Family Farms and Plantations in Tropical Development[1]

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Abstract:

Small family farms and plantations are the two contrasting systems of agricultural production in the tropics. While the family farm is an old institution, which has existed since time immemorial, the plantation is a new institution brought by Western colonialism for extracting tropical cash crops for export to home countries. Large-scale operation of the plantation was necessary for internalizing gains from investment in infrastructure needed for opening vast tracts of unused lands. However, where the communities of indigenous smallholders had already been established, family farms proved to be equally or more efficient producers of tropical export crops using the family labor of low supervision costs, relative to plantations based on hired labor. This advantage of family farms rose as population density increased and rural infrastructure improved, whereas not only economic but also social drawbacks of the plantation system loomed. Reorganization of the plantation is desired. However, the breakdown of plantations to the operation of smallholders by the government's coercive measures will likely prove to be disruptive and inefficient. A better approach will be to support the initiative of the private sector to reorganize the plantation system into the contract farming system in which an agribusiness enterprise manages the processing/marketing process and contracts with small growers on the assured supply of farm-produced raw materials.

1. Introduction.

Small family farms and large plantations are the two contrasting modes of agricultural production in tropical Asia. What roles will they play under growing globalization today? This essay aims to address this question by comparing between family farms and plantations in their past performances and future potentials.

The term "plantation" refers here to a large farm estate producing a crop (or crops) for commercial purposes, using a large number of hired wage laborers organized under a centralized management hierarchy[2]. It is a new institution brought by Western colonialism for extracting tropical agricultural products for export to home countries. The plantation became especially common after the 1870s with innovations in transportation including the opening of the Suez Canal and the use of steamships and railways.

In contrast, family farms in tropical Asia, in which operators try to stake out subsistence from small tracts of land cultivated mainly by their family labor, is the old institution, which has existed since time immemorial. The family farm is defined here as the farm production unit operated mainly by the operator's and his/her family members' labor. This characteristic makes the actual tillers of soil the "residual claimants" in family farms, whereas laborers tilling the soil of plantations usually have no claim on the residual profit that is defined as output minus paid-out costs. The family farm in this definition can be very large in terms of its operational land holding in high-income economies, as a farm of several hundred hectares can easily be cultivated by one or two family members with the use of modern labor-saving machineries. However, the family farm in low-income economies in the tropics under this study is typically small in the order of a few hectares to even less than one hectare, corresponding to the low market wage rate that represents the major determinant of the farm operator's reservation utility.

A traditional paradigm, developed under colonialism, had been to identify the plantations as modern enclaves geared for the international market, and family farms or "peasants" as dominated by subsistence orientation and irresponsive to profit incentives created by changes in market demands and technology (Furnivall 1944; Boeke 1953). This stereotyped view was demolished by three great development economists, Theodore W. Schultz (1964), Hla Myint (1965) and W. Arthur Lewis (1970). Schultz

convincingly argued that small farmers in traditional agriculture are rational and efficient in resource allocation and that they remain poor not because they are irresponsive to economic incentives but because only limited technical and market opportunities are available, to which they can respond. Myint, drawing on the experience of Southeast Asia, demonstrated how they responded vigorously to market incentives in opening new lands for the production of export cash crops. This observation for Southeast Asia was found by Lewis to be no exception in tropical development worldwide from the late nineteenth to the early twentieth century. As such, Myint and Lewis showed that not only plantations but also family farms acted as the effective carrier of economic development under the first wave of globalization, by which tropical economies were integrated into the world market.

Pushing forward a step further the work of the three great economists, this essay aims to identify the unique mechanism underlying the effective response of smallholders to the opportunities created from globalization, in comparison with that of plantations. My approach is to develop a robust hypothesis in the framework of "new institutional economics" along the tradition of Ronald Coase (1973) and Douglass North (1981), which can consistently explain broad changes in the role of family farms in relation to plantations in the course of modern economic growth, rather than attempting high-powered econometric tests. Discussions shall be advanced on what policies might be effective to promote the capacity of family farms so that they can best contribute to economic development through appropriate interactions with plantations.

Following to this introduction, Section 2 enumerates merits of the family farm system under the specific environmental and technical conditions specific to agricultural production in general. Section 3 explains the unique advantage of the plantation system at the stage of opening new lands for cultivation of crops corresponding to the sudden expansion of external demand. Section 4 specifies the tendency of the plantation system to lose its advantage in the process of closing land frontiers, increasing population density and improving rural infrastructure. Section 5 examines if this tendency applies empirically by comparing the performances of agricultural product exports in four countries in Southeast Asia. Section 6 discusses policies, which may further support the growing advantage of small farms. Finally, Section 7 tries to identify the direction of reorganizing plantations to better serve for the purpose of rural development in the era of globalization.

2. The Advantage of Family Farms

Despite the dramatic emergence of the plantation sector from the late nineteenth century, family farms have continued until today to be the dominant organization of agricultural production in tropical Asia. In fact, the dominance of family farms applies not only to developing economies but also to developed economies including North America and Western Europe (Hayami 1996). In the United States, for example, the operational holdings of commercial farms are typically as large as several hundreds to thousands of hectares. Still, the majority bases their core farm operations mainly on family labor, though supplemented by hired labor to some extent or the other. The farms primarily dependent on the teams of hired laborers organized under the command of central management are rather exceptional, being limited to such special enterprises as large-scale commercial vegetable production, cattle ranch and feed-lot operations existing in rather limited areas such as California and Texas.

The advantage of family farms lies in their predominant reliance on family workers who have the strong incentive to elicit conscientious work efforts for the sake of own family's well-being, in contrast to hired wage workers who are inclined to shirk in the absence of supervision. This advantage applies to not only farm but also non-farm family enterprises, but it is especially pronounced in agricultural production. Agricultural production is characterized by inherent difficulties in the enforcement of hired labor. In urban industries, work is standardized and relatively easy to monitor. The biological process of agricultural production, however, is subject to infinite ecological variations. Different ways of handling crops or animals are often required for even slight differences in temperature and soil moisture. The dispersal of agricultural operations over wide areas adds to the difficulty of monitoring. This difficulty multiplies as the farming system becomes more complex, involving more intensive crop care, crop rotations, and crop-livestock combinations: 'In areas more suitable for multiple enterprise farms, family operations have had the advantage. Increasing the enterprises so multiplies the number of on-the-spot supervisory management decisions per acre that the total acreage which a unit of management can oversee quickly approaches the acreage which an ordinary family can operate' (Brewster 1950). In fact, large plantations based on hired labor are limited largely to monoculture.

