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CORNELL
AGRICULTURAL ECONOMICS
STAFF PAPER

THE POLITICAL ECONOMY OF SMALLHOLDER AGRICULTURE:
CURRENT PROPOSALS FOR THE THIRD WORLD IN
HISTORICAL PERSPECTIVE

By

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February 1978 No. 78-5

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DEPARTMENT OF
AGRICULTURAL ECONOMICS
WARREN HALL

26 January 1978

Students who take Agricultural Economics 660 are duly forewarned. To understand the relationships linking "Food, Population, and Employment" considerable reading is necessary. Additionally I think it important that students have the opportunity to develop a major research paper. This requires even more time, both theirs and mine. Enrollment is therefore limited: by the number I can handle and by the number of students willing to put up with such unreasonableness.

But the results are a joy. I am privileged to work with a select few, and they by term's end have the satisfaction of having accomplished something significant. Initially to encourage the student to do his best, I offered publication in the Staff Paper series as bait. Increasingly this is no longer necessary; the papers stand on their own merit and warrant wider distribution.

In the present contribution, Peter Shiras examines the scope for building agricultural development around the smallholder--that small farmer so beloved by the latest wave of development theorists. He finds it not unpromising, given the proper resolve by those in authority, especially in areas suited to irrigated rice cultivation. Since a majority of the billion people who will be added to the labor force during the final quarter of the century will live in regions amenable to paddy, this is a singularly hopeful conclusion.

The author would welcome comments and these should be addressed to:

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Thomas T. Poleman

THE POLITICAL ECONOMY OF SMALLHOLDER AGRICULTURE: CURRENT PROPOSALS FOR THE THIRD WORLD IN HISTORICAL PERSPECTIVE*

By

Peter Shiras

> And basically it is upon this strategy of backing the small men--the half billion small farmers in the developing world--that the hopes of feeding most of mankind in the longer term depend.
>
> --Barbara Ward (1, p. 25)

> . . . any dependence on smallholder agriculture will probably prove fleeting. The labor-intensive schemes so far initiated have not met with great success and are not likely to.
>
> --T. T. Poleman (2, p. 15)

I. WHY THE INTEREST IN SMALLHOLDERS?

The purpose of this paper is to attempt to identify and clarify the many assumptions inherent in the two conflicting views presented above. Both statements are laced with myths concerning the small farmer-that amorphous individual who is both glorified and neglected. Within the last decade, increasing attention has been focused on the small farmer as the target for investment in the agricultural sector. This emphasis stems from a recognition of the failure of past strategies of agricultural development to raise the standard of living of the poorest in a nation. However, before one can seriously propose the small farmer as an alternative focus for an agricultural development strategy, the myths surrounding smallholder agriculture must be dispelled and a sound framework for decision making established.

The growth strategies of development of the 1950s and '60s emphasized absolute growth in gross national product, without worrying about the distribution of that growth within the economy. The rationale behind this approach has been that encouraging rapid growth in the industrial sector would create a ripple effect to spread the benefits of that increased wealth. The results of this strategy, however, have not been encouraging. In some countries, growth rates have been slower than expected (3, p. 6). But even in those countries that have experienced

*In slightly modified form, this paper was first submitted as a part of the requirements for Agricultural Economics 660: Food, Population, and Employment, Fall Term 1977/78.

rapid rates of growth, a large portion of the population has not shared in the benefits of this increased wealth. In India, for example, although per capita income rose by 40 percent in the period 1949/50 to 1968/69, average daily calorie consumption rose by only 14 percent. In a country of low levels of per capita income such as India, a rise of at least 32 percent in food consumption should be associated with a rise of 40 percent in income. What this means is that if total income were distributed equally, it would have shown a rise of 40 percent per capita. The small increase in food consumption shows that income was not equitably spread among the population and that therefore a large group did not share in the increased income (4, p. 31). In Pakistan, what data that are available indicate an absolute decline in welfare among both urban and rural poor during the period of Pakistan's most rapid economic expansion (5, p. 2). It is evidence such as this that demands a reassessment of traditional development strategy.

The reasons for the failure of this strategy lie in two closely related phenomena. First, it has not been able to generate increased employment in the nonfarm sector at a pace that would be able to absorb the growing numbers of people migrating out of agriculture. Second, it has been unable to stimulate agricultural production sufficiently to create a surplus for investment in the industrial sector or to provide a decent living to rural inhabitants. Ironically, much of the failure of the strategy for industrial growth can be traced to the failure of LDCs to invest sufficiently in agriculture. Without a dynamic agricultural sector that can produce a significant surplus, the industrial sector will not be able to provide the growing need for jobs.

Much of the industrialization taking place in the LDCs is based on modern capital goods as a major input and not as much on labor. Therefore, the employment-creating effects of increased industrialization are not likely to be able to absorb the bulk of population of largely agrarian societies. High rates of population growth, with many people moving into the employable age, increase the pressure on developing countries to create jobs. However, increasing costs of oil and other capital goods, and the associated problem of debt service, a decline in aid from the developed countries, and the limited prospects for increasing exports to developed countries further limit the potential for employment in the industrial sector (6, p. 41). With the possibilities for increased employment in the industrial sector limited, developing countries must look to agriculture to provide employment and to stimulate productivity in other sectors of the economy. FAO projections estimate that over 400 million new workers will enter the labor market in Asian countries alone by the year 2000. To absorb this population into nonagricultural employment would require a 4.25 percent per annum growth rate in employment. Atthough some Asian countries have achieved rates of growth as high as this (4.6 percent in the Philippines in 1964-73), due to factors mentioned above the outlook for future expansion is less optimistic. In addition, many Asian countries have achieved relatively low rates of growth in nonagricultural employment, for example, only 2.5 percent per annum in India from 1964-1971 (6, pp. 38-40).

In addition, the growth strategy of development has a deleterious effect on the rate of population growth. In many Latin American countries where the primary emphasis has been on overall growth of the economy to the benefit of the already rich, the rates of population growth are among the highest in the world, exceeding three percent per annum. One can safely postulate that if a development strategy does not provide for an equitable distribution of wealth, as well as improved health services, family planning, and a degree of control by the people over their own lives, little progress will be made in stemming these high rates of population growth (1, pp.19-20). The basic cause of the population problem is poverty and until the poverty problem is solved, the population problem will only serve to exacerbate the degree of poverty.

Growing out of a recognition of the failure of this strategy of overall growth and "trickle down" to the poor, national policy-makers and development planners began to look for a new strategy that emphasized employment creation and a more equitable distribution of income (3, 4). It is within this strategy that the role of agriculture, and of the small farmer in particular, is crucial. If the developing countries are to employ their expanding populations, the agricultural sector must absorb a large percentage of that population. One must guard, however, against introducing a new bias, the small farmer bias, into development policy. Because the small farmer has been neglected in the past, there is now a tendency to glorify the small farmer as the answer to the agricultural problems of the LDCs. However, the development of farm structure within a given country or region should conform to the twin objectives of efficiency and equity that a nation seeks to achieve. In many areas of the world, the achievement of both of these objectives is only possible under a system of smallholder agriculture; in other areas the converse is undoubtedly true. It must be emphasized, however, that the specific conditions of a particular region must be carefully analyzed to determine what is the appropriate farm size or multiplicity of farm sizes. The biases that have so often dictated agricultural policy in the past must give way to a more enlightened view that recognizes the need to satisfy criteria of both efficiency and equity.

II. HISTORICAL PERSPECTIVE--FOUR DEVELOPED COUNTRIES

In order to gain a better understanding of the process of development and the role of agriculture in that development of Third World countries today, let us go back and examine the development of four now-developed countries. Although the conditions then and now are strikingly different, we shall attempt to draw some general conclusions applicable to the now-developing countries. Throughout this discussion we will f focus on the role of the small farmer in the development process; if it was significant and why, and if it was not significant and why not?

