

POLICY ARENA

BUILDING EFFICIENCY IN AGRICULTURAL MARKETING: THE LONG-RUN ROLE OF BULOG IN THE INDONESIAN FOOD ECONOMY

C. PETER TIMMER
Harvard University, USA

Economists know an ideal marketing system when they see one. It contains markets for all commodities and services for all possible time periods. All participants are fully and equally knowledgeable about the state of the world, and can transact complete and costless contracts with each other. This is, of course, the marketing system designed by Arrow and Debreu (1954) to prove the existence of a competitive equilibrium in a market economy.

No market economy in the world meets these assumptions. Even the best endowed and competitive systems must confront the reality of incomplete contracts, and hence missing markets, caused by high transactions costs, asymmetric information and moral hazard. But after several centuries of institutional evolution, the rich capitalist countries have created marketing systems that work in ways that Arrow and Debreu would recognize. In these countries, typical market transactions, of which there are billions each day, are low cost and highly efficient in their use of economic resources.

Most countries in the developing world, and many transition economies, have not yet created such marketing systems. Especially in their rural economies, many markets are conspicuous by their absence or by very high costs of transacting business. In the poorest countries, or the most backward regions of even the more dynamic economies of the Asian-Pacific countries, rural markets for capital, risk, labour and commodities are highly imperfect or non-existent. Price margins between buyers and sellers of these goods and services are kept large by all the factors that Arrow and Debreu had to assume away in order to analyse the workings of a market economy. Unenforceable contracts mean trade can be conducted only among parties that trust each other for non-economic reasons, such as family or ethnic ties. Risk taking must be internalized within the household or village, sharply limiting the opportunities for economic specialization or adoption of new technology. Expansion of commodity production is limited by very thin local markets, and food security becomes a highly localized matter.

Building more efficient and lower-cost rural marketing systems is clearly an essential step toward agricultural modernization and food security. But how is this done? Few societies have the patience to wait several centuries for the evolutionary pressures of economic history to build the systems on their own. After all, the

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components of modern marketing systems are already known; there must be some way to speed the process of putting them in place in developing countries. Nearly all governments in developing countries have tried. And failed.

The landscape is now littered with the shells of state-owned marketing agencies that were set up to provide low-cost and efficient marketing channels for agricultural commodities that were important for export earnings or food security. Often given monopoly powers to avoid 'unfair' competition, the standard result from these agencies was high costs, poor service, corruption and the disintegration of whatever marketing system was already in place. As long ago as the early 1980s, it was possible to count this approach as a 'non-answer' to solving a society's food policy problems:

In its extreme form, in which the government takes over the entire food marketing function, the strategy [eliminating the middleman] almost never works. Consumers find that the government cannot provide food as cheaply as their corner market stall. Farmers discover that the government purchasing agent is missing when the crop needs to be sold or that payment will be delayed several months, even years. A furtive private trade springs up, reinforcing the government's view that the middlemen who conduct it are antisocial elements. Both producers and consumers, however, find they are better off dealing with them. Very quickly, the government's marketing program becomes a visibly empty shell (Timmer *et al.*, 1983, p. 287).

Whether the terms of reference were lower marketing costs by replacing the middleman, price stabilization, rural development, displacement of foreign firms and ethnic minorities, tax collection, or food security for urban populations, the reputation of government marketing agencies in the mid-1990s has been damaged by association with the clear failure of socialist economies and central planning.¹ The World Bank has been a leading convert to the principle that agricultural marketing parastatals almost never play socially productive roles and should be dissolved or privatized (World Bank, 1995).²

MODERNIZING THE INDONESIAN RICE ECONOMY

Despite the hostility to government parastatals in agricultural marketing, the question remains: how can rural marketing systems be built quickly that are efficient and low cost? Unfortunately for the most fervent supporters of privatization and a minimal role for government, the answer from the handful of success stories around the world is that the government must play an active and supportive role, especially in the provision of physical infrastructure and institutional

¹ A particularly thoughtful and balanced assessment of the role of government in agricultural marketing is contained in the chapter on marketing policy in Frank Ellis' text on *Agricultural Policies in Developing Countries*, (1992).

