated depreciation provisions. An extreme example of such a tax shelter is found in the income tax code of Brazil: it allows for a deduction from farm incomes of six times the value of the machine in the first year, thus generating tax losses whenever large machinery purchases are made. Other farm investments such as livestock are treated less favorably, and, of course, labor costs enjoy no preferential tax treatment at all.

The benefits of subsidies are typically confined to large farms and to regions with favorable climates and good infrastructure. The subsidies provide the wealthy rural population with a competitive advantage at the expense of poorer groups. For example, in Brazil, as industrialization took place in the state of São Paulo, labor was drained from rural areas to meet the growing demand for urban labor. In the face of rural labor scarcities, the degree of mechanization would have been limited by migration of labor from the northeast. However,

the government provided large subsidies in an effort to build a farm machinery industry and eliminated payments in kind to labor; this deterred the use of labor and enabled the southern region to compete in the production of sugarcane by neutralizing the northeast's advantage of lower labor costs. While sugarcane became profitable in the south, resources were diverted from other crops that had a higher international value.

There is typically no economic justification for machinery subsidies. This is not to say that mechanization cannot be profitable—it can be when wages are high or when the nature of the operation makes it especially advantageous (for example, irrigation pumps). When it is profitable, farmers can afford it—even small farmers can benefit by using machinery rental markets.

Credit subsidies

In almost all developing countries, governments have special programs for providing credit to farmers, generally at low interest rates. Subsidized credit programs usually have harmful side effects on financial institutions, rural financial markets, and the wider economy.

Many of the problems encountered in practice result from the pursuit of two inconsistent objectives: promotion of efficient production and the provision of income transfers to the poor. As will be seen below, credit is an ineffective instrument for bringing about income transfers to the poor. As for the production objective, credit does not by itself promote productivity increases—all it does is provide opportunities that farmers can take advantage of. If less productive opportunities are exploited by farmers before more productive ones, something else is wrong—which is where attention should focus. Credit policy should not be seen as an instrument for offsetting distortions elsewhere which cause resource misallocations.

Credit policy is often motivated by the belief that small farmers are unable to obtain loans because of inadequate collateral despite their ability to repay: that is, private credit institutions overestimate the risks of lending to small farmers. If this were so, it would be quite inappropriate to force lenders to make such loans at highly subsidized rates. A better policy would be to subsidize credit institutions, rather than farmers, to induce them to take the higher risks of lending to small farmers. This would provide an incentive to collect information about the previously ignored borrowers and their investment opportunities.

Box 5.6 Credit subsidies in Brazil

Credit subsidies and controls have had a great impact on rural financial markets in Brazil. During the 1970s the level of credit subsidies increased rapidly. This was partly unintentional, as credit contracts were set in nominal terms and actual inflation exceeded projected rates.

Between 1969 and 1976 the annual value of rural credit disbursed increased by four and one-half times in real terms, while value added in agriculture roughly doubled. It is not clear that this credit was always used for the intended purposes. In fact, since agricultural credit in 1975–78 reached levels equal to total value added in agriculture, substantial amounts must have been diverted to other purposes. The diversion of credit is also indicated by many instances in which the total area for which farmers got subsidized credit for a particular crop was larger than the area actually harvested for that crop. This is all the more remarkable since only a minority of farmers received any subsidized credit at all. The 1975 census indicated that there were approximately 5 million farms, while in 1976 there were only 1.8 million credit contracts, and most farmers using credit take more than one contract. The Association of Development Banks estimated that 23 percent of agricultural credit was diverted to other purposes.

There are doubts about whether any significant net benefits were obtained from the credit subsidies, even within the small part of agriculture covered by these

INCOME DISTRIBUTION AND CREDIT. Rich farmers have few problems in gaining access to credit. It is the poor farmers who face credit constraints, especially if they do not have well-established claims to their land. Even if credit is available to them, it often seems excessively costly.

It is difficult to channel low-interest credit to low-income groups. Low interest rates stimulate heavy demand for loans when resources are limited. Excess demand for credit is therefore common (Box 5.6 provides an illustration from Brazil). Some form of rationing has to be introduced, implying an increase in the effective cost of credit above that suggested by the subsidized interest rate. The increase in effective rates can take several forms. It can be shifted from the lender to the borrower by requiring more documentation, extra trips to town, or more queuing. Or it can be reflected by requiring borrowers to hold compensating balances or to provide extra collateral. Low-income farmers tend to be excluded by the

programs. Since land provides a basis for access to credit subsidies, land values increased rapidly. Elaborate regulations were instituted to limit the diversion of subsidized credit. The tying up of entrepreneurial and professional time and talent in working through the credit maze may have been one of the most important costs of these policies.

The problem of credit diversion means that it is exceedingly difficult to assess the impact of credit, positive or negative, on farm activities. There is some evidence that excessive mechanization and fertilizer use were encouraged by the credit subsidies, but there is no clear empirical evidence to suggest that credit subsidies have increased production or yields. It is also doubtful that the subsidy programs have benefited low-income farmers, despite an intended bias in favor of the low-income northeast and smallholders. The higher administrative costs of lending to large numbers of small farmers were a disincentive to the banks.

Credit subsidies contributed to inflation and helped destabilize the overall economy. The growth in the volume of credit, together with the widening gap between low interest rates and the cost of funds, led to subsidies that at one point in the late 1970s exceeded 5 percent of GDP. By the end of the 1970s this had become unsustainable. Since 1980 the subsidies have been gradually cut back by reducing the volume of real credit. Since 1983 the value of the loans has been indexed. The decline in credit for investment was particularly sharp (see Box table 5.6). As the volume of credit from the federal and state banks fell more rapidly, commercial banks were forced to carry an increasing share of the burden of making unprofitable loans. They in turn transferred the costs to nonsubsidized loans—which in turn contributed to real interest rates of more than 25 percent for unsubsidized borrowers. This experience illustrates how the objective of sustaining the growth of agricultural credit in real terms can be defeated by excessive subsidies and the rigidity of nominal interest rate policies.

