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GROWTH AND EQUITY IN INDIA'S AGRICULTURE IN RECENT YEARS: AN EAST ASIAN PERSPECTIVE

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The experience of India's economy in recent years has demonstrated quite convincingly that a stable and buoyant agricultural growth is the *sine qua non* of a strong performance in other sectors of the economy. It has become evident, moreover, that the pattern of agricultural growth is crucial in determining the distribution of the benefits of that growth not only among India's agricultural population but among the whole of her population.

The most urgent and yet the most intractable is the decades-old problem of labour absorption (or provision of gainful employment). The sheer magnitude of the problem evidenced by a set of recent statistics in India urges us to look at some countries whose experiences have not attracted much attention in this country. In this paper I propose to review the recent performance of India's agriculture and to turn our attention to the recent experience of the Peoples' Republic of China as well as the experience of Japan's agriculture in her early phase of modern development, not so much to imitate what these experiences may reveal as to reorient our perspective of India's pattern of agricultural growth in recent years.

THE SETTING

The Government of India contends that "there is considerable evidence of growing strength and resilience in Indian agriculture" and that "this testifies to the basic soundness of the strategy for agricultural development adopted since the late sixties."¹ Statistically, the average annual growth rate of agricultural output of India has increased from 1.9 per cent per annum in 1960-1970 to 4.1 per cent in 1970-1977.²

On the other hand, *The Economist* began its review of India's new budget for 1980-1981 by stating that:³ "After confounding the pessimists for four buoyant years, the Indian economy ended the 1970's on a depressing down. The monsoon failed and OPEC succeeded; GNP

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1. Government of India : Economic Survey, 1979-80, Ministry of Finance, New Delhi, 1980.
2. The World Bank : World Development Report, 1979, Oxford University Press, 1980.
3. *The Economist*, June 28, 1980.

fell by 3% in the 1979-80 financial year, while prices rose by 21%. A record 42 million days were lost through strikes. The trade deficits doubled to \$ 2.9 billion."

Despite one of the worst droughts in recent years, however, the Government could claim that:⁴ "The availability of ample stocks of foodgrains built up in the past, the steps taken to minimize the production losses, and timely transportation and distribution of required foodgrains, enabled the country to meet, from its own resources, the food requirements of all areas including drought relief on a massive scale."

Reflecting back only a few years ago, one must note that these are indeed achievements of major proportions. Nonetheless, there is no denying that the reports are mixed. In the first place, for foodgrains as a whole, the all-India compound rate of growth of production was 2.52 in 1952-1965 and 2.77 in 1967-1979.⁵ Moreover, the growth rate of agricultural production in India has been more or less uniform over the entire period of her nationhood 1949-1950 to 1977-1978, with no sharp evidence of either an acceleration nor a deceleration since 1967-1968. A recent study by Srinivasan reveals that, to be sure, the growth rates of foodgrain output and yield per hectare increased after 1967-1968, but only by a very small margin.⁶ It is wheat which shows faster growth in output and yield in the later decade compared to the decade and half preceding 1967-1968. According to Table I, and according to Srinivasan's study, there is as yet no evidence for such a change in the growth of output or yield of rice on the all-India basis. For the most important crop of all for the majority of India's population, the Green Revolution has not taken place. To use the term coined by Srinivasan, in other words, there has not been the green revolution but still only a 'wheat revolution'. Thus, it seems clear that what revolution there was in agriculture has been regionally limited in sweep and that its scope has been limited to very selected crops.

This means that the chief beneficiaries of the High-Yielding Varieties (HYV) programme and the strategy of the recent years have been the North-western wheat growing States. In these States, moreover, rice (a non-traditional crop) has been doing much better than the national average. In particular, Punjab and Haryana have achieved the yield advantage at twice the national average yield in rice, where the cultivation of the crop has become increasingly important in recent years.

Given the required complementarity in inputs (both natural and man-made), and control of water in particular, there is no doubt that certain geographic areas and certain types of farmers are favoured in the HYV programmes and by the strategy that emphasizes concentration of

4. Government of India : *op. cit.*, p. 6.

5. *ibid.*, p. 7.

6. T. N. Srinivasan, "Trends in Agriculture in India, 1949-50—1977-78", *Economic and Political Weekly*, Vol. XIV, Nos. 30, 31 and 32, Special Issue, August 1979.

resources into the most responsive regions and farmers. The implied regional disparity, and the widening regional gaps, can be inferred from a rather simple set of statistics assembled in Table II.

TABLE I—ALL-INDIA COMPOUND RATE OF GROWTH, 1952-53-1964-65
AND 1967-68-1978-79

Crops	Production		Area		Yield	
	1952-65	1967-79	1952-65	1967-79	1952-65	1967-79
Rice	3.18	2.64	1.47	0.82	1.68	1.80
Jowar	1.96	2.07	0.40	-1.49	1.56	3.62
Bajra	1.33	0.28	-0.28	-1.26	1.58	1.53
Maize	2.80	-0.04	0.28	0.05	0.51	-0.07
Ragi	2.22	3.98	0.55	1.00	1.66	2.97
Wheat	3.30	6.02	2.31	3.16	0.97	2.76
Barley	-1.62	-1.95	-1.47	-3.36	-0.16	1.39
Other cereals	2.74	3.05	0.90	0.41	1.83	2.07
Gram	0.83	0.66	1.15	0.29	-0.31	0.31
Pulses	0.72	0.54	1.35	0.74	-0.62	-0.07
Foodgrains	2.52	2.77	1.07	0.44	1.12	1.84