This constraint of managerial ability and family labor on operational farm size is

exacerbated by the danger of reckless use of draft animals and machines by non-family operators that results in capital loss. Therefore, 'a landless person with a family who owns animals and/or machines and possesses some managerial skill will find it more profitable to rent in land than to hire out his endowments separately. Similarly, a large landowner will find it more profitable to rent out land than to manage a large operation because of scale diseconomies arising from the use of hired workers' (Binswanger and Rosenzweig, 1986). In other words, technological scale economies arising from the use of indivisible inputs such as managerial ability and animals/machines are counterbalanced by scale diseconomies from the use of hired labor so that the nuclear family farm is usually the most effective except for some plantation crops that need close coordination with large-scale processing and marketing.

Another major advantage of family farm operations is the ability to utilize the low-opportunity-cost labor of women, children, and aged family members who have little employment opportunity outside their own farm.

3. Conditions of the Plantation System

Considering the unique advantage of family farms in agricultural production, why has it been necessary to introduce the plantation system?

A conventional explanation for this question is to assume the existence of scale economies inherent in the production of tropical export crops (Baldwin 1956). However, the crops subject to sufficiently strong scale economies at the farm production level to make the use of the plantation organization necessary are few (Pim 1946; Wickizer 1951, 1960; Lim 1968; Hayami, Quisumbing, and Adriano 1990)[3]. In fact, one can find an example of every so-called plantation crop being grown successfully by family farms somewhere in the world.

Significant increasing returns emerge only at the levels of processing and marketing activities. The vertical integration of a large estate farm with a large-scale central processing and/or marketing system is called for because of the need to supply farm-produced raw materials in a timely schedule. This need is known to be strong for the processing of such products as palm oil, sisal and tea. Comparison of processing tea leaves between fermented "black tea" and unfermented "green tea" is especially

illuminating on this problem. The manufacturing of black tea at a standardized quality for export requires a modern fermentation plant into which fresh leaves must be fed within a few hours after plucking (Wickizer 1951, 1960). The need for close coordination between farm production and large-scale processing underlies the traditional use of the plantation system for black tea manufacture. Unfermented green tea, in contrast, remains predominantly the product of family farms in China and Japan[4].

In the case of bananas for export, harvested fruits must be packed, sent to the wharf, and loaded on a refrigerated boat within a day. A boatful of bananas that can meet the quality standards of foreign buyers must be collected within a few days. Therefore, the whole production process from planting to harvesting must be precisely controlled so as to meet the shipment schedule. Thus, the plantation system has a decisive advantage for bananas for export, but not for bananas for domestic consumption so that they are usually produced in family farms.

On the other hand, for the crops for which centralized processing and marketing are not necessary, plantations have no significant advantage over family farms. Typical examples are cocoa and coconuts. The fermentation of cocoa and the drying and smoking of coconuts to make copra can be handled in small lots with no large capital requirement beyond small indigenous tools and facilities. These crops are grown predominantly in family farms.

Sugar is frequently cited as a classic case of scale economies stemming from the need of coordination between farm production and large-scale central processing (Binswanger and Rozenweig 1986). Efficient operation of a centrifugal sugar mill requires the steady supply of a large amount of cane over time. Coordination of production from planting to harvesting with processing is required. This coordination, however, need not be as stringent as it is for tea and bananas. The rate of sugar extraction decreases as the processing of cane is delayed, but this loss is in no way comparable to the devastating damage on the quality of tea and bananas for export that may result from delayed processing. Sugar cane can be hauled from relatively long distances and stored for several days. Therefore, the need for vertical integration is not as large, and the necessary coordination can be achieved through contracts of a sugar mill with cane growers on the time and the quota of cane delivery. In fact, an efficient sugar industry with smallholders has developed in Australia, Taiwan and more recently in Thailand.

Another explanation for the use of the plantation system is the advantage of large estate farms in accessing capital. Because of this, it has been argued that plantations have an advantage with regard to tree crops characterized by long gestation periods from planting to maturity (Binswanger and Rosenzweig 1986). However, the opportunity costs of labor and capital applied to formation of the tree capital are not necessarily high for peasants. Typically, they plant the trees in hitherto unused land. If such land is located near their residence, they open new land for planting by means of family labor at low opportunity cost during the idle season for the production of food crops on farmland already in use. When they migrate to frontier areas, a typical process is to slash and burn jungles and plant subsistence crops such as maize, potatoes and upland rice, together with tree seedlings. Such complex inter-cropping is difficult to manage with hired labor in the plantation system, because of inherent difficulty in monitoring the work of hired wage laborers over spatially dispersed and ecologically variable farm operations (Brewster 1950; Binswanger and Rosenzweig 1986; Hayami and Otsuka 1993).

Therefore, even in the export boom of tropical cash crops under colonialism from the nineteenth to the early twentieth century, the plantation system failed to make inroads in regions where indigenous population had established family farms (Lewis 1970, pp. 13-45). Western traders found it more profitable to purchase tropical agricultural commodities from peasant producers in exchange for imported manufactured commodities than to produce the tropical crops themselves by means of the plantation system.

The establishment of plantations in less-developed economies became a necessity when the demand for tropical products by the industrialized nations continued to rise, while the regions physically suited for the production of these products had no significant peasant population that could produce and trade their commodities. Opening frontier land for the production of new crops entailed high capital outlays. Virgin land had to be cleared and developed, and physical infrastructure, such as roads, irrigation systems, bridges, and docking facilities, had to be constructed. Capital, in the form of machinery and equipment, had to be imported and redesigned to adapt to local situations. Laborers were not only imported from the more populous regions but also had to be trained in the production of these crops.

The establishment of plantations thus requires huge initial capital investment. For the investors to internalize gains from investment in infrastructure, the farm size inevitably must be large. Viewed from this perspective, it follows that the plantation system evolved not because it was generally a more efficient mode of productive organization than the peasant mode. Instead, the system was adopted because it was the most effective type of agricultural organization for extracting the economic benefit accruing from the exploitation of sparsely populated virgin areas, typically in the development process based on the exploitation of unused natural resources, which Myint (1965) called 'the vent-for-surplus development.' From this perspective, it is easy to understand why the same crop is grown mainly by family farms in one place and mainly by plantations in another. For example, for sugar cane production the family farm system is more common in old settled areas of Luzon, and the plantation system predominates in the newly opened Negros, both in the Philippines (Hayami, Quisumbing, and Adriano, 1990, ch.5). Usually the share of family farms in the production of export cash crops rises as the initial land-opening stage is over and infrastructure is decently established with increased population density (Booth 1988, ch.6).