Box table 5.6 Indices of the real value of rural credit in Brazil for all banks, 1975–84
(1979 = 100)

Year	*Total credit*	*Short-term credit*	*Investment credit*
1975	86	79	108
1976	88	80	115
1977	79	80	76
1978	80	80	80
1979	100	100	100
1980	96	104	71
1981	83	93	51
1982	80	93	42
1983	61	67	41
1984	37	43	18

rationing process. Because transactions costs are frequently fixed according to the size of the loan, smaller amounts tend to be rationed out first. As studies from countries as diverse as Bangladesh, Bolivia, Brazil, and Honduras have shown, these costs can make the apparently low interest rate nearly as expensive, in real terms, as the much higher rates charged by moneylenders in informal markets.

Cheap loans are therefore unsuccessful in redistributing income toward the rural poor. The value of the subsidy is proportional to the size of the loan, and small farmers tend to receive small loans. Studies have revealed that the typical pattern is for large amounts of low-interest agricultural credit to be concentrated in the hands of relatively few borrowers, who are generally better-off and politically influential (see Box 5.6).

Governments can help low-income borrowers to get credit by removing obstacles that limit their access to commercial credit. Studies in a number of countries, including Thailand and Kenya, show that access to credit depends partly on the nature of land titles, since land is one of the few assets farmers can use as collateral. The governments in both countries are now trying to improve the quality of land titles. By removing restrictions on interest rates, governments can make it profitable for financial institutions to develop their rural lending activities. Indonesia has gone some way toward encouraging this, as discussed in Box 5.7.

CREDIT PROGRAMS AND PRIORITY CROPS. Many rural credit programs use interest rate subsidies to encourage farmers to use particular inputs or to grow specific crops. But subsidized credit is widely diverted to other uses. Close supervision can limit the diversion, but it is costly and difficult because farmers can reallocate other funds. Credit diversion indicates that farmers' own judgments on the best investments do not coincide with the priorities set in credit programs.

Even if the diversion of credit could be controlled, credit subsidies may not be efficient ways to promote particular crops or techniques. Many of the benefits are offset by poor service and delays or wide swings in the availability of credit. By tying credit to particular inputs or crops, the programs can distort farmers' business decisions. If credit is subsidized to fund the purchase of tractors, premature mechanization can be encouraged.

When the policy environment is congenial and the technologies profitable, the private sector performs well in providing inputs and credit. As modern technology spread through the Philippines, sales of farm inputs became more lucrative and

Box 5.7 Improving rural financial markets in Indonesia

In the early 1970s the government of Indonesia began a credit program to promote rice production. Credit was provided at low interest rates (12 percent, which was negative in real terms during most years of the program), mainly for buying fertilizer. Fertilizer prices were subsidized, and the government raised the price of rice to about 30 percent above import prices and provided agricultural extension services. The subsidized credit was administered by the Bank Rakyat Indonesia (BRI), a government-owned, largely rural bank, through a series of village branches set up in irrigated areas where the potential for increasing rice production was highest.

Rice production duly expanded, greatly facilitated, it was thought, by subsidized credit. After the mid-1970s, however, although the amount of credit disbursed under the program declined sharply, rice production continued to increase; this suggested that subsidized credit was not as important as other elements, such as better extension services and higher farm prices for rice. And why had the amount of credit disbursed declined? This was partly because credit under the programs was not as cheap as the subsidized 12 percent interest rate might suggest. The actual costs of obtaining credit were higher, particularly because of attempts to tie the use of credit to a particular package of inputs. Disbursements also declined because many borrowers failed to repay their loans and thus became ineligible for further credit under the program. These repayment problems necessitated larger government subsidies and cast further doubt on the virtues of providing cheap credit.

The village branches set up by the BRI became involved in two other government programs that began in the mid-1970s. The first aimed to encourage saving by paying small depositors 15 percent a year on their minimum monthly balance. Since this interest rate was higher than the bank could charge on loans, a government subsidy was necessary. The second offered small loans at subsidized interest rates of 12 percent a year funded by grants from the Ministry of Finance for diversification in rural areas.

By the early 1980s, as the price of oil began to fall, it became clear that the government could no longer afford to support the program of subsidized credit for rice production. It also became clear that other BRI activities (such as small saver and small loan programs) would have to be scaled down or abolished. Since the government had covered the operating losses of the village branches as well as shared the risk for bad debts, it appeared that the BRI would be left with more than 3,000 branches—more than 14,000 employees—and no obvious way of supporting them.

When reform finally came, in mid-1983, it was sweeping: direct controls on interest rates and the volume of credit were eliminated. The BRI decided not to close its village branches (and thereby lose a substantial investment in trained employees) but, rather, to reorganize them. Interest rates on most loans were raised to more than 20 percent a year, and loans could be used for almost anything. This was wholly unlike the original credit program. The village branches continued to pay 15 percent a year on deposits (which was higher than the rate of inflation). They also had an incentive to attract savings, because they made a profit on lending, and the more deposits they had, the more they could lend. They also needed savings to offset the reduced financing from the central bank.