² The anti-parastatal perspective has a long history (Bauer, 1991), but the open hostility to their existence and role dates to the fall of communism in the former Soviet Union. A recent 'Special Issue' of *Food Policy* (August, 1993), with Kay Muir-Leresche and Alberto Valdes as guest editors, provides a good example of how far attitudes have evolved. In their introduction to the issue on agricultural liberalization and market reform in Southern Africa, the guest editors disown a paper in the issue that argues for a potential role for parastatals in stabilizing grain prices in the region (Pinckney, 1993).

'rules of the game'. Unfortunately for the most fervent supporters of government intervention and control of rural markets, this government role must also be carefully limited to building a private marketing sector, not to displacing it. Historically, few governments have managed the delicate balance between investing in building a marketing system and trying to monopolize or control it. Those that have managed the balance, however, especially the rice-based economies of East and South east Asia, have been rewarded with a dynamic rural economy, enhanced food security, and rapid economic growth (Asian Development Bank, 1988; Sicular, 1989; Timmer, 1996b).

Since the mid-1960s, Indonesia has come as close as any developing country to managing successfully this tension between active interventions and growth of a private marketing sector. The process has not been easy; more countries would have succeeded if it were. The balance has often been tilted toward too much government control and too little opportunity for the private sector to develop. But over a quarter-century perspective, Indonesia's interventions into agricultural marketing, in an effort to speed the development of an efficient system, have succeeded in building one of the world's most dynamic rural economies.³ Poverty, most of it in rural areas, has been alleviated faster than in any large country in modern history—a result of rapid economic growth, heavy investment in human capital and considerable attention to food security.⁴ The story is worth examining in more detail.

The most important part of the story involves the rice economy, especially during the early years of the New Order. In 1969 a leading Indonesian newspaper said 'rice is the barometer of the economy'. It is impossible to understand Indonesia's dedication to modernizing its rural economy, or the approaches to doing it, without recognizing the role of rice in both the economics and politics of the country. It is impossible to imagine the budget resources or the policy attention devoted to rice being mobilized for any other commodity. The importance attached to stabilizing and developing the rice economy after 1965 helped reverse a long-standing urban bias in Indonesia's development policy (Timmer, 1993).

Indonesia's approach to modernizing its rice economy has had three components. The first has been to invest in rural infrastructure to build the foundation for a dynamic rural economy, including, but not limited to, the rice economy. These public investments include irrigation systems, roads, schools, market places, communications systems, electrification and public health facilities. The second component has been to develop and disseminate a technological package of productive inputs that typical rice farmers could afford and use. High-yielding rice varieties, fertilizer, pesticides and technical advice were provided throughout the country. In the early years of the New Order regime and well into the 1980s, many

³ An efficient agricultural marketing system matches the costs of transforming commodities through storage, transportation, and processing with price margins in time, space, and form. See the marketing chapter in *Food Policy Analysis* for an introduction to definitional issues, measurement problems, and policy implications (Timmer *et al.*, 1983).

⁴ Between 1970 and 1995, income per capita in Indonesia has increased from \$300 to \$1000 (in \$1995), a growth rate of nearly five percent per year. During the same time period, the rate of poverty as measured by a headcount of individuals below a poverty line based on daily intake of 2,100 kilocalories, decreased from nearly two-thirds of the population to less than one-sixth of the population (Wiebe, 1995).

of these components were heavily subsidized through mechanisms that lowered the market price farmers actually paid. As a consequence, these inputs, and especially fertilizer, were widely utilized by farmers (Timmer, 1989b; 1991).