While recognizing the economic advantage of the plantation system in the vent-for-surplus stage, plantations could not have been established unless concessions were granted to hold large tracts of virgin land for their exclusive use. Colonial governments gave these concessions to Western planters, typically under the British rule in such places as the highlands of Kenya and Sri Lanka. In Indonesia, the Dutch colonial government had traditionally tried to prevent alienation of farmland from indigenous peasants by regulating against land purchase by foreigners including ethnic Chinese. However, in the late nineteenth century when demands for tropical cash crops rose sharply, by the Agricultural Land Law of 1870 the government granted Dutch planters long-term contracts to lease in wild land, which were *de jure* owned by the government (though *de facto* used by native tribes). While this new institutional arrangement should have accelerated the development of "empty land" for cash crop production, it served as an instrument to preempt land for the elite, closing smallholders' land access (Pelzer 1945; Hayami and Kikuchi 1981). Similar public land-leasing arrangements were also practiced under the American colonial administration in frontier land of the Philippines, especially in Mindanao, which became the basis of large plantations under the management of multinational corporations (Hayami, Quisumbing and Adriano 1990, ch.6).

To recapitulate, the plantation system tends to be adopted despite its high cost of labor management where: (a) close coordination between farm-level production and large-scale processing/marketing facilities is required for certain crops, (b) basic infrastructure is absent in the land-opening stage so that the large-scale production unit is needed for internalizing the gain from its supply of infrastructure, and (c) concessions on the use of large tracts of virgin land are granted for exclusive use by certain power elite, such as Western planters during the colonial period. Historically these conditions often reinforced each other to result in the domination of the plantation system in some specific areas for specific crops, outside which the family farm tends to dominate.[5]

4. Declines in the Advantage of Plantations

The previous section argued that the efficiency of the plantation relative to the family farm system is high in the initial opening-up process of land-abundant and labor-scarce economies. However, several negative aspects of plantations become significant as tropical economies shift from the land-abundant to the land-scarce stage after the completion of the opening-up process.

First, the plantation system tends to substitute capital for labor, because of the inherent difficulty in supervising wage laborers in spatially dispersed and ecologically diverse farm operations as well as their relatively easy access to both private credit market and government's concessional loans. This substitution becomes socially inefficient in many developing economies, when labor becomes more abundant relative to capital.

Second, agricultural land tends to be cultivated less intensively under the plantation system that employs mainly wage labor and usually practices monoculture. Complicated inter-cropping and crop-livestock combination are more difficult to manage in the command system, implying that both labor input and income per hectare are lower in plantations[6]. This is a source of inefficiency in the plantation system where land becomes scarce relative to labor under the pressure of population growth. In contrast, small-sized family farms tend to cultivate land more intensively.

Third, plantations usually specialize in a single crop. This bias for the practice of monoculture reduces the flexibility of these productive organizations to respond to

changing demand by shifting to the production of other crops. Moreover, continual cropping of a single crop tends to result in soil degradation and an increase in pest incidence. Counter application of fertilizer and chemicals causes serious stress on environment and human health, incurring high social costs.

Fourth, the specialization of plantation workers in specific tasks inhibits the development of their managerial and entrepreneurial capacity (Baldwin 1956; Myint 1965; Beckford 1972).

Fifth, the plantation system is a source of class conflict between laborers and managers/capitalists. The presence of a plantation enclave in rural economies where the peasant mode of production predominates has often strained relationships in rural communities. In terms of the criterion of social stability, therefore, the plantation system is no match for the system of relatively homogeneous small producers owning small assets, however small they might be.

Overall, whether the net contribution of the plantation system is positive or negative depends on the population density of the region, the development of public infrastructure, the nature of the crop produced, and the quality of management employed in plantations. It is, however, inevitable that the negative impacts of the plantation system tend to out-weigh its positive contributions as population increases in once-sparsely populated regions and as unused lands become scarce.[7]

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5. A Comparison in Southeast Asia

It is expected that this change in the relative efficiency of the family farm versus the plantation system can be observed clearly in Southeast Asia after the Second World War. Southeast Asia is the region that was traditionally endowed with relatively abundant land resources ready for exploitation. Indeed, Myint (1965) developed his vent-for-surplus theory based on the experience of Southeast Asia since the late nineteenth century. However, the bases for the vent-for-surplus growth are different between (a) the continental part of Southeast Asia, including Thailand, Vietnam and Myanmar, and (b) the insular and peninsular part (henceforth abbreviated as " the insular part"), including Indonesia, Malaysia and the Philippines. The former was characterized, among others, by major river deltas and the latter by tropical rain forests[8].

Before the 1860s when new transportation technology integrated this region with the rapidly industrializing West, major deltas and thick rain forests were then largely unused for agricultural production. When Southeast Asia faced with growing demands from the West for tropical products, the deltas were converted into paddy fields for commercial rice production and the rain forests were converted to plantations for export cash crops. Corresponding to different natures of production by crop, deltas continued to be dominated by small family farms. In contrast, insular areas were bifurcated between family farms cultivating rice in small valleys and coastal plains on the one hand and large plantation producing tropical cash crops in highlands on the other[9]. Therefore, changes in the competitive strength of family farms relative to plantations in the world market can be observed from comparisons in the export performance of agricultural products between Thailand on the one hand and Indonesia, Malaysia and the Philippines on the other, as well as comparisons between the food-crop and the cash-crop sectors in these economies.

In terms of both environmental conditions and relative resource endowments, traditional comparative advantage in agricultural production of Thailand lay in rice and that of Indonesia and Philippines lay in tropical cash crops. It is, therefore, no surprise to find in Table 1 that Thailand was a major rice exporter (the world's largest) with its world market share continuing to rise from 1961-65 to 1991-95. On the other hand, Indonesia and the Philippines remained net importers. However, it is important to notice that their import margins were significantly reduced, reflecting much faster growth in rice output over domestic consumption, despite rapid increases in population. The high performances in rice production in Southeast Asia reflect the strengthened competitive position of family farms in this region. Their success owed much to public investments in development and diffusion of modern rice varieties, improvements in irrigation systems and fertilizer supply conditions that together brought about the so-called Green Revolution. This experience represents a strong evidence for the very high production potential of family farms that can be realized with adequate public investments in infrastructure, such as research and irrigation systems

Surprising to see in Table 1 is the rise of Thailand as the exporter of several tropical cash crops associated with the decline of Indonesia and, more conspicuously, that of the Philippines. Sugar represents a typical example. Thailand was a net importer of sugar before the Second World War and was barely self-sufficient in the early 1960s.