The end of the subsidies benefited even those whom the subsidies were designed to help. Between mid-1983 and mid-1985 deposits at the village branches almost doubled. This made more money available for lending, and the amount lent under the new small loan program reached more than $300 million. In addition, the village branches of the BRI had begun, overall, to break even. Far more borrowers repaid their loans: only 1 or 2 percent of total loans outstanding had payments overdue in mid-1985—far less than the default rates under the old program.

Because the loans did not have to be spent on rice, or on anything to do with farming in general, it may seem as if the loans were an opportunity to move resources out of farming altogether. Of the 900,000 borrowers, almost 750,000 said that they were borrowing for trading: 75 percent of these "traders," a recent survey found, were also farmers. Although other credit programs continue to carry heavy subsidies, the reform of the village credit operations has been an important step toward sustainable rural financial markets and higher rural savings.

attracted new entrants into the farm implement business. This was not hampered by credit constraints. Most of the new entrants were farmers, and they used credit to attract customers. They competed profitably with formal credit schemes by offering quick decisions and agreements adapted to local circumstances. Some of these farmers even allowed repayment in kind. In addition to tailoring repayment terms to customer needs, they minimized the risk of default by taking the advice of local farmers in assessing credit risks, by taking strict measures against defaulters, and by offering customers a reliable and mutually profitable business association that was likely to yield additional benefits in the future. Repayment rates to village bankers were much higher than to official lending institutions, even though the same groups of farmers borrowed from both sources of credit.

EFFECTS ON FINANCIAL MARKETS. Subsidized credit affects both rural financial markets and the fiscal system. Where financial institutions are required to allocate a fixed share of their lending funds to certain priority borrowers or sectors, the cost of the implicit subsidy must be recovered by increasing the margins between the institution's cost of funds and its lending rates elsewhere. Borrowers who do not have priority will receive less credit and pay more for it, and depositors will get lower interest rates.

Fixing nominal interest rates for long periods of time—the custom in most countries—means that the real interest rate varies with inflation. As the real interest rate falls (or rises), rationing and collateral adjustments vary in ways that make it difficult to judge how the effective cost of obtaining credit varies to match supply and demand. Thus, governments lose control of the very instrument that they seek to use in meeting their credit policy objectives. Furthermore, depending on the method of financing used, attempts to increase the volume of rural credit in real terms in periods of inflation can add substantially to the rate of inflation or lead to very high real interest rates in other markets. Rural credit reforms should be combined with general financial sector reforms, and much greater emphasis should be given to flexible and market-related interest rates.

Subsidized credit operations also make it difficult to encourage rural savings by increasing deposit rates. Higher deposit rates increase the budget costs of the subsidy program. Also, a borrower taking out a low-interest rate loan can simply deposit the proceeds to earn a profit. Thus, credit subsidies often go hand in hand with lower deposit rates. The effects on rural savings can be very important. If interest rates are below the rate of inflation, savings rates are affected negatively. Some have argued that a negative interest rate does not deter rural savings because they believe that these savings do not respond sharply to higher interest rates. But in India, where rural branches were opened primarily to disburse agricultural loans, deposits were so substantial owing to the availability of generally positive interest rates that some authorities were concerned about the drain of funds from rural areas. The response in India has also been repeated in many other countries which have improved incentives to rural savings. In Japan, deposits taken since the early 1920s by agricultural cooperatives have been greater than the agricultural loans financed by the cooperatives and have contributed to the private capital flows discussed in Box 4.9 in Chapter 4. Savings in rural households rose rapidly in postwar Japan as rural incomes increased. Similarly, in Korea, interest rates on loans and deposits almost doubled after 1965, resulting in real rates of more than 8 percent. Average savings in farm households rose rapidly by the mid-1970s. Sharply responsive savings have been features of the reformed village credit units established in Indonesia (see Box 5.7) and savings and loan programs developed by coffee cooperatives in Kenya.

Program-specific incentive systems

Subsidies and taxes of various types often form a part of the packages of measures that governments take to promote the development of particular areas and crops. Typically, these incentive systems are designed to help achieve the immediate objectives of development programs: for example, to attract farmer participation and to induce farmers to choose inputs, crops, and other practices which are judged necessary for their success.

A crucial aspect of the success of a promotional program is its continued financial and economic viability after the initial period of years so that public assistance can be withdrawn or substantially reduced. This requires not only that the farmers, traders, and others involved with program activities start off with the right practices, but also that they have the incentive to revise their decisions as circumstances change. And for long-term viability, the special incentives initially introduced need to be gradually withdrawn. If a government agency remains involved for a long period of time, it must

emphasize flexibility in decisionmaking and take account of the broader ramifications of the various measures taken to assist program participants.

TREE CROP DEVELOPMENT. Development programs for tree crops illustrate some of the problems that arise with heavily subsidized programs. Many governments encourage farmers to adopt new tree crop varieties and modern technology by establishing special agencies which set targets for the amount of land to be replanted or newly planted with the crops. The agencies sometimes demonstrate the new varieties or techniques for limited areas and time. Where they do so, they do not disrupt markets, especially if beneficiaries repay the input costs. These projects can demonstrate the high returns of recommended activities to both farmers and potential suppliers of inputs and credit. They stimulate, rather than crowd out, the private sector.

But agencies can also intervene for the worse, especially if crop development activities are not limited in time or coverage. Incentive systems introduced through the programs can have perverse effects both within program areas and outside, and decisions on such key matters as the choice of crop and technique of production can become inflexible and hard to change.

The types of issues that need to be considered in designing program-specific incentive systems for tree crops can be quite subtle. Box 5.8 provides an illustration with reference to the rubber replanting programs in Thailand.

