

WORKING PAPER NO. 7

Indonesian Food Policy Program

Website: www.macrofoodpolicy.com

Food Security in an Era of Decentralization: Historical Lessons and Policy Implications for Indonesia

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FEBRUARY 2002**

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This paper is part of a larger research project on the history of Indonesia's food policy. That policy has almost always been dominated by concerns for food security in general and stability of rice prices in particular. During the Dutch era food policies for Java and the Outer Islands were sharply different, reflecting sharply different population densities and cropping patterns. After Independence, substantial political and financial resources were devoted to designing a truly national food policy and to implementing it through agencies of a strong central government.

The current effort to shift political power and budgetary resources down to lower levels of government presents serious challenges to this national food policy and to the degree of food security that was achieved before the financial crisis that began in 1997. At the same time, decentralization should provide substantial opportunities for more effective management of programs to alleviate poverty and develop local human capital—also components of a food security that is sustainable in the long run. Managing food security in an era of decentralization will be complicated and require close coordination between those aspects managed by the central government and those handled by provincial or lower levels of government.

Food security for a country involves two basic dimensions: stable market supplies and prices for the staple food—rice in Asia, and reliable access by all households to supplies in these markets (or from home production).¹ This dual dimension to food security, linking macro to micro (and short-run stability to long-run purchasing power), creates several inherent tensions which are exacerbated when a serious effort is made to decentralize government policies, programs, and decisions about resource allocations.

First is the tension between free trade and border controls to isolate a region from “outside” instability in prices. If political decentralization creates many more borders, the resulting “cellular” economies can face vastly different price environments. Already, individual *bupatis* are talking about introducing a floor price for rice inside their regency that will differ substantially from the nationally announced floor price (if any). The efficiency gains that come from low-cost trade will be sacrificed if this happens—and there are historical precedents (see below).

Second is the tension between local versus central action. Poverty alleviation requires both rapid economic growth—a central policy concern—and locally-directed poverty programs (which may also depend on central funding). But even more specific issues, such as grain storage decisions (who will “control” local warehouses previously run by DOLOGs?), irrigation decisions, and decisions about location of new roads and maintenance of existing roads, will be vastly more complicated than when the central government had clear authority over these decisions.

Third, tensions will arise in managing the linkages between market stability and household access to food. One of these linkages involves the provision of public goods at the national level, especially stability of rice prices, whereas access to these public goods

¹ Defining food security is an exercise in itself, especially when both macro and micro dimensions are included in the definition. In a review, Simon Maxwell (1996) listed 32 (!) different definitions of the term used by various authors between 1975 and 1991. Each definition is sensible in some context. The goal of this essay is to understand the economic context in which food security is no longer a personal or a policy concern. Almost any definition that is intuitively plausible will do for that purpose

requires financially empowered and educated households, a local responsibility under the new arrangements. A second linkage involves trade. To what extent are local supplies going to be kept within the geographical boundaries of a region to keep local prices low, or outside supplies banned in an effort to keep local prices high?

This issue has a long history in Indonesia. Calls for local self-sufficiency usually arise when the central government fails in its task of ensuring stable supplies in major national markets. But decentralization in the context of locally contested political offices will raise a further complication. There is a deeply-felt sense in most of Indonesia that rice self-sufficiency means food security and the New Order exploited this sense to gain widespread support for its expensive but successful quest for national self-sufficiency in rice.

What is the right geographical boundary for self-sufficiency in a tradable commodity such as rice? Anything smaller than “the globe” restricts trade, and the gains from trade, on behalf of a food security objective. But the links between rice self-sufficiency and food security are complicated and depend on the size of the country and the nature of the market outside its borders. For small countries (or regions) there is almost no link at all between local self-sufficiency and food security. Large countries, such as China, India, and Indonesia, have fewer trade options. *Even with these countries, however, trade at the margin is an important component of food security.* For all importing countries, giving up the gains from trade and regional specialization places a heavy burden on their consumers, especially the poorest. Significantly, the smaller the normally net-deficit region enforcing local self-sufficiency, the higher the average costs to consumers. This fact is especially troubling if much authority over food security passes to the regency (*kabupaten*) level, but even decentralization of pricing decisions to the provincial level will create serious problems.

This paper has four main sections. Section I, the historical record on food security, is a lengthy review of Indonesian experience with food security, and especially efforts to stabilize rice prices, from Dutch times to the mid-1990s (the crisis years are not yet “history”). Section II then presents an analytical discussion of the links between food security and poverty alleviation as a mechanism for broadening the food security debate beyond rice price stabilization. Section III then searches for lessons from the Indonesian experience and from other regions, especially Africa, for decentralized decisionmaking about food security. The similarities between ecological settings in the Outer Islands and in Africa are noted, and implications drawn for how to achieve local food security when rice self-sufficiency will clearly be ecologically and economically irrational. Finally, Section IV attempts to draw from the previous discussion the key challenges for political decentralization in the arena of food security, and notes the scope for cooperation between local and central authorities.

I. The Historical Record on Food Security

Indonesia's Food Logistics Agency, BULOG, was widely regarded as a successful example of institution building in an area of the economy where government intervention in other countries has generally been counterproductive. BULOG's terms of reference at its founding in 1967 were twofold: stabilization of rice prices and provision of monthly rice rations to the military and civil service. Its success in carrying out this mandate led to other tasks. By the late 1980s BULOG was still charged with its original role in rice markets but also was responsible for handling or monitoring sugar, wheat, corn, soybeans and soymeal,

and a number of lesser commodities. The Chairman of BULOG was also the Minister of Cooperatives, and BULOG's enormous influence in rural markets was used to foster the development of Indonesia's village cooperatives. From a ragtag staff assembled hastily from the Quartermaster Corps of the Army shortly after the New Order government of President Suharto was established in 1966, BULOG grew in size, stature, and influence in the Indonesian economy to such an extent that it rivaled the former Pertamina petroleum empire.

Inevitably, such growth and influence raised questions about BULOG's performance, the costs and benefits of the services it carried out, and its appropriate role in the future. The rest of the Indonesian economy is progressively being deregulated under pressures to expand non-oil exports and shift the source of economic growth more to the private sector. BULOG escaped these "winds of deregulation" until the financial crisis in 1998, but even earlier it received substantial attention and criticism from the World Bank, IMF, USAID, and others. Substantial distortions were introduced to the Indonesian economy by agricultural regulations, including BULOG's interventions. Initially, attention focused on non-rice commodities, especially wheat, sugar, and soybeans, where the distortions were quite visible, as the discussions at the Agricultural Roundtable late in 1987 showed (Tabor, *et al.*, 1987). But BULOG's interventions in the rice economy also came under scrutiny, along with crop-specific acreage controls implemented by the Ministry of Agriculture, the fertilizer subsidy which was such a large share of the agricultural development budget, and irrigation subsidies. New budget realities, a shift in development thinking about the efficacy of free markets, major structural changes in the Indonesian economy since 1970, and the political revolution in 1998 have combined to alter radically BULOG's role and mission in rice markets.

One purpose of this project is to develop a scholarly and documented history of Indonesia's experience with rice price stabilization and market interventions that were intended to enhance food security (in rhetoric or in fact). Much of that history is available up to the mid-1990s; more recent experience is still not documented for the public record.²

The process of institution building (and remodeling) is inherently historical.

Naturally, in an ideal world analysts would be able to pull fully functioning agencies off the shelf whenever needed and throw them in the trash bin when their usefulness is gone. This is impossible, despite the assumptions of much price policy analysis that somehow implementing agencies will appear and disappear gracefully when it is time for domestic prices to equal border prices. The dynamics of building and dismantling institutions is poorly understood, especially when the policies to be implemented by the agency being built significantly influence how hard it will be to reduce its role and size. [Timmer (1988), p. 355]

The history of BULOG offers a unique opportunity to build some of this understanding, starting with how the mission of the agency was formulated in the first place. This dimension of institution building is little acknowledged in the wider applause for BULOG's success in the next phase, establishment of an implementing agency that was able to respond to its radically new mission and a rapidly changing rice economy. Agency leadership and staff-training efforts received most of the attention, but the extent of BULOG's integration into macro policymaking and access to financial resources also played key roles. In the 1980s, BULOG was used to "fine tune" agricultural price policy with respect to goals for production, consumption, and overall food security. The

² See in particular, BULOG (1971), Timmer (1975, 1989, 1993, and 1996), and Mears (1981).

analytical and operational capacities needed for such sophisticated interventions into agricultural policy would have been unthinkable even a decade before.

Parallel to the organizational and institutional efforts to strengthen BULOG's implementation capacity were a series of analytical debates over the appropriate policies to be implemented. Although the basic mission laid out by Mears and Afiff in 1968 was not challenged, all of the key parameters in the stabilization model were subject to continuous review.³ The size of the marketing margin to be permitted between BULOG's floor price and ceiling price, the size of buffer stocks needed to supply monthly distributions and market operations, the price of fertilizer relative to the floor price and relative to world prices (and consequently, the size of the fertilizer subsidy) were issues that received extensive analytical treatment by economists inside and outside the government. As world rice prices fell in the mid-1980s and Indonesia developed rice surpluses, analytical attention turned to the impact of rice prices on production, on the health of the rural economy, and ultimately, to consideration of the dynamic dimensions of rice price stability on the Indonesian economy and society (Pearson, et al., 1991; Timmer, 1989b, 1992). The political and financial crises in the late 1990s led to a fundamental rethinking of how food security should be achieved and the role of BULOG in achieving it.

Building an Institution to Stabilize Prices, 1968-1994

The economic and political chaos of the mid-1960s took its toll on Indonesia's rice economy; yields and per capita consumption were lower in 1966 than in 1958. The chaotic conditions also generated widespread support for measures to stabilize the economy, and this meant rice. As an editorial in an influential newspaper put it in late 1967 during another surge in rice prices, "rice is the barometer of the economic situation in Indonesia" (*Harian KAMI*, September 14, 1967). To most Indonesians, no return to normalcy was possible without stability in rice prices. BULOG was created in 1967 to fulfill this mission. The institution was not created *de novo*, however, as a review of earlier efforts reveals.⁴

Legacy of the Dutch, 1650-1940

Rice policy has been a function of rice prices for the entire recorded history of the Indonesian archipelago. Sunan Amangkurat I (1645-1677) prohibited the export of rice from Java in 1655 in response to a severe drought that sent rice prices up by 300 percent (BULOG, 1971). For the next two centuries rice prices were very unstable around a steeply rising trend, and in 1847 appeared the first recorded imports of rice to Java, from Saigon.

Basic Dutch policy was to minimize controls, subject to broadly satisfactory welfare levels for producers and consumers, although the latter generally fared better. In 1863, for instance, the import duty on rice was annulled following a bad harvest. Efforts were made to increase production to keep rice prices low, and when prices fell drastically in the 1880s as part of the worldwide overproduction of cereals, the Dutch response was to require that all government needs be supplied from domestic supplies. In 1911 poor crops and the approaching world war sent rice prices up again, and again exports were prohibited.

³ The original policy memorandum was published in 1969. See Mears and Afiff.

⁴ The following historical treatment of antecedents to modern Indonesian rice price policies is drawn from Timmer (1975).

A long period of declining rice prices began in 1930 due to Asian overproduction and the world economic crisis. Other food prices fell in step with rice prices, and farmers could not pay their taxes. The limit to the functioning of the free market had been met.

In March 1933, the Government decided to intervene. It put an end to the free import of rice and restricted it by a system of licenses. This meant more than merely a checking of free importation; it signified the intent to work toward a system of self-supply with regard to rice. Javanese rice which until then had been offered chiefly in local markets had to find its way to all the Outer Provinces. In the few rice-surplus areas of these provinces, such as Bali, Lombok and South Celebes, an inter-insular rice trade had to be started. It was necessary to replenish its stock and had to become familiar with the intricacies of a purchasing system covering all the scattered home supplies. Care had to be taken to insure a stable price so as not to raise the cost of living in the rice-consuming districts. In short, no failure of crops and no record harvest in a single territory of the vast archipelago could ever be allowed to become the occasion of a just reproach that the Government had neglected the obligations which it had undertaken to be responsible for a steady and regular supply of rice. . .