Nevertheless, Thailand rose to the third largest exporter in the world next to Brazil and Australia in the1990s. In contrast, Indonesia and the Philippines, two traditional exporters of sugar in Asia, almost completely lost their significance in the international market. Thailand exceeded Indonesia in the export of rubber and exceeded the Philippines in the export of pineapple products by the 1990s. Note that pineapples for processing are produced by large plantations in the Philippines and a significant share of rubber is produced in plantations in Indonesia. On the other hand, both of the crops are almost exclusively grown in family farms in Thailand. Indonesia was able to achieve a major increase in the world market share of coffee, but coffee is a crop predominantly grown by smallholders in Indonesia. The same applies to cocoa, though not shown in Table 1. These data seem to reflect increases in the advantage of family farms over plantations in the production of cash crops also.[10]

Compared with Indonesia and the Philippines, the plantation sector in Malaysia has been able to maintain or even increase the traditional comparative advantage in tree crops, as reflected in the sharp increase in its world market share of palm oil. The rise of Malaysia to become the dominant supplier of palm oil, through efficient conversion of rubber to oil palm estates, has been supported by the high entrepreneurship of private planters in managing their own estates as well as their ability to organize cooperative research on plantation crops since the colonial period. Vital for this success has been the preservation of private ownership and management of plantations, including those based on foreign capital, after Malaysia achieved independence.

In contrast, the plantation sector in post-independence Indonesia that expropriated the estates of Dutch planters seems to have suffered from inefficiency common to state enterprises. Several attempts to cure this problem include the "nuclear estate" scheme by which a state plantation acts as a marketing/processing center with a demonstration farm for technical extension, along which smallholders are organized in a manner similar to contract farming. These attempts have often been marred by the direct application of plantations' technology and practice without due understanding of smallholders' conditions (Barlow and Tomich 1991).

Since the early the 1970s, the Philippines has been losing out in world competition in most of the tropical cash crops, not only because of growing inefficiency of the plantation system, but also because of the government's trade monopoly during the regime of President Marcos (Bautista 1987; Intal and Power 1989) and of the negative

incentive of land reform programs on planters that shall be discussed later.

6. Promoting Family Farms

In view of the increasing advantage of family farms over plantations as tropical economies shift from the land-abundant to the land-scarce stage, it should be appropriate for tropical economies today to adapt policies for promoting family farms.

Provision of public goods:

As previously emphasized, the major limitation of family farms is that no individual farm is sufficiently large to profitably build infrastructure necessary for its own economic activities. For the promotion of family farms, it is critically important for the government to supply infrastructure such as roads and irrigation systems. The needs for public goods are not limited to physical infrastructure. The consensus has already been established that the most effective means to promote the production capability of small farms is to build up agricultural research and extension systems. The high rates of return to investment in agricultural research are amply documented, implying serious under-investment in agricultural research below social optimum (Hayami and Ruttan 1985; Alston, Norton and Pardey 1995; Evenson 2001). To a large extent this under-investment stems from the weak incentive for the private sector to conduct research and development on agricultural technology, partly because of small-scale farm producers being incapable to internalize the benefits from the research and partly because of the difficulty to establish effective protection on intellectual property rights on agricultural technologies. At the same time, the under-investment represents the evidence of the government's inability to capture the high rates of return to society by filling the gap between the private sector investment and the socially optimum investment.

The contribution of agricultural research to the promotion of smallholders' productivity has so far been demonstrated mainly for the case of food crops, most dramatically by the success of the so-called Green Revolution in tropical Asia. A large untapped potential seems to exist, however, to promote the production of tropical export crops by smallholders. So far, research on export cash crops has been designed mainly to improve production suitable for the practice of plantations, e.g., rubber research for improving rubber produced in monoculture. Relatively little effort has been allocated to the improvement of mixed cropping, e.g., rubber combined with coffee or rubber trees

in-planted among wild trees (so-called "jungle rubber"), in which smallholders have advantage (Hayami 1996). In general, the role of the government in organizing research on export crops is more important for family farms than for plantations. The task of organizing co-operative research by private producers is relatively easy for the plantation sector consisted of a small number of large planters (as demonstrated by the successful rubber and palm oil research in Malaysia). However, it is prohibitively costly to organize the large number of small family farms for the same endeavor

While the major infrastructure, such as highways, large-scale irrigation and research systems should be shouldered by the government, small public goods, such as country roads, grazing lands and fishing stock in small rivers and lakes, can be more efficiently augmented and maintained by the collective efforts of local people. The capability of local communities to conserve "common-property resources" or "commons" has increasingly been recognized in recent years (Ostrom 1990; Bardhan 1993; Baland and Platteau 1996). Yet, this capability depends on the tradition of each community, differing widely across regions and areas. For example, in Southeast Asia which had been characterized until recently by relatively abundant endowments of natural resources and, hence, by the absence of strong need to co-ordinate people on the use of natural resources, the capability of local communities to manage commons is relatively weak. In contrast, much stronger control of communities was traditionally established in Northeast Asia, especially in Japan, which had been subject to strong population pressure on natural resources since much earlier (Hayami 200; 2001). Where the tradition of organizing collective action at the community level is weak, the government should support communities' initiatives. The supports may include rendering to local people education and extensions on the management of commons, providing financial and material supports such as food-for-work programs and micro-credit programs, and backing up communities' rules by the government's administrative guidance and/or formal laws (Aoki and Hayami 2001).

Improving markets:

Critically important for small family farms to achieve the same economic efficiency is the development of agricultural product and input marketing networks in rural areas, through which their small-lot transactions are not overly handicapped as compared with large planters' large-bulk product sales and input purchases. For example, in remote areas to which urban traders are unable to extend operation of farm product collection,

smallholders cannot engage in commercial production, whereas large planters can bring products by their own trucks to urban markets.

It has been a popular perception that middlemen by means of monopoly/monopsony pricing and usury exploit poor peasants in developing economies. This stereotype, however, has failed to stand up under empirical tests. Accumulated empirical studies almost unanimously show that entry to agricultural marketing activities is open and competition among middlemen is intense in developing economies in the absence of government control so that marketing margins are largely consonant with the costs associated with marketing activities instead of traders' excess profits (Bauer 1964; Lele 1971; Jones 1972; Unnevehr 1984; Timmer 1987; Hayami and Kawagoe 1993). Indeed, in low-income economies it has been common for smallholders to suffer severely by the monopoly of government agencies, such as state marketing boards, as well as such distortive border measures as export tax and export license. Deregulation and liberalization can often spur major production boosts by family farms (Akiyama and Nishio 1996). The exploitation of smallholders by government monopoly practices in agricultural product and input marketing has been significantly reduced in the 1990s, owing largely to structural adjustment policies under the lead of IMF and World Bank. Yet, the exploitation still remains in Asia, typically on rice growers in such economies as Cambodia and Myanmar.

