MAINSPRINGS OF AGRICULTURAL GROWTH IN INDIA*

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I feel honoured to be invited by the Indian Society of Agricultural Statistics to deliver the Panse Memorial Lecture for this year. With my elementary knowledge of statistics I will not be able to fully appreciate Dr. Panse's valuable contribution to statistical methodology though, like other users of agricultural statistics, I am beholden to him for his pioneering efforts in preparing the first series of adjusted index numbers of agricultural production.

For me, Dr. Panse's contribution to the growth of scientific agriculture is enshrined in his successful efforts, along with another eminent statistician, Dr. Sukhatme, to introduce a nation-wide programme for estimating area, yield, and production of principal crops on the basis of well-laid out crop cutting experiments. By any standards this was a path-breaking innovation. Once we realize the limitations imposed by the largeness and diversity of our country, the lack of infra-structure in the countryside, the quality of village level functionaries, and the grip of a bureaucracy which is unwilling to move away from the trodden path, we can appreciate the significance of this innovation which circumvented all these hurdles.

Many more technical and organizational measures of this type are needed to impart dynamism to Indian agriculture. Therefore, a discussion of the structural features which constrain such actions and the directions in which new initiatives have to be taken are the main themes of this address.

My main contention in this address is that rapid and sustained agricultural development in this country can take place only when all agricultural workers—cultivators and wage-paid labourers—can contribute to the production programmes. Since a vast majority of the cultivators are small and marginal farmers, the nature of technology,

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institutional change, and supportive systems have to be adopted to small farm agriculture.

Let us briefly review the performance of the Indian agriculture during the last 25 years, speculate on the magnitude of future demands, examine the strategies followed so far to augment production, look at the contribution of different groups of cultivators to the total production, and finally, suggest the need for broadening the production base of agriculture in this country.

I

PERFORMANCE OF THE INDIAN AGRICULTURE

The agricultural sector's performance can be assessed in various ways. One way, for example, can be to compare the domestic supplies with the demands made on agricultural production. Another way can be to examine the extent of actual utilization of the production potential in the sector. Return on scarce factors, say, land or capital, can also be used as a critical indicator. As the performance of the agriculture cannot be viewed in isolation, the impetus that the sector provides to economic activities in other sectors is, again, an important consideration.

It is not my intention to evaluate the performance of the agricultural sector on all these counts. The purpose is to clarify that a unidimensional measure, such as rate of growth, is not adequate to explain the various implications of the sector's growth. At the same time, the rate of growth in aggregate production can be taken as the starting point for an evaluation of the performance of the sector, and other measures can be subsequently introduced to complete the picture.

From 1949-50 to 1973-74, *i.e.* roughly for the period beginning with the Independence and spanning the first four Five-Year Plans, agricultural production increased at an annual rate of 2.7 per cent. This rate of growth, when juxtaposed with the increased demand from various sources. *i.e.*, demand for food, agricultural raw materials, and agricultural exports, was inadequate. For example, roughly during the same period (from 1952 to 1972) the demand for foodgrains increased at the rate of 3 per cent per annum while the foodgrains production increased at the rate of 2.4 per cent per annum. Demand and supply got adjusted at the market place, partly by the augmentation of foodgrains supplies by imports, and partly by a rise in prices which affected the consumption of these essential commodities among economically vulnerable sections.

A more disturbing feature of the agricultural scene was the deceleration in the growth of production, especially during the last

decade or so. This was highlighted by the compound rate of growth of agricultural production in successive Five-Year Plans (Table I).

TABLE 1

All India Compound Rates of Growth of Agricultural Production, Area and Yield*†

(per cent per annum)

Period	*Agricultural production*	*Area under crops*	*Yield*
First Plan (1951-52 to 1955-56)	4.1	2.6	1.4
Second Plan (1956-57 to 1960-61)	3.1	1.3	1.8
Third Plan** (1961-62 to 1964-65)	3.3	0.6	2.7
Fourth Plan (1969-70 to 1973-74)	2.2	0.8	1.0
1949-50 to 1973-74	2.7	1.1	1.3

* 1. Growth Rates in Agriculture, New Delhi, DES.