IRRIGATION AND COST RECOVERY. While expansions in public irrigation have been a major achievement in developing countries during the past few decades, the benefits from irrigation have often been less than they might have been because of poor maintenance and operations. In some countries—such as Egypt and Pakistan—rehabilitation projects have become a higher priority than expansions into new areas. Excessive use of water has in some cases contributed to waterlogging and salinization. In Peru, for example, 25 percent of the 800,000 hectares developed for irrigation in the Costa area have salinity problems.

Charging farmers for the water they use can increase the benefits of irrigation. If they have to pay for the actual amounts they use, they would use

Box 5.8 Rubber replanting programs in Thailand

For twenty-five years the government of Thailand has supported schemes to encourage farmers to replant rubber trees. The main elements of this policy have been grants to farmers to cover about half the costs of replanting with high-yielding clonal varieties, a cess (tax) collected on exports of rubber to finance the replanting program, and a separate export tax to raise revenue for the government budget. Replanting grants are disbursed over a six-year period under the supervision of a replanting agency to make sure farmers follow recommended practices.

The replanting program in Thailand has two aims: to replant large areas of low-yielding rubber with modern high-yielding varieties and to make farmers aware of improved technology. After a slow and somewhat shaky start in the 1960s, about a half million hectares—about 50 percent of the total rubber area—had been replanted by the early 1980s. The substantial replanting assistance encourages farmers to enter the program despite the cess and the export tax. The replanting agency has successfully overcome many of the problems of implementation that have plagued efforts in other countries. Appraisals show satisfactory economic rates of return. The program, which is being supported by the World Bank, can be counted as an example of successful public sector intervention.

Programs of this type can, however, have adverse side effects unless carefully designed. The efficiency of rubber farming is determined not just by the varieties of trees but also by the quality of the tapping. Low-intensity, good-quality tapping and costly maintenance are required to extend the productive life of the trees and to increase the total output before replanting becomes necessary. However, cost recovery measures and pricing policies affect the choice of technique: the cess and the export tax tend to discourage output, while substantial replanting grants may induce farmers to adopt high-intensity tapping and poor maintenance practices. If so, advantages of the techniques that the government wants to promote would be reduced, yields would be lower, and productive lives would be shorter than anticipated.

The scheme may also discourage putting new land under rubber cultivation. Farmers who plant new land are not eligible for grants, although they still bear the burden of the cess and export tax. New planting was the primary factor behind the growth in rubber output until recent years, when the accelerated replanting program became more significant. The decline in the rate of new planting may have been related to an ear-

water sparingly, and crop selection would reflect the cost of water and other inputs. The revenue generated would make it easier to fund maintenance and further expansions of irrigation. The ability of farmers to pay is unlikely to be an issue in well-maintained systems, especially if fertilizers and seeds are readily available in local markets. Their net incomes can be several times higher, and also more secure and stable, than those of farmers in nonirrigated areas.

Unfortunately, there are few countries where the controls on water use allow volumetric water charges. In pressurized distribution systems, such as those in Cyprus, France, and the United States, water use can be monitored through meters in much the same way as other public utilities. Volumetric charges are also feasible in surface irrigation schemes if calibrated sluice gates are used—as in Jordan, Morocco, and Tunisia. These charges are also being used in the public tube-well schemes in India's Uttar Pradesh. Even when water use cannot be monitored directly—as in most surface systems in developing countries—annual levies on irrigated hectares permit some linkages with water use if they are differentiated by the water-depth requirements of the crops grown.

When charges based on actual water use are not feasible, there is a strong case for introducing betterment levies or access fees. Such fees can be flat—so many dollars a hectare—or they can be broadly differentiated by income levels. The logic is simple. Governments in many countries spend large amounts of resources on irrigation—frequently half of the total investment budget in agriculture. As discussed in Chapter 4, raising a dollar's worth of public resources can often cost much more than a dollar because of the inefficiencies involved in taxation—in particular, the efficiency costs of taxes on farm outputs. In contrast, the efficiency costs involved in a per hectare betterment levy would be minimal. Unless the levy is very large, the only costs would be those to administer and collect it.

Like the land taxes discussed in Chapter 4, betterment levies are far better instruments for raising revenue than commodity taxes. Thus, the large expenditures on irrigation create not only benefits for farmers but also the potential for raising resources much more efficiently than through general taxation. In addition, betterment levies are equitable—using them is much like using urban property taxes to finance urban improvements.

Why is it, then, that the revenue generated from water charges and betterment levies in irrigated areas is typically not even adequate to pay for maintenance and operation costs in developing countries? Part of the reason is the persistent notion in some countries that water is a free good of nature and should not be charged for. More important, the ability to impose betterment levies depends on the actual betterment realized. This in turn depends on the reliability of timely water supplies to farmers, on the prices of outputs and of complementary inputs, and on the quality of extension services. The poor record of cost recoveries in developing countries suggests that the full benefits of irrigation investments are far from being realized.

In the case of irrigation—so critical to continued success in agriculture—the challenge is to design systems and policies which permit better realization of irrigation benefits and better cost recoveries. In view of the high cost of public finance, a scheme that permits higher cost recoveries is preferable to one that leads to low cost recoveries, other things being equal. It may well be justified in some cases to choose irrigation systems with higher capital costs if they ensure good cost recoveries.

lier increase in export taxation and the replanting effort itself, which focused public sector support on replanting.

Finally, the program may discourage diversification into alternative and possibly more profitable crops. Diversification into other crops could undermine financing of the replanting agency and its program, which depend on the rubber cess. Officials of the rubber replanting agency are most familiar with that crop and therefore tend to encourage replanting rubber with rubber. Moreover, replanting grants for other crops have been lower than for rubber and depend on meeting exacting conditions. These reasons may have contributed to the fact that, despite a wide variety of crops for which grants have been given, the areas replanted with a crop other than rubber have been insignificant.