The empirical finding that the market surrounding smallholders in developing economies is largely competitive in the absence of government intervention does not mean that the government needs no action to improve the existing system of agricultural marketing. On the contrary, the wide scope exists to reduce transportation costs through public investment in roads and highways. Improvements in transportation and communication by public investment are also effective in reducing trade risk and transaction costs and thereby promoting new entry and competition. Of course, more fundamental in reducing transaction costs is establishment of the effective "third-party contract enforcement" mechanism including not only formal laws and court but also semi-formal conflict resolution committees organized by traders' associations, for example. Furthermore, development of institutions for the service of market information, such as standardization of measures and weights, commodity exchange, crop forecasting, and regular quotation of market prices in mass media, can promote much to the improvement of market efficiency. These policies, together with removal of government interventions on both internal and external trades, can greatly facilitate the transmission

of foreign demands for the products of smallholders, and thereby enable them to better respond to the opportunities created by increasing globalisation.

Avoiding the pitfall of agricultural protectionism:

The strong empirical regularity observable worldwide is that, while trade and taxation policies tend to be distorted in the direction to exploit (or tax) agricultural producers in low-income economies, they are designed to protect (or subsidize) them in high-income economies (Schultz 1978; Anderson and Hayami 1986). In the low-income stage the priority of national development policy is commonly bent toward promotion of modern industries, while agriculture is considered the source of exploiting resources for the support of industrialization. This bias tends to be incorporated into policies as the equilibrium of politics under the condition that a large number of farmers who lack education and live sparsely over the wide space are difficult to organize political lobbying, whereas a small number of industrial and commercial elite clustered in metropolis can easily organize themselves for political campaign. Organized urban laborers join the campaign for policies to lower food prices by such means as export tax and government monopoly procurement of foodstuff.

This political equilibrium changes as the economy moves to a higher-income stage. Typically, in the process of successful industrialization the rise in the per-capita income of farm population tends to significantly lag behind that of non-farm population, resulting in the widening of rural-urban income gap. In that stage farmers begin to organize political lobbying for agricultural protection policies, including import restrictions, price supports, input subsidies and special tax treatments. Farmers become politically powerful, partly because they become smaller in number but much better educated and informed, but more importantly because urban dwellers become so affluent as to be tolerant on the policies that entail modest sacrifice to them for the sake of raising farmers' income and level of living. The most dramatic example of this move to agricultural protectionism occurred in Japan during the two decades from the mid-1950s, when Japanese economy jumped up from the middle-income to the high-income stage. The experience of Japan was repeated by Korea and Taiwan about two decades later.

Several estimates indicate that the cost of agricultural protection as measured by social welfare loss in Japan has been very large (Anderson and Hayami 1986; Hayami 1988; Hayami and Godo 1997). Not measurable but perhaps more serious than the

measurable direct cost shouldered by consumers and taxpayers is the international economic frictions that agricultural protectionism entailed. In recent several decades, border protections on farm products continued to be the major thorn to the relations between Japan and the exporters of agricultural products. Today, the resistance to possible increases in the imports of agricultural products represents the major block against Japan's entry to regional free trade agreements, except with Singapore. If Japan will continue to be isolated from free trade agreements in Asia and the Pacific for the sake of protection of domestic agriculture, its damage will become immeasurably large.

Equally serious is the effects of protection policies to block structural adjustments in the farm sector itself. Farms in Japan distributed uni-modally with the average of only 1.5 hectare can hardly an efficient operational unit today, given the high labor wage rates and the ready availability of modern labor-saving machinery characterized by strong scale economies[11]. On the other hand, income from farming is only a small fraction of total income in most farm households (only about 15 percent on the average.) Indeed, the majority of farmers are earning the same level of income as the average income of non-farm employees from the non-farm source alone. As such, these part-time farmers are willing to withdraw from farming, while renting out their lands to full-time farmers who are eager to expand their operational scale for the efficient use of labor-saving technology. Yet, progress of such structural adjustment has been very slow under the policies to protect traditional small-scale farms, such as special deductions of real estate and inheritance taxes on small owner-cultivated farms (Hayami 1988). The result is continued declines in the competitive position of Japanese agriculture under globalization in progress. Upper middle-income economies like Malaysia and Thailand must be aware of this trap of agricultural protectionism awaiting in their path to high-income economies.

7. Toward the Reorganization of Plantations

Considering the growing inefficiency of plantations relative to family farms in tropical developing economies, is it appropriate for the government to apply land reform to the plantation sector, such that the government confiscates private plantations and sub-divide each into small units for the cultivation of family farms. Apart from the political difficulty of violating private property rights, administrative and technical difficulties involved are likely to make such reform infeasible. Land reform

implemented in non-communist Asia has been limited to the transfer of land ownership from landlords to tenants (in addition to the reduction of land rents). As such, it is easy to identify who should be the beneficiaries of land reform— a tenant who used to cultivate a certain land parcel leased in from a landlord before reform is unambiguous to receive the ownership of that land parcel. Since this beneficiary had the experience of managing cultivation of the land using his family labor and own capital (such as farm instruments and draft animals), no major disruption in production is expected to occur from the transfer of ownership. In contrast, in the case of plantations, it is difficult to identify who should receive the title of which land parcel. Plantation workers typically work by group by task over the territory of a plantation and no individual worker continues to cultivate a certain land plot over a crop season unlike the case of tenant farmers. Moreover, the question would arise who among the employees are entitled to share the land ownership. Should beneficiaries be limited to field workers? Is it fair to exclude truck drivers or mechanics in processing plants within the same plantation. How about clerks and accountants? Even if the ownership of a land parcel is transferred to an employee in any category, the time and cost to train him to be a manager of his own farm plus to purchase (or lease) the minimum amount of capital goods for his independent operation will be quite large.

Confronted with such obvious difficulties, the application of redistributive land reform to plantations will almost inevitably create major disruptions in production. For this reason, the application of distributive land reform has been limited mainly to the food-crop sector consisted of family farms, at least in Asia[12]. An exception to this tendency was the attempt of the Philippine government to extend the redistributive land reform from the food crop sector to the cash crop sector including plantations, by the Comprehensive Agrarian Reform Law of 1988. This Law has not been significantly implemented, obviously because of the difficulties mentioned above, but the fear has prevailed among plantation owners about eventual expropriation of their land. It is only natural that they have stopped investing to improve their land infrastructure including planting/replanting of trees. Some landowners have even preferred to keep their land idle rather than using them for agricultural production. It should be reasonable to hypothesize that the poor performance of Philippine agriculture in competition for world export market (Table 1) was, to a large extent, rooted in this great uncertainty to the planters of tropical cash crops concerning the future course of land reform.[13] Further, it is obviously difficult to organize new independent smallholders for the timely delivery of their products to large-scale processing and marketing.