Source: Economic Survey, 1979-80, *op. cit.*

TABLE II—ALL-INDIA (BY STATES) MEANS AND COEFFICIENTS OF VARIATION OF YIELDS OF
SELECTED GRAINS

Crop year	(kg./ha.)					
	Rice		Wheat		Jowar	
	Mean	C.V.	Mean	C.V.	Mean	C.V.
1967-68	1122	24.0	902	52.8	538	33.4
1968-69	1083	35.0	1025	56.9	529	49.5
1969-70	1184	32.8	1012	62.6	558	37.1
1970-71	1273	28.5	1153	59.7	532	29.6
1971-72	1302	33.8	1328	47.0	492	36.3
1972-73	1137	45.5	1133	50.3	490	40.8
1973-74	1162	36.9	1153	47.2	543	34.9
1974-75	1162	41.4	1244	43.5	591	36.4
1975-76	1466	35.8	1314	41.8	543	35.3
1976-77	1347	41.5	1240	49.7	624	37.1
1977-78	1572	42.9	1314	47.6	638	36.6

Computed by P. K. Joshi. This is a part of the study jointly undertaken by the author and Joshi.

For wheat, jowar, and rice, the all-India average yields rise over the period with year-to-year fluctuations as expected. The coefficients of variation, which measure the proportion of deviations around the averages, indicate for each year how closely the State average yields are clustered around the all-India average yield. If technological advance and rising uses of inputs are uniform across the States, the computed coefficients of variation ought to be more or less the same over the years. Here again the contrast between wheat and rice is striking. For wheat, the coefficients of variation tend to become smaller over the years, indicating that the yield variations across the States have tended to narrow. For jowar, the coefficient remains more or less at around the same level, although its up-and-down movements are rather erratic. For rice, the figures indicate that the variations around the all-India mean have been widening. This is what one would expect to find, if indeed some States advance quickly while others lag behind. As was mentioned, toward the end of the period in question, the yields of rice in Punjab and Haryana were twice the national average. It should be remembered that precisely in those regions that are lagging behind rice is the most important food crop and wage good for the masses.

MARSHALLING OF 'SURPLUS'

Secondly, that India has been able to overcome the impacts of one of the severest droughts in recent years without imports is indeed a major achievement. The immediate adverse effects on the trade balance would have been disastrous, had there not been enough stocks of grain to go around and had all deficiencies had to be made up by imports.

Looking back one decade or so ago, one remembers that imported foodgrains used to feed mainly the urban population and were used to mount disaster relief operations. That imports were no longer needed in emergency means that India has now succeeded in import substitution of foodgrains. By and large, it means that the surplus producing commercial farmers in the United States, Canada, and Australia have been replaced by indigenous, progressive, and commercialised farmers. There are two observations that appear relevant here.

Take the case of the P.L. 480 programmes,⁷ by which the United States provided food-deficit developing countries with her surplus food under concessional terms either as sale for local currencies or as grants. Many of us used to argue about the adverse impacts this programme would have on the developing country's agriculture in the long run, despite its merits in the short run. The argument was that, by depressing the agricultural prices in the short run, and adversely affecting

7. Public Law 480 of the United States authorises disposal of surplus agricultural commodities under concessional terms. The programme is also known as the "Food-for-Peace" programme.

the incentives for greater output in the long run (because the long run prices would be affected by the short run prices), and/or making the local authorities somehow complacent of the urgent needs to develop indigenous agriculture, the short run benefits of the food aid programme might be substantially offset by its adverse long run impacts. The relevant question in the present context seems to be the following: Would the effects be different on the rest of India's agriculture, if the 'surplus' comes from, say, Punjab or Haryana, instead of from, say, Iowa or Kansas?

Moreover, from the developing country's point of view, the saving grace in the long run of the P.L. 480 programme was the 'soft currency' sale of the surplus commodities as well as the outright grants for relief operations. Large amounts of funds in local currencies were built up from the sale of foodgrains for local currencies. The so-called 'counterpart funds' were thus generated. Such funds, for example, were in rupees in the United States government's account.⁸ In India a substantial proportion of the counterpart fund in rupees was made available for use in India's own development programmes and projects. Towards the end of the P.L. 480 programmes in India, billions of dollars worth of the counterpart fund rupees were presented to the Government of India.

Currently, the 'marketable surpluses' are being sold for rupees, and not for foreign exchange. One asks, however, where is the equivalent of the counterpart fund? Or, more broadly, is there any mechanism whereby a good proportion of those rupee receipts (more strictly, the net incomes) realised from the sale of 'surpluses' somehow gets channelled into India's development programmes and projects in accordance with her own priorities?

ASSESSMENT OF 'SURPLUS'

A third question may be more fundamental and much simpler. Has there in fact been a 'surplus' foodgrain stock from the all-India point of view? The answer, of course, would depend on what one means by the term 'surplus'. 'Marketable surplus' arises essentially because commercial farmers do not need it for their own consumption. If one defines 'surplus' in this way, that it is an excess over and above the minimum consumption needs, then, for India as a whole, it is quite unlikely that there was a 'surplus', although there indeed was a foodgrain stock of important dimensions built up in recent years. Again two observations appear pertinent here.

8. The U.S. account held at the Reserve Bank of India meant that the sales proceeds were temporarily withheld from circulation in contrast to the current situation.

One can take a look at the data on available daily calories per capita for the population and contrast them to the required minimum (or recommended minimum, adjusted for age-sex composition, climatic conditions, work habits, etc.) calories per capita per day. For India for 1977 the proportion of available calories to the required was 89 per cent, according to the World Development Report. In other words, the availability fell short by 11 per cent.