The third component, and the dimension discussed in this paper, has been a price policy for rice designed to balance several objectives: prices low enough to be affordable by most consumers, high enough to make rice farming profitable, stable enough to provide food security and clear signals to investors, close enough to prices in world markets to avoid serious distortions and smuggling, and prices with enough seasonal fluctuations to permit the private sector to buy, store, and sell most of the rice brought to market.

PRICE POLICY FOR RICE

The original architects of Indonesia's price policy recognized that there were more objectives than instruments in the above list (Mears and Affif, 1969). Accordingly, the early focus of the Food Logistics Agency (BULOG), the institution set up to implement this price policy, was on price stabilization, starting from a floor price designed to make rice intensification profitable. But production shocks, rapid growth in demand as the poor consumed more rice, and events in the world market repeatedly buffeted BULOG's stabilization efforts, and it was forced into a trade-off among objectives, as surpluses changed to deficits, and back again (Timmer, 1975; 1993). Despite all the difficulties, however, the need for satisfactory margins to induce participation by the private sector in rice marketing was never ignored. At the core of the policy was the recognition that BULOG could not carry out its tasks without the active involvement of the private trade (Mears and Affif, 1969; Timmer, 1974; Ellis, 1993a; 1993b).

By the mid-1970s, after barely weathering the world food crisis from 1972 to 1974, BULOG had learned to concentrate on its key task of stabilizing rice prices through rice procurement at the floor price and market operations in urban areas in defence of a ceiling price. Substantial but variable imports provided the balance wheel needed to maintain an equilibrium between supplies and demand at stable prices. Domestic prices tracked world prices over a five- or ten-year trend, but BULOG ignored altogether shorter-run fluctuations in the world market (Ismet, 1995; Timmer, 1996a).

Heavy exposure to the thin and unstable world market for rice, however, provided impetus for a push toward self-sufficiency. The fortuitous arrival of IR-36, resistant to the brown plant hopper, and which was rushed into use in 1978 after large crop losses to the insect in 1976 and 1977, in combination with huge subsidies for fertilizer, led to self-sufficiency in rice in 1984 and large surpluses in 1985 (Timmer, 1991). After spending a decade and a half learning how to stabilize Indonesia's rice economy when imports were needed routinely, BULOG suddenly had to learn how to stabilize prices when the country was self-sufficient in rice. The task turned out to be more expensive than expected, especially before the narrow definition of self-sufficiency, no imports or exports, was made more flexible by the policy of 'self-sufficiency on trend'.

This brief review of Indonesia's price stabilization programme and its implementation by BULOG highlights two issues. First, there has been a continuing

concern to use the interventions that stabilize rice prices to induce investment by the private sector rather than displace it. The stable price environment itself was one inducement, reducing uncertainty about the range of price volatility. The margins provided between the floor price in rural markets and the retail price in urban markets were also consciously designed to be profitable for competitive private traders to be able to handle most of the rice marketed. In a normal year, BULOG would procure and distribute less than 10 per cent of the rice produced and consumed in Indonesia (Ellis, 1993a, 1993b).⁵

Second, there has been a continuing effort to keep the costs incurred by BULOG to stabilize rice prices from exceeding the benefits to the country which are generated by such stabilization. There are four dimensions to this issue. First, at the most general level, there has been continuing concern over the size of the economic and social benefits of stabilizing rice prices, and how these benefits change over time. Second, BULOG has pursued approaches to cost control that involve improved management techniques in the storage, handling, and distribution of rice. Third, for more than a decade, analyses have been conducted on the extent of cost reductions that could be achieved by phasing out distribution of rice to civil servants and the military (the Budget Groups).⁶ Fourth, after the expensive episode of subsidizing exports of rice in 1993, serious discussions began on the nature of cost savings that would result from redesigning the policy approach to stabilizing rice prices.

BENEFITS AND COSTS OF PRICE STABILIZATION

Dawe (1995) constructed rough measures of the quantitative impact of BULOG's rice price stabilization activities on the historical rate of economic growth in Indonesia. BULOG made large contributions to the growth process since the first five-year development plan (Repelita I) began in 1969 by stabilizing rice prices, but its role in the growth process has declined in importance over time.