These types of concerns have been kept in view in developing successive stages of Thailand's rubber replanting program. Despite the potential for such adverse effects, the program has continued to be economically viable. This case also illustrates that developing countries can successfully specialize in primary commodities for exports by promoting technical change, despite long-run declines in real world market prices.

Policy reforms

This chapter and Chapter 4 have highlighted many of the difficulties that inappropriate pricing, trade, and macroeconomic policies create for agriculture. Some of the important lessons are:

- Macroeconomic policies can introduce a severe bias against agriculture. Exchange rates and the general pattern of prices and taxes need to treat the different sectors of the economy in an even-handed manner.
- Consumer price subsidy policies are expensive and often do not benefit low-income groups as much as intended, whereas they benefit middle- and upper-income groups to a considerable degree. Consumer subsidies can be effective only if they are restricted to the lowest-income groups and if their costs are controlled at levels that most developing countries can afford without having to resort to highly distortionary or inflationary means of financing them.
- Input subsidies are not an effective method for offsetting the adverse effects of low output prices, nor are they appropriate instruments for redistributing income, since most of the subsidies accrue to the larger and better-off farmers.
- While governments have played an important role in agriculture through expenditures on activities which the private sector does not have the incentive to provide, their role in providing a sound environment for private markets should not be underestimated. Although significant progress has been made in a few countries, other governments could do more by eliminating parastatal monopolies and by improving the legal and institutional framework required for the functioning of competitive private markets.

The above list is not new: many governments in developing countries recognize the need for reform, and several have begun to implement reform programs. The experience of the past decade has begun to dispel the pessimistic notion that positive reform is impossible because of political constraints. There have been striking—one might say revolutionary—reforms, and there have been others of a less sweeping nature that have had significant positive effects nonetheless.

Policy reform in China

The most far-reaching agricultural reforms of the past decade have been undertaken in the People's Republic of China. Because of the scope of the reforms, which touch all aspects of the organization of agricultural production, pricing and marketing of farm products, and allocation of labor between farm and nonfarm activities, it is appropriate to consider the reforms and their effects in some detail.

Before 1955, farming in China was carried out on some 100 million family farms averaging slightly less than one hectare each. Between 1955 and 1958, the agricultural organization was transformed first into cooperatives and then into some 55,000 communes, and direct planning and procurement controls were introduced. Sown area, output, and procurement targets became the main instruments of policy. There were some successes: the development and diffusion of modern seed varieties (especially high-yielding dwarf rice, hybrid maize, and hybrid sorghum); a two-thirds increase in irrigated land and an even greater increase in the share of land irrigated with water supplied from pumps; and the development of a modern and large chemical fertilizer industry.

Nonetheless, agriculture contributed only modestly to the growth of the economy during 1958–77, which itself was modest. The main reasons were the haste with which the commune system was created, the emphasis on egalitarianism in the distribution of rewards within accounting units, the prohibition of private grain sales, the restrictions on internal trade, and the promotion of self-sufficiency in staple foods at the provincial level.

In the mid-1970s, per capita output of grain was no greater than two decades earlier. The production of soybeans in 1975–77 was 30 percent below the 1965–66 output, and per capita cotton production was a quarter lower than in 1965–66. The slow growth of farm output, combined with the strict controls over the nonfarm activities of farm people, led to near stagnation in farm incomes. By 1977–78, the average rural real income was, at best, only slightly above the level of 1955–57. By 1978, China was no longer self-sufficient in grain and had to import grain to supply about 40 percent of its urban population.

The reforms which began in 1979 were designed to improve incentives for farm people and to reduce the intervention of the planning officials. Some elements of reform were instituted from the grass-roots level rather than from the top-level government. The first major step was to increase farm prices by between 25 and 40 percent in 1979, the first significant adjustment in farm prices in twelve years. The multitiered price system that was set up provided better prices, increased production, and boosted marketing through state

channels, as mentioned in Chapter 4. At the same time, relative prices of various agricultural commodities were altered and the state eased longstanding prohibitions against grain sales in rural markets. The aim was to encourage different regions to specialize in the crops they could grow most efficiently. In a few cases the state guaranteed supplies of grain to encourage specialized production of nongrain crops. Restrictions on trade between regions were relaxed. The government also allowed experiments with disbanding the collectives in the poorest regions of the country. These reforms proved popular and successful, and by the end of 1983 about 95 percent of farm households were managing their own plots under contracts from collectives. To provide greater security and more incentives to invest in improving the land, many households have been guaranteed the right to manage their farms for at least fifteen years. There is now some scope for subletting land, and in some provinces new laws allow parents to hand down farms to their children. Collective agriculture, by the mid-1980s, has given way to individual household management, if not formal ownership.

The pace of agricultural growth since the reforms began has been unprecedented (see Table 5.3). Grain output grew from 305 million tons in 1978 to 407 million in 1984, an average annual rate of almost 5 percent. Grain production per capita has exceeded both the government's benchmark level of 302 kilograms per capita in 1957 and the level of per capita output achieved in the early 1930s—the last normal years before World War II. Performance has been even more impressive in the nongrain crops. After two decades of sluggish growth, output has soared since 1978. In the case of cotton, traditionally China's second most important crop

Table 5.3 Growth in production of selected commodities in China, 1957–84
(average annual percentage change)

Commodity	*1957–78*	*1978–84*
Grain	2.1	4.9
Soybeans	−1.1	4.2
Cotton	1.3	18.7
Oil-bearing crops	1.0	14.6
Sugarcane	3.4	11.1
Sugar beets	2.8	20.5
Tea	4.2	7.4
Tobacco	7.0	15.2
Meat	3.7	10.1
Fish	1.9	4.6

Source: Lardy (background paper).