Real strategy was expected of the leaders. Here a district might be temporarily closed to outside supplies and designated to supply itself; there it might be desirable to shut out foreign supplies and at the same time to organize an inter-provincial supply; in yet another place a primitive traditional barter had, as with a conjurer's wand, to be transformed into a modern export trade. Measures had to be taken on quality, packing, freight rates, time of delivery, etc. Rice mills had to shoot up from the ground. . .

The prices at which the imported rice was sold to the public were controlled; if they appeared to be much higher than the c.i.f. value, the price level was reduced to reasonable proportions by the expedient of sending further supplies to the district concerned. Provision had to be made, too, that stocks were not left over at the end of the period of scarcity, which might be used by speculators to repress the prices of the new harvest. . .

Another insoluble difficulty is posed by the contrary interests of producer and consumer. The price of the intensively raised Java rice will usually be higher than of that raised on the South Asiatic mainland. Is it permissible to keep the price of rice high by artificial means in times when the prices of Netherlands Indian export products are decreasing? Already it has occurred that the Government has had to support Javanese rice exports to the Outer Provinces with export premiums in order to hold down the price of rice in these provinces, while at the same time it was compelled to raise the import duties on foreign rice. . .

The peculiar character of both the raw material and the final product of the rice hulling mills made it inadmissible to allow a free growth of these plants. Danger was seen in the withdrawal of too much rice from the producer-consumers in some areas and the increase of the share of the Java mills in the paddy crops sold in five years from 12 to 21.5 percent. Therefore, in 1940, the provisions of the regulations under the industrial ordinance were applied to rice hulling mills with a capacity of 2 1/2 H.P. or more. In addition, the mills were organized and their sales centralized, on condition that they keep to the paddy purchase and rice selling prices fixed by government directive. To compensate for this restriction of liberty, the Government

declared its readiness to take over any unsaleable rice surplus at the official price. [Boeke (1946), pp. 112-115.]

A specialized government agency was clearly needed to implement this revolutionary degree of interference in the functionings of the rice market. It was established in April 1939 as the *Sticting Het Voedingsmiddelenfonds*, or VMF. Its finance for imports was gained from the *Javasche Bank* with government guarantee; finance for purchase of domestic rice was arranged through private banks.

Looking back with a half-century perspective reveals how thoroughly the Dutch actions of the 1930s laid the path for what was to follow. The physical apparatus in the form of rice mills, transportation and communications networks, and the legal and institutional apparatus in the form of the VMF and regulations carefully organizing all aspects of trade in rice were put in place. In addition, and perhaps most importantly, a philosophy was established.⁵ It argued that rice was too important to be left alone and that the proper government response was direct intervention in the market place, frequently with trade barriers, price ceilings and floors, and an ultimate reliance on cheap foreign imports to maintain stability. Whether an efficient Dutch civil service adequately implemented these policies is a question without a full answer. Whether an inexperienced, underpaid, and demoralized Indonesian civil service could implement similar policies drawn from this inherited philosophy is a question with all too final an answer, as the history of the first two decades of the new Republic shows.

Efforts by the New Republic, 1945-58

After the chaos of the war years and the fight for full independence, rice policy settled into the old Dutch pattern. The VMF was renamed BAMA (*Jajasan Bahan Makanan*, or Foundation for Food) in 1950, but its activities were unchanged. In 1952 this became the JUBM (*Jajasan Urusan Bahan Makanan* or Foundation for Food Affairs), again with little changed activities.

Continuing inflation in 1950 and 1951 did bring a new policy that was a glimpse of the future: rice rations were distributed in kind to civil servants and the military (and their families) to protect their real income. No longer was the government rice agency interested solely in avoiding high rice prices during scarcity and low prices during surpluses. It now had fixed distribution commitments that had to be honored, month in and month out. A government that cannot pay its civil servants and army will fall. First claim on foreign exchange for imports and on the rupiah budget for domestic purposes went to rice.

The move to making partial salary payments in rice, while perfectly understandable and indeed laudable on welfare grounds, clearly served over time to politicize further a commodity that historically was already nearly beyond the control of normal market forces. Almost lost sight of for the next decade and a half was the fact that rice was not at all political to the rice farmer. To peasants, rice was traditional, cultural, and economic, but it was not political. These widely divergent views of the basic foodstuff were to cause periodic upheavals in the Indonesian government.⁶

⁵ Some would argue that this philosophy had always been dominant in Dutch thinking. For a review (in Dutch) see de Vries (1937); in English, see Booth (1988).

⁶ These upheavals paralleled those in Europe in the 17th and 18th centuries. See Lipton (1977) for a review of the causes of the urban bias that underlay these clashes between urban politics and rural economics.

Not that the farmer was forgotten during this time; he was the source of the great bulk of Indonesia's food supply. Perpetual shortages of foreign exchange to buy foreign rice frequently caused the government to turn hopefully to the countryside for increased output. Early attempts, for example, the *Kasimo* welfare plan announced in 1952 which aimed at self-sufficiency in rice by 1956, followed the early Dutch colonial extension approach of *olie vlek*, or "oil spot" method.⁷ Good farming techniques were demonstrated at critical locations in the countryside and were to spread gradually from there. The Dutch experienced satisfactory qualitative results, but the rate of progress was much too slow to keep up with expanding population.⁸

The early Indonesian plans were never adequately staffed or funded. Still, rice prices were stable from 1952 to 1954, and plans were made to eliminate imports in 1955 on the basis of the promising trends. But yields on Java in 1955 were lower than in the previous years, the JUBM was caught without stocks when rice prices started to rise sharply, and the production program fell apart in the scramble to arrange emergency imports.

Massive imports that arrived in 1956 were used to push rice prices down. Prices declined throughout most of that year and even dropped during the three pre-harvest months in 1957. But the "feeling of ease" in the rice market--that sense among urban consumers that there was adequate rice available--had been disturbed. Imports continued for the next few years on a large scale: an average of 770,000 tons per year from 1956 to 1958 compared with only 225,000 tons from 1953 to 1955. And yet rice prices more than doubled from early 1957 to late 1958 as part of the inflation created by budget deficits. The "feeling of ease," now badly shaken, was not to return for a decade.⁹

Sukarno's Guided Economy, 1958-66

Physical rice rations had gradually been phased out in favor of cash payments for civil servants during the quiet years of the early mid-fifties. Rations for the army and police were never discontinued. But the rising prices in 1957 and 1958 brought a predictable response: reinstatement of physical rations for all civil servants and their dependents. Authority given earlier to provincial governors to set the price of paddy at which the JUBM would buy supplies was extended to the ceiling price at which the JUBM could sell. This action, coupled with the increased reliance on physical distributions, fragmented Indonesia's rice markets very badly. Governors of surplus regions kept prices extremely low to serve the interests of their urban consumers and to reduce budget demands for providing rations for their civil servants and military, while governors of deficit regions, mostly in the outer islands, found ways to tap local export earnings in order to import rice. Jakarta was supplied by the central government's capacity to allocate foreign exchange for rice imports and through residual supplies of the JUBM. *This early experiment in decentralization of Indonesia's food security was an economic disaster.*

The costs of this strategy were becoming apparent before the end of the decade. In a clash between using foreign exchange for fertilizer or for rice imports, rice in the short run always won over rice in the long run. As Indonesia's balance of payments deteriorated, the reality of the impact of monthly distribution requirements on Indonesia's rice policy

⁷ See Higgins (1957) for a review of these and other efforts in the 1950s to stabilize the Indonesian economy.

⁸ Similar techniques to spread the "New Husbandry" that underlay the English Agricultural Revolution in the 18th century were calculated by Coke of Norfolk, one of their most vocal proponents, to have spread at the rate of a mile a year! See Timmer (1969).

⁹ An excellent account of the events during this time and government's response with respect to rice price policy is contained in the official BULOG history (1971).

was a mortgaging of the future for the present. It was a mortgage that became increasingly expensive in terms of current foreign exchange.

Once again the government, now under the banner of Sukarno's Guided Democracy (and economy), turned to the farmer for help. But an ambitious three-year program for self-sufficiency collapsed in the wake of the politicization of rice by Sukarno. It was "the main food of the people whose distribution and spreading in the guided economy was not allowed to be made an object of trade or of speculation" (BULOG, 1971). As the domestic economy deteriorated under the brunt of exploding government deficits, spiraling inflation, and negative investment, the rice economy crumbled as well. To pick the worst years, rice production dropped by 13.6 percent on Java from 1960 to 1964.

If only the rather modest trends of the late 1950s--an increase of 1.5 percent per year in production--could have been maintained on Java, output in 1966/67 would have been 5.61 million tons instead of 4.82 million tons, or 16.4 percent higher than what was actually realized.

The production problems on Java in the early 1960s were caused jointly by declining area harvested and declining yields. Yields dropped continuously from a 1962 high of 1.23 tons of milled rice per hectare to a 1966 low of only 1.13 tons per hectare, which was no better than in 1958. Compounding the problem of lower yields, and partly causing them, was a prior decline in area harvested. This was mostly due to a deterioration, through neglect and lack of funds, in the rather sophisticated irrigation network on Java. As the extent of controlled irrigation declined, so did the area successfully double cropped. Inadequate and uncertain water supplies led to lower yields. [Afiff and Timmer (1972), pp. 133.]

The failure of the farmer to treat his rice in the political spirit desired intensified the foreign exchange demands of imported rice. From 1961 to 1963 over a million tons a year were imported, and then the foreign exchange simply ran dry. Imports the following three years averaged only 290,000 tons and rice prices spiraled out of control.

Since marketing is the glue that holds an economy together, the economy in the mid-1960s was quite literally coming unglued. Typically, the highest retail rice price in provincial capitals in Indonesia would be four times the level of the lowest retail price. The entire economy, rice marketing an important and special example, was unable to perform the very basic tasks of marketing--matching the seasonal and the regional price differences to the costs of storage and transportation.

But the government's penchant for intervention made matters far worse. Rice mills could operate only for the government. Despite attempts by the central government to regain control of regional rice price and trade policy from regional administrators, authority and proper communications were lacking, and most regional administrators protected their own local interests before thinking of Jakarta. Since the national government was unlikely to be of much help in times of shortage, most regional administrators simply prohibited the export of rice from their regions, no matter how low prices fell. Rice trade was easily taxed, especially at military checkpoints, and it probably provided the bulk of finance for surplus and deficit regions alike. "Rice policy, such as it was, emphasized consumer

interests and local revenue generation. It is no wonder that production suffered and prices were unstable."¹⁰

The Stabilization Years of the New Order, 1966-70

Rice as a tool of stabilization and stable rice prices as the intended result date back at least to Sunan Amangkurat I. But no government since Dutch colonial times pursued the goal with quite the same intensity, resources, or skill that the Suharto government brought to the task, beginning in the last third of the 1960s.

The abortive coup attempt late in 1965 seemed the climax of a nightmare, except the unreality of the previous half decade turned out to be real. The year ended with a 1,000 to one revaluation of the rupiah. By March of 1966, when leadership was transferred to the triumvirate of General Suharto, Adam Malik, and the Sultan of Yogyakarta, an evaluation showed no rice in the warehouses of the food agency (then called BPUP), no foreign exchange in the treasury, and an inflation rate of 600 percent per year. The first task was to find new supplies of rice.

In the months December 1965 to March 1966, there was an acute shortage of rice, particularly for government employees and members of the Armed Forces. There were sufficient stocks in the free market, but depletion of government stocks led the authorities to reverse the earlier decision to stop imports. . .

Some Indonesian experts doubt whether Indonesia needs to import rice in the sense that domestic production is insufficient if properly distributed to meet reasonable minimum requirements of the population. Even these experts, however, agree that imports of rice (on the order of \$30 million) will be unavoidable because the Government is unable, organisationally and politically, to purchase from domestic sources the rice needed by the Armed Forces and for distribution in kind to government employees. To import rice for these purposes is both easier (to the cities by ship from abroad than by land transport from the villages) and cheaper (at the unrealistic official exchange rate applied to government transactions). Any attempts to do without rice imports would run into strong opposition from the politically powerful beneficiaries, the military and the bureaucracy. ["Survey of Recent Developments," *Bulletin of Indonesian Economic Studies*, 1966.]