It appears that the reorganization of plantations to a more efficient form could better be induced under the initiative of private entrepreneurs rather than based on the government's coercive measures. The design of a new structure attractive to private business must be based on a clear understanding of the pros and cons of the plantation versus the peasant system. To recapitulate, the advantage of the family farm system is the high work incentive and the low cost of enforcing family labor, so that family farms are capable of managing complicated crop rotation and crop-livestock combination by making productive use of low-opportunity-cost labor on scarce land. The advantage of the plantation system consists of (a) the low transaction costs associated with the supply of farm-produced materials to central processing and/or marketing characterized by scale economies, (b) internalization of external effects such as provision of public infrastructure and prevention of contagious pest and disease, and (c) low credit costs.
These advantages of the two systems can be combined in the so-called "contract farming" system in which an agribusiness enterprise manages the processing/marketing process and contracts with small growers on the assured supply of farm-produced raw materials. The contract may include stipulations not only on the time and quantity of material supply but also on prices, credit and technical extension services.[14]

However, it needs a high degree of entrepreneurship and managerial skill to organize and operate the efficient contract farming system, because it is not easy to enforce contracts with a large number of smallholders concerning the quantity, quality and time of their product delivery to processing plants and/or marketing centers. Insufficient ability and effort of agribusiness firms in this regard have often resulted in the failure in the operation of contract farming. Thus, the performance of contract farming has so far been mixed even in Thailand (Siamwalla 1992). The same applies to other areas including Africa where it is reported that contract farming organized by government agencies is usually inefficient (Jaffe and Morton 1995, pp.94-107).

A gradual reorganization of the existing plantation system into an efficient contract-farming system should be feasible though difficult, if the high management capability of agribusiness, including multinational corporations, can be mobilized for this endeavor. Under present conditions, however, since the prevailing mode of agribusiness plantation management is both efficient and profitable, the multinationals do not see the need for such reorganization. Therefore, a policy design is necessary to

create an incentive mechanism to induce efforts for organizational change toward that direction. The design might include (a) gradual phasing-out of special treatments to plantations, such as public land leases at favorable terms and special allocation of import and foreign exchange licenses, (b) more strict enforcement of land taxation on the ownership of large farm estates, and (c) more strict application of labor and environment codes to corporate farms. At the same time, government must invest in education, research, and extension for developing the capability of small growers to operate effectively under the contract-farming scheme.

Another approach might be to encourage the organization of cooperatives for processing and marketing. Inefficiency in organizing farm production by cooperatives has been amply illustrated by the experiments of centrally planned as well as some market economies. On the other hand, examples of successful cooperatives in organizing agricultural product marketing and processing are not rare, for example, horticultural marketing cooperatives in Netherlands and cooperative creameries in Denmark. The best services of marketing and processing will be provided to both consumers and farm producers in an environment in which cooperatives and private marketing agents compete with each other and among themselves. Their services are bound to degenerate if monopoly is granted to the cooperatives, as demonstrated by the Japanese experience (Hayami 1988).

Plantations have been and will continue to be an important sector in tropical Asia. While negative aspects of plantations have been looming larger over time, government direct controls on their operations will likely prove damaging to both national economic development and the well-being of rural people. The entrepreneurship and management capability of agribusiness enterprises, including multinational corporations, in the area of agricultural marketing and processing are very valuable inputs that developing economies cannot afford to lose. The rational approach, therefore, should be to design an inducement mechanism toward an agrarian organization that may be able to combine the merits of both the family farm and the plantation systems.

REFERENCES

Akiyama, Takamasa, and Akihiko Nishio. 1996. *Indonesia's Cocoa Boom: Hands-Off Policy Encourages Smallholder Dynamism.* Washington DC: Policy Research Working Paper 1580, The World Bank

Anderson, Kym, and Yujiro Hayami. 1986. *The Political Economy of Agricultural Protection: East Asia in International Perspective.* Sydney: Allen and Unwin.

Alston, Julian M., George W. Norton, and Philip G. Pardey, 1998. *Science under Scarcity: Principles and Practice for Agricultural Research Evaluation and Priority Setting.* Wallingford: CAB International.

Aoki, Masahiko, and Yujiro Hayami, eds. 2001. *Communities and markets in Economic Development.* Oxford :Oxford University Press.

Baland, J. M., Platteau, J. P., 1996. *Halting Degradation of Natural Resources: Is there a Role for Rural Communities?* Oxford :Oxford University Press.

Baldwin, Robert E. 1956. "Patterns of Development in Newly Settled Regions." *Manchester School of Economics and Social Studies* 24 (May): 161-79.

Bardhan, Pranab., 1993. "Symposium on Management of Local Commons." *Journal of Economic Perspectives* 7(Autumn): 87-92.

Barlow, Colin, and Thomas P. Tomich. 1991. "Indonesian Agricultural Development: The Awkward Case of Smallholder Tree Crops." *Bulletin of Indonesian Economic Studies* 27 (Dec): 29-53.

Bauer, Peter T. 1964. *West African Trade: a study of Competition, Oligopoly, and Monopoly in a Changing Economy.* Cambridge: Cambridge University Press.

Bautista, Romeo M. 1987. *Production Incentive in Philippine Agriculture: Effects of*

Trade and Exchange Rate Policies. Washington, D.C.: International Food Policy Research Institute.

Beckford, George L.1972. *Persistent Poverty: Underdevelopment in Plantation Economies in the Third World*. New York: Oxford University Press.

Binswanger, Hans P., and Mark R. Rosenzweig. 1986. "Behavioral and Material Determinants of Production Relations in Agriculture." *Journal of Development Stud*ies 22-23 (April): 503-39.

Boeke, Julius S. 1953. *Economics and Economic Policy of Dual Society as Exemplified by Indonesia*. New York: Institute of Pacific Relations.

Booth, Anne. 1988. *Agricultural Development in Indonesia*. Sydney: Allen & Unwin

Brewster, John M. 1950. "The Machine Process in Agriculture and Industry." *Journal of Farm Econ*omics 32 (February): 69-81.

Coase, R. H. 1937. "The Nature of Firm," *Economica,* NS 4 (November) :386-405.

de Janvry, Alain, and Elizabeth Sadoulet. 1989. A Study in Resistance to Institutional Change: The Lost Game of Latin America," *World Development* 17: 1397-1407.

Evenson, Robert E. 2001."Economic Impacts of Agricultural Research and Extension," In Bruce L.Gardner and Gordon C. Rausser, eds., *Handbook of Agricultural Economics.*Vol.1A, Amsterdam: Elsevier, pp.573-628.

Feeny, David. 1982. *The Political Economy of Agricultural Productivity: Thai Agricultural Development, 1880-1975*. Vancouver: University of British Colombia Press.

Furnivall, John S. 1944. *Netherlands India: A Study of Plural Economy.* Cambridge UK: Cambridge University Press.

Furnivall, John S. 1948. *Colonial Policy and Practice: A Comparative Study of Burma*

and Netherlands India. Cambridge, U.K.: Cambridge University Press.

Hayami, Yujiro. 1988. *Japanese Agriculture under Siege*. London: Macmillan.

