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How to Facilitate or Stifle Economic Development: The Role of Agriculture in Indonesia and the Philippines

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I. Introduction

Strikingly different patterns of agricultural growth and widely divergent results in terms of rural income, poverty. and employment have cmcrged in Southeast Asia. In the Philippines, with some regional variations, a pattern of declining real farm wages, increasing landlessness in worsening poverty and diminishing employment relative to demand for jobs has emerged despite some brief periods of improvement since 1960. Since 1980, the employment and poverty situation has deteriorated sharply, particularly in areas concentrating on single traditional export crops (like sugar or coconuts) but also in a more general context. Indonesia (particularly in Java, which contains over 60 percent of the population) succeeded in reversing a seemingly inevitable worsening of poverty and inequality in the rural economy. with strong evidcncc indicating that rural real wages and income of small farmers rose substantially between the mid-1970s and late 1980s.

Why such divergent patterns of rural development exist and the lessons that can hc extracted from the varied cxpcricnccs of Indonesia and the Philippines are subjects of this paper. Wc begin wilh a stylized description of the typical historical pattern of agricultural growth in the monsoon-Southeast Asian economies. Wc then compare actual patterns of growth with the stylized pattern and comment on pertinent policy issues and responses. Macroeconomic policies are of particular importance in understanding differences in agricultural growth, rural poverty. and employment patterns between the two countries.

II. Stages of Growth

In Southeast Asia, the pattern of agricultural growth can be represented by three specific stages. The three stages can be distinguished by the differing responses to rising demand for agricultural output associated with population and income growth.

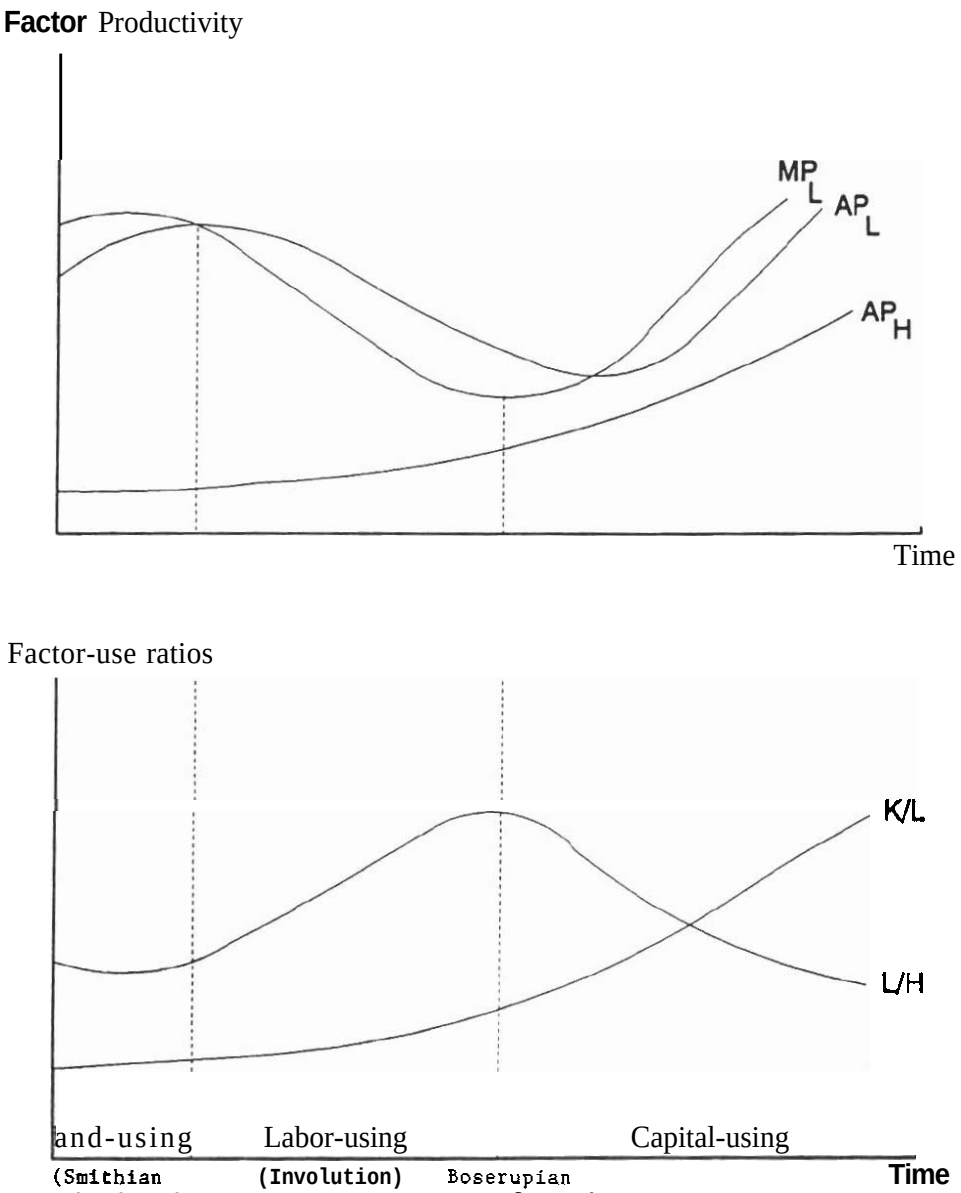
The land-using stage refers to the period of development when cultivated land area is expanding. This period is characterized by an increasing output per worker due primarily to Smithian economies-of-scale frotn specialization (Borland and Yang, 1992; Young. 1928). The labor-using phase corresponds to what is referred to in peasant studies as agricultural involution (Geertz, 1966). Population pressure leads to more labor-intensive methods of cultivation and declining labor-productivity. If the Boserupian forces of technological change and capital accumulation arc sufficient to offset these Malthusian forces, then the economy can escape a dismal steady-state and enter a period of capital-using development. The