Alternatively, one can ask whether the per capita consumption of foodgrains by the great mass of people has increased in recent years. In particular, for small and marginal farmers and agricultural labourers, who occupy at least one half of India's population, has consumption of foodgrains on the per capita basis increased appreciably since the 1950s? Presumption is strong that it has not been the case.

For one thing, the total output of foodgrains in India has increased at the rate only slightly above the rate of population growth. If per capita income in real terms had grown, if the distribution of income had become more equitable, and if there had been no physical constraints so that people could have shifted their consumption patterns to more preferred grains, the demand for foodgrains must have risen much faster than the availability.⁹ To put it in another way, if there was indeed a 'surplus' emerging in recent years, real per capita income may not have grown much, or the distribution of income may not have become more equitable, or the people of India have been under constraints of physical quantities to have upgraded their consumption patterns, or any combination of all these factors may have been responsible.

If there are a great number of malnourished people, or at least they are undernourished, as the data on food consumption indicate, while there is a 'surplus', there is something wrong in the structure of demand and supply relations and their interactions. This set of data is indicative of the fact that effective demand is not being generated in the very process of creating the supply of output. In another time, in another context, this is exactly the point J. M. Keynes attacked. His was a structural crisis of advanced capitalism in the West (and the world) in the 1930s. His great analytical question was directed fundamentally to the classical assumption that the supply creates its own demand, *i.e.*,

9. Under the assumption of stable relative prices, demand for food grows at a rate approximately equal to the income elasticity multiplied by the growth rate of per capita real income plus the rate of population growth. Strictly speaking, however, this familiar relationship must be further qualified. Those assumed to be constant in the derivation of this simple formula include: (i) the economy's preferences and habits with respect to consumption; (ii) the pattern of income distribution; (iii) the degree of urbanisation; (iv) the stages of development of marketing, transportation, and processing of foods, etc.

the so-called Say's Law).¹⁰ It seems to me that we have a rather similar situation in India's agriculture today in that the process of generating supply is not creating effective demand. Moreover, it seems to me crucial to distinguish clearly between short run and long run considerations in diagnosing this situation and in proposing prescription. The 'rural Keynesianism', such as the Food for Work programmes, would provide relief to those who are hungry and who suffer from privation. But it is essentially a programme for short run redistribution in consumption. In the long run, how much productive capacity is generated by such programmes and how the masses would be able to participate in the new productive activities are the key questions to be raised.¹¹

EMERGENCE OF DUALISM IN AGRICULTURE

Fourthly, all these considerations and observations seem to add up to what might be called the "emergence of a dualistic pattern of agricultural development in India." On the one hand, holdings of less than one hectare account for more than a half of all agricultural holdings in India. On the other, large farms with holdings of more than ten hectares, while constituting less than 4 per cent of all holdings in number, control nearly a third of all agricultural land. Although there is nothing new in these statistics, there are emerging several indications that a cleavage is widening between those that enjoy higher rates of (total) productivity growth and those who do not. This situation is the result of (and one fears that it is the cause of) the strategy where the "progressive modernization of the entire agricultural sector" is being superseded by the "crash modernization strategy that concentrates resources (indirectly or directly, say, by price/subsidies policy or by fiscal policy) in a highly commercialized sub-sector of agriculture."

A prime example of such a contrasting pattern of agricultural development can be found in Mexico.¹² In Mexico, increases in output have been concentrated in the sub-sector of large scale, relatively capital-intensive, commercialised farms with control on water supplies. This

10. Contrarily, Keynes' Law that says "Demand creates its own Supply" is now under attack by the so-called supply-side economists who question the long run consequences of the short run policy measures derived from Keynesian economics. For example, a transfer of income from the rich to the poor adds to the current level of effective demand (Keynesian). But, if such a transfer discourages savings and capital formation, in the long run, then the growth of productivity will be lessened, the potential supply of goods would be less than otherwise.

11. M. L. Dantwala makes a similar point in his article. "The Poor Should Become Producers", *Commerce*, Annual Number 1979. Dantwala argues forcefully in this article that "science is no substitute for social change" in India's agriculture.

12. It is to be noted that the per capita GNP of Mexico in 1977 was US \$ 1,120, with a considerably higher level of incomes among the non-farm population that depends on purchased food. The domestic commercial demand for farm products is large in relation to the number of farm households. This point must be kept in mind in comparing Mexico and India in their respective dualisms in agriculture.

sub-sector is located in the wheat- and cotton-producing areas of northern Mexico, adjacent to the south-western United States. The great majority of farm households in more densely populated areas of Mexico have not been able to participate in the high growth of (total factor) productivity enjoyed by their northern counterparts. Mexico has one of the most skewed distribution of income among the countries for which income distribution statistics are available. Although Mexico is by no means unique in Latin America in this regard, her case is illuminating. In 1977 when the income per capita was \$1,120, the poorest 40 per cent of the households shared 10 per cent of income while the richest 20 per cent obtained 55 per cent. For India, the income distribution statistics available are tentative and only for 1964-65, some fifteen years ago.¹³ The data indicate that the poorest 40 per cent of India's households shared 17 per cent of income, the richest 20 per cent got 49 per cent, and the richest 10 per cent of the households in India claimed 35 per cent of the total income.

Available indications are, however, that the distribution of income, particularly in agriculture, and specifically that of after-tax income, may be worsening in India.

(a) In contrast to the commercial sub-sector of agriculture, whether in Punjab, Haryana, or in Bihar, the subsistence sub-sector of agriculture has experienced relative stagnation in per capita output and per hectare yields.