Britain, 1750-1850

Britain was the first country to experience the shift of a major portion of the population out of agriculture and into the industrial sector. Chart I shows the decline of the British agricultural population over time, and one is particularly struck by the fact that even in 1811 less than 40 percent of the working population was employed in agriculture. The development of this structure was largely determined by two forces: the Industrial Revolution and an agrarian revolution led by the landholding elite. To quote Griswold (7, p. 51):

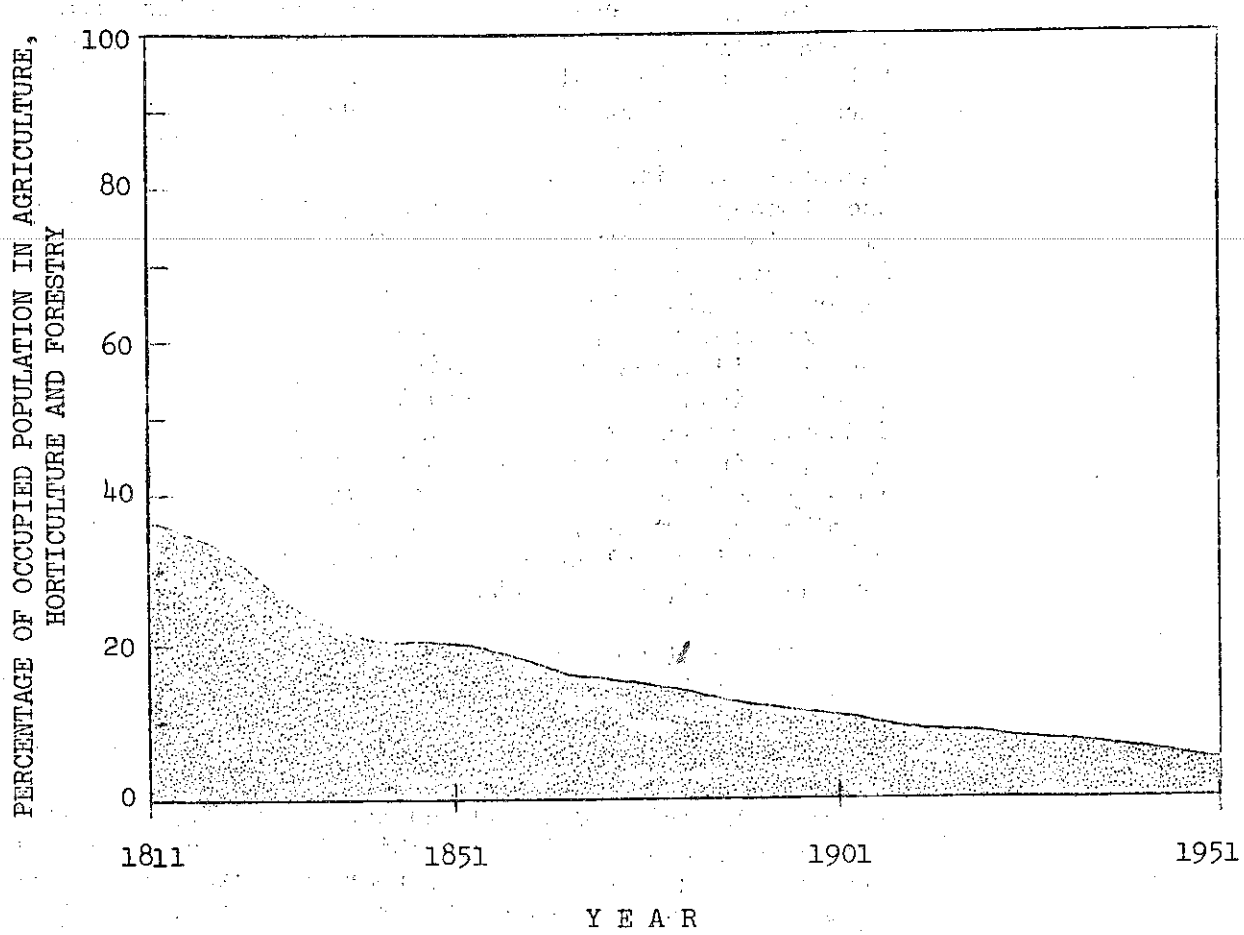
> Opinions differ as to the precise interrelationship of these two phenomena, but in the perspective of history they merge in a general trend of capitalism and commerce. The industrial revolution stimulated the agrarian in several ways: by creating in the rapidly increasing industrial population a new and apparently insatiable market for foodstuffs; by contributing to agriculture new organizational and mechanical techniques, and by providing employment for the surplus agricultural labor these created. On the other hand, the agrarian revolution made the industrial revolution possible by supplying the greatly increased quantities of food required by its workers.

With the Industrial Revolution came a scientific revolution in agriculture led by the experiments of Jethro Tull (1674-1740) and Arthur Young (1741-1820). Through the application of scientific methods to agriculture, landowners were able to farm larger units more efficiently than they had in the past. The enclosure movement was the result of these technical changes in agriculture and of the whole movement of the society towards an industrial economy.

A large amount of land in Britain at this time was held in common as pasture or strip-cropped by peasant farmers and landless laborers. Often the survival of these individuals depended on their access to this common land for animal and crop production. Between 1761 and 1845, some five million acres of this land, or 20 percent of total British agricultural land, was subject to enclosure. This meant invariably that the land was bought by large landowners and added to their holdings, while local peasants were deprived of an important source of subsistence. The political means by which this was accomplished was through private acts of Parliament that allowed the rural gentry exclusive access to the land (7, pp. 52-54).

The effects of enclosure were many. First, it resulted in highly concentrated land ownership. Some four thousand landowners controlled four-sevenths of the cultivated land which was in turn leased to a quarter of a million tenant farmers who employed 1.25 million farm laborers (8, p. 164). Second, enclosure meant that for the first time in centuries, major technical change could be brought into agriculture. By replacing strip-cropping and common pastures with more intensive

CHART I. BRITAIN: PERCENTAGE OF OCCUPIED POPULATION IN AGRICULTURE, HORTICULTURE, AND FORESTRY, 1811-1951*



*Source: E. J. Hobsbawm, Industry and Empire, (London, 1967), Chart 4, Appendix.

methods of cultivation allowing capital formation, mechanization and soil management, productivity was greatly increased. At the same time, many farmworkers were displaced, losing their jobs due to mechanization and overall increased production, and many were unable to survive without common land and sought better opportunities in the rapidly expanding cities.

The driving force behind this commercialization of agriculture and concentration of land into large units through enclosure was the Industrial Revolution. Although the Industrial Revolution depended on the surplus of agricultural laborers and ample supplies of foodstuffs for its development, a complex of other factors contributed to Britain's industrialization. Transportation and communication systems were cheap and abundant, and the technology involved in the industrialization was also relatively simple to master; it required no specialized training. Small-scale production was economically feasible and did not require external capital but could be financed out of accumulated profits. Furthermore, the spark that really set the Industrial Revolution off was the widespread availability of overseas markets. From 1750-1770 domestic industries increased their output by 7 percent while export industries increased output by 80 percent. This was made possible both by exporting to Europe and North American colonies and by capturing foreign markets through war and colonization. At home, the Industrial Revolution virtually destroyed the system of cottage industries that had developed in rural areas, further depriving rural inhabitants of a means of support (8, pp. 32, 44).

The British laborer did not adjust overnight to the radical changes in the organization of society. Up until 1845, unemployment and social unrest were widespread in the countryside, causing riots and destruction of farm machinery. Relief measures that were attempted actually worsened the problem. According to the Speenhamland Act of 1795, the difference between the price of bread and the prevailing wage rate was to be made up out of parish donations. This allowed large landowners to pay less than a living wage and forced poor parishioners to make up the difference between the wage rate and the price of bread. The Poor Laws of 1834 were as unenlightened as the earlier act. As a result, the poor became poorer and the accumulation of capital and land by the ruling gentry was increased.

The Industrial Revolution was both the cause of and the eventual solution to the poverty that existed in the countryside. Gradually, the industrial sector was able to absorb most of the labor that had been displaced from agriculture into the ranks of the urban wage-earners. The small British farmer and much of the agricultural labor force as a whole became a part of the growing industrial work force.

To conclude then, we can say that the small farmer was eliminated relatively early in British economic development due both to the speed with which the Industrial Revolution overtook the nation and to the power of a landholding minority in fueling the Industrial Revolution with both labor and food. One must recognize, however, that the success of this process of development was heavily dependent on the rapid pace of industrialization made possible by a unique set of circumstances existing at

that time. The present requirements for industrialization differ substantially from those of the eighteenth century, i.e., highly sophisticated technology, complex communications, expensive transportation systems and the necessity of large-scale production to compete with other producers and large capital and managerial requirements. Furthermore, the British market was primarily for export and often at the expense of the development of British colonies. The decline of the small farmer and the agricultural population as a whole with a more advanced stage of economic development is commonplace among Western industrialized countries. What is unusual about Britain is the speed and early date at which this was accomplished.