The importance of obtaining rice for these groups, especially the military, is reflected by the highly uncertain political situation immediately following the coup attempt. The military had crushed the coup, but Sukarno was still in power. His sympathies, moreover, remained with the coup organizers, and so the military was left to fend for itself. To do so, a network of national logistical commands was set up (KOLOGNAS) to provision the military and civil service. It obtained some rice domestically, but the bulk of its supplies came on special arrangements from Burma and Thailand and from a surprisingly fast offer of PL 480 rice from the United States.

There was no hope for stability in 1966. The budgetary process was too disrupted, the political situation much too unsettled, and the economy too shattered for hopes of

¹⁰ Quoted from Afiff and Timmer (1972), p. 135. A great deal more could be added about the details of efforts to stabilize rice prices during the Sukarno era, but the essence is conveyed above. The BULOG reference volume (1971) is the best source of information about these years.

anything but mere survival. And although rice prices increased more than threefold during the year, the country did survive, and by early 1967 General Suharto emerged sufficiently powerful to set the country on a course of stabilization. The military emergency over, the KOLOGNAS network was disbanded and replaced with BULOG, the presently functioning Food Logistics Agency, directly under the control of the President.¹¹

For once, the stabilization strategy involved more than massive injections of imported rice. From budget deficits double and triple the total government revenue, the budget was to be balanced, quarter by quarter, (although revenues generated from foreign loans counted in balancing the domestic budget). From government loans with annual interest rates of 6 percent per year in nominal terms and negative real rates, loans henceforth charged a real positive rate of interest commensurate with the capital scarcity in Indonesia. *Monthly* interest rates early in 1967 from the State Bank ranged from 6 to 9 percent depending on the priority of the sector involved. By mid-July it was possible to reduce them to 3 to 5 percent per month.

The food supplies side of stabilization required a double-edged attack. Large imports of food aid commodities, mostly rice and wheat flour, were arranged to keep rice prices under control directly. But the counterpart rupiah funds were channeled to the government's Development Budget, which in the first few years was to draw almost exclusively on aid financing for support. The Routine Budget was financed entirely from domestic revenue collections, especially import duties. Ultimately the surplus from the Routine Budget was also channeled to the Development Budget, and this surplus became quite large when oil prices went up in the early 1970s.

The inflation rate was reduced from 650 percent in 1966 to 120 percent in 1967. Still, the year was very nearly a disaster for the new government because rice prices were less stable than the overall price level in the economy as a whole, something of a reversal for Indonesia. Early in the year rice rations were discontinued; the rice agency simply ran out of supplies. The situation eased as the wet season harvest arrived in May and some imports also started coming in. The old trade-off between short run and long run was resolved in the historic fashion, but new sentiments were being heard.

There was a strong case for using . . . foreign exchange to buy fertilizer rather than rice. There was indeed increasing recognition of the short-sightedness of a price policy which, by artificially keeping down the price of rice while allowing the price of imported fertilizer to rise through currency depreciation, made it uneconomic for farmers to buy fertilizer to expand rice production. But to tackle the problem by raising the price of rice was enormously difficult politically; and to reduce the price of fertilizer would require new subsidies in the teeth of the Government's resolve to abolish subsidies. ["Survey . . .", 1967.]

Still, the Ministry of Agriculture did agree to carry a subsidy on urea fertilizer of 3 rupiahs per kilogram, permitting a reduction in its price from Rp 21.5 per kilogram to about Rp 18.

Despite the government's resolve to keep rice prices low and despite a fairly successful domestic purchase program that brought in over 500,000 tons of milled rice in

¹¹ This administrative arrangement was important. It meant that BULOG was not a "budget agency" directly responsible to the Ministry of Finance, and its employees were outside most civil service restrictions, especially on salaries.

the face of obvious administrative and financing difficulties, limited supplies in the world export market due to strong competition from China, Japan, and the Philippines meant there was not enough rice available to meet demand. A severe food shortage gripped Indonesia when the dry season crop turned out to be sub-average. From the harvest low at the end of May rice prices doubled by the end of October and redoubled by mid-January 1968.

One result of the rice crisis was an increase in the cost of living in September which ruled out any possibility of keeping the rate of price inflation for 1967 as a whole within the 65 percent target. Since the cause was from the side of supply, not demand, this did not necessarily imply a serious impairment of inflation control, however painful the additional burden on those with low and relatively fixed incomes. Until the next harvest, the food situation seemed likely to remain a major preoccupation for the Government, not least for its political implications. The student newspaper's editorial comment that "rice is the barometer of the economic situation in Indonesia" was bad economics but important politics.

Provided, however, the food situation remained manageable, politically as well as socially, the September rice crisis, not unlike the August banking crisis, might in retrospect appear to have been a blessing in disguise. After the deliberate increase in public utility charges and other previously subsidized prices in February, the uneconomically low price of rice had remained as the single most important distortion of the price structure. Until September [1967] it seemed doubtful whether the Government would be willing to court political trouble by raising the price of rice closer to the cost of imported rice or to the level at which it would pay farmers to buy fertilizer to produce more rice. The September crisis forced the Government's hand. ["Survey . . ." (1968).]

The crisis refreshed short memories as to the key role of rice in any stabilization scheme. At the time, it accounted for 31 percent of the Jakarta cost of living and had important indirect effects on other economic sectors due to its dominant role as the wage good.

But the psychological and political significance of the price of rice is much greater still. It was the fact that to most Indonesians the price of rice is the touchstone of price stability which made the confidence reactions to the sudden rise in the price of rice in September and again in January so devastating. If . . . both the rise in the cost of living and in the exchange rate went further in December and January than the domestic monetary situation would have led one to expect, the main explanation is undoubtedly the collapse of confidence that followed the government's loss of control over the price of rice. ["Survey . . ." (1968).]

The hard-learned lessons of 1967 had immediate returns in 1968. The government decided to pay farmers an incentive price for their surplus rice, based on the *Rumus Tani* (farmer's formula), which says the price of milled rice and urea ought to be about the same for the farmer. In combination with a major new production effort as part of the BIMAS (mass guidance) program, these incentives meant that 1968 was a good year for price stability.¹² An excellent harvest and the incentive price paid by BULOG permitted domestic purchases of 600,000 tons. Imports exceeded 625,000 tons. Prices in Jakarta in

¹² The BIMAS program has been the subject of extensive discussion and review. See in particular the DPIS Report (1983) and Booth (1988).

December 1968 were actually lower than in December 1967, and they continued to decline through the preharvest period from January to March 1969. Prices continued to fall throughout the 1969 harvest to very low levels, as BULOG was unable for administrative reasons to buy more than 200,000 tons despite a good wet-season harvest. A poor dry season, plus a shift in crops away from rice by farmers disappointed in the prices of the wet-season crop, left supplies smaller than anticipated. BULOG's failure to purchase adequate quantities domestically and reduced concessional imports, due to a good harvest and low prices, meant inadequate stocks late in 1969 to keep rice prices stable. The situation was brought quickly under control, again with emergency imports--with seriously inadequate accounting--but the experience served to burn anew the just-healed scars of 1967.

Surviving the World Food Crisis, 1970-1974

Although the First Five-Year Development Plan (REPELITA) was drafted in 1968 and inaugurated April 1, 1969, it was a document for the seventies. It was formulated on a premise of stability, which came to full fruition in the 1970-72 period, and it was built around self-sufficiency in rice. The plan fortunately did not spell out program details. The failure of the production program (BIMAS *Gotong Rojong*) and the BULOG domestic purchase program in 1969 required major changes if self-sufficiency were to be achieved. And major changes in both areas were soon forthcoming. The poor performance of the BIMAS *Gotong Rojong* was interpreted as a failure of the command nature of the program. When it was suddenly discarded in mid-1970 (after President Suharto traveled incognito to several rice-growing areas to talk with farmers), the program was replaced by a highly incentive-oriented "perfected BIMAS" organized around village units. The program stressed getting profitable inputs, subsidized credit, and information out to the farmers and letting them decide whether and how much to participate. Fertilizer distribution was partially turned over to the private market, with a charge to sell for no higher than the ceiling price of Rp 26.6 per kilogram for both urea and triple super phosphate (TSP). The price required a subsidy to distributors of Rp 7-8 per kilogram (in 1971), which was covered from the Development Budget. From the very beginning of the Government's efforts to support incentive prices, a fertilizer subsidy was an integral component of the calculations.

The second innovation was to implement an effective floor price for stalk paddy. With the lesson learned several times over that farmers do not like to repay debts with stalk paddy at below market prices, BULOG was instructed to prevent the price of village dry stalk paddy from falling below Rp 13.2 per kilogram. Earlier attempts to use the *Rumus Tani* as a guide to price failed due to great uncertainties on the part of local BULOG agents as to just what price to pay. In 1968, for example, it ranged from a low of Rp 27 per kilogram for milled rice in Lombok, to a high of Rp 46 near Jakarta. Such regional variations might have made sense in terms of the realities of local fertilizer prices, but they did little to help integrate the Indonesian rice economy. With a national fertilizer price ceiling established, it was possible to establish a national floor price. Although the floor price was stated as Rp 13.2 per kilogram for stalk paddy in the village, it was implemented by having BULOG pay Rp 36 per kilogram of milled rice at the rice mill.

With such forceful actions taken on behalf of the farmer, the government felt it could likewise commit itself to a nation-wide ceiling price for rice. Medium quality rice in urban markets was not to sell for more than Rp 50 per kilogram. This permitted an expected spread of between Rp 8 to Rp 10 per kilogram between the seasonal low price and the seasonal high price. Although this margin was very narrow in terms of prevailing

interest rates, the private trade did seem to find it profitable to carry stocks in 1970 and 1971, partly perhaps because of increased supplies from the second harvest.

By mid-1972 the new programs looked like major success stories. Rice production was exceeding the high targets set in REPELITA, BULOG was so successful it took over handling responsibilities for wheat flour and sugar, and the National Planning Agency (BAPPENAS) and Ministry of Finance were trying to find alternative sources of revenue to take the place of food aid counterpart funds, which seemed about to disappear.

Instead, the generally good weather from 1968 to 1971 ran dry (throughout most of Asia). In addition, BULOG moved quickly to improve its buying standards in order to reduce storage losses, and ended up buying very little rice in 1972. In a repeat of 1969 (and 1967), the dry season was poor, BULOG stocks ran out, and imports were suddenly hard to find. The government lost control of the rice situation and reverted to emergency imports as the solution. More than a million tons of very expensive rice poured into Indonesia from mid-1972 to mid-1973, before the world market for rice all but disappeared. A year earlier it had seemed that no imports at all might be needed. Urban rice prices went through the ceiling price of Rp 50 per kilogram in late 1972 and were more than double that level by mid-1973.

The Drive to Self-Sufficiency, 1975-1983

By the mid-1970s it was possible to see just how important stability of the rice economy was to the overall success of the development program, and its vulnerability to events in the world rice economy. A new Chairman of BULOG had been appointed during the crisis, General Bustanil Arifin, the former deputy for logistics who was recalled from his position as Consul General in New York. Financial constraints were nearly eliminated as petroleum dollars flowed into the Ministry of Finance after OPEC succeeded in raising oil prices. The disappearance of rice supplies from world markets in 1973 clearly established the political vulnerability of relying on large imports of rice. Farmer welfare received substantially more attention in the late 1970s as the political goal of rice self-sufficiency was translated into operational terms. Since the civil service and military were no longer so dependent on rice rations to maintain their real incomes, the pressure was off BULOG always to keep monthly distributions as the top priority. It had the resources to meet these requirements without difficulty.

From 1975 to 1983 BULOG implemented the government's floor and ceiling price policy and delivered monthly rations to the Budget Groups without a hitch. The changed external constraints noted above account for part of this success, but internal developments also played a major role. With the enthusiastic support of the Chairman, massive and expensive efforts at staff recruiting and training were designed and carried out by Sidik Moeljono, the head of the expert staff. Supporting the floor price received top priority as a way of stimulating domestic rice production, a crucial task because of the perceived unreliability of the world rice market. From 1974 to 1978, persistent problems with disease and pests associated with the new rice varieties kept upward pressure on rural prices, so maintaining the floor price was relatively easy at the prices actually set, which merely kept pace with inflation. As world rice markets returned to normal in the late 1970s and Indonesia's foreign exchange reserves remained ample, BULOG turned increasingly to imports to meet rising demand in urban markets. Imports from 1977 to 1980 averaged nearly 2 million metric tons per year, or about one-fifth of the total amount of rice traded internationally.