Hayami, Yujiro. 1994 "Peasant and Plantation in Asia," In Gerald M. Meier, ed., *From Classical Economics to Development Economics*. New York: St Martin's Press.

Hayami, Yujiro. 1996. "The Peasant in Economic Modernization." *American Journal of Agricultural Economics* 78 (December): 1157-67.

Hayami, Yujiro. 2001a. "Ecology, History, and Development: A perspective from Rural Southeast Asia." *World Bank Observer* 16 (Fall):169-98.

Hayami, Yujiro. 2001b. *Development Economics: From the Poverty to the Wealth of Nations*, Second edition. Oxford: Oxford University Press.

Hayami, Yujiro, and Yoshihisa Godo. 1997. "Economics and Politics of Rice Policy in Japan," in Takatoshi Ito and Anne O. Krueger, eds. *Regionalism versus Multilateral Trade Arrangements.* Chicago: University of Chicago Press.

Hayami, Yujiro, and Toshihiko Kawagoe. 1989. "Farm Mechanization, Scale Economies and Polarization: The Japanese Experience," *Journal of Development Economics* 31 (Oct.): 221-39.

Hayami, Yujiro, and Toshihiko Kawagoe. 1993. *The Agrarian Origins of Commerce and Industry: A Study of Peasant Marketing in Indonesia.* London: Macmillan.

Hayami, Yujiro, and Masao Kikuchi. 1981. *Asian Village Economy at the Crossroads.* Tokyo:University of Tokyo Press and Baltimore: Johns Hopkins University Press.

Hayami, Yujiro, and Masao Kikuchi. 2000. *A Rice Village Saga: Three Decades of Green Revolution in the Philippines*. London: Macmillan; New York: Barnes & Noble; Los Baños, Philippines: International Rice Research Institute.

Hayami, Yujiro, and Keijiro Otsuka. 1993. *The Economics of Contract Choice*. New York: St. Martin's Press.

Hayami, Yujiro, and Vernon W. Ruttan. 1985. *Agricultural Development: an International Perspective*, Revised ed. Baltimore: Johns Hopkins University Press.

Hayami, Yujiro, M. Agnes Quisumbing, and Lourdes S. Adriano. 1990. *Toward an Alternative Land Reform Paradigm: A Philippine Perspective.* Quezon City, Philippines: Ateneo de Manila
University Press.

Ingram, John C. 1971. *Economic Change in Thailand, 1850-1970*. Stanford: Stanford University Press.

Intal, Ponciano S. Jr., and John H. Power. 1989. *Trade, Exchange Rate, and Agricultural Pricing Policies in the Philippines.* Washington D. C.: World Bank.

Jaffee, Steven, and John Morton. 1995. *Marketing Africa's High-Value Foods.* Dubuque, IA: Kendall/Hunt Publishing Co.

Jones, William. O. 1968. "Plantations," In *International Encyclopedia of the Social Sciences*, vol.12. New York: Macmillan and free Press, pp.154-59.

Jones, William. O. 1972. *Marketing Staple Food Crops in Tropical Africa*. Ithaca: Cornell University Press.

Lamb, Geoffrey. and Linda Muller. 1982, *Control Accountability, and Incentives in a successful Development Institution: The Kenya Tea Development Authority.* Washington DC: World Bank

Lele, Uma. 1971. *Food Grain Marketing in India*. Ithaca: Cornell University Press.

Lewis, W. Arthur, ed. 1970. *Tropical Development, 1880-1913: Studies in Economic Progress.* London: Allen and Unwin.

Lim,Yongil. 1968. "Input of Tea Industry on the Growth of the Ceylonese Economy." *Social and Economic Studies* 17 (December): 453-67.

McLennan, Marshall S. 1969. "Land and Tenancy in the Central Luzon Plain." *Philippine Studies* 17 (October): 651-82.

Myint, Hla. 1965. *The Economics of Developing Countries*. New York: Praeger.

North, D. C. 1981. *Structure and Change in Economic History*. New York :Norton.

Ostrom, Elinor., 1990. *Governing the Commons*. Cambridge University Press, New York.

Pelzer, Karl J. 1945. *Pioneer Settlement in the Asiatic Tropics*. New York: American Geographical Society.

Pim, Alan. 1946. *Colonial Agricultural Production*. London: Royal Institute of International Affairs, and New York: Oxford University Press.

Schultz, Theodore W. 1964. *Transforming Traditional Agriculture.* New Haven:Yale University Press.

Schultz, Theodore W., ed.1978, *Distortions of Agricultural Incentives*. Bloomington: Indiana University Press.

Siamwalla, Ammar. 1992. "Myths, Demons and the Future of Thai Agriculture," Paper presented at *Year-end Co*nference *on Thailand's Economic structure: Toward Balanced Development*. Bangkok: Thailand Development Research Institute.

Timmer, Peter, ed. 1987. *The Corn Economy of Indonesia*. Ithaca: Cornell University Press.

Unnevehr. Laurian S. 1984. "Marketing and Price formation," In Walter Falcon, William O. Jones and Scott R. Pearson, eds., *The Cassava Economy of Java.* Stanford University Press, pp.136-62.

Wickizer, Vernon D. 1951. *Coffee, Tea, and Cocoa: An Economic and Political Analysis*.

Stanford,CA: Stanford University Press.

Wickizer, Vernon D. 1960. “The Smallholder in Tropical Export Crop Production.” *Food Research Institute Studies* 1 (February): 49-99.

Table 1: Shares of net exports in world total export value of selected agricultural commodities in Indonesia, Malaysia, Philippines and Thailand, 1961-2000.

	Share in world market		
	1961-65	1976-80	1996-2000
Rice			
Indonesia	-10.9	-17.7	-8.4
Malaysia	-5.9	-2.4	-2.6
Philippines	-3.1	0.5	-3.7
Thailand	19.7	18.8	25.2
Maize			
Indonesia	0	-0.1	-1.0
Malaysia	-0.5	-0.8	-3.2
Philippines	0	-0.2	-0.7
Thailand	3.6	2.9	-0.2
Sugar[a]			
Indonesia	0.3	-1.4	-3.7
Malaysia	-1.2	-1.2	-1.8
Philippines	7.3	4.0	-0.1
Thailand	0.2	2.7	7.4
Coffee[b]			
Indonesia	1.0	4.5	4.0
Malaysia	0	0	-0.2
Philippines	0	0.3	-0.1
Thailand	-0.1	0	0.5
Coconut Oil			
Indonesia	0	-1.0	25.6
Malaysia	6.4	3.7	0.4
Philippines	39.8	68.5	51.3
Thailand	-0.1	-0.2	0.3
Palm Oil			
Indonesia	17.8	14.5	19.2
Malaysia	19.3	59.4	60.2
Philippines	-0.9	-0.1	-0.4
Thailand	0	-0.6	0.1
Rubber[c]			
Indonesia	25.0	24.9	28.8
Malaysia	43.9	52.5	15.6
Philippines	0	0.1	0.4
Thailand	9.4	13.6	34.1
Pineapples[d]			
Indonesia	0	0	10.3
Malaysia	12.8	8.1	2.5
Philippines	12.9	20.7	15.0
Thailand	0	17.0	39.7
Bananas			
Indonesia	0	0	0.2
Malaysia	0.3	0.2	0.1
Philippines	0	8.0	5.0
Thailand	0.1	0.1	0

[a] Sugar, raw equivalent
[b] Coffee, green and roast
[c] Natural dry
[d] Canned pineapples

Source: FAOSTAT database.