states are described below for a hypothetical country corresponding to conditions found in Southeast Asia and illustrated in Figure 1.

2.1. *Land-using Stage*

In the pre-modern e n , the economy consisted principally of traditional agriculture. People settled first on the fertile lands of river deltas and basins and then moved on to less fertile areas as the population expanded. As population rose, the rising demand for food was met by an expansion of cultivated area in the same proportion as the demand growth. When land was abundant, more land was brought into production. The method of production expansion was simple and remained unchanged as long as the supply of land was perfectly elastic (see, for example, Pelzer, 1945; also Huke. 1963).

Figure 1
A Stylized Portrait of Agricultural Development



As population expands without land constraints, the economy experiences at best slow growth in per capita income due to increasing specialization within communities and between communities. During this phase, specialization affords increasing returns to labor as described by Borland and Yang and Young, who referred back to Adam Smith's description of growing per capita income during a period of land abundance. As a consequence, paying factors their marginal products would more than exhaust total income. Capitalism is infeasible (Day, 1982).

2.2. *Labor-using Stage*

After the fertileandaccessiblelandhasalready been brought into cultivation, subsequent increases in food demand are met by bringing less fertile lands into production and by increasing the intensity of production on cultivated hectarage, both of which lower the average product of labor as show in Figure 1. The land-laborratiodeclines rapidly after the land frontier is reached. As wages fall, and agricultural involution intensifies, there isdangerof theeconomy entering a Ricardian phase of stagnation and polarization. The rural economy may exhibit symptoms of a low-level equilibrium trap: declining real incomes and wages. stagnation of crop yields, environmental degradation and mounting landlessness, poverty and underemployment. As described in Jorgenson's dual-economy model, if the negative force of population growth is not offset by technical progress, the economy stagnates at subsistence income. Escape from the Ricardian trap is possible only by increasing the rate of technical progress or by absorbing rural labor into nonagricultural employment. The rural economy then enters a third stage.

2.3 *Capital-using Stage*

At this stage, capital inputsare substituted for traditional inputs. Land is augmented by the use of fertilizer, new high-yielding seed varieties, and irrigation. Where the low-level equilibrium trap is overcome, capital per hectare of farmland rises as does yield per hectare and output per worker. Wages increase as a result of higher returns to labor and the demand pull of labor out of agriculture into the commercial-industrial sector. Although the ratio of land to totallaboris still falling, agricultural land per worker is rising as labor-saving techniques are applied. As farm labor becomes more expensive, it is replaced by the use of mechanical power (i.e., tractors and treshers). The development of the commercial-industrial sector is critical to the availability of these capital inputs and hence the rate of technical growth in the agricultural sector. The patternofindustrialgrowth and thelinkages with the rural economy fostered by industrial, trade, and macroeconomicpoliciesareimportantforagricultural development. In particular, intersectoral resource flows, terms of trade, and demand patterns generated by industrial expansion are of critical importance to the farm sector. The sustainability of rural development will depend on positive interactions between the sectors (Johnston and Kilby, 1975).