The combination of disease and pest problems, which led to the widening import gap, and deteriorating rural-urban terms of trade as a by-product of Dutch Disease, which caused severe problems of rural poverty, forced a re-evaluation in 1978 of development strategy and the role of rice in it. BULOG was ill equipped to take the lead in rethinking its mission in the context of broader objectives and constraints. It was not a key player in either of the two basic policy changes in 1978 that set the rural economy in a new direction: the surprise devaluation of the rupiah in November 1978, which was partially intended to provide "exchange rate protection" to the rural economy; and the decision to keep fertilizer prices constant while continuing to increase the floor price for rice at about the rate of inflation (see Timmer, 1984, and Warr, 1984). *Nominal* urea prices were unchanged from 1976 to 1983, and they were increased only slightly in 1983. When IR-36, an IRRI rice variety resistant to the most troublesome pests and diseases, was introduced on a nationwide basis in 1978, the stage was set for a surge in rice production that would transform BULOG's role. By 1984, the country was self-sufficient in rice, domestic procurement replaced imports as BULOG's sources of supply shifted, and the agency's success in defending the floor price was widely cited as a key factor in the unprecedented increase in rice production.

Managing Self-Sufficiency, 1984-1989

The switch in primary source of supply had a radical effect on the management of BULOG. Far more logistical capacity was required; local warehouses, mills and transportation facilities were needed as domestically produced rice had to be stored and transported to points of distribution--a more complicated task than ordering imports for delivery at the time and location desired. Financial operations became much more complex when the variance in domestic procurement increased and the average time rice stayed in storage (and storage losses) rose. BULOG's outstanding credits from the Central Bank became a significant proportion of total bank credit for the whole economy. The agency became a significant macroeconomic actor.

Comparative experience would suggest that this was a dangerous time for the agency. It needed huge sums of money on a flexible basis for fixed investments, seasonal inventory, and operational expenses. *None of this financing was provided in the Routine Budget of the Ministry of Finance.* Finding funding mechanisms was a major challenge. They had to be sufficiently stable to permit long-range planning, sufficiently flexible to accommodate large variations in procurement financing on short notice (before rural market prices fell below the floor), and yet not too distorting to the rest of the economy. Senior leaders in the agency and their advisors worked closely with senior members of the economic team (the EKUIN ministry and the "Economic Cabinet") and their advisors to find pragmatic solutions. Several measures contributed to keeping BULOG's finances off the front burner of political concerns.¹³ Although some individual components of the agency's finances were public knowledge and officials in the Ministry of Finance reviewed BULOG's costs each year in order to calculate the "book price" for sales to the Budget Groups, no one outside BULOG understood all the components of the financing mechanisms. It is probably true that no one inside BULOG knew how the individual components related to each other or how dependent they were on the external dynamics of Indonesia's rice economy.

¹³ These measures included interest rate subsidies on an open line of credit at the Central Bank, annual increases in book profits from revalued rice inventories as nominal rice prices rose each year, "cost-based" pricing for rice delivered to the Budget Groups, and profits from trading additional commodities put under BULOG's responsibility.

Those dynamics changed radically as Indonesia approached and then surpassed self-sufficiency in rice. Substantial surpluses emerged in 1985, BULOG's warehouses were still full from the record 1984 procurement, and support of the floor price was unsuccessful. Rice prices fell 20 to 30 percent below the floor price in many areas. Once again, BULOG was unprepared for an unexpected new mission, managing surplus stocks. A major external study undertaken in August 1985 revealed several fundamental problems with the design of rice policy and BULOG's structure to implement it. The structural problems related mostly to financing mechanisms; the report concluded that without significant changes, BULOG would be bankrupt before the end of the decade.

This episode illustrates clearly the broad range of analytical, financial, and management problems inherent in any operational effort to implement a price stabilization policy in the context of self-sufficiency. Three serious problems for Indonesia's rice economy appeared in 1985:

(1) Large domestic procurement relative to very small market operations and subsequent build-up and aging of BULOG stocks;

(2) Low prices to farmers during the main harvest in February-April, 1985, with *short-run* consequences for incomes of larger rice farmers; and

(3) Rice prices that had remained very stable at the retail level for over two years, with consequences for the role of the private sector in rice storage, *long-run* income prospects for rice farmers, and the financial viability of BULOG under its existing funding arrangements.

To a substantial extent, all three problems were triggered by the collapse of the world rice market, where prices were over \$400 per ton in 1981 but had fallen to below \$200 per ton by mid-1985 for qualities similar to those produced and consumed in Indonesia. If world prices for these qualities had remained at \$400 per ton, there would have been no "rice crisis" in Indonesia. BULOG's "surplus" stocks would have been a valuable export commodity, prices for farmers would easily have been supported, and normal seasonal patterns of rice prices would be seen by allowing urban retail prices to rise during the four to five months before the main harvest. The underlying cause of the problem was thus a fundamental change in world market forces, precisely the sort of problem that self-sufficiency was supposed to prevent.

From both a short-run and a long-run perspective, however, some of the problems could be traced to Indonesian rice policy and the success with which its various components had been implemented. In addition, even if the problems were *caused* by international market forces, they remained *Indonesian* problems. Consequently, adjustments of domestic policies and changes in their implementation were the only sensible response.

In the long-run, Indonesia had contributed to its own problems by the success of its rice production program. The conversion in the early 1980's of Indonesia from an importer of one to two million metric tons of rice annually to a net exporter had a dramatic effect on the world rice market. Although all grain prices were low in the mid-1980s, rice prices were depressed even relative to long-run relationships with wheat or corn. This shift in relative prices was due largely to the withdrawal of Indonesia from regular import status. Attempts by Indonesia to solve its rice surplus problems by exporting sizeable quantities into those market conditions exacerbated this depressing effect.

BULOG's short-run implementation of rice price policy also created some of the problems. Successful defense of the floor price in 1984 yielded 2.5 million metric tons of domestic procurement; somewhat less successful implementation in 1985 still yielded 2.0 million tons. With large production, huge stocks, and stable prices, market operations to supply urban consumers were minimal. Two acute problems were then caused by these efforts to implement the existing price policy: large BULOG stocks of deteriorating quality caused very high storage costs at the same time that sales revenues were sharply diminished due to small market operations; and efforts to improve the quality of rice procured in order to enhance its storability had a significant depressing effect on prices received by farmers for their gabah, just as in 1972. Both problems would have been solved quite easily if world rice prices were \$400 per ton. But expectations at the time, however, suggested (only partially correctly) that low prices were likely to prevail in the foreseeable future, and so domestic policy changes were identified to solve the problems.

The seriousness of these problems was stressed in the study team's report to the Government (Falcon Team, 1985). Continued failure to implement the announced floor price would jeopardize the confidence that farmers had built up in the government to deliver on its policy promises. This confidence was a key factor in stimulating rice production. Farmers adopted new technology, used large quantities of fertilizer, and made farm-level investments on the basis of this confidence. A well-supported floor price had been and continued to be an important tool in the kit of policy interventions available to the Indonesian government in its efforts to foster agricultural development. Farmer confidence in the government's floor price was taken for granted because of the apparent ease with which it was created between 1975 and 1985. But few governments have been able to establish long-run trust on the part of their farmers, and most developing countries envied Indonesia's capacity to do so. The government was urged to give continued high priority to maintaining the trust of its farmers by implementing fully the policies that were announced.

The financial problems for BULOG were also very serious. Before 1984, BULOG was able to finance its cash flow requirements with a negotiated price for rice distributions to the Budget Groups. BULOG's costs were kept down through a subsidized interest rate on its outstanding credits with Bank Indonesia (BI) (subsequently handled by Bank Rakyat Indonesia (BRI)). A "book profit" was shown each year by valuing the carry-in stock at the new negotiated price. When nominal rice prices were rising and market operations kept procurement and distributions roughly in balance (with import volumes used as the adjustment mechanism), BULOG's rice finances were healthy.

The situation in 1985 on the rice account was totally different. Imports were not available to balance the physical side of the ledger, cash flow was sharply reduced due to low market operations, and BULOG's cost price was significantly above market prices because of high storage costs on a very large rice stock. The financial integrity of BULOG as a food logistics agency was severely threatened by policies in place in mid-1985, and bankruptcy was almost inevitable unless fundamental changes were made in the mechanisms by which BULOG was funded.

Three key lessons emerged from the 1985 experience. First, it is important to define the floor price clearly and precisely. It is *not* a "farm gate" guarantee--no country can do that--but rather a promise to buy a certain quality of rice or gabah at a reference buying station, a KUD or DOLOG warehouse. Farmers understand this perfectly well, but it is not clear that the press or some concerned citizens do.

Second, there is an entire *structure* of rice prices in the countryside, from the DOLOG buying price for high-quality, mill-dry gabah or rice, all the way down to a

tebasan price for a standing field of still-green *padi*. A farmer may quite willingly and wisely sell the standing crop to a trader at Rp 120 per kilogram on the basis of an estimated yield in the full knowledge that the trader will eventually sell the harvested, dried, cleaned, transported, milled, and stored rice to the DOLOG some weeks later for the gabah-equivalent price of Rp 175 to 180 per kilogram. The government's floor price, even when perfectly implemented, affects the *level* of this structure of rural rice prices, not the structure itself.

Lastly, in a competitive rice marketing system such as that on Java and in other rice surplus regions, if DOLOGs will not accept low-quality rice the cost burden will very quickly be pushed back on the farmers. This will be "unfair" if they do not expect to bear this burden and if local facilities are inadequate for farmers or traders to raise the quality of harvested gabah to DOLOG standards. But the cost burden will settle on the farmers or on BULOG, and costs will be large until adequate grading and drying facilities are widely available in the countryside.

After the team's report was submitted, the government acted quickly. By January 1986, a special line item to finance a national "iron stock" of rice for food security had been inserted in the Routine Budget in response to that concern. Although the budget allocation was never funded because of the collapse of oil prices later in 1986, it focused the attention of senior economic policy makers on problems with BULOG financing mechanisms and increased their understanding of the large costs of implementing a price stabilization policy.

Price policy was reconsidered and a new pricing model was proposed:

Floor price and fertilizer price policy should be thought of as a short-run tool to manage production trends, subject to constraints imposed by world price levels for both rice and fertilizer and availability of budget resources to finance wide price divergences. Price incentives have been particularly strong for the past eight years. Several years of reduced incentives will significantly improve BULOG's stock position without seriously jeopardizing rural incomes in the short run. Longer-run price policy needs a significant research effort before permanent changes could be made with confidence. [Falcon Team, 1985]

This call to use price policy to fine tune BULOG's stock position relative to trends in domestic production and consumption required yet another ratcheting upward in the agency's capacities to analyze and implement policies that affected the rice economy. The new pricing model was used to reduce incentives gradually to rice farmers. Rice production slowed its rapid expansion and rested at a plateau from 1986 to 1988 that left procurement sharply below the levels of the previous five years. BULOG's surplus stocks were exported and used for distributions to the Budget Groups; by late 1987 the agency was unable to inject enough rice into retail markets to maintain price stability.

The shortages caught everyone by surprise. The attention of most policy makers and analysts was still focused on surpluses and government initiatives to stimulate diversification out of rice just as an Asia-wide drought, plus reduced stocks in the United States due to export subsidies, flipped the thin international market back to shortage. With a relatively short delay, Indonesian rice prices followed world prices up, ending 1988 at rough parity. However, because Indonesia had maintained its domestic rice prices well above those in world markets during the worst of the surplus in 1985 and 1986, its price increases were relatively smaller than those in the world market. Once again it seemed as though there was a longer run vision behind the stabilization program, although the

abruptness of the domestic price increase was quite unsettling to many consumers and policy makers.