(b) It is reported in India's newspapers that small and marginal farmers are increasingly being dispossessed. When the author was in Bihar in 1975, it was estimated that approximately 70 per cent of the State's population belonged to 'marginal farmer' households (with one hectare or less) or to agricultural labour households, and that some 75 per cent of the State's population were below the official poverty line in terms of annual income per capita.¹⁴ It is reported in the newspapers, although no hard checking can be made on this, that the number of landless agricultural labourers is increasing and their proportion in the total labour force in agriculture is also rising. Even if the absolute number is not rising and/or the relative proportion of the poor is not rising, given the advance made by the commercial sub-sector, it is still quite likely that the distribution is not improving.

(c) Despite the reported rise in real agricultural wage rate (per day), it is quite unlikely that the annual earnings of agricultural labourers are on the rise. It is reported that, even if the agricultural

13. World Development Report, 1979, *op. cit.*

14. My estimates, as one of the World Bank mission members in 1976. See also, "Sham of Minimum Wages", *Economic and Political Weekly*, Vol. XV, Nos. 24 and 25, June 14-21, 1980. The Planning Minister, Shri N. D. Tiwari, reported in the Rajya Sabha that more than half of India's population is living below the poverty line, according to the estimates for 1977-78. According to *The Times of India*, August 1, 1980, the Minister said that 249 million of the poor live in the rural areas and 57 million of them were in the urban areas.

minimum wages were paid to the agricultural labourers (which, according to reports, are not necessarily the case), their household incomes cannot reach the official poverty line in all States of India, except for in Punjab.¹⁵ This is so because of the shortfall in the number of days workers can get employed gainfully. In fact, the Planning Commission data indicate that the real earnings of rural workers during the decade ending 1974-75 *declined* by 10 to 18 per cent. In contrast, during the period between 1960-61 and 1976-77, the average earnings of the workers in the registered factory sector rose by 21 per cent in real terms (though a rather meagre rise at that).¹⁶

(d) According to Anand P. Gupta, the net distributive effect of fiscal policies in India, after accounting for who pays what taxes, who benefits from what expenditures by the government (Centre, State, etc.), turns out to be regressive. Briefly, Gupta's study shows that the poor share 26 per cent in benefits from expenditures. But they pay 28 per cent in taxes (when corporate taxes and export duties are treated as direct taxes); they pay 32 per cent in taxes if these taxes and duties are treated as indirect taxes (in other words, if they are treated as indirectly paid by the consumers).¹⁷

(e) Most importantly, one should consider the incidence of benefits of agricultural programmes in India. Subsidies benefit those who can marshal resources to purchase the subsidised inputs or those who can have favoured access to public goods (be they irrigation water, credits, or extension services) for taking advantage of the higher productivity of the 'new' inputs. Output price supports (or higher procurement prices) benefit those who have marketable surpluses to sell, and adversely affect those farmers who have to buy their daily food requirements, say, for a part of the year. Moreover, in India agricultural taxation is a State subject. Agricultural income is not taxed.¹⁸ The net effect of all these would be the following: An increase in output prices creates a transfer such that the largest percentage decline in the income of low income consumers is accompanied by the largest percentage increase in the income of high income producers.¹⁹ This transfer would be greater if accounts are taken of the incidence of taxes (both direct and indirect) and expenditures by the government.

(f) The recent data indicate that the cost of living has risen faster for 'agricultural labourers' than either for 'industrial workers' and 'urban non-manual employees'. The rise of the index as of June 1980 over the

15. The gap between likely earnings and the poverty-line income as per cent of the poverty-line income is said to be 67 per cent for Tripura; 63 per cent for Bihar, 61 per cent for Orissa, 47 per cent for Uttar Pradesh, etc., *ibid*:

16. *The Times of India*, July 8, 1980

17. Anand P. Gupta, *The Times of India*, July 13, 1980.

18. More on this later.

19. John W. Mellor, "Food Price Policy and Income Distribution in Low-Income Countries", *Economic Development and Cultural Change*, Vol. 27, No. 1, October 1978.

level in March 1979 was 17.4 per cent for agricultural labourers, 12.3 per cent for industrial workers, and 11.4 per cent for urban non-manual workers.²⁰ It is a well-established empirical fact that the expenditure of the poor on food are far more elastic with respect to the income effects of price changes than are those of the rich. Given the low initial level of foodgrain consumption in the poorest groups, the privation imposed on them by the rising basic food prices is very great indeed. As a consequence, the poor substantially reduce consumption of agricultural goods of high nutritive value, such as milk and milk products, as was found by Mellor in his study of consumption behaviour of Indian households.²¹

It is safe to state, then, that when a slow rise in per capita income (output) is accompanied by a rapid rise in the prices of essential commodities and also by a limited growth in employment opportunities, there is unlikely to be any shift in the distribution of income in favour of low income earners in agriculture.

ARITHMETIC OF AGRICULTURAL POPULATION

The available statistics indicate that the agricultural population in India has been increasing at about the rate of population growth despite net migration from rural to urban centres. This is so, because the rate of natural increase of population is higher in the rural areas than in the urban centres. According to the World Development Report data, the agricultural labour force in India formed 73 per cent of the total labour force in 1960, the proportion of the agricultural labour force to the total in 1977 stood at the same 73 per cent, again.²² In the meantime, the total labour force in India grew at the annual rate of 1.9 per cent, slightly below the rate of population growth. Counting those in working age (between 15 and 64) who constitute 55 per cent of the population of India, one finds 347 million in the 'labour force' thus defined. This, in turn, implies that there are 253 million workers (and farmers) in agriculture now.