The French Experience, 1750-1970

The French experience provides an interesting contrast to that of Britain. Until very recently, the French had resisted the trend towards larger farms and a reduction in the agricultural population. In 1941, France still had 36 percent of its population employed in agriculture, compared to only 6 percent in Britain, and 62 percent of French farms were under 25 acres in size (7, p. 88). How did the French manage to retain small farms and what impact did this have upon her economic development?

French agriculture has historically been dominated by peasant farmers. At the time of the French Revolution, peasant farmers constituted 90 percent of the landowners and held 40 percent of the arable land, with nobles, clergy, and a few larger farmers owning the rest. Almost all production was carried out by peasant farmers, either on their own land or on lands leased to them by the clergy or nobles. One of the objectives of the peasants during the revolution was to free themselves from the feudal control the nobles and clergy imposed on them through payment of dues and taxes and the lack of clear title to the land.

The French Revolution essentially legitimized the agricultural structure that had been evolving for centuries by consolidating the political power of the peasants. First, peasants were granted fee simple ownership of their land. Second, the peasants demanded that the land owned by the church and nobles be confiscated and turned over to the peasants. This was accomplished to some extent, but not to the full satisfaction of the peasants. Third, the principle of equal inheritance was established under which all heirs divided up property equally. This principle was crucial to the French belief in equality of all and their conviction that small peasant farms were both more just and more efficient. The French looked with horror on the British practice of primogeniture as decidedly undemocratic. However, over time, the French system resulted in the fragmentation of farms into very small, inefficient units. Although the principle of equal inheritence did reduce rates of population growth, as families found it in their interests to limit the size of their families, a steadily increasing population was vying for a limited land base. By continuing the structure of agriculture that had existed since medieval times, the French retarded both the pace of technical advance and the growth of the economy as a whole.

The Industrial Revolution came later and more gradually to France than it had to Britain due to both the structure of agriculture and to problems in the industrial sector itself. France lacked a large and steady supply of coal with which to fuel its industrial plants, and this, combined with an inability of the government to maintain long-term economic policies, hampered the development of the industrial sector. At the same time, the retention of a large portion of the population in agriculture, under conditions of relatively low productivity, denied the industrial sector of both a large pool of labor and a large supply of cheap food for urban workers.

In the late nineteenth century, France adopted protectionist policies in response to increasing competition from American and other non-European grain producers. These policies were designed to preserve the existing allocation of resources, and to retain the system of peasant farmers and small holdings. The political strength of the peasants was also evident in their resistance to government attempts to consolidate some smallholdings into larger, more efficient units. Although enabling legislation was passed in 1918 to allow for this kind of consolidation, because the initiative had to come from the local level, very little farm consolidation actually occurred.

It was not until after World War II that the need to revive the ailing French economy became paramount in the agricultural sector. The postwar governments embarked on a policy of increased industrialization, trade liberalization, modernization of agriculture and reduction in the agricultural labor force. Upon its entry into the European Common Market, France was forced by the demands of other member nations to modernize its agricultural structure as other EEC members did not want to have to pay for inefficient French agriculture. This included measures to help people leave agriculture and find other jobs, creation of nonfarm jobs in rural areas, increasing the size and efficiency of the farms remaining, and improving the tenure conditions and managerial abilities of the remaining farmers (10). The progress that France has made can be seen in Table I, in the increasing size of farm, reduction in the agricultural labor force, and relative increase in efficiency of the agricultural worker compared to the nonagricultural worker.

The French experience shows that it is possible to maintain an agricultural structure that is heavily dependent on small-scale producers, but it raises the question, is it desirable? Because of the political power of the French landowners, in this case the small farmers themselves, and the corresponding value that the French found in a peasant style agriculture, small farms remained a part of the French agriculture into a relatively late stage of development. The economic costs of preserving small farms for so long is apparent in the relative inefficiency of French agriculture compared to Britain (Table I) and in the lower productivity of the economy as a whole. Whether France as a nation, economically, socially, and one wants to say, spiritually, benefitted from the values that promoted small farms and a large agrarian base is a question that only the French themselves can answer.

TABLE I. COMPARISON OF BRITISH AND FRENCH AGRICULTURE, SELECTED INDICATORS*

	Average Farm Size in Hectares		Agricultural Labor Force as a Percentage of Total Labor Force	
	1955	1974	1955	1974
Britain	37.3	64.3	5	3
France	15.2	23.5	27	11

	Ratio of Gross Agricultural Product per Agricultural Worker to Nonagricultural Gross Domestic Product per Nonagricultural Worker	
	1950	1974
Britain	110	181
France	40	62

	Degree of Self-Sufficiency in Cereals (Except Rice), Percentage of Consumption Product Domestically, 1956	
	1956-60	1973-74
Britain	NA	68
France	110	170

*Source: EUROSTAT, Basic Statistics of the Community 1975-76, Tables 27, 9, 11, 41.

USDA, ERS, Structural Changes in West European Agriculture 1950-1973, Foreign Agric. Econ. Report No. 114, Nov. 1975, Table 8 and Table 2.

European Economic Community, La Situation de l'Agriculture dans la Communauté Rapport 1976, January 1977, pp. 175, 234-35.

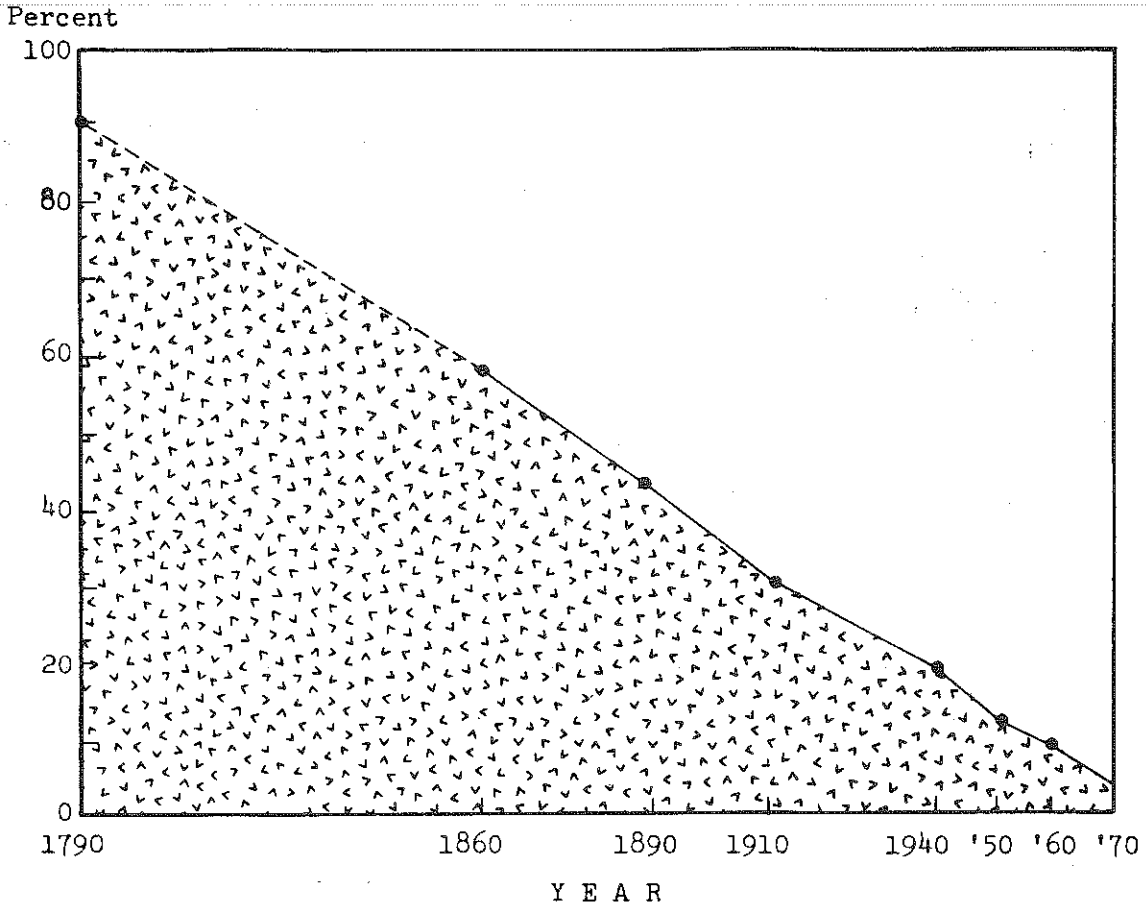
United States, 1790-1970

United States agriculture is regarded by many the world over as the most highly evolved, efficient and productive system in the world. In support of this contention, one may point to the fact that one American farmer is capable of feeding 52 people (11, p. 25). The farm problem in the United States has historically been one of overproduction and low farm prices, rather than a shortfall of production. From Chart II and Chart III, the trend in declining agricultural population and increasing farm size is readily apparent. The question we must answer then is, what were the forces that have caused the gradual decline of the small farmer in American agriculture.