2. Fourth Five Year Plan, 1969-74.

**The Year 1965 66 has been excluded for purpose of calculating the growth rates due to its being an abnormal year.

†Plan-wise growth rates have been calculated on the basis of triennial averages with the base and last year of each Plan as mid years except in the case of Third and Fourth Plans when instead of triennial periods the years 1964-65 and 1973-74 respectively were taken as end periods.

It is true that trend in production for a short period is heavily influenced by the performance in the terminal years and can be seriously distorted by large increases or decreases during one or few years within the reference period. Yet it is obvious that over the period of the four Five-Year Plans, the momentum in agricultural growth could not be sustained. In fact the reverse happened to be true. Much of the deceleration in growth was the result of declining contribution of area under crops, which the increase in yields failed to compensate.

The second disquieting feature was the extent of instability in agricultural production which, it seems, instead of declining was becoming more acute. This was clearly evident from the performance in the foodgrains sector. The National Commission on Agriculture (NCA) on the basis of a simple exercise, *i.e.* fitting trend lines to peak and trough points on the production (adjusted) of foodgrains from 1950-51 to 1960-61 and from 1960-61 to 1973-74, concluded that foodgrains production in the second period was more unstable than in the first period (NCA 1976).

Three facts emerge from this review of the performance of the agricultural sector in the last 25 years :

1. The overall rate of growth in agricultural production was slow in relation to the growing needs.
2. The rate of growth decelerated during the later part of the period.
3. The last half of the period was characterized by higher instability.

The decelerating trend in agricultural production has led to stagnation in agricultural incomes, even though the terms of trade have marginally shifted in favour of agriculture. This as will be noted below has a serious repercussion on the national economy. The main brunt, of course, is borne by the poor among the rural households.

There seems to be a direct relationship between the mean level of agricultural incomes and the extent of poverty in rural areas (Bhatty 1974). In an exercise based on NSS data, I had earlier concluded that in the 1950's, when agricultural growth was rather satisfactory, the poverty problem had eased, even though insubstantially (Vyas 1972). On the other hand, a number of studies on rural poverty concluded that in the 1960's, when agricultural production was sharply fluctuating around a more or less static trend, no dent could be made on the problem of rural poverty (Bardhan 1974, Minhas 1974). A few studies on agricultural wage determination showed that the wage incomes, on which the majority of rural poor depended, was closely correlated to the demand from and productivity of agricultural sector (Bardhan 1977).

Moreover, the labour market in agriculture behaved in a manner that the incidence of decelerating income was largely shifted to agricultural labour. Only in the areas of high agricultural growth, the real wages of agricultural labourers showed some improvement (Lal 1976).

An equally important consequence of a slow growth of incomes in agriculture, is tenuous links which persist between agricultural and non-agricultural sectors. These sectors can play mutually reinforcing roles if interrelationships are strong. Such relationships can be examined from several points of view. More important among these are: (*a*) production linkages, (*b*) consumption linkages, (*c*) saving, investment linkages, (*d*) employment linkages, and (*e*) linkages with the foreign sector. In a recent study, with which I had the privilege of being associated, I am referring to the Second Asian Agricultural

Survey (AAS-II in brief), some of these relationships existing in the Asian economies were examined in detail.

I will briefly comment on the first two of these linkages, *i.e.*, production linkages and consumption linkages. Adequate data are not available to meaningfully discuss saving, investment linkages and employment linkages. The importance of the linkages with the foreign sector in relation to total agricultural output, though crucial, is not overwhelming.