⁵ Many observers are surprised that BULOG can stabilize rice prices in such a large and diverse country as Indonesia with less than ten percent of the rice under its control. It is important to recognize, however, that the private sector does most of the "work" precisely because marketing margins are wide enough for them to make a profit. BULOG intervenes only at the upper and lower edges of these margins. In addition, the Indonesian rice market is well integrated by flows of information (and rice), so modest interventions in central markets have economy-wide impact (Ismet, 1995). Finally, the private sector has come to *expect* that BULOG will intervene when necessary to stabilize prices. Consequently, interventions can often be quite modest to send a signal that stability will be defended. Of course, if the private sector ever thinks that BULOG will *fail* in this task, expectations have the opposite effect and destabilize prices (Timmer, 1996a).

⁶ Rice distributions to the Budget Groups total approximately 1.5 million metric tons per year, or about 60 to 75 per cent of BULOG's normal annual turnover. They have been an important part of BULOG's logistical operations since the early days of the New Order regime in 1967. At that time, high inflation quickly eroded the purchasing power of the money wages paid to civil servants and the military. Rice distributions in kind were an effective mechanism for providing these groups with a constant real wage. It has been difficult to phase out these distributions because the monthly turnover in BULOG's stocks lowers storage losses through good inventory management, the price paid by the Ministry of Finance for this rice is high enough to cover all of BULOG's operating costs and is thus a mechanism for funding the price stabilization policy itself, and because the President remains convinced of the efficacy of the program. An extensive analysis of the conflicts created in the late 1960s and early 1970s by the need to distribute monthly rations when rice was also needed to maintain the ceiling price in urban areas is contained in Timmer (1975). The financing dimensions are analyzed in Pearson (1993).

The contribution of BULOG's rice price stabilization activities in the early years of the New Order regime was very large. During Repelita I, from 1969 to 1974, the rice price stabilization programme alone generated nearly 1 percentage point of economic growth each year, which was more than one-sixth of the total increase in output during that period. In the second five-year plan, from 1974 to 1979, the contribution was 0.61 per cent per year, or 13.5 per cent of the total growth in per capita income. In absolute terms, rice price stabilization contributed more than \$300 million (in 1991 U.S. dollars) per year to increased output in the first five-year plan and more than \$270 million in the second. These estimates are probably lower bounds, because they do not credit the rice price stabilization programme with any benefits from enhanced political stability and the greater confidence felt by investors because of such stability. These estimates also do not include the direct contribution of rice price stabilization to reduced variance in the rate of inflation, which also has a negative impact on economic growth (Barro and Sala-i-Martin, 1995; Dawe, 1996).

However, the benefits from stabilizing rice prices fell markedly over time. By the middle of the fifth five-year plan in 1991, stabilization activities contributed only 0.19 percentage points a year to economic growth, just 3.8 per cent of the total increase in per capita income during that period. Because the Indonesian economy was much larger, the absolute contribution to increased output did not fall so fast, and this contribution still averaged more than \$180 million per year between 1989 and 1991.

The decline in benefits from stabilizing rice prices occurred because the share of rice in the economy fell over time, and this decline reduced the importance of spillovers from rice into other sectors of the economy. The impact of rice price stabilization on investment and economic growth thus declines at higher levels of per capita income (Timmer, 1989a; 1996a; Dawe, 1995).

The costs of rice price stabilization include four components: the costs of running BULOG as an agency (for example, wages, warehouse rental, and interest); the deadweight efficiency losses of not having domestic prices conform to the short-run opportunity cost of rice as reflected in world markets; a lack of diversification and flexibility in the farm sector as farmers are encouraged to shift production from other crops into rice because its price is relatively stable; and a potential retarding effect on the development of a private marketing sector. Stabilization produces benefits in each of these domains as well. So it is difficult to calculate an overall cost figure that includes static and dynamic components. The attention here is primarily on agency costs. The short-run, static costs of not following world prices are trivial if domestic prices follow the long-run trend in world price. Only the long-run trend has much useful economic information for making decisions about rice production and consumption (Timmer, 1986; 1989a).