A precondition for an increasing rate of capital accumulation is an improvement in underlying conditions favorable to a higher rate of return to investment. One such factor is the increasing division of labor that occurs throughout both the land- and labor-using stages of development. Division of labor and the evolution of markets increase the returns of human capital and the greater human capital plus these same determinants increase the return to physical capital. Land-augmenting investments such as irrigation also increase the returns to research and development. Some of these investment opportunities (e.g., agricultural research) require institutional innovations that facilitate cooperation beyond bilateral contracting. The institutional changes required to facilitate these new forms of investment may be labeled as the "Boserupian transformation."

The evolution of economic development through the three stages just described is induced by changes in relative factor scarcities. Labor abundance induces labor-using development and capital accumulation facilitates the capital-using phase. However, inappropriate government policies may thwart the natural order of efficient evolution. Protection against foreignanddomesticcompetition, and cheap capital policies can divert scarce capital into inefficient uses, e.g. premature mechanization of farming (David and Otsuka, 1989; Coxhead, 1989)

thereby stifling the efficient evolution described above.

III. Agricultural Development in the Philippines and Indonesia: A Comparison

It was in the mid- to late 1960s that modem varieties (MVs) of rice were introduced. The development of the new rice technology occurred at an opportune time. For the Philippines, by the early 1960s the land frontier had been reached and the rural economy was entering a period of mounting population pressure that can only be offset by land-saving technology. Indonesia had suffered through a disastrous period in its brief national history with widespread poverty, malnutrition, and runaway inflation. In order to reduce balance of payments pressures and to stabilize the economy and the society, improvements in rice production based on higher productivity were essential. In most of Java, containing over 60 percent of the population on Indonesia on only 7 percent of the land, there were even more acute pressures on farmland and labor market conditions than in the Philippines.

The initial conditions for the agricultural growth appeared, in most aspects, to be more favorable in the Philippines than in Indonesia. The Philippines had a higher per capita income, more agricultural land per worker, higher primary school enrollment and literacy, and agricultural exports were more buoyant and much larger on a per capita basis than Indonesia. Average farm size in the Philippines in 1971 was 3.6 hectares, compared to less than a hectare in Indonesia in 1973. (Data sources for the statistics presented in this paper include: IRRI, 1987: FAO, 1990; and World Bank, 1990). The Philippines was also where the new, fertilizer-responsive rice MVs were initially developed and tested. Fertilizer was more readily available and at more favorable price in the Philippines than Indonesia in the late 1960s. Indonesia had a higher percentage of its rice land under irrigation (about 54 percent for 1966-69 compared to about 43 percent in the Philippines). The main difference between the two countries was that the distribution of farmland was more even and was composed of a larger percentage of owner-operators in Indonesia than in the Philippines. In Indonesia, farms of 3 hectares or less comprised about two-thirds of total farm area and 94 percent of farms in 1963. In the Philippines in 1960, farms of 5 hectares or less made up 43 percent of area, but 81 percent of holdings. In the Philippines, farms of over 10 hectares accounted for about a third of total area and 5.6 percent of the number of farms. In Indonesia (in 1963), farms about 10 hectares in size comprised only 12.5 percent of area and less than 1 percent of farms. In both Indonesia and the Philippines, rice farms account for a large share of total farms and farm area and rice lands tend to be more evenly distributed than non-rice lands. The Philippines in the early 1970s introduced land reform legislation that limited retention size of rice and corn land to 7 hectares and sought to redistribute landholdings above retention limits to small tenant cultivators who would eventually become owner-operators. The land reform appears to have at best mildly reduced the concentration of landholdings in the Philippines, though other factors (such as subdivision of holdings among heirs) also contributed.

The initial level of rough rice yields per hectare was slightly higher in Indonesia than in the Philippines, reflecting the more intensive operation on smaller parcels and perhaps a difference in soil fertility and irrigation coverage as well. However, the gap, at the time of introduction of MVs, was only about half a ton of paddy per hectare (1965-69).