Linkages induced by input demand and those induced by output supply were examined by the AAS-II in four different ways:

1. A measure of the strength of the direct backward linkage caused by changes in the level of production within a sector, known as the "coefficient of backward linkage," and denoted symbolically as (U).
2. A corresponding measure of the strength of direct forward linkages between one sector and the rest of the economy, known as the "coefficient of forward linkage," and denoted as (W).
3. Another measure of the economy-wide impact of increased production within a sector, known as the "total linkage coefficient," which accounts both for direct linkages and for the indirect linkages induced via feedbacks and spillovers to other sectors not directly linked with the sector in which production initially increased; this index is denoted by (Y).
4. An index which measures the total of direct and spillover inducements to a particular sector (say agriculture) caused by changes in the levels of production in all of the other (non-agricultural) sectors. This measure is known as the "coefficient of total linkgage receipt" and is denoted by (Z) (AAS-II, P. 112).

Let me summarize the results of the study (Table II). The Table II clearly brings out the weak inter-sectoral production linkages though agricultural processing activity is an exception.

The same holds true for consumption linkages. Given the low levels of incomes, it is not surprising that the rural poor in our country, spend a large part of their incomes on foodgrains and a very small part on non-food goods and services. The most disturbing factor emerging from the data is that this expenditure pattern has not improved over time (Table III).

TABLE II

Relative Strength of Intersectoral Linakge Co-efficients (Based Upon Standardized Average Rankings Within Broad Sectoral Categories)

India (1973-74)	*Coefficient and Relative Strength*			
	U	*W*	*Y*	*Z*
Foodcrops[a]	W	M	W	MS
Industrial Crops, Animal Husbandary[b]	W	M	W	MS
Agricultural Processing				
1. Foods[c]	S	MW	S	MW
2. Industrial Crops, Animal Products[d]	S	MW	MS	MW

[a] includes food-grains, other agriculture.
[b] includes animal husbandry, plantations.
[c] includes sugar and gur, vegetable oil, other food products.
[d] includes Tea and Coffee, Cotton Textiles, Jute Textiles, Leather Products, Rubber Products.

NOTES : U=Coefficient of Direct Backward Linkage
W=Coefficient of Direct Forward Linkage
Y=Total Linkage Coefficient
Z=Coefficient of Total Linkage Receipt Inside of Table
S=strong
MS=medium strong
M=medium
W=weak

TABLE III

Percentage Distribution of Average Total Consumption Expenditures for Food Items, Non-Food Items, Services etc. in Rural, Areas

	Time Period			
	Early	*Mid*	*Late*	*Early*
	1960s	1960s	1960s	1970s
Food Items	—	74.0	—	73.6
Non-Food Items[a] Services, etc.[b]	— } — }	26.0	— } — }	26.4

[a] Non-food items include liquor, tobacco, fuel, electricity, clothing, shelter, household furniture and equipment.
[b] Services include health, education, recreation and transportation.

The reasons for the lack of interactions are also not far to seek.

The high yielding varieties programme, which did affect agricultural incomes in a measurable way, could not cover more than 27.6 per cent of the total cropped area under principal cereals, *i.e.*, less than one-fifth of the gross cropped area in the country. In certain other crops, returns did improve either due to increase in productivity or due to a favourable price situation. But for none of

the principal crops was the impact on incomes comparable to, say, that registered in areas growing high yielding varieties of wheat. As incomes of the farm labourers as well as the wage component of the incomes of the small and marginal farmers depended on the prosperity of agriculture more than on any other factor, agricultural incomes remained depressed in large parts of the country. Even in the areas affected by the new varieties programme or by other income boosting measures, the share of additional incomes going to wages remained relatively low. The net result was that, in real terms, the agricultural incomes over a large part of the country and the wage incomes over practically the whole of the country did not rise significantly. Thus the basic element ensuring larger interaction between different sectors, *viz.*, a strong cash nexus, was missing and in its absence agricultural non-agricultural interaction remained by and large, passive.

II

FUTURE DEMANDS ON AGRICULTURE

If the progress during the last two decades can be considered as not very satisfactory, prospects for coming years are all the more daunting. Nature and magnitude of pressures on agriculture will make the tasks before the sector more difficult. The more important tasks in the future will be to :

1. Increase domestic supply of foodgrains to meet the rising demands.
2. Provide adequate jobs for a growing work force in rural areas.
3. Enlarge contribution of agriculture in earning and/or saving foreign exchange.