Table 5.4 Growth in yields of selected commodities in China, 1957–83
(average annual percentage change)

Commodity	*1957–78*	*1978–83*
Grain	2.6	6.1
Cotton	2.1	11.5
Peanuts	1.4	6.0
Rapeseed	3.1	10.2
Sugarcane	0.0	4.3

Source: Lardy (background paper).

(after cereals), harvests almost tripled between 1978 and 1984. The output of oilseed crops more than doubled. Production of pork, beef, and mutton exceeded 15 million tons in 1984, up about 80 percent since 1978. With the exception of aquatic products, the levels of agricultural output achieved by the end of 1984 far surpassed the target levels for 1985 that were established by the Central Committee when it approved the first steps in agricultural reform in December 1978. China has also reversed its growing dependence on imported grains and has become a net exporter of coarse grains (particularly maize), soybeans, and raw cotton—all products that China had to buy on international markets only a few years ago. In 1984, China registered its largest agricultural trade surplus in thirty-five years.

The remarkable growth in Chinese agriculture since 1978 was achieved without sharp increases in total farm inputs: only the use of chemical fertilizers increased. The amount of land under cultivation declined by about 4 percent between 1978 and 1983; so did the use of other inputs, such as water and pesticides. The area of farmland under irrigation, the quantity of irrigated land served by mechanized pumping, and the use of tractors for land preparation all fell in absolute terms between 1979 and 1983. Given increased employment opportunities in rural small-scale enterprises, the number of rural workers engaged in farming has probably declined as well. Average per capita farm income in current prices increased from 134 yuan in 1978 to 355 yuan in 1984. Even after allowing for price increases, there is little doubt that the real income gains in rural areas during the past seven years have been very substantial and probably exceed those achieved in the previous three decades.

With the possible exception of cotton, there is no evidence of a breakthrough in farm technology that could account for the growth in yields indicated in Table 5.4. It is true that there have been increases in the number of small tractors, in the

number of trucks used for rural transportation, and in the use of chemical fertilizers. Yet most of the increase in productivity that lies behind China's remarkable success story is the result of using existing resources more efficiently.

The reforms had numerous components in addition to those mentioned. In particular, families were permitted to engage in nonfarm activities that had been forbidden on most communes. Rural fairs or markets that were circumscribed during the Cultural Revolution were encouraged again, and there are now more than 43,000 such markets in rural areas and 4,500 in cities. Direct sales to urban consumers by farmers were prohibited prior to 1979. Township enterprises employed 60 million surplus farmhands by the end of 1980. At least 20 million farm families have been permitted to become specialized households and are no longer required to produce grain or other specific crops.

Nor have the reforms come to an end. In 1984 and 1985 the required deliveries to the state were eliminated for most farm products, including both cotton and grain. The two-tier price system has been replaced by a single price and by procurement agency contracts with farmers.

Other reforms

Far-reaching changes in agricultural policies have also occurred elsewhere—for example, in Chile and Turkey. The policy changes in agriculture that accompanied the general economic liberalization in Chile after 1973 led to spectacular growth in the volume of agricultural trade. Agricultural exports grew from $18 million in 1972 to $375 million in 1984, partly the result of the more than tenfold increase in the volume of exports of fruits and vegetables. Exports of wood products, pulp, and timber rose from $26 million in 1972 to $376 million in 1984. While the agricultural trade balance greatly

Box 5.9 Agricultural policy improvements in Bangladesh

Bangladesh shows how the types of policy reforms discussed in Chapters 4 and 5 can bear fruit on a large scale in even the poorest countries. Bangladesh is one of the most densely populated countries in the world, and its 100 million people had an average per capita income of only $130 in 1983. It has fertile soils and a relatively abundant supply of water, but few other natural resources. Situated in the world's largest active delta, the country is prone to floods and cyclones during the monsoon and droughts during the dry season. Agriculture is the heart of the Bangladesh economy, generating about 50 percent of GDP and accounting for about three-quarters of employment and exports.

The government's policy reforms began in the late 1970s under exceptionally difficult circumstances. After the war for independence, agricultural production declined, domestic food prices rose well above world market prices, and rural wages fell in real terms between 1971 and 1975. There was a famine in 1974, and Bangladesh became heavily dependent on food aid. Although growth in annual agricultural production picked up to 3 percent in the late 1970s, output increased only slightly faster than population, which was growing at the rate of 2.6 percent a year. Another famine occurred in 1979, after a serious drought.

The government responded to these difficulties by expanding public investment in agriculture, concentrating on small irrigation projects with low costs and quick returns, increasing the role of the private sector, and improving the effectiveness of public agencies. The allocation to agriculture in the development budget, excluding the fertilizer subsidy, was restored to 28 percent on average between 1978–79 and 1984–85. It had fallen from 34 percent in 1973–74 to only 19 percent in 1977–78. The acreage covered by modern irrigation facilities doubled, at a rate of expansion about three times faster than during the previous five years.