The 1970s was a period of rapid adoption of rice MVs and other modern inputs in both countries, supported initially by large-scale credit subsidies, irrigation expansion, and improved price incentives. Total agricultural credit rose ten-fold between 1970 and 1975 in the Philippines and five-fold over the same period in Indonesia. Imgation as a proportion of total rice land rose from 26 percent in 1969 to 36 percent in 1979 in the Philippines and from 53 to 60 percent in Indonesia. Fertilizer use per hectare of rice land rose from 22 kilograms to 35 over the 1970s in the Philippines, and from 17 to 73 kilograms in Indonesia. A major difference between the two was that price incentives (farmgate price of paddy relative to fertilizer) were steadily improved in Indonesia, yet deteriorated in the Philippines over

the course of the 1970s. By the end of the 1970s, lndonesian rice yields per hectare had risen by a third, while the improvement in the Philippines was about a fourth. Indonesian rice farmers harvested about 3 metric tons of rice per hectare compared to 2.1 tons by their Philippine counterparts in 1979.

In the non-rice sector, agricultural exports at first boomed in the Philippines, more than tripling in dollar value between 1970 and 1974, but then levelling off for the remainder of the decade. The boom in commodity prices allowed the Philippines to overcome the first oil shock and to borrow heavily against a good credit standing in world financial markets. lndonesian agricultural exports improved steadily (falling only in 1975 with the world recession). and by the late 1970s, lndonesian yearly agricultural exports exceeded those of the Philippines by over $600 million. Output per agricultural worker rose by 2.3 percent per annum in Indonesia between 1976-82, compared to less than 1 percent per year in the Philippines. The low rate of labor productivity growth in the Philippines reflected mounting population pressure and signalled deterioratinglabor market conditions. In the 1970s, real wages in both agriculture and nonagriculture declined rather sharply in the Philippines (David, 1987) temporarily turning upwards in progressive rice growing areas at the end of the decade (Roumasset and Smith, 1981). lndonesian real wages, which had been stagnant or falling after the mid-1970s began showing an upward trend (Manning, 1988; Naylor, 1990).

The 1970s was a decade of moderately strong growth performance in both Indonesia and the Philippines. Between 1973 and 1980, real GDP grew by 6.1 percent in the Philippines and by 7.9 percent in Indonesia. Agricultural output in both grew by about 4 percent per annum. However, on a per capita basis, real GDP growth in Indonesia was almost 5.5 percent compared to 3.3 percent in the Philippines. Moreover. Indonesia had shown a stronger growth in nonagricultural employment. Only about 10 percent of the increment in the rural labor force was directly employed in agriculture in Java (Manning, 1988), the remainder finding employment in services, construction and increasingly in new manufacturing industries. Whereas the share of agriculture in employment declined fmm 64 to 55 percent in Indonesia in the period 1970-1980, the share that the Philippine agricultural sector had to absorb actually increased from 51 to 52 percent. Indonesia, no doubt, was favored by a boom in oil revenue during this period. However, the Philippines also had access to rather ample amounts of foreign exchange, and bormwed abroad heavily to finance expansion of industry and infrastructure to support it.

The relative decline of the Philippines in the 1970s became a complete economic collapse in the 1980s. Governmental inefficiency, conuption. and rent-seeking are commonly cited causes of the poor results in the Philippines. Yet the Philippines has no monopoly on these ills. What does distinguish the Philippines is a trade and industrial policy regime that is heavily biased against agricultural production (Bautista, 1987; Power and Sicat, 1971; Montes, 1991; Ranis, 1991; Balisacan; and Clarete and Roumasset, 1987). Agriculture has been victimized by an inward-looking, import-substituting industrialization strategy over the past four decades with only temporary and mild exceptions (Shepherd and Alburo, 1991; Montes, 1991). The overvaluation of the peso, high tariff and nontariff protection of manufacturing, and taxation (both explicit and implicit) of agricultural exports have hindered the development of the rural Philippines. The worsening macroeconomic situation of slower growth, rising inflation and real appreciation of the peso in the late 1970s and early 1980s discouraged agricultural investment.

In the 1980s. the infrastructure associated with agricultural growth has deteriorated. Rural credit programs conwacted as default rates became extremely high. In addition, the domestic fertilizer industry was heavily protected and inefficient. Restrictions were placed on entry into the industry. The result was high cost fertilizer. Fertilizer consumption fell significantly between 1980 and 1985. Irrigated area stagnated. Rice yields grew slowly between 1979 and 1987; the increase was from 2.16 to 2.63 tons per hectare. The nominal value of agricultural exports in 1988 was $750 million below what it was in 1980.