The earliest policies of the United States in agriculture established the public land laws, based on the Jeffersonian principles of private ownership and support of entrepreneurial small farmers. Land was to be held in fee simple ownership and one of the promises of the new land was that everyone should, or at least could, own land. The Pre-emption Law of 1841 legalized squatting on public lands, with the option to buy up to 160 acres. The Homestead Act of 1861 gave title to land to any person who lived on and worked the land for five years. Although the purpose of these laws was to give ownership of land to family farmers, they were not without abuse. Between 1850 and 1880, railroads acquired up to 187 million acres of land, causing a great deal of speculation in the land market (7, pp. 140-141). One of the fundamental advantages that the American farmer enjoyed, however, was and still is the abundance and high fertility of American agricultural lands. That resource is a gift of nature matched by no other nation in the world.

Further public investment in agriculture came with the establishment of the land grant agricultural colleges (1862), federal support for state agricultural experiment stations (1887), and the agricultural extension service (1914). All of these programs were designed to aid the family farmer, although over time they have contributed to the increase in farm size and reduction of agricultural labor force. During the Depression, a major effort was made to provide assistance to small, tenant farmers. The Resettlement Administration (1935) purchased submarginal units and resettled displaced families on larger farms. In 1937, the Farm Security Administration (FSA) took over the work of the Resettlement Administration and embarked on an ambitious program of farm credit and counsel, primarily in the South. FSA encouraged the formation of cooperatives, provided credit on favorable terms to needy farmers and purchased land for tenants. However, due to its controversial nature, it never had the political backing it needed from the USDA, and in 1946 the FSA became the Farmers Home Administration and lost most of its reformist programs. FHA gives loans to farmers who cannot receive credit from any other source, however, in recent years its importance in agriculture has diminished.

CHART II. UNITED STATES: PERCENTAGE OF TOTAL LABOR FORCE IN AGRICULTURE, 1790-1970*



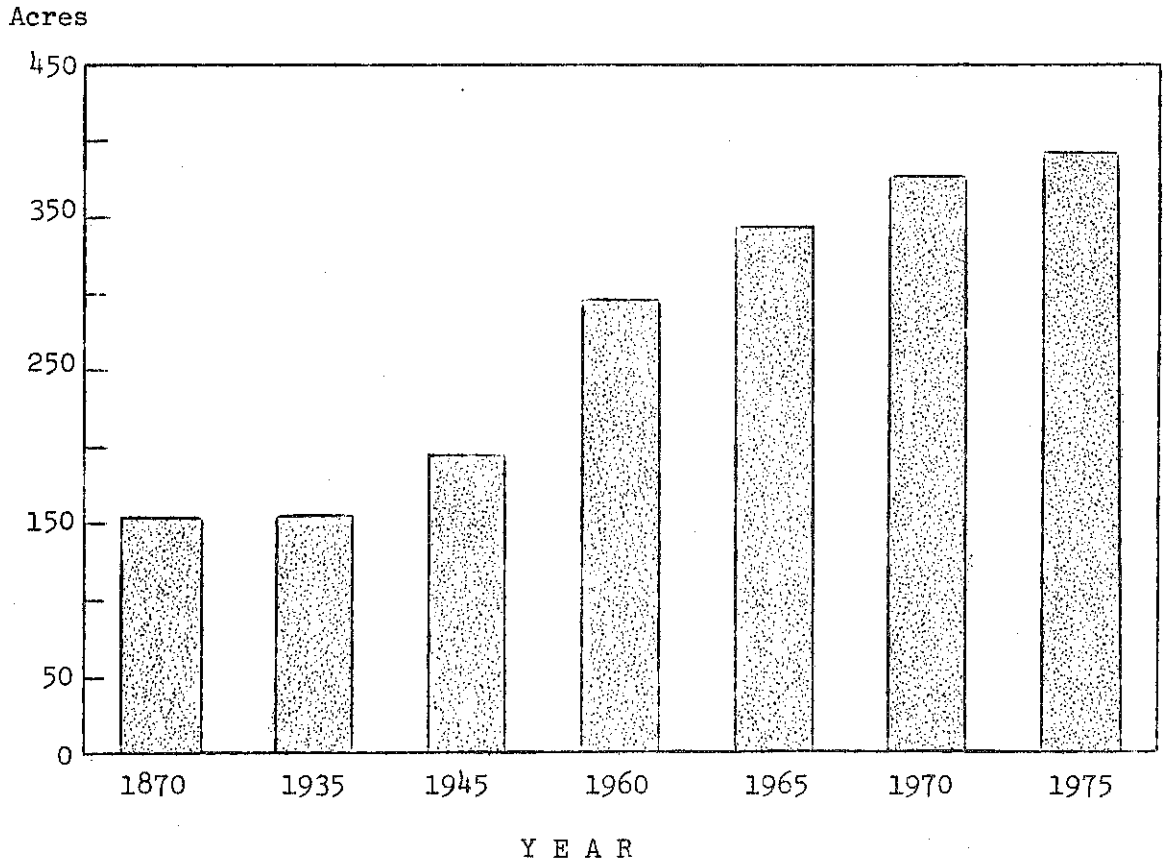
*Sources: USDA, Economic Research Service, A Chronology of American Agriculture 1790-1970, pp. 0-423-381.

USDA, Handbook of Agricultural Charts, No. 504, p. 60.

U.S. Department of Commerce, Bureau of the Census, Historical Statistics of the United States, 1975, p. 457.

CHART III. UNITED STATES: AVERAGE AREA PER FARM, SELECTED YEARS, 1870-1975*

(acres)



*Source: U.S. Department of Commerce, Historical Statistics of the United States, Colonial Times to 1970, p. 457.

U.S. Dept. of Agr., Agricultural Statistics 1975, p. 417.

These programs to directly encourage the retention of farm families in agriculture are in marked contrast to the majority of public programs adopted by the USDA. The general drift of government agricultural policy has been both dictated by and has reinforced a set of economic forces that has resulted in the loss of three million American farms in the past 30 years, and a rate of loss in 1975 of 12,000 farms (12, p. 417). Those farms that remain, though by and large family farms, are larger and more capitalized than ever before.

As industrialization took place in the nineteenth and early twentieth century, the real price of capital declined in relation to labor or land (13, p. 382). In agriculture this meant that it became more economical to substitute capital inputs for labor and land: use of fertilizer, improved varieties, pesticides and mechanization led to a displacement of labor and specialization. In the United States at this time, yield-increasing technology forced workers out of agriculture because fewer farms and less land were needed to meet effective demand. With rising wage rates, farmers were encouraged to substitute capital for labor and to gain from the economies of scale associated with mechanization and cash grain production. The large increases in production due to yield-increasing technology squeezed less efficient farmers out of agriculture.

While certain economic forces were pushing people out of agriculture, other forces were pulling them towards nonfarm employment. As economic development proceeds and incomes rise, the demand for most food commodities becomes highly inelastic in relation to the demand for other consumer goods. People can only eat so much, but they seem to have an insatiable appetite for cars, vacations, household gadgets, insurance, etc. Therefore, nonfarm employment opportunities became more attractive than farm employment to many marginal farmers. This pulling force provided jobs for many of those leaving agriculture, offering the prospect of greater security, higher incomes and the lure of city life. At the same time, this unplanned migration from rural to urban areas has contributed to the problems of urban areas due to the lack of job training for rural migrants.

While our natural resource endowment and economic forces worked together to reduce the agricultural work force and increase farm size, government policy reinforced these trends. Although the purpose of U.S. agricultural policy has been to promote family farms, these policies have contributed to the increase in farm size and reduction of agricultural labor. This bias is expressed in the public underwriting of the development of mechanization, support prices, land retirement programs and loan policies. In a number of studies of the distribution of gains from public policies, it has been consistently shown that larger farms benefit more from these policies than do smaller farms (14, pp. 33-36).

From the standpoint of economic efficiency, the United States has followed an entirely rational agricultural policy line. Indeed, given the characteristics peculiar to American agriculture outlined above, it

is unlikely that anything short of a massive political effort and tremendous federal spending could have reversed the trends in farm size and population shown in the charts. However, before attempting to extrapolate from the American experience to other nations, one must recognize the particular circumstances of the United States which have enabled it to pursue the policies that it has.