How much does it cost BULOG to stabilize rice prices? This question is difficult to answer both conceptually and in financial terms (Pearson, 1993). One can estimate the costs empirically in two ways. The costs of the stabilization programme can be built up from individual cost components in BULOG accounts, which are agreed to be directly or indirectly incurred because of price stabilization activities. Alternatively, the subsidies, direct and indirect, that are needed to keep BULOG from losing money on a regular basis can be summed. This approach implicitly

attributes to the rice stabilization programme all costs above some competitive standard.

Fortunately, the two methodologies for determining costs produce similar answers. The annual costs of stabilizing rice prices, since 1969, exhibit a pattern over time that is in sharp contrast to the pattern of benefits since 1969. During Repelita I (1969–74), costs of rice price stabilization averaged just \$30 million per year (in 1991 U.S. dollars), and these costs rose to about \$40 million and \$80 million per year in Repelita II (1974–79) and Repelita III (1979–84), respectively. Costs remained at roughly \$80 million per year during Repelita IV (1984–89). During Repelita V, which ended on March 31, 1994, the average cost of stabilization declined as BULOG brought the costs of managing large surpluses under control. These cost reductions were a direct result of its adoption of 'self-sufficiency on trend' as a more flexible approach to achieving food security. However, the cost in 1993–94 of the price stabilization programme was more than \$90 million, at a time when the trend in benefits had declined to less than \$200 million. When the cost of subsidizing the export of surplus rice produced in 1992 and 1993 is included, the annual costs exceeded \$200 million.

The high costs incurred by the agency in the mid-1990s indicate the importance of finding ways to reduce the costs of stabilizing rice prices if BULOG were to remain as a cost-effective agency. Its options were to reduce the amount of rice distributed to the Budget Groups, to improve its management techniques in the short run, and to adopt a new strategic approach that would minimize both trade losses and costs of holding stocks. The latter approach is of most interest to marketing analysts.

PRICE POLICY AND STABILIZATION OF THE RICE ECONOMY

A strategy designed to reduce costs of price stabilization while still generating most of the benefits has several dimensions. First, the amount of rice in storage, and the average period it is held, must be reduced. Second, the country must resort more to international trade in rice by routinely using imports. Third, by using *variable* imports as the balance wheel, rice supplies and prices can be stabilized with smaller domestic buffer stocks. Each of these components has implications for the degree of price stabilization that is maintained, both seasonally and from year to year, as well as the economic costs of stabilizing prices. In combination with management initiatives to lower agency costs of BULOG's rice operations and reductions in the volume of rice distributions to the Budget Groups, a more trade-oriented stabilization strategy has the potential to reverse the upward trend, seen since the early 1980s, in the cost of price stabilization.

An important question is whether Indonesia's rice economy can still be stabilized if BULOG's role were substantially smaller and its operations implemented primarily by varying the amount of imported rice. Because warehouse capacity is limited in the short run, a relatively tight relationship exists between domestic production of rice, BULOG procurement, marketing margins, and the level of retail rice prices (Timmer, 1996a). The relationship exists whenever Indonesia attempts to maintain self-sufficiency for rice. In such an environment, retail prices vary substantially in response to relatively small deviations in rice production from

its expected trend. To stabilize prices when these deviations occur, as with the severe drought in 1994, BULOG ultimately had to break apart the tight relationship that linked production, procurement, and prices.