Macroeconomic conditions associated with debt repayment, fiscal deficits, high inflation, and an appreciating peso likewise exemised an adverse influenceon Philippine agriculture. By the late 1980s, the number of absolutely poor rural households in the Philippines rose from 2.9 million to 3.6 million. The sharp increase in poverty comes despite efforts at land reform and introduction of MVs, and despite a respectable growth of agricultural output for the 1970s. There appears to be a failure of growth to stimulate positive linkages between agriculture and nonagriculture. In particular, growth of nonfarm employment in labor-intensive manufacturing and modern service industries seems not to have been stimulated. Moreover, poverty incidence has been as widespread among small farmers as among landless workers (Balisacan). The agricultural incomegrowth that has occurred in the Philippines has apparently not created much demand for labor-intensive nonagricultural goods. Income growth in rural as in urban areas seems to have been concenhated among higher income groups. Agrarian unrest has mounted in the rural Philippines as the unfulfilled promisesof the late 1960s and early 1970s have resulted in widespread rural poverty in the 1980s.

Indonesian experience in the late 1970s and 1980s contrasts sharply with that of the Philippines. From the vantage point even of the mid-1970s, it was Indonesia, rather than the Philippines, that was widely viewed as in danger of widespread impoverishment as population grew on a fixed supply of agricultural land (Hayami and Kikuchi, 1984; Collier *et al.*,1974). In 1970 it was estimated that more than 40 percent of rural households in Java were landless or had less than one-tenth of a hectare of land and that "75 percent of Java's rural households clearly do not have land enough to meet the fanners' own ideas of the poverty line and the true percentage might be much more" (Palmer, 1977, p. 212). Rising population pressure seemed to guarantee inexorable worsening of rural poverty in Java in spite of stepped-up expenditures by government on transmigration to outer islands and adoption of MVs, made possible by the oil boom.

In rural Java, it appeared that labor supply expansionon a fixed amount of arable land was more rapid than land-saving technological progress or growth of nonagricultural employment. With the elasticity of substitution of labor for land being below unity, the expectation was that continued population growth would push down the relative income share of landless and land-poor households. Moreover, the traditional "poverty-sharing" institutions associated with traditionalrice technology were eroding. Rather than continued "involution" there was a fear of polarization of villagers into extremes of impoverished rural landless versus a landed elite.

The small size of industrial sector employ–ment in the 1970s also made it appear unrealistic to expect even rapid industrial growth to absorb much of the increment in the rural labor force for the next decade at least. Meanwhile, modern rice varieties first introduced in the late 1960s failed to live up to expectations as harvests stagnated in the mid-1970s. Though it was true that the government rice intensification programs had led to an increase in the proportion of the commercial rice crop from about 20 percent of production in the late 1950s to between 30 aid 40 percent in the 1970s (Mears, 1981, p. 97). there were fears that a breakdown of traditional arrangements in rice sector coupled with greater concentration of landholdings could lead to agrarian unrest.

Changes in contracts and techniques for rice harvesting observed during the 1970s led some researchers to conclude that MVs themselves were contributing to polarization. Accumulation of rice land was made possible by new landlawspromulgated in the late 1960s, and by the 1970s in some areas of Javaincreased land concentration was being observed (Hayami and Kikuchi, pp. 155-69).

Government programs to provide credit at subsidized interest rates and free irrigation water also appeared to disproportionately benefit larger landowners. Artificial cheapening of interest rates could encourage theprematuresubstitution of capital for labor through mechanization of farm operations such as land preparation and post-harvest work. Though average rice yields had risen somewhat between 1970 and 1975, the gains were thought to be

primarily the result of adoubling of fertilizer use on a per hectare basis. The BIMAS rice intensification program expanded most rapidly during this period and featured credit for ordirectprovisionof fertilizer to rice farmers (along with improved seeds). Movement along a fixed production function rather than a significant outward shift wascharacteristic of Indonesia's early experience with modem rice varieties. Labor demand was growing more slowly than labor supply in rural Java, worsening labor market conditions for the poor and landless.