BULOG activities were badly disrupted during the episode. Because of the strict policy of self-sufficiency being enforced by the President, imports were not available to replenish stocks used in a vain effort to control price increases in late 1987 and early 1988. The Government's floor price had been announced before prices ran out of control and by the procurement season in February, 1988, BULOG's permitted buying price was well below the structure of rural rice prices. Even with special task forces, premiums paid through the KUDs, and direct appeals to rice traders, BULOG was unable to replenish its stocks from domestic sources. Prices rose sharply from May to July and then stabilized at levels that were maintained through the end of 1989.

BULOG was able to "recall" rice shipped abroad in 1986 as well as obtain permission for small quantities of rice under PL 480. The roughly 400,000 tons of external supplies that arrived late in 1988 and 1989 were never called "imports" in public, but they did ease the agency through a difficult period before the excellent harvest in 1989 arrived. Abundant rains late in 1988 and very substantial price incentives for farmers, by some measures the highest since the late 1960s, produced a bumper crop. BULOG was able to procure over 2.5 million tons of rice, thus replenishing its buffer stock and returning the overall rice economy to an equilibrium not seen since the early 1980s.

Costs and Benefits of Self-Sufficiency on Trend, 1990-1994

This review of Indonesia's early experience with price stabilization programs and implementation by BULOG until self-sufficiency in rice was achieved highlights two issues. First, there had 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 percent of the rice produced and consumed in Indonesia (Ellis, 1993).¹⁴

Second, there was a continuing effort to keep the costs incurred by BULOG to stabilize rice prices from exceeding the benefits that are generated by such stabilization. Four dimensions to this issue were identified. First, at the most general level, there has been continuing concern over the size of the benefits to the economy and to the society of stabilizing rice prices, and how these benefits change over time. Second, BULOG pursued approaches to cost control that involved improved management techniques in the storage, handling, and distribution of rice. Third, for more than a decade, analyses had 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). Rice

¹⁴ Many observers are surprised that BULOG could 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 did most of the "work" precisely because marketing margins were wide enough for them to make a profit. BULOG intervened only at the upper and lower edges of these margins. In addition, the Indonesian rice market was well integrated by flows of information (and rice), so modest interventions in central markets had economy-wide impact (Ismet, 1995). Finally, the private sector had come to *expect* that BULOG would intervene when necessary to stabilize prices. Consequently, interventions could be quite modest to send a signal that stability would be defended. Of course, once the private sector thought that BULOG would *fail* in this task (as in 1998), expectations had the opposite effect and destabilized prices (Timmer, 1996c, 1997a).

distributions to the Budget Groups totaled approximately 1.5 million metric tons per year, or about 60 to 75 percent of BULOG's normal annual turnover. It had been difficult to phase out these distributions because the monthly turnover in BULOG's stocks lowered storage losses through better inventory management, the price paid by the Ministry of Finance for this rice was high enough to cover all of BULOG's operating costs and was thus a mechanism for funding the price stabilization policy itself, and because the President remained (adamantly) convinced of the efficacy of the program. 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 5-year development plan (Repelita I) began in 1969 by stabilizing rice prices, but its role in the growth process declined in importance overtime.

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 program 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 percent per year, or 13.5 percent 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 program 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, 1994; Dawe, 1996).

However, the benefits from stabilizing rice prices fell markedly over time. By the end of the fifth Five-Year Plan in 1994, stabilization activities contributed only 0.19 percentage points a year to economic growth, just 3.8 percent 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 during Repelita V (1989-1994).

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, 1996c; 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 did 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 program 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 were needed to keep BULOG from losing money on a regular basis can be summed. This approach implicitly attributes to the rice stabilization program 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 program 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 indicated 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 has the most analytical interest.

Greater Flexibility through Self-Sufficiency "On Trend."--A strategy designed to reduce costs of price stabilization while still generating most of the benefits had several dimensions. First, the amount of rice in storage, and the average period it is held, had to be reduced. Second, the country needed to resort more to international trade in rice by routinely using imports. Third, by using *variable* imports as the balance wheel, rice supplies and prices could be stabilized with smaller domestic buffer stocks. Each of these components had implications for the degree of price stabilization to be 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 reversed the upward trend, seen since the early 1980s, in the cost of price stabilization.

But an important question remained. Could Indonesia's rice economy 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, 1996c). 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 (the years of “strict” self-sufficiency) to less than 1.4 million tons between 1989 and 1994. Full storage costs (including the value of quality losses when milled 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 percent. 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 percent. Flexibility in rice trade thus contributed significantly to a more efficient and a more effective BULOG.¹⁵

The Crisis Years.—The very severe el Nino-caused drought that started early in 1997, the financial crisis that became especially severe in Indonesia in early 1998, and the political crisis that has not been entirely resolved by mid-2002, each contributed in powerful ways to changing BULOG's ability to stabilize rice prices. After the agency lost control of domestic rice prices in mid-1998, strong pressures from domestic politicians and foreign donors combined to strip BULOG of its monopoly over international trade in rice. By late 1999, its mandate to stabilize rice prices was revoked, although many Indonesians in both government and civil society seemed unaware of this development. As of mid-2002, efforts to define a new structure and role for BULOG were still unresolved.

¹⁵ 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 thus more than \$200 million (in \$1995).

II. Linking Food Security and Poverty Alleviation

It is only in modern times that entire societies, as opposed to privileged members of those societies, have been able to escape from chronic hunger and the constant threat of famine (Fogel, 1989, 1991). Many countries in the developing world, especially in Africa and South Asia, have not managed this escape. In these countries, understanding the factors that cause widespread hunger and vulnerability to famines, and the mechanisms available to alleviate their impact, remain important intellectual challenges (Ravallion, 1987, 1997; Sen, 1981; Dreze and Sen, 1989).

There is a different way to pose the question, however. Rather than asking how to cope with hunger and famine, the question might be how to escape from their threat altogether. As Fogel has emphasized, this is a modern question that is only partly answered by the institutional and technological innovations that are at the heart of modern economic growth (Kuznets, 1966). Without these innovations, to be sure, the modern escape from hunger to food security would not have been possible. But the record of economic growth for the Third World since the 1950s shows that even in countries with relatively low levels of per capita income, government interventions to enhance food security can lift the threat of hunger and famine. The countries most successful at this task are in East and Southeast Asia, although the experience in South Asia has been instructive as well. Because of the ecological similarities of much of Africa and the Outer Islands of Indonesia, the rather negative lessons from Africa on food security are sobering in an era of decentralization of decisionmaking with respect to food security in Indonesia.

Food Security and the Escape from Hunger

That rich countries have little to fear from hunger is a simple consequence of Engel's Law; consumers have a substantial buffer of nonfood expenditures to rely on, even if food prices rise sharply. In a market economy, the rich do not starve. Wars, riots, hurricanes, and floods, for example, can disrupt the smooth functioning of markets, and all in their wake can perish. But rich *societies* usually have the means to prevent or alleviate such catastrophes, social or natural. Food security in such societies is simply part of a broader net of social securities.

Without the buffer of Engel's Law, consumers in poor countries are exposed to routine hunger and vulnerability to shocks that set off famines (Anderson and Roumasset, 1996). And yet, several poor countries have used public action to improve their food security. The typical approach reduces the numbers of the population facing daily hunger by raising the incomes of the poor, while simultaneously managing the food economy in ways that minimize the shocks that might trigger a famine. These countries, some of them quite poor, have managed the same "escape from hunger" that Fogel documents for Europe.

An early escape from hunger is *not* primarily the result of private decisions in response to free-market forces. Improved food security stems directly from a set of government policies that integrates the food economy into a development strategy that seeks rapid economic growth with improved income distribution (Timmer, *et al.*, 1983). With such policies, countries in East and Southeast Asia offer evidence that poor countries can escape from hunger in two decades or less--that is, in the space of a single generation. Although two decades may seem an eternity to the hungry and those vulnerable to famine, it is roughly the same as the time between the first World Food Summit Conference in 1974 and the second one in 1996. Despite much well-meaning rhetoric at the earlier

summit, including Henry Kissinger's pledge that no child would go to bed hungry by 1985, the failure to place food security in a framework of rural-oriented economic growth, in combination with policies to stabilize domestic food economies, meant that two decades were wasted in many countries.

Food Security and Economic Analysis

The focus here is on food security as an objective of national policy. The emphasis is on food security at the "macro" level. At that level, policymakers have an opportunity to create the aggregate conditions in which households at the "micro" level can gain access to food on a reliable basis through self-motivated interactions with local markets and home resources. The perspective taken is, thus, primarily an economic one.

Surprisingly, however, recent literature on food systems and economic development makes such an *economic* assessment of food security a difficult task. Three bodies of literature are potentially relevant to an analysis of how countries can escape from hunger and provide food security for their citizens, and yet none addresses the topic directly.

First, there is a substantial literature on the achievement of rapid economic growth (World Bank, 1993; Lucas, 1988; Barro and Sala-i-Martin, 1994; Taylor, 1996; Easterly, 2001). Export orientation and openness to trade tend to be the dominant policy issues in this literature. In none of this literature is food security even mentioned, and agriculture receives only passing notice. Both omissions are surprising in view of the historical links between agriculture and economic growth and the fact that no country has sustained rapid economic growth without first achieving food security at the macro level (Timmer, 1996b);

Second, agriculture is treated in the literature on rapid poverty alleviation through rural-oriented economic growth (Timmer, 1991, 1995, 1996a, 1997b; Birdsall, Ross, and Sabot, 1995; Ravallion and Datt, 1996; Lipton, 1977; Mellor, 1976). But even though the agricultural sector and the rural economy are the focus of this literature, no connections are made to price stability or other dimensions of food security, and trade issues are largely ignored;

Third, there is a growing literature on stabilization of domestic food economies and the contribution of stability to economic growth (Bigman, 1985; Chisholm, 1982; Sarris, 1982; Newbery and Stiglitz, 1981; Morduch, 1995; Timmer, 1989a, 1996c; Dawe, 1996; Ramey and Ramey, 1995). But the stabilization literature is badly bifurcated into micro-based analyses of decision-maker response to risk (both consumers and producers) and macro-based assessments of the impact of instability, usually measured by rates of inflation, on economic growth. Virtually no analysis has been done to connect these two topics, which is surprising in view of the macroeconomic significance of the food sector in most developing countries. A further connection links food security to political stability, which is increasingly important as a factor influencing investment, including foreign direct investments and portfolio investments in these countries.

The Asian Approach to Food Security

Not surprisingly, food security strategies in Asia have been little influenced by this economic literature. The lack of influence stems from at least two factors. First, the dominance of rice in the diets of most Asians, coupled to the extreme price instability in the world market for rice, forced *all* Asian countries to buffer their domestic rice price from the

world price. This clear violation of the border price paradigm and the accompanying restrictions on openness to trade seem to have escaped many advocates of the East Asian miracle, who saw the region's rapid growth as evidence in support of free trade (World Bank, 1993).

Second, most Asian governments have paid little attention to formal efforts to define food security as a prelude to government interventions that would be seen as their approach to "food security." Instead, the food security strategies of most countries in East and Southeast Asia have had two basic components, neither of which is specifically linked to any of the standard definitions of food security used by international agencies. The United States position paper for the 1996 World Food Conference, for example, used one version of these standard definitions:

Food security exists when all people at all times have physical and economic access to sufficient food to meet their dietary needs for a productive and healthy life. Food security has three dimensions:

AVAILABILITY of sufficient quantities of food of appropriate quality, supplied through domestic production or imports;

ACCESS by households and individuals to adequate resources to acquire appropriate foods for a nutritious diet; and

UTILIZATION of food through adequate diet, water, sanitation, and health care.

(United States Department of Agriculture (USDA), 1996, p. 2)

This definition is obviously an ideal that no country could hope to reach in fact. By contrast, the Asian countries that have been most successful at providing food security to their citizens have based their strategies on two elements of their domestic food system over which they have some degree of policy control: the sectoral composition of income growth and food prices.

The rate and distribution of economic growth are primarily matters of macroeconomic and trade policy (once asset distributions are given as an initial condition). Although after the Asian financial crisis began in 1997 widespread controversy erupted over what role Asian governments played in stimulating growth and channeling its distribution, there is no disagreement that high rates of savings and investment, coupled to high and sustained levels of capital productivity, in combination with massive investments in human capital, explain most of the rapid growth that occurred up to 1997 (World Bank, 1993). Growth that reached the poor was one component of the food security strategy.