Beginning in the early 1990s, BULOG was allowed to define self-sufficiency on trend rather than in year-to-year terms, and this tight relationship began to give way to greater flexibility. The result was quite promising. BULOG was able to import substantial quantities of rice in 1991 and 1992, to export rice in 1993, and to import again in 1994 and 1995. Because of the flexibility, BULOG was able to reduce the average level of stocks that it carried from one crop-year to the next from over 2.1 million metric tons between 1984 and 1989 to less than 1.4 million tons between 1989 and 1994. Full storage costs (including the value of quality losses when rice is stored for extended periods in the tropics) were roughly \$100 per ton per year. So BULOG's annual costs were reduced by about \$70 million in the first half of the 1990s solely because of the added flexibility permitted by the new policy of self-sufficiency on trend.

More important, the new policy permitted BULOG to be *more effective* at stabilizing domestic prices. During the 1984 to 1989 period, the average coefficient of variation of monthly retail rice prices in Jakarta and Surabaya was greater than 20 per cent. During the subsequent five years, 1989 to 1994, despite the greater volume of imports and significantly lower average levels of stocks, the coefficient of variation of retail rice prices in Jakarta and Surabaya averaged less than 10 per cent. Flexibility in rice trade thus contributed significantly to a more efficient and a more effective BULOG.⁷

By the mid-1990s, this flexibility could be expanded considerably. If BULOG were allowed routine access to imports in order to conduct more extensive market operations than were carried out between 1984 and 1994, the tight relationship that links production and rice prices in a self-sufficient system could be broken nearly completely. In many respects, such a strategy would be a return to the basic approach used to stabilize rice prices in the 1970s, when imports played a larger role than domestic procurement and when BULOG's programme costs were significantly lower than in the 1980s and early 1990s. With the world rice market expanded to between 15 and 20 million metric tons per year in the mid-1990s, BULOG's routine involvement would not be as disruptive as its occasional forays into the market from a trend position of full self-sufficiency.

PRICE FORMATION FOR RICE IN THE LONG RUN

It is no coincidence that BULOG's rice price stabilization operations were far less costly in Repelita I and Repelita II, when imports and market operations were the main instrument for balancing the Indonesian rice market, than in Repelita IV and Repelita V. As self-sufficiency approached in the mid-1980s, stabilizing rice

⁷ Not only did society benefit from BULOG's lower costs, the enhanced stability of rice prices also contributed to economic growth. Using Dawe's coefficient for the net impact of reduced instability on growth—a reduction of 0.25 percentage points in the growth rate for each percentage point increase in instability relative to GDP from price fluctuations, a ten-percentage-point reduction in the coefficient of variation should lead to an increase in the rate of economic growth of 0.18 percent per year when rice is seven percent of GDP. The annual increment to GDP was more than \$200 million (in \$1995).

prices by using domestic procurement and storage proved to be much more costly, because of high internal transportation costs and the high real costs of storing milled rice under tropical conditions. If cost efficiency is to become a high priority in the future to justify a continued price stabilization programme, it will be necessary to reconsider the costs and benefits of maintaining rice self-sufficiency on trend. A greater role for international trade as a stabilizing mechanism would reduce the role of domestic storage and sharply reduce storage costs. But if surpluses are produced and exports of rice require substantial subsidies, international trade in rice would not necessarily bring significant cost reductions for the price stabilization programme. The programme becomes much cheaper to operate in the long run only if the structure of rice prices in Indonesia remains close to prices for rice of similar quality in the world market.

To be truly cost-saving, regular (but variable) imports, rather than alternating imports and exports, have to serve as the balance wheel in stabilizing the domestic rice economy, and therefore, full self-sufficiency on trend cannot be a rigid policy objective. Of course, self-sufficiency for rice in Indonesia is not just a matter of short-run price policy. In the longer run, if domestic prices are to be kept on the same trend as prices for rice in world markets, the supply curve for rice would need to shift outward in relation to shifts in the demand curve at a rate that keeps equilibrium in domestic rice markets along this path.

IMPLICATIONS OF A RETURN TO RICE IMPORTS TO STABILIZE RICE PRICES

What difference would relaxing the objective of full self-sufficiency for rice make to rice consumers, to farmers, and to the macro economy? What are the implications for the level of rice prices in Indonesia? For the world market? Will the country's farmers need increased price protection from world competition in the future? Or will the historical policy of keeping domestic rice prices on the same long-run trend as rice prices in world markets continue to provide adequate rice supplies and satisfactory levels of farm income?