First, the United States possesses an abundance of fertile land and so has not measured efficiency in terms of land resources, an abundant factor, but rather in terms of labor resources, the relatively scarcest factor. Therefore, to say that the U.S. has a highly efficient system, one must recognize that this is measured in terms of labor and not land or capital (energy).

Second, given this measure of efficiency, the larger farmer in the U.S. has been able to substitute land and capital for labor more effectively than the smaller farmer. This is due to the economies of scale involved in the use of mechanization, large capital requirements needed to purchase new technology, and the ability to spread labor costs over more units of production.

Finally, the United States has evolved to its present farm structure gradually over time, and in general those squeezed out of agriculture or those choosing to leave have been able to find nonfarm employment. It must also be recognized that government policy has been consistent with the resource endowment of the country in its promotion of efficient family farms. Undoubtedly, there have been costs involved in the movement to ever larger and fewer farms, both in terms of the quality of life in rural and urban areas, the limited possibilities of entry into farming, and the environmental problems of agricultural pollution (15, p. 13). In addition, agricultural policy has tended to either discriminate against or simply ignore the small farmer in the U.S. Nevertheless, the United States has in many ways been highly successful in its agricultural development by taking advantage of its rich factor endowment.

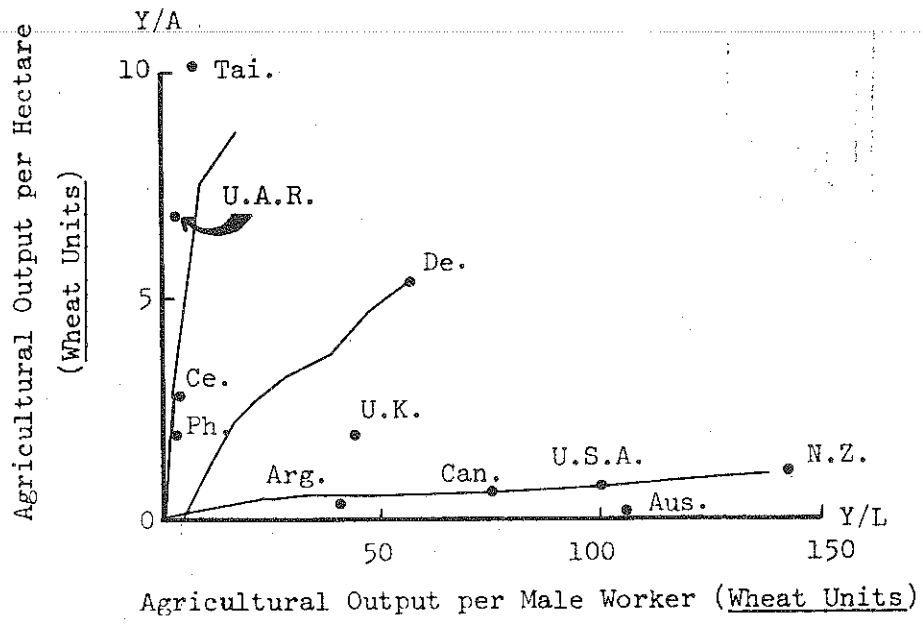
Japan, 1850-1970: A Prospective Model?

Japan, in contrast to the United States, is a country of very limited land resources and large population. Therefore, the single most important imperative of Japanese agricultural policy has been to maximize output of basic grains (principally rice) per unit of land area. Figure I shows the different responses of Japan and the United States to different resource endowments, the U.S. emphasizing output per worker and Japan maximizing output per unit land.

From Table II one can see that Japan has shown impressive increases in both output per worker and output per hectare while only slightly increasing the land base per worker. Chart IV shows the relative stability of the Japanese agricultural work force over time, with the beginning of a downward trend only since 1960. Finally, Chart V shows

FIGURE I. HISTORICAL GROWTH PATHS OF AGRICULTURAL OUTPUT PER MALE FARM WORKER AND AGRICULTURAL OUTPUT PER HECTARE OF AGRICULTURAL LAND AREA IN JAPAN, DENMARK, AND THE U.S.A. (1880-1965), IN TERMS OF QUINQUENNIAL DATA, COMPARED WITH INTERCOUNTRY CROSS-SECTION DATA OF 1960

(1957-1962 Averages)



KEY:

Argentina	Arg.
Australia	Aus.
Canada	Can.
Ceylon	Ce.
Denmark	De.
New Zealand	N.Z.
Taiwan	Tai.
United Arab Republic	U.A.R.
United Kingdom	U.K.
United States	U.S.A.
Philippines	Ph.

*Source: Yujiro Hayami, A Century of Agricultural Growth in Japan, Minneapolis, 1975, p. 201.

TABLE II. COMPARISON OF AGRICULTURAL PRODUCTIVITIES AND MAN/LAND RATIOS BETWEEN JAPAN AND SELECTED COUNTRIES IN ASIA*

(wheat units per worker for output; hectares per worker for land area)

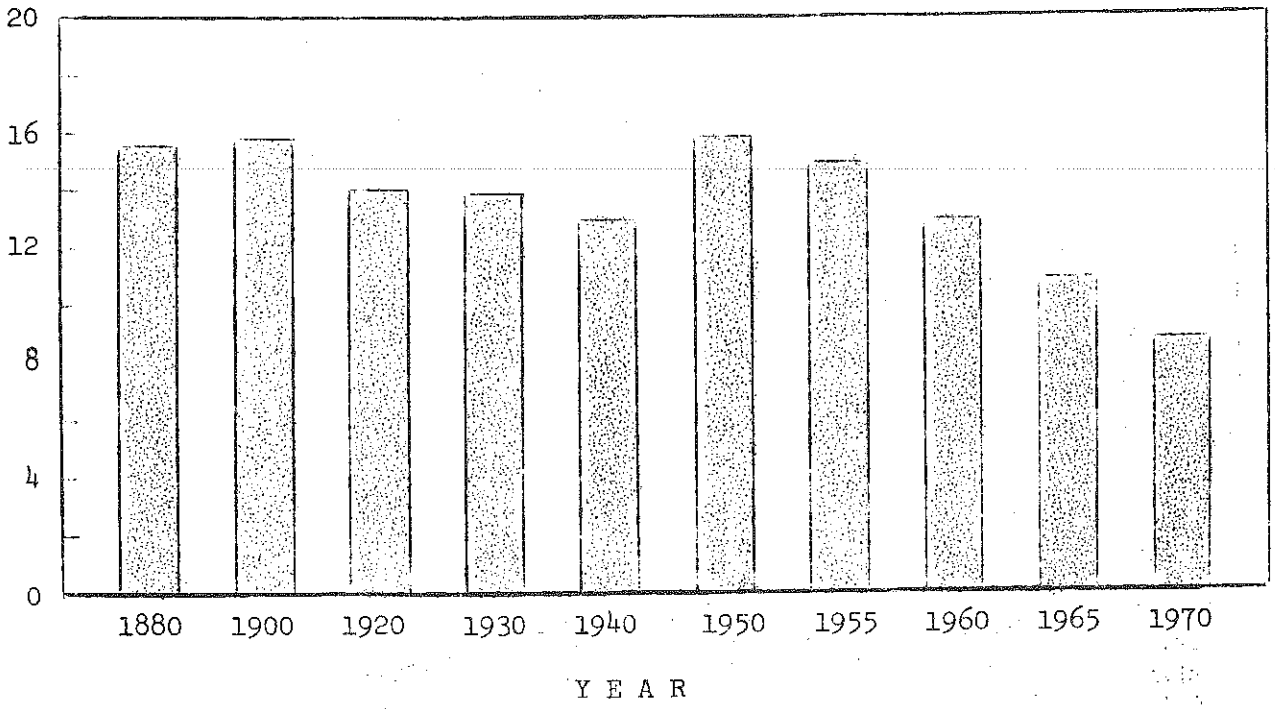
	Agricultural Output per Male Farm Worker	Agricultural Output per Hectare of Agricultural Land	Agricultural Land Area per Male Worker
	(wheat units per worker)		(ha. per worker)
Japan			
1878-1882	2.5	2.9	0.9
1898-1902	3.4	3.6	0.9
1933-1937	7.1	5.5	1.3
1957-1962	10.7	7.5	1.4
Asian, 1957-1962			
Ceylon	3.9	2.9	1.3
India	2.1	1.1	1.9
Pakistan	2.4		
Philippines	3.8	1.9	2.0

Note: Agricultural output in wheat units: Gross agricultural output net of intermediate products, such as seed and feed. Individual products are aggregated by the price ratios to the price of wheat per one metric ton. Farm workers: Economically active male population in agriculture. Agricultural land area: Includes permanent pasture land.