The increase in public investment in agriculture would have been impossible without a sharp reduction in subsidies, particularly the fertilizer subsidy. Between 1978–79 and 1984–85, the fertilizer subsidy was reduced from about 10 percent of the development budget to 2.4 percent. The unit subsidy fell from 50 percent of cost to 17 percent. Yet, despite this, fertilizer sales have continued to grow by more than 10 percent a year. One reason is that retail distribution of fertilizer was transferred to the private sector, which found it profitable to distribute fertilizer throughout the country at the right time—a marked contrast to the frequent shortages of the 1970s, which often meant that fertilizers could be had only at prices far higher than the official prices. Similarly, the entry of the private sector into the distribution of minor irrigation equipment has been an important reason for the rapid growth in farm mechanization over the past few years.

Similar successes have been achieved in the distribution of food grains. The government suspended antihoarding laws, abolished the accreditation system whereby grain dealers were designated to procure grains on behalf of the government, and lifted restric-

improved, imports of food—especially wheat, rice, and maize—also increased during the 1970s. However, as a result of better exchange rate policies, the domestic production of cereals grew by about 48 percent between 1982 and 1984 and imports declined significantly.

The reforms in Turkey are much more recent. As part of the general reforms adopted by the government in 1980, input subsidies and production price supports were reduced and credit subsidies curtailed. The real exchange rate was significantly increased, with assurance that the new level would be maintained. Exports were encouraged. While the growth of agricultural GDP was low in 1981, due in part to oil shortages and poor weather, it soon recovered to an annual rate of about 3.0 percent in 1982 and 1983 and 3.7 percent in 1984. Agricultural exports, by contrast, responded immediately, growing at an annual rate of 17.7 percent in 1980 and 1981. The annual rate of growth of the value of exports dropped sharply thereafter, owing to the fall in world commodity prices, but the increase in agro-industrial exports partially compensated for this decline. Broader reforms within agriculture, which began in 1984, have already led to more liberal policies for the parastatals.

Substantial policy reforms have also been undertaken in Bangladesh, as discussed in Box 5.9. The main elements in the policy shift were a sharp reduction in the subsidies on fertilizers (which accounted for as much as 10 percent of the development budget in 1979); an increase in, and redirection of, spending on the infrastructure to emphasize small-scale irrigation, drainage, and flood control facilities; the liberalization of marketing (with retail distribution of fertilizer privatized); the elimination or reduction of export taxes on many agricultural products; and the adoption of a more realistic exchange rate policy.

Serious reform efforts can also be seen through-

tions that prevented the private sector from importing food grains. The private sector now handles about 85 percent of the internal marketing of grains. Aided by the construction of adequate storage facilities, the private sector has been particularly effective in limiting temporary increases in food-grain prices between harvests. The reduction of subsidies to urban consumers enabled the government to expand rural investment and relief programs rapidly, providing food-for-work and nutrition schemes for the poor. The investments have provided rural jobs equivalent to the full-time employment of close to 1 million landless laborers and have been used to maintain roads, canals, and embankments, which are essential to agricultural growth.

The government combined its reduction of subsidies and expansion of rural assistance schemes with more appropriate exchange rate policies and the provision of export incentives. It reduced or abolished export taxes on jute, tea, shrimp, and other agricultural exports, which helped to sustain growth in agricultural exports. As a result:

- Agricultural production has grown at about 3.5 percent a year.
- Agriculture has directly or indirectly generated most of the growth in employment, and rural wages have risen about 15 percent more than food-grain prices.
- The adoption of high-yielding varieties has increased, fertilizer consumption has grown by more than 10 percent a year, and irrigation, drainage, and flood control facilities now cover nearly one-quarter of the cultivated area, as compared with less than 10 percent in the early 1970s.
- Agriculture has become more resilient to natural disasters. In four of the past five years, the grain crop has set new records, despite bad monsoons, floods, and drought.
- Food-grain imports, though still high, have fallen as a proportion of total consumption, and Bangladesh is now less dependent on food aid. A large and growing proportion of such aid, currently about 50 percent, goes to finance programs specially aimed at helping the rural poor.
- Farmers have diversified away from rice to wheat. Wheat is grown during the dry season between rice crops, when fields would otherwise lie fallow; it is less expensive to produce and is better nutritionally. Over the past decade production of wheat has risen from almost nothing to nearly 10 percent of total food-grain production. Consumption has increased from about 10 percent to nearly 20 percent of total grain consumption.
- Exports have increased and become more diverse. Jute exporters have won a higher world market share, despite slumping prices and declining demand. Exports of other agricultural commodities, such as shrimp, tea, and leather, have grown by more than 10 percent a year and now account for 30 percent of total exports, compared with about 15 percent in the early 1970s.

Box 5.10 Cotton sector reform in Sudan

Cotton is Sudan's main cash crop. It accounted for 56 percent of the country's export earnings in 1980–81. Public irrigation is the heart of cotton farming. The first large irrigation project was started in 1925 in the Gezira, which is now the world's largest irrigation scheme under single management; in all, more than 4 million acres are under irrigation using Nile waters, with more than a quarter of the area under cotton. There are six large schemes operated by agricultural parastatals, each divided into 200,000 tenancies of uniform size. The parastatals provide most inputs and machinery, the Ministry of Irrigation (MOI) supplies the water, and the tenants supply the labor, tend the crop, sprinkle the water, pick the cotton, and transport it to the ginnery. The ginned cotton is then handed over to the Cotton Public Corporation for export.