In the second element of the strategy, Asian governments sought to stabilize food prices, in general, and rice prices, in particular. Engel's Law ensures that success in generating rapid economic growth that includes the poor is the *long-run* solution to food security. In the language of Dreze and Sen (1989), such economic growth provides "growth-mediated security." In the meantime, stabilization of food prices in Asia ensured that short-run fluctuations and shocks did not make the poor even more vulnerable to inadequate food intake than their low incomes required.

Economists are highly dubious that such stability is economically feasible or desirable. It is not a key element of the "support-led security" measures outlined by Dreze

and Sen (1989). In a review of food security and the stochastic aspects of poverty, Anderson and Roumasset (1996) essentially dismiss efforts to stabilize food prices using government interventions:

Given the high costs of national price stabilization schemes (Newbery and Stiglitz, 1979, 1981; Behrman, 1984; Williams and Wright, 1991) and their effectiveness in stabilizing prices in rural areas, alternative policies decreasing local price instability need to be considered. The most cost-effective method for increasing price stability probably is to remove destabilizing government distortions. Government efforts to nationalize grain markets and to regulate prices across both space and time have the effect of eliminating the private marketing and storage sector. Rather than replacing private marketing, government efforts should be aimed at enhancing private markets through improving transportation, enforcing standards and measures ingrain transactions, and implementing small-scale storage technology (Anderson and Roumasset, 1996, p. 62).

Although this condemnation of national price stabilization schemes might well be appropriate for much of the developing world, it badly misinterprets both the design and implementation of interventions to stabilize rice prices in East and Southeast Asia (Timmer, 1993, 1996c).

For food security in this region, the stabilization of domestic rice prices was in fact feasible in the context of an *expanding* role for an efficient private marketing sector. The resulting stability was not an impediment, but was conducive to economic growth. In addition, the stabilization scheme and economic growth had to work in tandem to achieve food security as quickly as possible.

Both elements of the Asian strategic approach to food security--rapid economic growth and food price stability--address the "macro" dimensions of food security, not the "micro" dimensions found at and within the household. Governments can do *many* things to improve food security at the household and individual level, and most countries in East and Southeast Asia have programs to do so. Rural education accessible to females and the poor, family planning and child-care clinics in rural areas, nutrition education, and extension specialists helping to improve home gardens are just a few of the possibilities. Most of the literature on food security deals with approaches at this level, but problems of definition, measurement, project design, and management vastly complicate strategies that rely on household interventions (D. Maxwell, 1996; World Bank, 1986).

These complications, in turn, sharply limit the number of households that can be reached with a micro approach. Without dismissing the potential effectiveness of these approaches to enhance food security in particular circumstances, it is still important to realize the scale of the problem. *Hundreds of millions* of people still do not have food security in Asia, and programs directed at households will not bring it. Only food security at the macro level can provide the appropriate facilitative environment for households to ensure their own food security (Timmer, forthcoming).

III. Lessons for a Decentralized Indonesia

To achieve and sustain food security through rapid economic growth, the Asian experience suggests that the agricultural sector must be linked through three elements to food security: poverty alleviation, stability of the food economy, and growth itself. The effectiveness of these links depends critically on the initial conditions at the start of the

process of rapid growth. In particular, agriculture can contribute little to equity if it is based on a "bi-modal" distribution of production or to stability if it is concentrated on a single export crop subject to substantial price fluctuations. Even in these circumstances, more representative of the Outer Islands than Java, agriculture can still be a significant contributor to economic growth.

Because of the dominance of rice in Asian diets, the prevalence of smallholder cultivators, the large size of many Asian countries, and the instability of the world rice market, the most successful countries in achieving food security developed effective programs and policies to raise the productivity of their own rice farmers. Many of these programs were explicitly motivated by the objective of self-sufficiency in rice, especially after the world food crisis in 1973, when the "world rice market" in Bangkok disappeared for several months. When long-run costs of production are less than the long-run average costs of importing, such programs make economic sense, and the "self-sufficiency" slogan can be used effectively to mobilize political and bureaucratic support.

But self-sufficiency campaigns can do much mischief, especially where low-cost crop technologies are not available. Many countries have a deep aversion to international trade, an aversion seen since well before the Corn Laws debate in England in the early nineteenth century. Lindert (1991) has documented an "anti-trade bias" in agricultural pricing and trade policy that has deep historical roots. In the face of this clear political preference for self-sufficiency, Asian countries have had a difficult time distinguishing legitimate concerns for food security from a simple desire not to import anything that could be produced domestically, whatever the costs.

Even in Indonesia, which had an admirable record until the mid-1990s on stabilization of rice prices, higher productivity of rice farmers, and food security for nearly the entire population, self-sufficiency for a broad array of staple foods became a policy objective (Timmer, 1994). An assessment of the steps needed to reach this objective concluded as follows:

If economic considerations should play a significant (but not complete) role in determining appropriate policy for rice and its contribution to Indonesia's food security, the economic arguments are even stronger for all non-rice commodities. There is simply no nutritional, political, or logistical rationale to override the long-run signals from the world market on which foods Indonesia should produce domestically and which it will be more economic to import, because these economic signals are the surest indicators of where to allocate resources for increased productivity and incomes (Timmer, 1994, p. 39).

Such openness to short-run price signals from world markets for all but the most important staple food, and for all commodities in the long run, will require more open and stable markets in the future than have existed in the past. One major attraction to developing countries of the Uruguay Round of the GATT negotiations was the promise that liberalized agricultural trade would result in more stable prices on world grain markets. However, this promise may have been premature (Greenfield, *et al.*, 1996; Islam, 1996). The shortages that caused high grain prices in world markets in 1995 and 1996 renewed anxieties about future food supplies, and policy-induced reductions in grain stocks seem destined to cause greater, not less, instability in grain prices. The low grain prices seen in world markets from 1999 to 2002, equally a part of price instability, raise serious questions about the long-run opportunity cost of grain in these markets (Dawe, 2000). Asia, with nearly half the world's population to feed, is understandably concerned about how much to

respond with new investments in domestic production and how much to rely on production and privately-held stocks available in international markets for supplies of basic grains.

However the balance is struck on domestic versus imported supplies by individual countries and regions, the striking improvement in food security in Asia since the mid-1960s, especially in East and Southeast Asia, is not likely to be seriously threatened for long. Even in 1998, in the midst of the worst drought in memory and devastating political and financial crises, Indonesia imported 6 million metric tons of rice from world markets and avoided a famine. That is the advantage of "growth-mediated" food security. From this perspective, the lesson from East and Southeast Asia for achieving and maintaining food security can be summed up in this way: a growth process stimulated by a dynamic rural economy leads to rapid poverty alleviation, which, in the context of public action to stabilize food prices, ensures food security.

The Relevance of Other Settings: Environmental, Economic and Political

This approach might not work in other settings--for example, where the staple foodgrain is traded in more stable world markets, or where land holdings are highly skewed, or where technologies are not available to raise agricultural productivity, or where the political environment does not support rural investments. At least part of Africa's failure to achieve widespread food security for its population, for example, can be attributed to these factors, but part must also be attributed to differential treatment of agriculture by prevailing development strategies in Africa. These strategies have important lessons for those regions of Indonesia where rice cultivation is not economically viable.

Two dimensions are important. First, because government policy makers maintained a macroeconomic environment that supported exports, Southeast Asia invested heavily in building a comparative advantage in a wide range of agricultural exports. The contrast with Africa is striking because the macroeconomic support for agriculture was not crop specific but sector wide (indeed, economy wide). Such sector-wide support will remain an important function of Indonesia's central government even if many dimensions of food security strategy are decentralized.

Much can be learned from Asia's experience of changing its long-term comparative advantage in export commodities through investments in research, training and market development over the past three decades. For example, Thailand, Pakistan and Vietnam are routinely selling rice throughout Africa by outcompeting African farmers even after international and internal transport charges are taken into account. Moreover, Nigeria, Kenya and many other countries are importing palm oil from Malaysia to meet their growing demand for cooking oil. This is especially humbling to Nigeria because at independence in 1960, it was the world's leading producer and exporter of palm oil. Today, Malaysia's production of palm oil is about ten times larger than that of Nigeria. [Eicher (1992), p. 80.]

Second, governments in Southeast Asia actively sought to provide food security to domestic consumers, both urban and rural, by stabilizing rice prices. Their ability to do so had both economic and political roots. Because populations were large in relation to agricultural resources, and because domestic rice consumption was large in relation to supplies available in world markets, countries in Southeast Asia were forced to develop successful rice intensification programs to ensure domestic food security. This force will be much less powerful where agricultural export earnings, and especially mineral or oil and gas earnings, provide ample foreign exchange to import rice or wheat. This will be

especially relevant when world markets for rice and wheat have large supplies at low prices (Dawe, 2000).

The multi-staple food economies of Africa and the Outer Islands of Indonesia differ markedly from the irrigated lowland rice economies of Southeast Asia. Thus it is important to identify the crucial linkages between stabilization of rice prices and consequent stimulus to economic growth and determine whether similar linkages can be established in the agricultural environments of these other regions. If the lowland rice economy of Asia is sufficiently different from food systems of Africa and the Outer Islands, which are based on upland rice, maize, millet, sorghum, cassava, and yams, the models of food security and economic growth that propelled Southeast Asia will need to be modified in a decentralized Indonesia

In this regional context there are several important questions. Does the analytical support for policies that stabilize food prices hold only for rice economies? Is the implementation of such policies inherently more difficult and expensive in multi-staple food economies? If the benefits are smaller and the costs are larger in these food systems, stabilizing food prices might not be necessary or desirable. But if food prices are not stabilized, how can the investment climate be stabilized for farmers and urban industrialists? How can consumers be assured of food security? Will the world market fill this need reliably and cost effectively? If so, what would stimulate the dynamic linkages between agriculture and industry that were the basis of rapid economic growth in East and Southeast Asia?

Is Rice Different?

A massive literature exists on Asian rice societies and the extent to which they are culturally, ecologically, and politically unique, but there has been surprisingly little effort devoted to understanding how these unique noneconomic dimensions translate into advantages and disadvantages for economic development. Cultural and sociological aspects are treated in Geertz (1963) and Castillo (1975), ecological dimensions in Grigg (1974) and Hanks (1972) as well as Geertz, and political effects of large-scale irrigation systems in Wittfogel (1957). The Asian rice *economy* has been studied as a commodity system in the classic volume by Wickizer and Bennett (1941), an approach updated by Barker and Herdt (1985). Country or village studies that use economic methodologies to analyze rice systems are more numerous; representative examples are Mears (1981) for Indonesia, Hayami and associates (1978) for a village in the Philippines, and Croll (1982) for a household perspective in China. But apart from Bray's (1986) extensive historical treatment, and Oshima's (1987) incorporation of labor demands in wet-rice cultivation into a general explanation of Asian poverty relative to European development, the unique characteristics of rice cultivation in the Asian environment have not been examined for their direct and indirect contributions to the overall process of economic growth.

This paper can merely highlight the key linkages that are likely to mediate these contributions. The Asian rice economy can be characterized in sufficient detail to outline the story and to indicate the nature of the rice economy, especially in economically important ways, without becoming lost in the complexity of any given specific setting. Grigg (1974) provides an excellent description of wet-rice cultivation in Asia before the advent of high-yielding varieties developed at the International Rice Research Institute (IRRI). Barker and Herdt (1985) provide the details on the post-Green Revolution rice

economy and Pingali, *et al.* (1997) discuss the sustainability of high-yielding rice systems.¹⁶

Rice in lowland areas of Asia is produced primarily in irrigated or rainfed paddy fields that are managed intensively in a highly labor-intensive manner. Typical management units are households that own or rent these paddy fields, and few households actively manage more than one or two hectares of irrigated paddy. The median size of management unit for wet rice cultivation in Southeast Asia is less than one hectare, with double cropping the norm if water supplies are adequate.

Most households retain some rice for home consumption, but nearly all households that cultivate rice in Southeast Asia market at least small quantities after the harvest. Farmers with larger surpluses will often store rice for sale well after harvest when seasonal prices are higher. Purchased inputs are used almost universally, and nitrogen fertilizer—usually urea—is normally the single most important input bought from the market. Hired labor has become an important cash purchase as well, although exchange labor during planting and harvesting has been a feature of Asian rice cultivation for ages.