Full answers to these questions would require more research, but preliminary analysis suggests that considerable scope exists to increase the efficiency of price stabilization while freeing farmers to engage in activities capable of supporting higher incomes than growing rice on very small plots of land. One approach to increasing the efficiency of Indonesia's rice economy, while maintaining the country's food security, is to consider a simple modification in the current policy of self-sufficiency on trend by reducing the trend of rice production to slightly less than the expected trend in rice consumption. For example, if exact self-sufficiency on trend requires that the production and consumption trends be equal (over a five- to ten-year period), a policy of '99 per cent' or '98 per cent' self-sufficiency on trend would scale back growth in rice production to slightly less than the growth in consumption. Reducing the rate of growth of rice production could be accomplished by a more rapid phase-out of fertilizer subsidies than seemed likely after the slowdown in growth of rice production in the mid-1990s or by a slower rate of investment in new irrigation facilities from what would be needed to maintain full self-sufficiency.

Under such a policy, rice imports would be positive on average rather than zero, and the average volume of imports would depend on the degree of average self-sufficiency attained. Naturally, this policy makes sense only if the world price for rice declines again to its long-run downward trend. Rice prices in world markets increased in early 1994, mostly because of Japan's need to import two million tons of rice to compensate for a poor rice harvest in 1993, and rice prices increased again in 1995 as Indonesia (and China) resumed large scale imports to compensate for the serious drought in 1994. If rice prices on world markets remain at the levels seen in mid-1995, Indonesia would be unlikely to be a regular importer even with free trade in rice.

There are three major advantages to a policy designed to use imports, when world prices decline to their long-run trend, as the balance wheel in BULOG's efforts to stabilize domestic rice prices. The first advantage is that BULOG's costs would be lower. With the level of imports the primary mechanism for compensating for fluctuations in rice production from year to year, BULOG's storage costs and the financial costs of export subsidies in years of surplus would be substantially less. Given the level of variance in rice production seen since self-sufficiency on trend was achieved in the early 1980s (the standard error of the time trend for the logarithm of production is about 2 per cent), BULOG can expect to export rice about 1 year in 6, if the trend of production is the same as the trend of consumption.

If the trend of rice production were to be reduced to just 98 per cent of the trend of consumption, on average about 660,000 tons of rice would need to be imported each year. In 1 year out of 6 under such a policy, no imports would be needed, and in roughly 1 year in 40, either exports or substantial increases in BULOG stocks would be needed. A positive deviation of 2 standard deviations, for example, or 4 per cent, would produce a rice surplus of 660,000 tons. Such a surplus could be stored by BULOG, exported using subsidies, or eaten by Indonesian consumers under the stimulus of a 20 per cent decline in the real price of rice. A rough rule of thumb is that a change in the real price of rice of 30 per cent would induce a change in consumption of one million tons in the opposite direction.

In terms of food security, the more important calculations involve the required imports of rice needed to guarantee domestic supplies and price stability in the face of production shortfalls. Under 98 per cent self-sufficiency, for example, the *average* level of rice imports is 660,000 tons. But in 1 year in 6, imports would probably reach 1.33 million tons, and in 1 year in 40, imports would likely exceed 2 million tons. In the mid-1990s, the world rice market was trading about 15 million tons a year—more than 20 million tons in 1995—and the prospect of Indonesia importing these amounts would not seem alarming. In the late 1970s, Indonesia was routinely importing more than 20 per cent of total supplies available in the world market. To need about 9 per cent of supplies traded in the world market 1 year out of 6, and 13 per cent of supplies 1 year in 40, means that the country would be significantly less dependent on the world market than in the early years of the New Order government. It is also expected that the world rice market will become much more open and stable as the Uruguay Round of the GATT negotiations is implemented in the late 1990s. An alternative approach being discussed is the possibility of an ASEAN free-trade zone in rice. ASEAN includes Thailand

and Vietnam, both major exporters, and soon will include Myanmar. With Indonesia, Malaysia, the Philippines and Singapore as regular importers, a significant share of the rice that crosses international borders would be inside such a free-trade zone.