Cotton production fell sharply in the 1970s, dropping from 659,000 tons in 1974–75 to 259,000 tons in 1980–81. Both the area under cotton and the yield fell. The main reasons for the decline were:

- Low and declining producer prices. Some of the problems were common to other developing countries: an overvalued exchange rate, export duties on cotton, high parastatal profit margins, and delays in payment to tenants, sometimes as long as two years. Others were peculiar to Sudan: a sixty-year-old revenue-sharing formula between government, the parastatal, and the tenant (known as the Joint Account) under which the government siphoned off 36 percent of total revenue and distributed the rest in a way which taxed the more productive tenant; and the practice of offsetting the input costs of other crops (groundnuts, wheat, and sorghum) marketed by parastatals with earnings from cotton. This was administratively simple but made the inputs of other crops seem free, while cotton was made even less attractive.
- Shortage of the foreign exchange and local currency needed to maintain the irrigation works and the marketing operations. Low cotton prices meant the parastatals could not to cover their costs, which led to foreign exchange shortages. Government money was spent on new investments rather than maintenance. External development agencies neglected the maintenance and rehabilitation of existing schemes and invested in new projects instead.
- Poor performance of parastatals. Senior and skilled personnel migrated to oil-producing countries, where job opportunities were more attractive. Remaining managers were handicapped by red tape and weak accounting systems. The agriculturalists running the parastatal and the irrigation engineers running the Ministry of Irrigation failed to coordinate water supplies. In the end agricultural services were not provided and known technologies were not adopted. The cotton became severely infested by pests, which proved difficult to control with the available technology.

By late 1979, the country's balance of payments was in crisis. The current account deficit reached 11 percent of GDP, external debt rose to five times the value of annual exports, and the debt service ratio exceeded 40 percent. This triggered bold reforms for financial stabilization and promotion of exports.

The government abolished the export tax on cotton, lowered the exchange rate applicable to cotton exports, set the domestic price near the export price, announced the price before harvest, and paid it as soon as tenants delivered their cotton. As a result, for the first time in more than half a century, the tenants were able to estimate incomes from cotton reliably and could lobby for, and negotiate, a remunerative price for cotton. Simultaneously, several measures were taken to improve parastatal performance. These ranged from new statutes and better training to more concentration on research, extension, and marketing.

Helped by good weather and new supplies of equipment, spare parts, and other inputs, cotton production had a spectacular revival (see Box table 5.10).

The success of Sudan's cotton farmers survived even the severe problems which beset the country in 1984: the abrupt introduction of Islamic law, the escalation of civil war in the south, and the unprecedented drought in the west. The country's creditworthiness declined, and capital fled from the country. But because domestic cotton prices remained high enough to offset the effects of an overvalued exchange rate, cotton output continued to rise. Special arrangements were made to guarantee the foreign exchange (mainly from donors) required to finance the needs of cotton production. While the government's budget deficit widened, the parastatals' finances improved because of higher yields, better uses of inputs, and higher output prices.

Box table 5.10 Production and yield of seed cotton in Sudan, 1980–85

Item	*1980–81*	*1981–82*	*1982–83*	*1983–84*	*1984–85*
Production (thousands of tons)	306	461	573	586	625
Yield (tons per hectare)	0.82	1.39	1.57	1.54	1.69

out sub-Saharan Africa. The reform of the cotton sector in Sudan illustrates how much can be gained by taking small steps despite unfavorable trends in the overall economy. Sudan's irrigated farming sector has been revitalized through changes in the relationship between farmers and management in irrigation schemes such as the Gezira. This has involved abolishing the export tax on cotton (the major crop in the Gezira scheme), lowering the nominal exchange rate applied to cotton exports, and announcing producer prices before the harvest and paying farmers promptly for their cotton. Cotton production doubled between 1980–81 and 1984–85 (see Box 5.10).

In many other African countries producer prices for food have been increased in real terms, and it has now become more profitable to grow staples to substitute efficently for imports. Real producer prices of traditional export crops have also risen. Unskilled workers can earn higher incomes in farming than in wage employment—a radical shift from a decade ago. Consumer food price policies are also changing in Africa, where urban consumption has been heavily subsidized for many decades. In countries from Madagascar to Mauritania and Zambia to Mali, sharp increases in prices have reversed long-standing subsidy policies.

More competitive marketing arrangements are emerging. In some West African countries, export marketing parastatals have either disappeared (for instance, for groundnuts in Mali) or have been exposed to competition. In Somalia the monopoly of parastatals in maize, sorghum, and imported foods has been eliminated. Madagascar has liberalized domestic rice marketing, and Zaire has eliminated its food marketing parastatals. The tendency is not universal, and there are cases where marketing controls have been made more, rather than less, extensive in recent years. But the trend is toward more open marketing arrangements and price policies that are more favorable for agricultural growth.

Policy reforms in the pricing of fertilizers are also noteworthy. Following the early years of the Green Revolution, few notions took root as deeply as the notion that fertilizers need to be subsidized to encourage rapid technological change. Yet, recently many of the East Asian countries have abandoned fertilizer subsidies; such subsidies are declining in Bangladesh and Pakistan. They have been cut back sharply in Benin, Burkina Faso, Mali, Niger, Senegal, and Togo. The subsidization of fertilizers and other inputs seems to be in clear retreat throughout the developing world.

These examples illustrate the numerous reforms that have been undertaken or are under consideration in developing countries. Whether sweeping in scope or restricted to particular aspects of sectoral policies, the reforms illustrate that political institutions can have the capacity and the commitment to devise and carry out significant policy changes. This was also evident in the case of Sri Lanka's reform of its long-entrenched consumer subsidy program for rice, as discussed in Box 5.4.

While this reformist trend also illustrates the scope there is in developing countries for doing better, one must not lose sight of the policies in industrial countries which greatly influence the external environment. Do policies in industrial countries ease or exacerbate the difficulties faced by developing countries? What domestic objectives are being pursued by industrial countries, and can they be met at lesser cost to themselves and to the developing world? These are the questions discussed in the next chapter.