Large cash purchases of fertilizer and labor, small size of rice plantings managed by individual households, and active marketing of a significant share of output combine to make intensification of rice cultivation and the achievement of high yields an important objective of farmers and governments alike. Successful intensification has been important to farmers in order to keep their incomes on a par with opportunities elsewhere in the rural and urban economies. Likewise, intensification has been important to governments who are concerned about the availability of marketed supplies of rice that are needed to feed growing urban populations.

The very nature of irrigated rice cultivation means that farmers are not able to raise their rice yields successfully unless the government provides key ingredients in the intensification process. At the same time, governments cannot intensify rice cultivation directly—farmers are needed to make all the key managerial decisions that translate productive potential into high yields. An important symbiosis exists in the relationship between farmers and governments, even when the political system does not support a democratic voice for the rural population. Each party is dependent on the other to provide a crucial element of success.

Asian rice cultivation uses a small-farmer technology that offers high rewards to farmer knowledge and skilled management. These rewards depend on availability of high-yielding varieties, productive inputs, and incentives for their use, all of which can be delivered efficiently only through a system of competitive rural markets. Governments have had to build rural marketing systems that were able to connect farmers with local buying agents, thus transmitting market information and permitting exchange to take place, which generated gains in efficiency from trade. The marketing system serves to transform agricultural commodities at the farm gate into foods at the time, place, and form desired by consumers. An efficient marketing system has to solve the problem of price discovery, at least at the local level and seasonally, even if government price policy sets a band in which such price discovery must take place.¹⁷

¹⁶ A less detailed set of stylized facts for Asian agriculture is developed by Haggblade and Liedholm (1991) as part of their simulation model that traces the evolution of the rural nonfarm economy under the stimulus of linkages between labor demand in agriculture and in the nonfarm rural economy.

¹⁷ See Chapter 4 of Timmer, *et al.* (1983) for further analysis of the importance of an efficient marketing system and the role of price policy in developing one.

Asian governments have also had to make large-scale investments in rural infrastructure. Managing these investments generated important opportunities for "learning by doing" on the part of government bureaucrats and policymakers. Part of this rural infrastructure supported the marketing system--roads, communications systems, market centers, and so on. But large investments were also needed in irrigation systems so that rice cultivation could be intensified successfully. Such systems have been the responsibility of governments nearly everywhere. The coordination and planning skills required to design, build, and maintain large-scale irrigation systems imposed serious obligations on those governments that undertook the tasks successfully. On the other hand, governments that acquired these skills by learning how to manage an irrigation-based agriculture also acquired a confidence in governance that was quickly applied to other dimensions of managing economic growth.

The key steps in the argument are now in place. Food security became the principal task of Asian governments with large populations in relation to their arable land resources. Policies to stabilize rice prices were the key interventions used to provide food security at the national level. Heavy reliance on rice imports was not feasible unless the country was small--for example, Singapore, Hong Kong, and to some extent Malaysia. But the larger countries of Southeast Asia had to grow nearly all of their own rice. Inducing farmers to produce this rice, for their own needs as well as surpluses for urban consumers and non-rice farmers, required governments to pursue an agricultural development strategy that focused on small farmers, reached them via markets, and raised the productivity potential of rice cultivation through large investments in rural infrastructure, irrigation, and research on high-yielding rice varieties.

Food Security and the Government

Both tasks undertaken by Asian governments--reaching small farmers via markets and investing to raise agricultural productivity--created positive externalities for the overall process of economic growth in addition to the direct contribution from higher output of the staple food grain and the consequent lowering of the real wage bill.¹⁸ First, making rural markets work is a direct lesson in the efficacy of a market-oriented economy. Building an efficient rural marketing system requires careful intervention and support from the government, but not too much support if the private sector is to grow, learn how to take risks, and compete effectively. Governments must learn how to play their role in a market economy just as traders, banks, shipping companies, and supporting institutions must learn theirs. Solving the problem of food security in Asia forced governments to learn the importance of a market-oriented economy and the means to make it work.

Simultaneously, however, the need to invest in public infrastructure, irrigation, research and extension systems and to ensure the price stability that enabled the market economy to grow quickly and efficiently also forced Asian governments to develop a high degree of governmental competence in economic management. Without both components--a market economy and a competent government investing in agriculture--Asian countries could not have developed the high degree of food security that they have achieved at the national level. Not all countries have been equally successful in translating this aggregate degree of food security into equitable access to food on the part of all households. That success would require a government devoted to alleviating poverty as well as stimulating growth while maintaining political stability. Among countries of Southeast Asia, Malaysia

¹⁸ For a review of the importance of externalities in the development process, see Stewart and Ghani (1991).

and Indonesia have good records of achieving all three objectives of growth, stability, and improved welfare, although the records in both countries have been threatened by the financial crisis.

If this argument for a market economy and competent management on the part of government is correct, the rapid economic growth in Southeast Asia from the 1960s to the late 1990s can be traced to a considerable extent to the development of a new rice technology that greatly increased yield potential when the surrounding environment--economic, ecological, and political--was conducive to rapid adoption by farmers. The elements of this environment are well known for irrigated rice systems, but they have never been assembled successfully for the staple foods of Sub-Saharan Africa or the agricultural systems that are prevalent in the Outer Islands..

Why Africa is Different (and so are the Outer Islands)

The staple food economies of Sub-Saharan Africa are not easily described with the simplicity possible for rice cultivation in Asia. Two standard references on African food systems, Johnston (1958) and Grigg (1974), stress the heterogeneity and complexity of production systems even within small localities. The point can be made in a vivid fashion by comparing the area around Krawang in West Java, Indonesia, one of the country's major rice bowls, and the Machakos region of Kenya, home to many of the country's most progressive small farmers. A drive across Krawang reveals that irrigated rice is grown as far as the eye can see. Small home gardens surround the many villages, but farming is almost completely a matter of managing a homogeneous ecological environment to grow one crop. The relative simplicity of developing a high-yielding technology for this environment and of learning to optimize its management accounts for the nearly universal adoption of IRRI varieties and the high and stable yields produced from them.¹⁹

The contrast with Kenya and the rest of Sub-Saharan Africa is striking. Wherever it is possible to drive through regions of intensive food production--and the poor state of the road networks often makes driving very difficult for tourists and for trucks-- an unbroken stretch of a single foodcrop is uncommon. Small patches of land with multiple- and intercropping are the norm, and the pattern shifts radically as one crosses areas with changed altitude, soil type, or rainfall. Maize, sorghum, millet, cassava, yams, groundnuts, cowpeas, and many others are intercropped in complex combinations, which reflect the farmer's knowledge of local growing conditions, available technologies, market prices, and the family need for food. Tree crops are almost always the most homogeneous plantings seen.

Tasks to Modernize Multi-Staple Food Systems.--Raising the productivity of such complicated, multi-staple food systems requires more of agricultural scientists than improving the average yield of a single crop when grown under ideal conditions in a pure stand. As with upland regions in the Outer Islands, the farming systems research has not been extensive enough to identify the constraints facing farmers in these heterogeneous environments.²⁰ The economic as well as the ecological interactions among various crops need to be analyzed and incorporated into the research strategy. When successful results have been achieved at the research center, they must then be transmitted back to farmers

¹⁹ A drive from Jakarta to Krawang in the 1990s also revealed many factories being built on former rice paddies.

²⁰ A good review of this approach has been produced by the CIMMYT Economics Staff (1984).

through messages that contain the same range of complexity that stimulated the development of new crop varieties and farming systems in the first place.

The point here is not that rice intensification is easy--that would misrepresent the hard-won achievements in Asia since the mid-1960s and the continuing challenge facing Asian researchers, farmers, and policy makers—but it will be harder to achieve similar results in more difficult ecosystems. The farming systems that produce the great bulk of Africa's food staples are much more complicated, less understood by researchers, and operate under environmental stresses that vary more widely, especially moisture stress, than in the rice-based systems of Asia. A major difference between Africa and Southeast Asia is the role of women in household decision making and management of foodcrop production, which complicates the design of institutions that provide modern inputs, new technology, and credit to farmers. None of these difficulties is insurmountable with appropriate investments in research, infrastructure, and incentives. It remains to be seen how much more expensive these investments will be in Africa than they were in Asia.²¹ A serious test has yet to be made.

A multi-staple food system is more complicated to modernize not only at the farm level but also at the level of marketing inputs and output. Marketing a wide variety of different commodities with varying degrees of substitutability requires greater knowledge on the part of traders, higher storage and transactions costs because of smaller average lots handled, and far more sophisticated policy designs if governments attempt to stabilize prices for the three or four important food staples. But is this degree of intervention in pricing necessary? In the specific context of Ghana, Alderman (1992) asked whether cross-commodity substitution in consumption, production, and storage is adequate to link prices of maize with prices of sorghum and millet. The answer is a qualified yes, with price integration requiring three months on average. Such integration offers the potential for government policy to stabilize the price of maize only, if that is desirable, while allowing market forces to transmit these stable prices to other staple foods that are close substitutes.²²

Reliance on Imported Food.--The food economy of Africa has one other feature that distinguishes it from the rice economy of Southeast Asia: the heavy reliance on imported wheat to provision urban areas. Although wheat is an increasingly popular food in urban Asia, in none of the Southeast Asian countries does it account for as much as 10 percent of caloric intake. By contrast, in the cities of Sub-Saharan Africa, where roughly 30 percent of the population lives, an average of 50 kilograms per capita of imported grain, most of it wheat, provides nearly 500 calories per day, or nearly 25 percent of daily energy intake. To a substantial extent, Sub-Saharan Africa is dependent on world grain markets to provision its urban (and vocal) population.

Historically, the world market for wheat (and yellow maize) is not nearly as unstable as the world rice market, although instability was similar in the 1990s. Total volumes traded are much higher--on the order of 100 million tons per year each for wheat and maize, compared with only 20 million tons for rice. The shares of production are

²¹ For a particularly eloquent statement of the lack of investment in African agriculture, see Eicher (1992). Block (1995) demonstrates how serious the productivity problems are in agriculture.

²² The rather long period required for price integration to occur may be a significant impediment to such a single commodity stabilization policy. Three months of highly unstable prices for substitutes may impose very heavy burdens on consumers who depend on these commodities for most of their caloric intake. Similarly, prices can collapse at harvest for these commodities for as long as three months even if maize prices are stabilized, thus providing to producers few of the benefits of stable prices. The difficulties of stabilizing prices in the African context, and the costs of doing so, are modeled in Pinckney (1988).

similarly larger. Rice trade is just 5 percent of world production, whereas wheat and maize are 20 and 15 percent, respectively. The thinness of the world rice market made it notoriously unstable, thus forcing policy makers in rice-consuming countries to insulate their domestic rice economies from the world market. Such insulation is not nearly so important for economies whose staple food is wheat or yellow maize. Many African cities depend heavily on imported wheat for their staple food supply.²³

Compared with a rice-based, domestically supplied economy, a wheat-based, import-supplied food economy does not have the same imperative to develop its domestic food production. When the domestic staples produced are root crops or specialized coarse grains not available in world markets, governments are even less inclined to invest in domestic food production. If a political economy with a powerful urban bias is superimposed on this bifurcated food economy, the neglect of African food producers is easily understandable.²⁴

The obvious concern in a decentralized Indonesia is that urban politicians will face similar pressures to neglect their farmers, or even to tax them heavily. It is not easy to see how to prevent this bias, either politically or economically. In particular, if price stabilization of staple foods is important to both consumers and producers, the thin international market for several of these crops rules out the trade-oriented approach used in Southeast Asia. Price fluctuations in world markets for white maize and local varieties of sorghum and millet are similar to those for rice, and high transportation costs mean extraordinarily wide margins between c.i.f. import and f.o.b. export prices²⁵

IV. The Role of Macro Food Policy: Food Security During Indonesia's Transition to a Market Approach

Even in a decentralized Indonesia, macroeconomic policy will be a key component of food policy and the economic environment in which food security strategies are designed and implemented at the regional level. From the point of view of central government policy, food security can be thought of as a continuous spectrum – from the micro perspective of nutritional well-being of individuals all the way to the macro perspective that assures regular supplies of food in national, regional, and local markets. One important objective of “macro” food policy is to create an environment where access to purchasing power, nutritional knowledge, and health care within each individual household assures adequate demand for food in those markets, thus guaranteeing food security at both ends of the micro-macro spectrum. Creating food security at both the micro and macro levels is a complicated task in an open, market-oriented economy, which is the only kind of economy that can generate rapid growth and alleviation of poverty. Indonesia's macro food policy is now in transition from a heavily state-managed approach

²³ Imported rice is increasingly important in several West African countries. Dawe (2000) also argues that the world rice market may be approaching the stability of the wheat and corn markets, thus opening options for a trade-oriented strategy of food security for rice-consuming regions where ecological conditions make rice production too expensive.