Several adverse factorsappeared to be leading to a worsening of poverty incidence. The first was the 1972 drought that brought with it rice shortages and rapid escalation of rice prices into 1973. After some recovery in 1974,1975, and 1976, rice MVs proved to be highly susceptibletostemborerdamage. Rural-basedresearcherssuggestedthatproductivity-boosting innovations associated with the "Green Revolution" in rice were driving more and more rural families into poverty by displacing labor (Hart, 1986). Among thesewasthe widespreadintroduction of rice milling by machine, which replaced hand-pounding (as well as larger rice mills). Between 1968 and 1973, the number of small rice mills rose from 5,000 to 35,000 (Mears, 1981, pp. 5-6). One study estimated that ricemilling replaced 125 million mandays of labor (mainly female) valued at $55 million with only $5 million worth of labor of (male) rice mill machinery operators (Collier *et al.*, 1974). *A* second change was the shift away fmm traditional harvesting techniques and associated institutional arrangements that allowed the rural landless to participateinriceharvesting, earning 10 to 15 percent of the crop using small hand-held knives (Kikuchi, Hafid and Hayami, 1984). In place of the traditional "poverty-sharing"system, a more efficient but less labor-intensive system was adopted. Rice farmers would sell thestanding crop toentrepreneursheading teams of harvesters using sickles. The *tebasan* contract limited participation to team members only, thus restricting the access of the largecommunity of rural poor to shares of rice. The traditional system was well-suited to traditional rice varieties that matured at roughly the same time. The new rice varieties matured at varying times, allowing the teams to move from place to place, providing their more efficient but labordisplacing services.

The grim prospects that were feared to be the likely outcome of institutional changes and rapid labor supply growth did not generally materialize in Java, however. The changes occurring in rice production techniques and agricultural labor arrangements can not be properly assessed in isolation from the changes transpiring in other sectors and at the macroeconomic level. Agricultural producers were benefitted by changes in macroeconomic and sectoral policies. Devaluations of the rupiah and improved paddy prices relative to fertilizer costs were stimulants to higher agricultural productivity (Timmer, 1984).

Also, it was difficult for those engaged in village-levelstudies to perceive that long-run positive changes in rice production possibilities had finally started to bear fruit. The crossbreeding of imported modem varieties with local rice varieties resulted in improvements in pest resistance and other characteristics such as shorter maturation periods. Improved irrigation facilities led to steady improvements in yield and in greater cropping intensities. Land ownership did not become as highly concentrated as feared, and rice farmers gained as technological advances led to sharply improved productivity, even on small parcels of land.

What was missed by the polarization/immiserization school is that efficiency-enhancing innovations free up resources for other activities. in the same sector or in other sectors, and theseactivities generate an additional demand for labor. In the case of elasticly demanded agricultural good, for example, an innovation may be labor-saving in terms of labor per unit of output but labor-using in terms of labor per land area. Even when real wages are falling these innovationscushion the fall by rendering thedemand for labor more elastic. The conclusion that the modernization of technology and organization actually caused immiserization was a case of spurious correlation.

Commercialization of rice production led to significant changes in the nonrice sectors of rural

Java. Transport drastically improved, promoting greater labor mobility within Java and much of Indonesia. The "inexorable" advance of population growth had been slowed and reversed in rural areas through improved family planningand theeconomic growth and development process.

The changes observed in rice technology were only a part of a dynamic process of rural development that was sweeping Java and some other main islands of Indonesia (Bali, Madura, Sulawesi, and Sumatra). The underlying dynamism of the rural economy began to be reflected in rising real agricultural wages and significant increases in nonfarm rural employment (Collier *et al.*, 1982, pp. 82-101; Manning. 1988). Significant increases in government expenditure accompanied booming private investment and construction, all associated with the second oil bonanza (1978-1981). Thus, while the revolution in rice production contributed to rising incomes of small farm operators. rapid expansion in demand fnr nonfarm labor benefited the rural landless. The trend towardsreducedpoverty incidence in rural Indonesia became apparent when household expenditure data from the 1976 National Socio-Economic Survey was compared to 1970 data (Dowling, 1984, pp. 32-4).

Detailed surveys of six West Java villages between 1976-77 and 1983-84 (World Bank, 1985, pp. 86-171) revealed that gains in real income and thediversificationofemployment were spread among all economic classes, so that while income distribution was stable. the incidence of poverty was reduced. Agricultural income growth was found to be higher among small fanners. who, accounting for 20 percent of total farm income in 1976, secured 40 percent of the rise in farm incomebetween 1976 and 1983. This indicates that inadequate farm size was not an obstacle to equitable agricultural growth in this period in West Java.

Income gains from agricultural activities in the sample villages reflected increasing agricultural diversification. While rice income increased steadily, larger gains came from production of nonrice crops, fisheries, and livestock (poultry). The shareofrice in total farm income fell from about 70 percent in 1976 to around 60 percent in 1983.