This means that, from the viewpoint of the employment structure, when attention is focused on the relative importance of the sectors in which the labour force is engaged, the structural transformation has not yet begun to take place in India. After some 20 years of successive Five-Year Plans, Annual Plans, and development efforts, agriculture still contains 73 per cent of the labour force. Of course, this is not the fault of agriculture by itself. Nonetheless, it is not possible to escape the most obvious question that follows these statistics.

20. "Statistics : Cost of Living Index", *Economic and Political Weekly*, Vol. XV, No. 26, June 28, 1980.

21. Mellor, *op. cit.*

22. World Development Report. 1979. *op. cit.*

If the trends in the last two decades or so continue, the agricultural labour force will increase by 4.8 million a year now, 5.2 million a year in five years, and by 5.7 million a year in 1990. Indeed, if things continue the way they have, the relative proportion as well as the absolute number of the agricultural labour force will not start declining in India. Then, the so-called structural transformation of the economy, whereby the centre of gravity of the economy shifts to industry from agriculture as higher and higher incomes per capita are achieved, will not be forthcoming.

It is indeed sobering to ask a question: How would it be possible to absorb an additional 52 million people during the coming decade into agriculture, when most of those who are in it now do not work full-time, and in most cases, as we have seen, cannot maintain even the official poverty level of income? The sheer magnitudes involved are staggering. Reflecting on the experiences of the industrialised countries of today, one realises that none had to face this problem in such a formidable magnitude.²³

To my knowledge, the only country that confronted the similar set of problems in similar dimensions and appears to have succeeded is the People's Republic of China. However, in terms of relative dimensions as looked at in relation to the population and the resource base, the experience of the People's Republic of China is by no means unique among East Asian countries. The Republic of China (Taiwan) and the Republic of Korea (South) had to face these problems and have managed successfully to undergo the structural transformation of their economies.

THE EAST IS GREEN

Since the founding of the People's Republic of China in 1949, national income has grown at the rate of 5 or 6 per cent per year and industrial output by more than ten per cent per year. Between 1960 and 1977, the growth rate of real GNP per capita was 5.1 per cent (as compared with 1.3 per cent for India). In 1977, 63 per cent of the labour force was in agriculture, while the proportion had been 75 per cent in 1960. The crude birth rate (CBR) and the crude death rate (CDR) both came down by about 40 per cent each during the period of 17 years from the CBR of 36 in 1960 to 22 in 1977 and from the CDR of 15 in 1960 to 9 in 1977. The average natural rate of increase in population was, therefore, 1.3 per cent during 1970 to 1977 in contrast to the decade of the 1960s when the rate stood at 1.9 per cent per annum. Moreover, in 1977 the availability as a proportion of daily calorie requirement per capita in China was 99 per cent, compared with 89 per cent

23. Even for Japan the highest rate of population growth (over any decade) has never exceeded 1.5 per cent per annum.

for India as mentioned earlier.²⁴ It is well-known that in the history of the People's Republic growth and equity have been consistently pursued and attained in tandem.

The course of progress was nonetheless tortuous. In 1957, just one year before people were drafted into Chairman Mao's Great Leap Forward, and eight years after the triumph of the Chinese Red Army, there were 280 million in the labour force, 240 million of whom were in the rural areas. For 230 million or more in agriculture there was massive seasonal idleness. Thomas Rawski estimates that the average farmer worked for only 160 days per year.²⁵ But, between 1957 and 1975, China's total labour force grew at a rate of 2.4 per cent per annum, even faster than the population. Between these years the total labour force increased by 150 million, of which 100 million had to be absorbed by rural areas.

Not only had the huge number of people to be employed in agriculture, but the Chinese leadership decided that the target working days should rise to 275 days per year. Of course, this meant that not only the additional days were to be worked by the new entrants in the agricultural labour force, but also by those who had already been there and working for only 160 days per year. How was this tremendous increase in the supply of labour in agriculture accommodated?

First, by institutional reforms; the Chinese started off with the land reform in the early 1950s, with rather primitive co-operatives in the mid-1950s, and finally with collectivisation of agricultural activities by the establishment of the Rural People's Communes in 1958. These institutional changes put in place an organizational structure capable of mobilizing large quantities of labour for large scale projects involving restructuring of farm land and major irrigation works.

Secondly, by industrial support of agriculture and farm land capital construction, which involves shaping of the fundamental geographic features of an area to provide a firm base for yield-increasing and yield-stabilising farm practices; the Chinese emphasized the principle of self-help in these projects. Much of the needed supplies and equipment (cement, bricks, iron and steel, pumps, other machinery) are produced locally by small scale factories,²⁶ which in turn use labour during the slack seasons.

These changes enabled further intensification of farming practices. Table III tells much of the story. In land preparation, there was a great increase in organic fertilizers (fermented chopped vegetation and animal manure). Transplanting from seed-beds to main fields, thus

24. World Development Report, 1979, *op. cit.*

25. Thomas G. Rawski : Economic Growth and Employment in China, The World Bank, Washington, D.C.; Oxford University Press, New York, 1979. Also see *The Economist*, February 16, 1980.

26. Dwight Perkins *et al.* : Rural Small-Scale Industry in the People's Republic of China, University of California Press, Berkeley, California, 1977.

economising on the growing period of crops on main fields, spread from rice to other crops. Multiple cropping, as well as changes in crop-mix toward more labour-intensive and high value crops, was responsible in mopping up labour on the farm. Rice cultivation, which is one of the most labour-intensive activities, spread to northern China, replacing coarse grains.