*Source: Yujiro Hayami, A Century of Agricultural Growth in Japan, Minneapolis, 1975, p. 8.

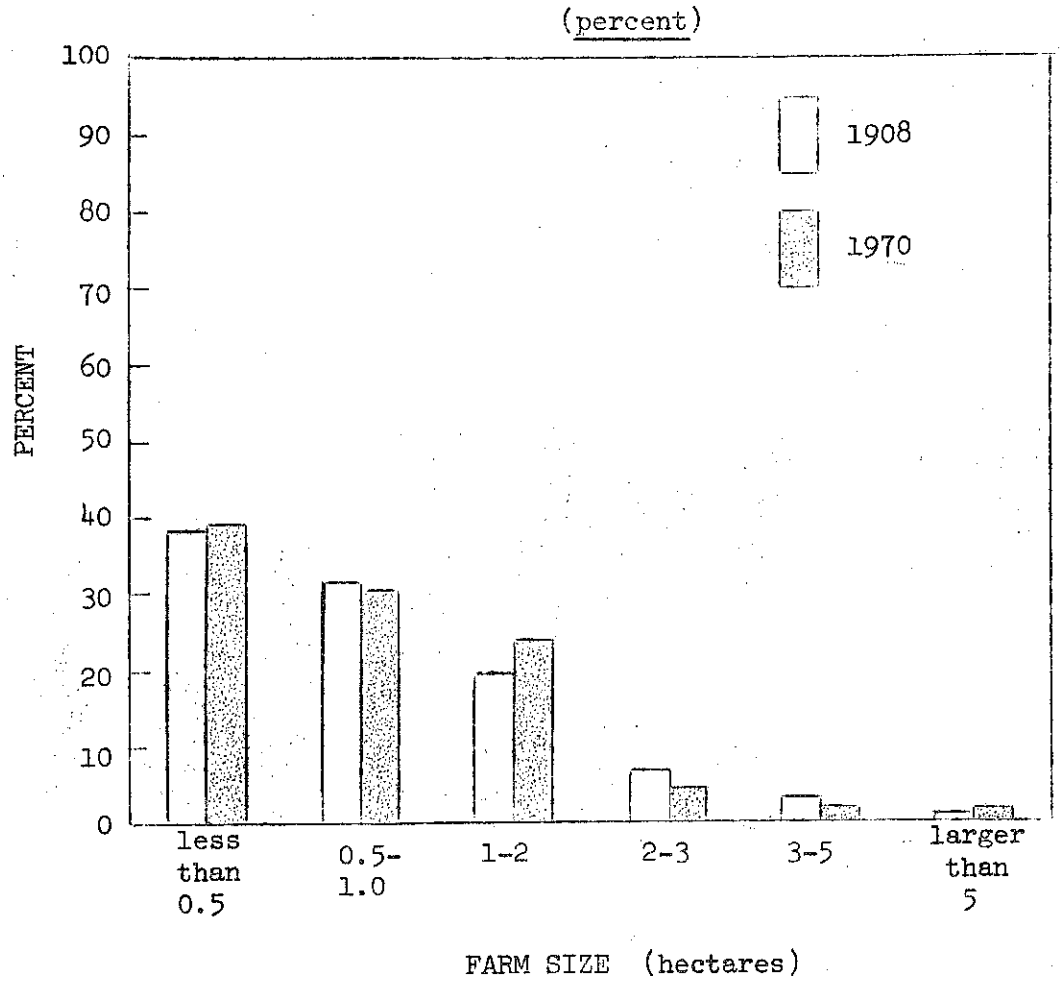
CHART IV. JAPAN: WORKERS EMPLOYED IN AGRICULTURE, SELECTED YEARS, 1880-1970*

(millions)



*Source: Yujiro Hayami, A Century of Agricultural Growth in Japan, (Minneapolis, 1975), p.224.

CHART V. JAPAN: DISTRIBUTION OF FARMS BY SIZE OF CULTIVATED AREA, 1908 AND 1970*



*Source, Yujiro Hayami, A Century of Agricultural Growth in Japan, Minneapolis, 1975, p. 9.

the distribution of farms by size and the relative change in that distribution from 1908 to 1970. Note that there has been virtually no change in the structure of farm size in Japan in this century.

Is Japan a prospective model for the now-developing countries of Asia? Because of its emphasis on paddy rice production, its high population to land ratio, and its concentration of smallholder production, Japan is very similar to other Asian developing nations. From Table II we can see that the levels of productivity existing today in Asian and Southeast Asian countries are similar to those existing in Japan in 1880.

Most Asian countries today face a deterioration in the man/land ratio as population growth rates are in the 2.5-3.0 percent category, and possibilities for land expansion are limited. The possibility of absorbing this population increase into the nonfarm sector is likewise limited. Clearly, the greatest potential lies in increasing productivity per unit land as a stimulus to the rest of the economy and also as a means of employment in rural areas. The question is, then, how was Japan able to achieve high levels of productivity within the high employment structure of smallholder production and what lessons can other LDCs learn from the Japanese experience?

The agriculture of Japan is based primarily on paddy rice production, and this is significant in that it is the major form of agricultural production throughout most of Asia and Southeast Asia. Paddy rice is also a type of agriculture particularly well suited to smallholder production in that it must be very carefully managed to be highly productive. Transplanting rice seedlings is labor-intensive and increases yields per unit of land, and a very carefully managed irrigation and flood control system maximizes yield response to fertilizer applications by reducing volatilization losses. For all of these reasons, the Japanese found that small-scale production was the most efficient form in terms of their scarcest resource, land. However, in many other Asian nations small-scale production also predominates and therefore we must ask, what other factors contributed to Japan's success?

The feudal period in Japan (pre-1868) had already developed an advanced irrigation network and flood control system. Without this inheritance, Japan could not have progressed as rapidly as it did in its growth periods. The feudal period also saw the emergence of a market economy and an organizational structure that promoted small farms and cooperation among farmers. The feudal lords forced farmers to work together to build and maintain irrigation systems. This later gave the farmers the organizing ability to form cooperatives and to participate actively in the adoption of new technology into their farming systems.

Japan also pursued a policy of investment in agriculture that very early resulted in the development of the seed/fertilizer technology to increase productivity. Long before anyone talked of a "Green Revolution" Japan was developing high-yielding varieties well adapted to their

farming systems. Government policy tended not to favor large landowners as opposed to peasant farmers; rather, because of the homogeneity of farm size in Japan and because of a land reform program in the post-World War II period to equalize tenure relationships, the benefits of government support of agriculture were widely distributed.

A third constraint on the productivity of smallholder agriculture is the ability of the farmers to adjust to changing conditions and the ability of rural institutions to remain stable with changing social conditions. The development of agricultural societies by landowning farmers with government support was a crucial factor in the ability of the Japanese farmers to adjust to changing technology. In addition, the formation of farmer cooperatives further extended the ability of Japanese farmers to work together to increase productivity. The importance of institutional and social stability in the adoption of new technology should not be underestimated and deserves further study. The Japanese combined public investment in agriculture with support of private initiative to encourage the adoption of new technology. This strategy was successful because the technology required for paddy rice production is particularly well adapted for small-scale production and because of a relatively equitable distribution of land.

A fourth constraint on the development of Japanese agriculture has been the tenure system. In the early stages of agricultural development, landlords, many of whom still worked their own land, were some of the primary innovators in agriculture and thus helped to stimulate agricultural productivity. However, as their wealth grew, they tended not to farm their own land and invested increasingly in the nonfarm sector. During the period 1912-1925, landlords became increasingly exploitative of agriculture and production stagnated as a result. By 1930, tenancy rates had risen to 50 percent (16, p. 60). Therefore, one of the first actions to stimulate agricultural production after World War II was a land reform program (carried out at the insistence of the Allied Supreme Command) that resulted in a reduction of tenancy rates from 45 percent in 1945 to 9 percent in 1955 (16, p. 68). This land reform program succeeded in increasing incentives of small farmers and, backed by new and additional inputs of fertilizer and small-scale mechanization, provided the basis for sustained productivity growth.