Poverty incidence in the sample villages declined from 50 percent in 1976 to 30 percent in 1983, a substantial change (World Bank, 1985. p. 131n). In the West Java villages surveyed, a strong negative correlation was observed between initial income level and changes in income—so that poor households were proportionately more represented in groups enjoying large gains, while the opposite applied to upper income households. Within the same household categories, there was significant mobility—both upward and downward. Forexample. 9 percent of the sample households actually experienced changes that moved them into the absolutely poor group. Among the sample households, income distribution showedlittlechange, with the bottom 40 percent of the householdsreceiving 14 percent of total income in both 1976 and 1983 and the top20 percent receiving 53 percent of all income in 1976 and 52 percent in 1983. About 20 percent of all households remained poor throughout the whole period; however, per capita income rose by 17 percent even for this group.

Growth of rural incomes had, in all probability, strong positive effects on employment creation through increased market demand for domestically produced goods and services. Analysisof expenditure oattemsshowedthatmadditionalonemillionru~iah of spending by rural households led t o m increase of from 1.2 to 1.5 man-years of employment (World Bank, 1985, pp. 130-36). Nonrice agricultural goods along with manufactured consumer products accounted for high fractions of incremental expenditures. The indications are that the rural income gainsthemselvesled to substantial positive secondary employment effects and contributed to diversification of production within agriculture itself.

Farm land is relatively evenly distributed among farm operators in Java and in the outer islands in Indonesia, though average farm size is rather small even by Southeast Asian standards. Tenancy is less common in Indonesia than in many other Asian countriesso that owner-operated farms are the standard. In 1973, wholly owner-operated holdings

accounted for 75 percent of all farms, while 22 percent of all farms were part-owned and only 3 percent were under pure tenancy arrangements. The size of the tenanted farms was half the average of 1.0 hectare found on owner, or part-owner-operated farms. The distribution of area under owner-operated farms was 77 percent, under part-owners it was 22 percent, so that only one percent was under pure tenant farmers. The proportion of the farm area under owner-operation in 1987 increased, reflecting the impact of transmigration and spontaneous migration, which creates new small-holder-owned farms on the outer islands. Between 1973 and 1987, nverage farm size increased by about ten percent, again reflecting the movement to the outer islands. Farm size off-Java averaged 1.69 hectares in 1987 compared with 0.63 hectares on Java.

Agricultural employment and real wages on Java continued to rise up to the mid-1980s as a result of multiple-cropping (Manning, 1988, p. 51; Naylor, 1990). There was even more rapid growth of nonfarm employment in manufacturing, construction, and services. The improvement in transportation and the very rapid improvement (compared to past trends) in rice yields and productivity have radically changed the situation in rural Java. While most rural households continue to engage in farming, the main trend is towards heightened mobility of labor and diversification of economic activities in the rural sector. Labor was formerly available in almost continuous surplus, hut this is clearly not the case any longer. Labor has been shifted away from low productivity households and farm activities towards more remunerative employment in service, construction, or manufacturing activities.

Though real wages were stagnant between 1985 and 1987, they began rising again in 1988 (Naylor, 1990). A renewed surge in economic growth after the introduction of wide-ranging liberalization of trade and investment policies in 1986 is likely to further stimulate employment and real wage increases.

During much of the past two decades, efforts have been focused on raising the productivity and incomes of small farmers in Java. Among the most important have been the expansion and improvement of irrigation facilities that, in conjunction with disease-resistant, fast-maturing varieties, and fertilizers and pesticides, have permitted more intensive land use and multiple cropping. These efforts largely succeeded with favorable income effects for all groups of rice farmers. These agricultural policies worked because the macroeconomic policy environment became more favorable; inflation was reduced, industrial protection was lowered, and the rupiah was devalued on several occasions. The future evolution of patterns of agricultural growth will likely undergo some major changes in rural Java. The rural work force will continue to grow in Java. Agriculture and rice farming, in particular, will be less able to absorb the additions to the labor force as rice production growth cannot be expected to continue at such high rates (Hart, 1986). Hence, labor-intensive industries and services as well as diversified agriculture, such as horticulture and animal husbandry, will play a key role in providing rural Javanese with employment in the future. The rate of growth in this sectors will determine the future pattern of development in rural Java. If growth is high enough, the shifting demand pattern for labor, coupled with technological development, is likely to result in more mechanized farm operations. Indonesia has apparently entered the capital-using phase of its rural development. If demand for nonfarm labor grows sufficiently, it may be that the average size of parcels will rise and more modem management practices will evolve on farms producing rice and other food crops.