²⁴ The political economy dimensions of the argument are explained in Bates (1981).

²⁵ Several countries in East Africa fluctuate around self-sufficiency for white maize, their staple grain. In good years exports are possible and in bad years imports are needed. For landlocked Malawi, the swing between the c.i.f. and f.o.b. prices can be very wide indeed--from negative prices for exports to more than \$300 per ton for imports! The lessons for several provinces in Eastern Indonesia are obvious.

to food security to an approach that relies much more heavily on markets. Decentralization can both help and hinder this process.

To achieve this transition, it is necessary to understand that food security depends on the successful coordination and integration of three policy agendas – rapid growth in the macro economy, poverty alleviation through rural economic growth, and stability of the food system. The complexity for macro food policy arises because each of these three topics is linked causally to the other two through market and behavioral mechanisms. Rapid growth in the macro economy must be designed to reach the poor through market-generated new jobs and higher real wages. Otherwise, poverty alleviation is delayed and more direct interventions to reach the poor, such as the targeted rice distribution program (OPK), will be needed (Tabor, 2000). Similarly, raising poor households above the poverty line does not guarantee their food security if food supplies disappear from markets or prices rise beyond their means.

There is widespread agreement that a rural-oriented development strategy, at least for the first decade of the 21st century, will be the key to linking rapid growth to poverty alleviation. Both Indonesia's own experience and comparative lessons from the rest of East and Southeast Asia show conclusively that growth of the rural economy helps the poor more than growth in the urban industrial sector and that such growth also contributes to more rapid growth in the overall economy. The question is how to do it, especially now that increasing productivity in rice growing is no longer the engine of growth in rural areas. Indeed, reliable availability of inexpensive rice in rural markets may be the key to rapid expansion of small and medium enterprises (SMEs) based on labor-intensive processing and manufacturing. Real wages can be kept high at the same time that labor costs for rural manufacturers are kept low. This opportunity to emphasize rice *availability* rather than rice *production*, especially on the Outer Islands, may be the key to renewed growth in rural areas.

Indonesia was a leader in the agricultural revolution that swept through East and Southeast Asia since the 1960s. The living standards of most Indonesian people improved dramatically, despite the setbacks from the Asian financial crisis. Far fewer people are trapped in poverty in 2001 than in the mid-1960s, food security has been enhanced by surpluses of rice available in regional markets, the economy has become much more diversified as the manufacturing sector outgrew the agricultural sector, and export-oriented companies are competitive in international markets. Throughout the region, and especially in Indonesia, governments are becoming less involved in day-to-day production, regulation, and control of their economies. Instead, they are increasingly focused on providing a stable macroeconomic and legal environment in which the private sector is the engine of growth and where economic decision making has been significantly decentralized.

The market-oriented approach is welcome, but it brings a burden to policy makers as well. It is more difficult to design and coordinate relationships among sectors so that the growth process is rapid, equitable, and sustainable. Food security now requires an integration of macroeconomic policies that affect the speed of economic growth, sectoral policies and institutional changes that affect the distribution of that growth, and implementation of decentralized food distribution and stabilization schemes that do not distort rural markets but still guarantee continued access to food by the poor.

When rapid growth occurs, an additional problem arises: the relationship between the rural and urban economies during the process of industrialization. In all successful economies, incomes earned from farming tend to lag behind those earned in other occupations because labor productivity increases as workers shift from agriculture to

manufacturing or the modern service sector—the long-run process known as the structural transformation. In Indonesia, there has been a growing spread between the wages earned by unskilled agricultural workers and new entrants into labor-intensive manufacturing sectors such as garments and electronics. During the financial crisis the rural economy actually expanded in relation to the urban sector, but even the modest recovery in 2000 renewed the long-run pressures on the rural-urban terms of trade and on rural incomes. These pressures are historically inevitable in a successfully modernizing economy.

In the face of these pressures, the challenge is to transform Indonesian agriculture by reducing its heavy dependence on rice, integrating the sector more fully into the industrial sector, especially through greater processing activities, and keeping rural incomes high enough to avoid rapid migration of workers to cities. This challenge to diversify agricultural systems is not unique to Indonesia. It is the heart of the tension generated by all successful structural transformations. But the political pressures to resolve the tension can quickly distort policy making and cause massive budget losses, burdens on consumers, and conflicts with trading partners. A macro food policy that helps smooth the transition from a poor and rural economy to a rich and urban economy can pay very high dividends, especially if local political authorities come under less pressure to protect their own farmers at the expense of their neighbors and their own consumers.

Policy making during the structural transformation thus becomes the organizing framework for macro food policy analysis. The advantage of this perspective is the need to keep long-run objectives and economic forces in focus, at the same time that short-run crises receive urgent attention. For example, when the government attempted to mitigate the problem of low prices for rice farmers during the main harvest in 2000, the structural transformation had already reduced the significance of rice to the national economy, to consumers, and even to rural incomes. The great majority of rice-producing families earn more income from non-rice sources, including non-farm sources, than they do from producing and selling rice. Growing rice is a source of income competitive with non-farm wages for only a small share of rural households, and that proportion will fall quickly in the future. If efforts to raise incomes of rice farmers are not consistent with these longer run forces, the efforts will at best be expensive palliatives that slow down the movement of resources to higher paid alternatives.

Successful macro food policy seeks more efficient paths. Although the path followed by the Indonesian food economy over the next decade and beyond will depend on responses to specific challenges and opportunities, any successful path will involve greater diversification of agricultural production and consumption, continued commercialization and market orientation, and a healthy balance between the roles of the public and private sectors. At the core will be the welfare of the farm household. Market mechanisms to enhance asset accumulation, including land acquisition and larger enterprises for successful farmers, will be needed for these households to remain competitive as agricultural producers. More effective rural credit systems will help this process, but institutional changes in land tenure are also likely to be needed.

Policy in a newly democratic Indonesia needs to find new paths to the rapid alleviation of poverty and to speed the inclusion of previously excluded communities into a more just and broad-based economy, an important part of the rationale for political decentralization. The issue is how to accomplish this goal within a sustainable institutional and economic framework. Freedom is not just a political reality; it carries important economic dimensions as well. Competitive markets have proven to be the only institution able to accommodate the simultaneous demands for political and economic freedom. This lesson and others from modern economic history provide important guidelines on the issues

that Indonesian food policy analysts will face and the approaches that are worth consideration.

Indonesia's rice economy is caught mid-way in a transition from being a sector heavily regulated by a centralized Ministry of Agriculture and stabilized by a well-financed food logistics agency (BULOG) to being a market-oriented sector which depends on farmer and consumer decision making to allocate resources efficiently. The large gap between domestic and world prices that emerged during the financial crisis in 1997 continues to narrow, but Indonesia's rice prices remain substantially above world prices--in contrast to the long-run parity seen from the mid-1970s to the mid-1990s.

The key question at this juncture is how to complete the transition to a market-oriented rice economy while recognizing the constraints on policy initiatives that face the new government. It is necessary to understand how rice prices were stabilized and maintained on the long-run trend in world market prices before the financial crisis in order to understand why the policies that achieved that desirable outcome are no longer appropriate. The details of this story have been spelled out above, but in summary, BULOG defended a floor price and a ceiling price through a combination of the following policy instruments:

- monopoly control over international trade in rice,
- access to an unlimited line of credit (at heavily subsidized interest rates in the early years; at commercial rates with a Bank Indonesia guarantee in the later years),
- procurement of as much rice as necessary to lift the price in rural markets to the policy-determined floor price, and
- extensive logistical facilities, including a nation-wide complex of warehouses, which permitted seasonal storage of substantial quantities of rice (including the one million tons for the "iron stock" that was considered essential for Indonesia's food security). These rice stocks, accumulated through domestic procurement in defense of the floor price and through imports when domestic supplies were inadequate, were then used to defend a ceiling price in urban markets. In the early years, the ceiling price was explicit and announced publicly; in the later years, it was informal, providing local DOLOG officials more flexibility in maintaining stability of rice prices.

This was a heavily interventionist approach to formation of rice prices in Indonesia. Still, few observers doubted the need for such intervention in the late 1960s and through the period of instability in the world rice market in the 1970s. An econometric assessment of the 25-year period from 1970 to 1995 concluded that BULOG's stabilization efforts paid very high dividends in fostering faster economic growth during Repelita I and II, apart from the additional benefits provided by enhanced political stability. But even this assessment concluded that benefits were diminishing as rice became a much smaller proportion of the value added in the economy and as a share of consumers' budgets. By the mid-1990s there was clearly a need to design a much more market-oriented price policy (Timmer, 1996c).

This need for reform of rice policy was driven by two forces. First, the price stabilization program was very expensive in budgetary terms, because heavy subsidies had to be provided to BULOG to maintain large stocks, subsidize exports when surpluses accumulated, and subsidize imports when domestic supplies were short. The increased corruption in the agency in the mid-1990s further called into question the use of public funds to support the price stabilization role. Second, successful stabilization of rice prices enhanced the profitability of growing rice and biased farmer decision making toward its cultivation. This bias was probably desirable as new rice technology and extensive investment in rural infrastructure, especially irrigation, meant farmers had to learn how to

manage a new production possibility frontier. But by the 1980s, the bias was causing serious difficulties in diversifying Indonesia's agriculture toward higher-value crop and livestock systems.

A long-run decline in the price of rice in world markets, and significantly greater stability in world prices, have now sharply lowered the opportunity cost of rice to the Indonesian economy (Dawe, 2000). To have better income-earning prospects in the future, farmers will need to diversify out of rice growing. Alternatives to this high-cost and inefficient approach to rice price policy were already under discussion in the mid-1990s (Timmer, 1997a). Although various analysts had differing priorities for reform, the core ideas were similar.

In summary, they argued that Indonesia should rely much more heavily on rice imports for its food security, including taking the lead in forming a free trade zone for rice in East and Southeast Asia (possibly to include Bangladesh and India as well). Substantial investments in rural infrastructure to improve efficiency of rice marketing would be needed so that traders and farmers would buy and store nearly all of the harvest. Continued development of rural capital markets would also be needed to ensure that the financial liquidity traditionally provided by BULOG procurement in defense of the floor price would be available from the formal banking system at reasonable rates to farmers and traders. Greater variability in seasonal prices would be permitted so that these farmers and traders could earn adequate returns on their investments. Such variability would not be a problem for consumers because rice had declined to a small and manageable share of their budget expenditures. In case of large increases in rice prices in world markets (less likely with a large Asian free trade zone) or localized shortages, subsidies to poor consumers could be targeted through special logistical efforts (BULOG had already experimented with such a program during the drought in 1991). Variable tariffs on rice imports were also discussed as a mechanism for stabilizing rice prices in Indonesia without the need for a costly logistical agency.

These discussions about improving the efficiency of the rice economy were put on hold during the financial crisis, although both the IMF and the World Bank pushed for liberalization of rice trade and curtailed Bulog activities as part of their support programs. Indeed, it is these donor efforts that have pushed Indonesia into the transition that is currently underway, and it is clear the donors would prefer to see the process completed as rapidly as possible. There is substantial merit to the market-oriented rice economy seen at the end of this transition, and it remains a highly desirable goal. But there are also substantial barriers in the way of this outcome. It will be important over the next two to three years to deepen understanding of how the Indonesian food economy functions, especially in a decentralized setting, and to help design policies that overcome the technical, economic, and political barriers to a smooth transition to a market-oriented rural economy.

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