Finally, as production increased tremendously during and after the mid-'50s, Japan adopted a price support policy to provide income support to farmers. The government guaranteed a price of rice tied to cost of production plus a return on labor equal to that of an urban wage earner. Although this policy worked to the benefit of the Japanese farmer who grew rice, it has reduced consumer welfare in the form of higher rice prices which are subsidized but not to the same extent that prices are supported. Furthermore, it has worked to the direct disadvantage of other Asian rice-exporting countries, principally Thailand and Burma, as Japan has accumulated surpluses and dumped them on the market (5, p. 162).

In relation then to paddy rice production in other Asian countries, again with a majority of small-scale producers, several important factors can be identified. A well-developed flood control and irrigation system is essential if the seed fertilizer technology is to be successfully exploited. Second, increased investment in the development of yield-increasing technology which is suitable to the needs of a particular country must be forthcoming. Finally, and perhaps most importantly, the social and institutional constraints to the adoption of new technology by small farmers must be minimized. This can be accomplished in a variety of ways: improving tenure conditions, promoting farmer cooperation and encouraging farmer participation in the development and evaluation of new technology, to mention only a few that were particularly important in the Japanese experience.

III. CONSTRAINTS ON THE DEVELOPMENT OF SMALLHOLDER AGRICULTURE

Let us turn now to a discussion of the constraints on the development of smallholder production in the developing countries themselves, particularly as it relates to the adoption of technical change. If the small farmer is to be successful, he must be able to utilize the new technology that is being developed, specifically that technology which is yield increasing rather than labor displacing. In countries of low agricultural productivity, one would expect that yield-increasing technology would have the effect of more fully utilizing presently underemployed resources, particularly land and labor. The success of the small farmer in Japan resulted from an institutional structure that developed and promoted technology appropriate to small farms and an economic structure that encouraged small farmers to adopt that technology. An understanding of the institutional and economic barriers to small holder adoption of new technology is crucial to the success of the agricultural sector as a whole in the developing countries.

Land Concentration and Tenure Conditions

The concentration of land ownership is a major cause of distortions in the market system in the rural economy. By establishing monopoly control over scarce resources necessary as agricultural inputs, large landowners and small farmers face different relative prices that determine the mix of inputs each will use in their production system. The ability of large landowners to command monopoly or monopsony power over factors of production arises from a set of interrelated circumstances. Firstly, commercial and export production, often consolidated into large units, tends to occupy the more productive soils in a country. Secondly, these areas are more likely to receive the benefits of improved infrastructure before areas of primarily subsistence production. To some extent, of course, this makes sense as the production for export or domestic commercial markets requires more infrastructure facilities than does a system of purely subsistence production. However, the benefits of irrigation and land infrastructure improvement are often skewed

in favor of larger units. Thirdly, land ownership brings with it political power and the more land one owns the more power it brings. This may result in the bias of government policy that unduly favors the politically powerful landholding minority.

The degree of land concentration is highly correlated to the ability of small farmers to adopt new technology. Because small and large farmers face different relative prices, they will respond differently to changing technology: a capital-intensive technology that is rational for a large farmer to adopt may make no sense whatsoever to a small farmer who faces a virtual zero opportunity cost for his labor and for whom capital is the scarcest resource. The large farmer on the other hand must hire labor and may be able to benefit from government subsidization of capital inputs. Table III from Ceylon shows the different mix of inputs adopted by small versus larger production units. Note that the smaller units employ more labor and obtain slightly higher yields, while the larger units utilize more capital-intensive methods and obtain slightly lower yields. Figure II shows the relationship between yield and employment on the one hand and size of farm on the other in Thailand. It is the more intensively managed small farms that yield higher and create more employment than the larger farms.

Looking strictly at size of farm holdings can be misleading if land ownership is highly concentrated but holdings are divided up among many tenant farmers or sharecroppers. If the tenure system is designed so that landlords are the primary beneficiaries of increments in production, then there will be little incentive on the part of the tenant to innovate. Because tenant relationships are so varied and complex, one must examine not only size of holding but also the particular tenant relationship in a given area to determine what effect it has upon adoption of new technology.

The degree of land concentration and type of tenure relationship together determine the extent to which small farmers may have access to credit, water, technical information and other necessary factors of production. Availability of credit, for example, is necessary if small farmers are to have access to the inputs that require capital and thus to compete effectively in those crops that they market. In Taiwan government support for agricultural inputs ensured that smallholders would have access to the resources (5, p. 186). In Guatemala, on the other hand, in 1962 smallholders received only six percent of all agricultural credit while in 1965, 90 percent of agricultural credit went to three export crops: coffee, cotton, and sugar (5, p. 162). It is this type of bias that must be altered in a new agricultural development strategy if emphasis is to be placed upon improving the traditional systems of production as a means of improving the welfare position of the rural poor.

Looking at the Japanese experience in this regard, one notes that the vast majority of farms (90 percent in 1908) were in the range of 0.5-2.0 hectares and that this homogeneity of farm size resulted in a

relatively equitable distribution of production inputs across different size groupings. Rates of tenancy were also low during the initial period of Japanese agricultural growth. The period of stagnation in agriculture corresponded to a period when tenancy increased to 50 percent and landlords became increasingly parasitic (16, p. 60). The postwar land reforms in both Japan and Taiwan were a major factor in increasing rates of growth in agriculture and providing an equitable distribution of that growth in rural areas.

The Risk Problem

Every change involves some degree of risk, both to the large farmer and the small one. The farmer who operates closer to the margin, be it an economic margin or the survival margin, will be less likely to adopt a risky innovation than a farmer who has some economic cushion. Given the vastly different access to resources that faces small versus large farmers, it is clear that the incentive to adopt technical change is more closely tied to resource availability than to anything else. The small farmer is not inherently a risk averter, but rather responds to the economic conditions that he faces. Of course it is riskier for a small farmer to plant a high-yielding variety that will require a whole package of inputs if he has no guarantee that he will be able to obtain the credit necessary to purchase those inputs. In Guatemala, for example, some work has been done on basing crop recommendations not just on agronomic criteria, but also on the risk involved to the farmer in planting a particular crop (17). This is not essentially a question of attitudes but rather one of sound economic judgment given the imperfect market conditions in which the small farmer must operate.

Economies of Scale

A major argument against small farmers is that they are inefficient producers because they cannot take advantage of economies of scale. Although this may be true in the agriculture of developed Western nations, as in the case of France, it has limited applicability to the agriculture of the developing countries. In the production of paddy rice, we have seen from the Japanese experience that the most efficient form of production is the small farm and that this system of production is not well suited to realizing the economies of scale associated with mechanization. Given sufficient access to the capital required for the purchase of seed, fertilizer and water use, there are virtually no economies of scale associated with their use. It is the access to these inputs and not economies of scale associated with their use that poses the more serious barrier to smallholder production.

The economies of scale associated with mechanization only begin to make sense in, for example, areas in which labor is unavailable at the time or in the quantities needed or where very deep plowing is required, or in economies in which labor is relatively highly priced compared to capital. The latter reason is the cause of much of the mechanization in Western countries. The former reasons do provide circumstances in which

mechanization in developing countries would be appropriate. However, government policy that subsidizes capital inputs, specifically tractor purchases, will distort factor prices and result in an allocation of resources which is both inefficient and inequitable. This type of policy amounts to a direct transfer of resources from taxpayers to the relatively well-off farmers who can afford such inputs to the deprivation of the relatively poorer farmers who cannot.

In a study undertaken in Ghana of a large-scale rice production project, it was shown that under an alternative system of smallholder production government subsidies would be reduced threefold with only a small drop in production (18, p. 143). Pakistan has also subsidized interest rates for the purchase of tractors, thereby reducing employment and allowing landowners further capital accumulation and concentration of land holdings (19, pp. 48-49). Similarly, one must recognize that diseconomies of scale exist in relation to large farms, both in the production process itself and in the underutilization of land resources on large farms (20, p. 15; 21, p. 46).

IV. CONCLUSION

Unquestionably, there are certain areas and certain types of production for which large-scale, highly mechanized systems are the most rational. However, the same can be said for small-scale, labor-intensive systems. Table III from Ceylon and Figure II from Thailand demonstrate that the small farm sector can produce more per hectare, create more employment, and use the relatively more abundant factor of production (labor) more intensively than the large farm sector. In our analysis of Japan, we saw that a system of smallholder agriculture was necessary in achieving the high rates of productivity that Japan has maintained. The system of paddy rice production is one of the primary reasons for the relative efficiency of the small farmer in the Asian context. Equally important, however, is the institutional context in which the small farmer operates. Does the market system allocate scarce resources efficiently or are factor prices distorted by monopoly and monopsony power? Are land tenure conditions equitable or do they cause disincentives to the small-scale producer? Does government policy support the development of smallholder production or does it discriminate against the small holder by subsidizing capital inputs for large producers? These are only a few of the important questions that must be analyzed if developing countries are to be able to exploit the great potential they have in smallholder agriculture.