TABLE III—MANPOWER ON THE FARM IN CHINA

(billions of man-days)

Manpower on the farm	1957	1975
Demand for labour for		
Cultivation	27.4	33.1—49.7
Organic manuring		16.6—21.5
Subsidiary work	6.2	9.9
Construction projects	2.3	8.3
Other	0.9	
Total	36.9	67.9—89.4
Supply of labour, assuming 275 days a year per worker	63.7	90.4
Actual number of days worked per worker	160.0	250.0
Labour productivity (in 1957 yuan)		
Per man-day	1.46	0.94—1.24
Per man-year	232.0	255.2

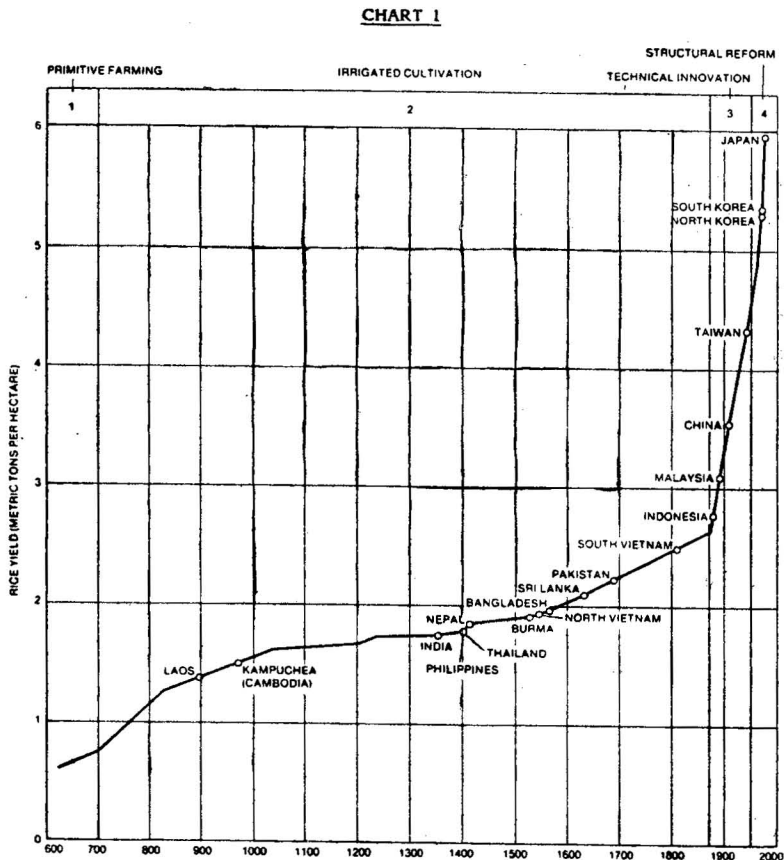
Source: Rawski: *op. cit.* and *The Economist*, February 16, 1980.

All these factors contributed to increasing work to go around, despite the huge increase in the sheer number of agricultural workers between 1957 and 1975. In addition, as the table shows, the number of days worked a year by the average farmer rose from about 160 days per year to about 250 days per year. Although labour productivity per man-day declined, each worker was producing more in a year. The productivity of labour per year has increased.

I do not mean to imply that the Chinese have solved all the problems of labour absorption. They face formidable challenges still, especially because the productivity of labour per man-day has fallen and because it becomes more and more difficult to increase yields per hectare per year. The current concern of the leadership to put their economic house in order is in part a reflection of the need to boost

labour productivity on the farm as well as in urban industries. My point is that the People's Republic of China has been successful so far in confronting what seemed to be impossible tasks of absorbing massive numbers of people in agriculture and increasing the working hours of all farmers.

In this connection, it is worthwhile to recollect a chart published in the September 1976 issue of the *Scientific American* (Chart 1). This chart depicts the historical progress of rice yield per hectare, as Japanese agriculture moved from primitive farming (to 700 A.D.) through the advent of irrigation (700 to latter half of the 19th century), to scientific agriculture (the late 19th century to the mid-20th century), and finally to the 'structural reform' in the second half of this century. The yield of rice rose rather gradually from the level of less than one tonne per hectare (during the primitive farming phase) to about 2.5



Source: *Scientific American*, September 1976.

tonnes per hectare (in the period before technical innovations of Meiji era). Subsequently, the yield of rice rose steeply to attain the typical yield level of about 6 tonnes per hectare today.

One interesting aspect of this chart is the plotting on the historical curve of Japan the levels of current yields of Asian countries. Most of these countries place themselves in the pre-Meiji stage on the Japanese curve. India, for example, is placed at about the mid-14th century Japanese level with the current yield of rice less than 2 tonnes per hectare. In fact, the countries placing close to Japan, and by implication in the scientific agriculture phase or thereafter, are South and North Korea (with over 5 tonnes per hectare), Taiwan (over 4 tonnes), and China (about 3.5 tonnes). At about 3 tonnes of rice per hectare are two South-east Asian countries, Malaysia and Indonesia.

There are two obvious observations to be made here. First, despite the fact that the yield data refer to those several years after the dawn of the 'Green Revolution' in Asian countries, the only truly Green Revolution countries in terms of the overall yield of rice crop (which, after all, is the most important foodgrain of Monsoon Asia) are East Asian countries. In this sense, the East is more green than red. Secondly, it is obvious that the Japanese yield before the advent of the so-called scientific agriculture was already higher than the current yields of most Asian countries several years after the dawn of scientific agriculture epitomized by the seed-fertilizer technology. In fact, scientific selection of rice plants (on the Mendelian principles of heredity) and the use of chemical (inorganic) fertilizers in Japan did not begin in any substantive sense until well into this century. What, then, were the factors responsible for a rapid rise in the yield of rice per hectare in the early phases of Meiji development (1868 to the first decade of the 20th century)?