Notes

1 This paper was originally prepared under the title "Family Farms and Plantations under Globalization," for the 4th Conference of the Asian Society of Agricultural Economics, Kedah, Malaysia, 20-22 August 2002. It intends to develop a synthesis of my ideas on this theme, which have been advanced earlier in several publications, especially Hayami (1994; 1996; 2001a; 2001b).

2 According to a broader definition, for example, Jones (1968), farm estates based on forced labor, such as slavery, corvee and serf, instead of free wage labor may also be called plantations. These estates based on forced labor were established typically before the onset of the industrial revolution in Europe and North America. They had a major impact on United States South and Latin America (hacienda) as well as Eastern Europe (such as the Junker estates in Prussia) but had little impact in Asia. The plantations dealt with in this paper are those established in tropical Asia in the nineteenth to the early twentieth century. From the beginning their operation was based on wage laborers, though many laborers were imported from densely populated economies such as China and India under long-term contracts, often tied by credit, akin to debt peonage.

3 Absence of scale economies in agriculture in developing economies in general is also attested by the estimation of aggregate production functions based on inter-country cross-section data (Hayami and Ruttan 1985,ch.5).

4 Even for the manufacture of black tea is not imperative to use the plantation system as evident from the case of Taiwan where smallholders have been used to produce both black and green tea with small-scale equipment. Plantations have used the large fermentation plant as a device of enforcing work schedule and standardizing product quality for the export market. In fact, farm production by smallholders based on the system of "contract farming" (which shall be explained in Section 7) has recently been developing in Kenya (Lamb and Muller 1982).

5 Absence of one of the three conditions can prevent the plantation system from emerging. For example, In the late nineteenth century when the Chao Delta of Thailand opened for rice production, the government gave concessions on large tracts of unused land to canal-building companies, resulting in the emergence of large private ownership of rice land (Hayami 2001). The large owners in the Delta, however, did not attempt to establish rice plantations. Instead, they leased out their land in small parcels to smallholders who migrated from outside the newly opened delta, resulting in the pervasive establishment of small family farms under tenancy. Why was the family farm instead of the plantation system established in the new land-opening stage under the policy of land preemption to wealthy canal builders? The reason may partly be the difficulty of standardizing tasks in rice production and, hence, of monitoring the efforts of workers. However, the more decisive reason was that paddy is storable and hence the need of close coordination between farm production and processing/marketing is not necessary unlike the cases of black tea and banana for export, as explained before in the text. Although rice milling and marketing for export involved significant scale economies, the operators of this business could secure adequate supply of paddy through ordinary market transactions. As a result, they dispensed with efforts to vertically integrate farm production with processing and marketing by means of the plantation system or the contract farming system. Therefore, it should not be unreasonable to postulate the counter-factual hypothesis that, if the nature of rice milling technology were such as to require close coordination with paddy production, large rice plantations would have been established in the Rangsit area, where canals were extensively built by private companies.

6 Official statistics often record that yields per hectare of cash crops such as coffee and rubber are higher in plantations than in smallholders. However, these statistics do not take into account various products intercropped with principal cash crops by smallholders, whereas monoculture is the common practice of plantations.

7 However, it is difficult to identify at which historical time point the family farm became socially more efficient than the plantation system in the production of tropical crops. The transition should have been gradual over a long span of time with any specific threshold point unlikely to be observable from available statistics.

8 For detail on the ecological environments of the two areas, see Hayami (2001).

9 Different agrarian structures in terms of distributions by farm size as well as land tenure type across economies in the region emerged not only because of different crops with different technological characteristics grown under different ecological conditions but also because of the different trajectories of social and political history (Pelzer 1945; Furnivall 1948; Mclennan 1969; Ingram 1971; Feeny 1982; Hayami and Kikuchi 1981; Hayami 2001).

10 Of course, there were factors other than the production organization that influenced agricultural growth performances. For example, Thailand's high growth in cash crop production during the period under study was supported by rapid land opening, especially in the Northeast, and also by major improvements in roads and highways, which were originally undertaken for the national security purpose of countering the communist insurgence in the border areas. However, these factors can not fully explain why Indonesia performed less well despite its large open frontiers in the Outer Islands and remarkable improvements in communication and transportation infrastructure under the Suharto regime. It seems reasonable to interpret that the improvements of infrastructure increased the advantage of the family farm over the plantation system, thereby causing Thailand to surpass Indonesia in the exploitation of available land frontiers for cash crop production. A detailed analysis of the interplay between production organization and other influential factors should be the agenda of future research.

11 Significant scale economies in agriculture began to emerge in Japan in the 1970s with the introduction of large-scale machines such as riding tractors and combines as the labor wage rates approached the level of high-income economies (Hayami and Kawagoe 1989). This is consistent with the result of cross-country studies that show scale economies are absent in low-income economies but significantly prevail in high-income economies.

12 Attempts in Latin America to apply the redistributive land reform to large estates using workers hired on wages or labor dues for subsistence plots (hacienda) have largely resulted in disastrous consequences (de Janvry and Sadoulet 1989).

13 The negative effect of land reform on plantation production is difficult to verify by means of formal statistical tests. Yet, stagnation in the growth of pineapple area in the Philippines after the 1970s, as compared with sharp increases in Thailand, despite availability of new land for opening in Mindanao, seems to represent strong evidence.

14 Possible incorporation of credit provision in the contract farming system includes not only cash credits but also in-kind credits in the form of supply of inputs to farmers during the crop-growing season before harvest, akin to the "putting-out system" in manufacturing. In this contract the cost of inputs is usually deducted from the payment for the delivery of products. This practice, which is commonly called "credit tying," is often used by traders/processors as a means of enforcing farm producers to fulfill their contractual obligations such as the timely delivery of products satisfying a certain quality standard, while it increases farmers' access to credits, especially for those possessing no assets usable for collateral. The empirical evidence of this practice's being used as an instrument for traders/processors to exploit small farmers is not very strong (Hayami and Kawagoe 1993).