Table IV demonstrates that the relative efficiency of the small farmer in Asia is shared by his Latin American counterpart. Output per hectare is consistently higher on small farms while output per worker is higher on the large farms. The difference is due to the greater use of labor on small farms and the substitution of capital for labor on the larger farms. However, the small farmer of Latin America, or in

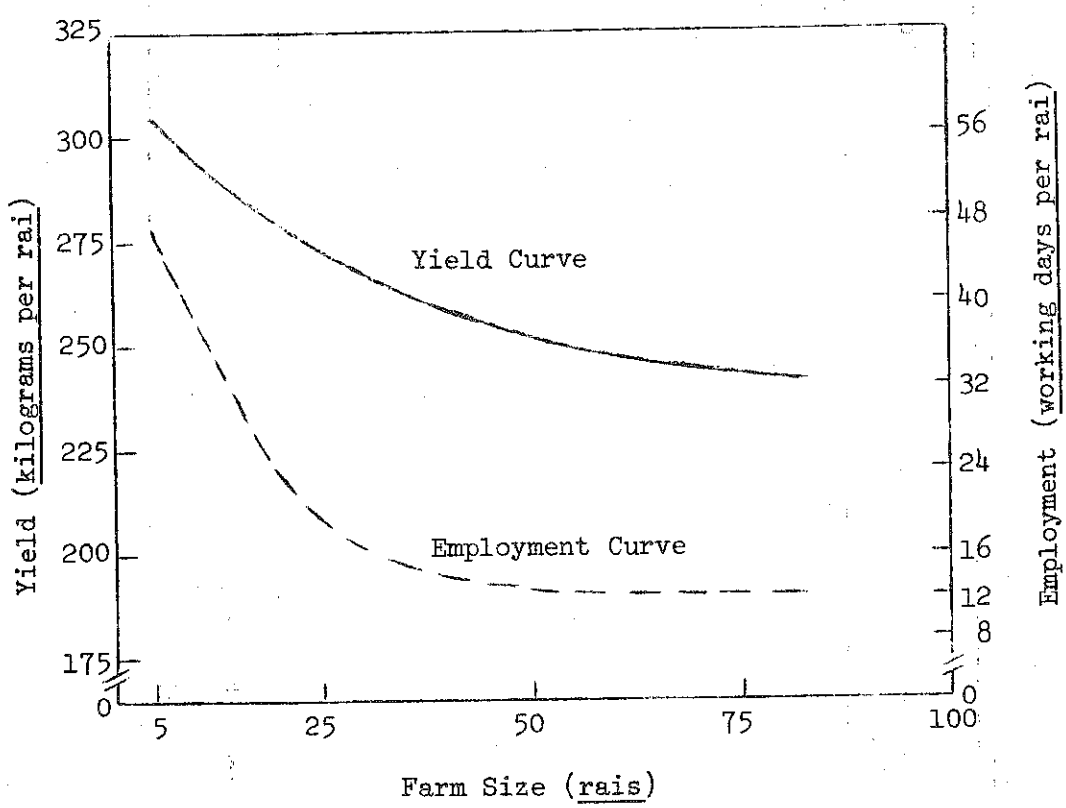
TABLE III. INPUTS AND OUTPUT PER ACRE OF PADDY IN CEYLON, 1966/67*

Farm Size (perches)	Labor Cost Per Acre (Rs.)	Quantity of Seed Per Acre (bushels)	Tractor Cost Per Acre (Rs.)	Weedicides Etc. Per Acre (Rs.)	Ferti-lizers Per Acre (lbs.)	Yields Per Acre (bushels)
0 - 20	428	2.57	18.5	1.65	107	36.4
21 - 40	405	2.29	18.7	4.25	118	37.3
41 - 80	335	2.24	19.3	2.36	129	33.6
81 - 160	259	2.30	21.1	2.12	112	31.8
161 - 320	204	2.22	42.4	3.64	77	33.0
Over 320	180	2.56	65.2	5.22	157	33.7
Average	212	2.45	51.3	4.34	136	33.5

NOTE: One acre = 40 perches

*Source: Keith Griffin, The Green Revolution, An Economic Analysis, UNRISD, Geneva, 1972, p. 36.

FIGURE II. THE RELATIONSHIP BETWEEN YIELD, EMPLOYMENT, AND FARM SIZE IN PADDY PRODUCTION IN THAILAND*



Note: one acre = 2.5 rais

*Source: Keith Griffin, The Green Revolution: An Economic Analysis, U.N. Res. Inst. for Soc. Dev., Geneva, 1972, p. 39.

TABLE IV. AGRICULTURAL OUTPUT PER HECTARE AND PER WORKER BY FARM SIZE, IN LATIN AMERICA*

Country	Year	(1) Smallest Subfamily Farms	(2) Largest Multifamily Farms	(3) Ratio of Column 1 to Column 2
		National Monetary Unit Per Agricultural Hectare		
Argentina	1960	2,492	304	8.20
Brazil	1950	1,498	170	8.80
Chile	1955	334	41	8.20
Colombia	1960	1,198	84	14.30
Ecuador	1954	1,862	660	2.80
Guatemala	1950	63	16	3.90
		National Monetary Unit Per Worker		
Argentina	1960	40	192	0.21
Brazil	1950	1,197	8,237	0.14
Chile	1955	268	1,171	0.23
Colombia	1960	972	9,673	0.10
Guatemala	1950	74	523	0.14

*Source: World Bank, The Assault on World Poverty, Baltimore, 1975, p. 216.

many other parts of the world, does not share the advantage of the paddy rice producer in terms of the system's natural suitability to small-scale production. Although the small farmer of Latin America faces similar if not more serious institutional constraints as the Asian small holder, the situation in all nonpaddy systems is complicated by the need to develop technology that is particularly well suited to small-scale production.

Attempts are being made along these lines, however. For example, four years ago the Guatemalan government initiated an institute to develop technology for the traditional farmer in Guatemala. The Instituto de Ciencia y Tecnologia Agricolas (ICTA) has developed a working methodology to develop and promote small farm technology based on the following premises, and I quote, (17, pp. 1-2):

> 1. Because the conditions and farming systems of the traditional farmer were not known, an understanding of his agro-socioeconomic situation would have to be the starting point from which to generate improved technology appropriate to his needs.
>
> 2. Traditional farmers tend to possess inferior land and farm in such diverse conditions that most experimental work would need to be undertaken on farms rather than on experiment stations, most of which tend to be on the better lands.
>
> 3. Farmers should be directly involved in the research process to assure the practicality of the technology being generated.
>
> 4. Final evaluation should be based on the acceptance of the technology by the farmers and not on its desirability from the technician's point of view.

The success of the smallholder in Latin America will depend not only on attempts such as ICTA's to develop technology suitable to small farmers, but also upon overcoming the considerable institutional constraints that would be required in a basic redistribution of wealth and power. Not only must attempts such as ICTA's be greatly expanded to develop a large pool of technology adaptable to a small farm system, but even more difficult, the political constraints to effective smallholder agriculture must be surmounted. Many smallholdings in Latin America are simply too small to provide the farmers and their families a subsistence living (5, p. 163), while at the same time much of the cultivable land in large estates goes uncultivated (20, p. 15). Without addressing the serious inequalities that exist in the structure of agriculture itself as a prerequisite for the development of smallholder agriculture, only marginal improvements can be anticipated through the implementation of new technology. This is not to say that the technology should not be developed, but rather that the structural problems of agriculture in many Third World countries must be confronted in a comprehensive approach to agricultural development.

Finally, it should be emphasized that the problem of small and large farm sizes is not a static phenomena that once established should remain fixed over time. The appropriate mix of farm sizes will be a response to many different forces and will undoubtedly change over time. However, if the now-developing nations are to provide to the rural inhabitants of their nations the fruits of increased wealth and welfare, if, indeed, that increased wealth and welfare is to be created at all, then the biases that have tended to discriminate against the agricultural sector in general, and the small farmer in particular, must be replaced by a policy that will combine the twin objectives of efficiency and equity in determining the best farm structure. From this perspective, the case for the small farmer is considerably strengthened, particularly in those areas where the technology for efficient smallholder production is readily available. The challenge that lies ahead for agricultural scientists and policy-makers alike is to begin to develop the vast potential that exists in so many parts of the world in smallholder agriculture.

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