The second advantage involves trade diplomacy and Indonesia's relationship with the World Trade Organization (WTO) and its main trading partners, especially the United States. If Indonesia adopts a policy of maintaining rice production on a trend slightly below that of consumption, and routinely imports rice, its rice stabilization policy would be easier to explain to (and defend at) the WTO. In principle, Indonesia was asked to import 3 per cent of its 1986-88 base-year consumption level as part of the lengthy negotiations during the Uruguay Round of the GATT. In fact, side agreements with the United States at the final negotiations in 1994, and a high 'ceiling binding' on the difference between world prices and Indonesia's domestic rice price suggest that only minimal imports would be needed to satisfy trading partners and avoid a challenge.

The third advantage in pursuing such a policy is to reduce the cost of *producing* rice. Because the marginal cost of production is well above the average cost, the most expensive rice to produce is always the last 2 or 3 per cent of output. Irrigation systems must be developed in less suitable locations, cropping intensities must be pushed to their limits, with possible threats from pests and disease, and fertilizer must be applied at very high levels, with possible run-off damaging water supplies further downstream. By reducing the pressure to expand rice production, fertilizer subsidies could be eliminated rapidly, investments in irrigation systems could be curtailed in favour of greater expenditures on rural schools, clinics, and roads, and farmers would be free to pursue cropping systems that offer significantly higher incomes. Even a modest level of routine imports would offer substantial reductions in the cost of rice production, and these cost reductions would be in addition to the reduced cost of price stabilization.

TOWARDS MORE EFFICIENT POLICIES

This paper has made three points. Historically, building low-cost and efficient marketing systems, especially for the products of rural areas, has been a lengthy process involving significant government participation as an investor and as stabilizer of the economic environment. Efforts by developing countries to short-circuit this lengthy process by more active government involvement in marketing activities themselves have almost universally ended up making the situation worse for farmers, consumers and taxpayers.

Second, the few success stories in rapid market development have involved a very delicate balance between having the government provide the essentials for such development—physical infrastructure and economic stability—and having it take a more active role in the management of food prices. Stabilization of food prices has been the key element in this more active management because it provides macroeconomic benefits and faster economic growth. In the Indonesian context, implementation of the price policy for rice was carried out by BULOG, a parastatal agency charged to defend a floor price for farmers and a ceiling price for consumers, while not allowing the domestic price band to drift too far from

parity with the trend in rice prices on the world market. Building a progressively more active and competitive private sector in rice marketing was a conscious element of BULOG's terms of reference.

Third, the role of the price-stabilization agency evolves as the marketing system develops and the country's economy undergoes a structural transformation. To remain successful as a public institution since its founding in the mid-1960s, BULOG has had constantly to respond to new tasks by modifying its operational routines. Often, new policy approaches have been needed to provide operational guidelines that BULOG could implement in a cost-effective manner. The evolution of tasks, policy approaches, and operating skills has kept BULOG's role in stabilizing rice prices beneficial to the whole society, even as rice has dropped sharply in economic significance.

In the future, however, shocks to the Indonesian rice economy will have little impact on the rest of the economy. Private traders have developed the capacity to cope with instability in production, and the world rice market is becoming large enough to handle routine imports from Indonesia without substantial price fluctuations. What is the role of an institution like BULOG in this more mature environment? In perhaps its most serious challenge since the about-face needed to manage self-sufficiency in rice in the mid-1980s, BULOG will need to reinvent itself yet again to remain useful. This time, however, the process will be more complicated, because the remaining tasks in developing an efficient marketing system are unclear.

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