Aside from the all-important considerations relating to the (economic and socio-cultural) pre-conditions of growth, there are at least two important factors that account for the growth in the productivity of land in this period.²⁷ First, the institutional and social reforms of the Meiji era made possible the diffusion of the backlog of accumulated knowledge and known techniques throughout Japan. The feudalistic socio-political barriers to the spread of information and practices have been removed. Veteran farmers travelled throughout the country to teach the best-practice techniques available, through their accumulated personal experiences rather than through their capabilities of scientific experimentation as such. Selection of crops was based on the pre-Mendelian principles, choosing those plants that yielded well and resisted adverse environment well, rather than breeding plant varieties on the basis of certain hereditary characteristics. Legislative actions culminating in

27. Hiromitsu Kaneda, "The Sources and Rates of Productivity Gains in Japanese Agriculture, as Compared with the U.S. Experience", *Journal of Farm Economics*, Vol. 49, No. 5, December 1967.

the Arable Land Replotment Law facilitated water control, irrigation and drainage programmes and the necessary consolidation of land plots under the newly reorganized configuration of land infrastructure. One notable effect of all this was the so-called "eastward movement of rice cultivation techniques." The less-developed districts of eastern Japan began the process of catching up with and eventually even surpassing the traditionally advanced districts of western Japan.

At this point, it may indeed be worthwhile to reflect on what the national average yield of rice, or any crop, represents. The average, of course, represents a central tendency of yields of a variety of farms, differentiated by characteristics such as the size, geographic and environmental conditions, tenurial conditions, etc., and weighted by the relative importance of these particular characteristics. Thus, the national average yield will be affected by the variance of yields according to each of these characteristics and also by weights attached to each. Hence, the more uniform the yields are around the best-practice level and the less divergences there are between the yields of the best-practice farmers and the majority of the farmers, the higher would be the national average yield. In this sense, then, narrowing of the variations in yields among important segments of farmers would be as important as aiming at increasing the yields of a nation's best farmers. The process of backward areas (eastern Japan) catching up with the more advanced areas (western Japan) in the period of modern agricultural growth was as important as the rise in land productivity in western Japan.

AN EAST ASIAN PERSPECTIVE

An old Chinese saying, attributed to one of the sages of ancient China, goes somewhat like the following: "When you plan for a year, plant rice. Plant trees, instead, when you plan for a decade. Cultivate men, however, when you plan for a century."

The point is that the means of achieving long-term strategic objectives and those of accomplishing short-term tactical objectives are different. Although one cannot neglect rice and trees in the pursuit of a long-term strategy, rice and trees alone surely do not make a century of growth in agriculture. What I want to emphasize here is my concern on the long run consequences of a succession of short run, more or less *ad hoc*, policies that concentrate on minor and marginal adjustments and by and large ignore (the oft-repeated public pronouncements to the contrary notwithstanding) the long-standing structural maladjustments.

We know now that the enabling factors of scientific agriculture are research, extension, and land infrastructure development (flood control, irrigation/drainage, and land consolidation) supported by security of tenure on land (or equitable distribution of the ownership thereof).

These so-called enabling factors are characterized essentially by *indivisibility*, *externality*, and *jointness* in supply and utilization. These are precisely the characteristics of 'public goods' in economics. Perfectly functioning markets fail to ensure socially optimum levels of supply of these public goods. And market failures usually invite intervention by public bodies.

In general, it is correct to state that a key to growth of East Asian agriculture (Japan, Korea, China, or Taiwan), or the pre-conditions for their success, for that matter, is the 'institutional' development of agriculture where public support and group action were instrumental in allocating resources for the provision of such public goods as land infrastructure investments and new technology development. In fact, one of the most important Sinic traditions shared by all these countries of East Asia is the skill and experience in complex organization in mobilizing resources for public works such as farm land capital construction in China and land infrastructure development in Japan.²⁸

We all remember how dramatically the production of wheat and rice rose in India and West Pakistan (now Pakistan) in about 1968. On either side of the border in the sub-continent, however, the drama was mainly in the Punjab and in its selected districts. We attributed this to the generally favourable conditions in the region with respect to solar energy and irrigation water.²⁹

A new technology embodied in the short-stemmed varieties of wheat and rice was imported from abroad together with chemical fertilizers and expert advice. It so happened that in the first instance the adaptability of Mexican wheat and IRRI rice proved particularly appropriate for the local conditions in the Punjab. It was indeed a highly successful case of international transmission of technology through the transfer of scientific knowledge embodied in key inputs of high-yielding seeds and fertilizers. Particularly important in the areas that were congenial to the new technology was, of course, the development of supplementary irrigation by private tubewells, which had begun earlier in the late 1950s and the decade of the sixties.³⁰ More important than the quantitative improvement in irrigation water due to tubewells was the

28. Two other legacies of China's history and civilization often cited are : (i) a respect for education, and (ii) a strong work ethic.

29. Tubewells increased the annual yield of land (per hectare) even before the so-called Green Revolution of the mid-1960s. By enabling the farmers to control the application of water on their own, wells contributed in increasing the yield per crop, raising cropping intensity (multiple cropping), and in improving the crop-mix toward more valuable crops, thus increasing the value-added per year. Hiro-mitsu Kaneda, "Tubewells and the Green Revolution in West Pakistan's Agriculture", *Keizai Kenkyu*, October 1970, also my "Economic Implications of the 'Green Revolution' and the Strategy of Agricultural Development in West Pakistan", *Pakistan Development Review*. Summer 1969.