IV. Concluding Remarks

During the past two decades, the rural economies of the Philippines and Indonesia have traversed each other. The upward course of rural Java was made possible by the intensification of agricultural production in an increasingly favorable policy environment for farmers and agricultural workers. Exchange rate, expenditure, pricing, credit and trade policies enhanced incentives for agricultural productivity growth. Subsequently, nonagricultural employment opportunities expanded with rising real wages. The downward course of the rural Philippines

was accelerated by an economic crisis that was in itself the outcome of a punitive macroeconomic and industrial policy environment facing agriculture. The slowdown in agricultural productivity below that needed to offset mounting population pressure in the Philippines has led to increased conflict and polarization.

As Indonesia enters the 1990s, it has increasingly moved to adopt more open, market-oriented policies in order to stimulate growth of income, exports, and employment (Affif, 1990). The Philippines has been unable to achieve any consensuson how toovercomeitsongoing economic crisis. Hence, one can expect the direction of the two economies to remain different, barring unforeseen radical changes in policy.

An intriguing question is: why did growth of agriculture production have strong positive interactions with nonagricultural sectors in Indonesia but not in the Philippines? One fruitful area of further research would be toexaminedifferencesin demand patterns generated by growth in agricultural in–comes. In particular, gains in farm income coupled with Indonesia's unimodal pattern of landholdings are likely to have stimulated demand for labor-intensive nonagricultural goods and services. In the Philippines, the high concentration of landholdings may have led to a skewed pattern of income growth and, consequently, demand patterns may not have created much stimulus for production of labor-intensive goods and services. Continuation of protectionist and inward-lookingindustrial and trade policies in the Philippines may also have prevented development of strong intersectoral growth linkages. Thepatternof growth in Indonesia appears to conform to the induced innovation model proposed by Ruttan, Binswanger, and others, even without taking rent-seeking into account. In the Philippines, however, rent-seeking artificially lowered real wages and arrested the initiation of the capital-using stage that had begun in progressive rice-growing villages during the late 1970s.

Widespread immiserization in Africa may also be viewed as a failure to achieve a Boserupian transformation. The centralization of governance from somewhat competitive tribal hierarchies to noncompetitive and predatory oligarchies has led to pricing, marketingndresearchpolicies thatenhaice therentsoftheestatesectorandleavefood production organized into nonsustainable systems where population pressure erodes the resource base.

The comparison between agricultural development in the Philippines and in Indonesia suggests that the induced innovation paradigm (Binswanger and Ruttan, 1978) is useful for interpreting economic development from an evolutionary perspective. Our preliminary sketch can be extended in anumberof ways. First, the stages of agricultural development may be hypothesized to differ in duration according to factor endowments. Thus the relative land-abundance and demographic transition in Thailand, for example. along with outward-looking growth in the modem sector, allowed Thailand to bypass the involuting stage of falling real wages. Second, the evolutionary dynamics of rent-seeking require further exploration. What changes in institutional prerequisites have allowed the economies to avoid the escalation of predatory rent-seeking andnegotiate the Boserupiati traisformation to capitalistic (or other) economic developmetit? Moreover, the model needs to be supplemented by considerationsof rent-seeking and causes of policy distortions (Gardner, 1987; Balisacan and Roumasset, 1987). Third, asymmetries in adjustment lags need to beexplored. Forexample, if real wages fall after initially rising and inducing labor-saving mechanization (as happened in the Philippines during the early 1980s), employment may not adjust until sufficient time has elapsed for depreciatioo to reduce the stock of labor-saving machinery and Keynesian unemployment may result. Fourth, the stages of agricultural technology may be more explicitly complemented by stages of institutional change. Since capitalism is infeasible during the initial period of Smithian abundance, one may expect hierarchical forms such as feudalism to prevail. As specialization and exchange accelerate in the labor-using phase, there will be a dramatic expansion of bilateral contracting corresponding lo market evolution (James and Roumasset. 1984). After the Boserupian transformation, agricultural firms will become more complex in order to

accommodate specialization between management (of decisions) and control (of assets). In addition, the latent demand for institutions for collective provision of infrastructure, research, and training will, in the appropriate constitutional environment, call forth the supply of those institutions. Finally, the induced innovation paradigm needs to be more extensively formalized in order to explain diverse patterns of agricultural development. In particular, the new theory of endogenous technological change can be exploited in order to fully relate R & D, capital formation (both public and private) and learning to factor scarcities and other determinants.

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