30. Ghulam Mohammad, "Waterlogging and Salinity in the Indus Plain", *Pakistan Development Review*, Autumn 1964, and his "Private Tubewell Development and Cropping Patterns in West Pakistan", *Pakistan Development Review*, Spring 1965.

qualitative improvement in the use of water made possible by the fact that the wells were in farmers' own hands.

But we also remember the wisdom of that penetrating observer of India's agriculture, Wolf Ladejinsky, who stated in 1969: "When all is said and done, it is not the fault of the new technology that the credit service does not serve those for whom it was originally intended; that the extension service is not living up to expectations; that the panchayats are essentially political rather than development bodies; that security of tenure is luxury of the few; that rentals are exorbitant; that ceilings on land are merely notional; that for the greater part tenurial legislation is deliberately miscarried, or wage scales are hardly sufficient to keep soul and body together."³¹

More than a decade after the dawn of the so-called Green Revolution on the sub-continent and those immortal words of the late Wolf Ladejinsky, we now realise that nothing has basically changed in the realm of socio-institutional structure of agriculture of India. In the absence of strong public action in flood control, irrigation and drainage, private tubewells and minor-minor irrigation schemes have proliferated.³² Those who have acquired tubewells have also been able to exploit better access to other essential inputs such as seeds, fertilizers, pesticides, and credits. In the absence of effective provision of public goods independent of land ownership and control of operational holdings, small and marginal farmers have been deprived of the resource base to be able to participate more fully in the HYV technology. The perennial question still is the following : It the solution for the small and/or marginal farmer is not to develop a different technology, but to give him the resource base to exploit the available technology, then how?

I have argued in this paper that the recent developments in India's agriculture have revealed ever more starkly structural imbalances in the sector. I have further argued that structural problems of India's agriculture are largely institutional problems having to do with the provision of public goods. Flood control, storage of water for later use, irrigation/drainage, and farm land capital construction are, when consi-

31. Wolf Ladejinsky, "The Green Revolution in Bihar, The Kosi Area : A Field Trip", *Economic and Political Weekly*, Vol. IV, No. 39, September 27, 1969.

32. From this perspective, proliferating private tubewells are somewhat like separate air conditioning units in various rooms in an office complex, as one often sees in New Delhi. Each unit may reflect the ability of the individual concerned to take advantage of his privileges, or his initiative, for that matter. But these units represent *ad hoc*, short-term adaptations to the given building complex. Of course, a well-designed building complex has a central air conditioning system, as such systems are characterized by indivisibilities and involve economies of scale. So is the case for a well-designed irrigation system. In a long run perspective such an irrigation system must be at least nationwide (as in the power grid system), centrally controlled with a well-developed local monitoring unit.

dered in the long run perspective, characterized by those characteristics of public goods that I cited earlier, indivisibility, externality, and jointness in supply and utilization. I have touched upon briefly one of the most important 'pre-conditions' in East Asian agricultural growth, namely, public support and group action in allocating resources for the provision of such public goods.

I understand, however, that in India irrigation, land reform, and agricultural taxation are all constitutionally State subjects.³³ It is clear that a systematic and consistent flood control and irrigation network must be planned and implemented on the nationwide basis rather than each State formulating its own separate schemes, given the geography of India if nothing else.³⁴ This state of affairs, with respect to irrigation, is symptomatic of the fundamental cause and effect of inaction and preservation of the status quo in the socio-institutional structure of India's agriculture. The Centre is deprived of the constitutional authority, and, therefore, the policy instruments, of affecting the three vital components in the long run planning of agricultural growth. And the effects will be felt multi-sectorally even beyond the vastness of the agricultural sector, because the sector is large in the economy.

The implications of my argument in this paper must be clear. When all is said and done, to borrow Ladejinsky's phrase, but turning to another penetrating observer of the agrarian scene, Keith Griffin, it would be worthwhile to consider the following: "Rather than assume that governments attempt to maximize social or national welfare but fail to do so, it might be more fruitful to assume that governments have quite different objectives and generally succeed in achieving them. Rather than criticizing governments for failing to attain what they did not set out to attain, or offering advice on how to attain a non-goal, it would be instructive if more time were devoted to analyzing what governments actually do and why."³⁵

I am convinced that a radical solution is not the only alternative. In pre-war Japan and Taiwan, the highly skewed distribution of land ownership was consistent with the almost uniform distribution of operational holdings of land and the satisfactory increase in annual productivity of labour in agriculture.³⁶ Steps toward institutional/structural reforms must be taken in order to make the current highly skewed pattern of land ownership in India compatible with a not-so-sharply dualistic pattern of agricultural growth.

33. Pramit Chaudhuri: *The Indian Economy*, Vikas Publishing House Pvt. Ltd., Bombay, 1978, p. 12.

34. According to *The Times of India*, July 27, 1980, the Irrigation Minister, Shri Kedar Pandey, stated that flood control should be made a central subject and agreed with a member of the Lok Sabha that the Centre should take over irrigation and flood control from the States.

35. Keith Griffin: *The Political Economy of Agrarian Change*, The Macmillan Press Ltd., London, 1974.

36. It is to be noted also that in the early phase of Japan's modern development (the early decades of Meiji) taxes on agriculture, land tax in particular, contributed more than 90 per cent of the revenues of the national government. See Kazushi Ohkawa, Bruce F. Johnston, and Hiromitsu Kaneda: *Economic Growth and Agriculture: Japan's Experience*, University of Tokyo Press and Princeton University Press, Tokyo, Japan, 1969.