In the study (AAS—II) that I referred to earlier, we tried to assess the production potential which various economies of the region including India could possibly reach by 1985. A Model of Agricultural Demand Supply, and Employment and Trade Systems, better known by its acronym ADSETS, was prepared. A series of variants were run for each country of the region to test the sensitivity of projections to different assumptions about key economic variables.

I will briefly report on the results obtained from two of these variants.

Variant A, the "High" growth situation, presents feasible increases in cropped area and yields within a period of 10 years or so. These are not merely the extrapolation of past trends, but imply,

"substantial efforts to apply available knowledge, mobilizing resources, overcome institutional obstacles and appropriately adjust domestic policies". These projections will fructify if the production conditions, by past criteria, turn out to be "exceptionally good".

The second variant, Variant B, the "Low" growth situation, postulates the "average" conditions while projecting supplies, and more or less approximate to the extrapolation of the past trends.

Both these projections pertain to the period 1975-85. India, Variant A suggests a rate of growth of 3.9 per cent per annum, and Variant B a rate of growth of 2.8 per cent per annum in agricultural production. It is easy to relate these two projections to the demands which are likely to be placed in coming few years on agricultural sector.

Let us underline the implications of these growth rates in agriculture for the Gross Domestic Product. ADSETS calculated elasticity of GDP for agricultural production at 1.32. Thus, a growth rate of 3.9 per cent per annum in agricultural production will mean a growth of 5.1 per cent in GDP, while the lower variant growth of 2.8 per cent per annum will mean growth of GDP at the rate of 3.7 per cent per annum. With a projected population growth of 2.3 per cent per annum, the high and low variants will mean all the difference between a continuing precarious existence and the prospects of slightly more comfortable living for the masses.

The implications of these growth rates come out more sharply in the three related concerns to which I made a reference earlier. Coming to the demand for foodgrain in the first instance, with 2.3 per cent per annum rate of growth in population the estimated requirements for foodgrains due to population growth alone will be 128 million tonnes by 1985. But this will mean perpetuation of low level of cereal intake, which in the absence of other sources of energy means a low caloric diet. If the diets of the projected population has to reach the nutritionally satisfactory levels, the foodgrain requirements will be 140 million tonnes. With the achievement of high agricultural growth situation, namely, Variant A, domestic production will only be below domestic requirements, *i.e.*, a deficit of 2.9 million tonnes, at the end of the period (1985). However, if the current trends in supplies continue, *i.e.*, the rate of growth is around 2.8 per cent per annum, the gap between the requirement and availability will be 12.5 million tonnes.

The agricultural growth does not relate merely to the demand for foodgrains. It has significant repercussions on the employment situation as well. The ILO has estimated that India's labour force

will grow from 1975 to 1985 at the rate of 2.2 per cent. This means that 47 million new entrants will be available in the labour market during that period. I have shown elsewhere that a very large bulk of these, nearly two-thirds, have to be absorbed in agriculture itself (Vyas 1970). We do not have reliable studies of labour absorption in agriculture under different technologies. However, in other developing countries of this region, it has been found that employment-output elasticity in agriculture is roughly 0.5 (AAS-II). (Incidentally, it should be noted that in these economies agirculture is more labour intensive than in India.) Thus, even with the high growth situation, additional labour force in the country-side will be barely absorbed in productive occupations; with low growth situation slightly more than half of the additional labour force will be gainfully employed in agriculture. When the "residuals" are translated into actual number of people for whom additional jobs have to be provided in the non-agricultural sectors and are related to the past performance in employment creation in these sectors, grimness of the situation becomes obvious.

The projected foreign exchange needs of the Indian economy suggest that the past growth rates in exports have to be be considerably increased to earn adequate foreign exchange. As in the past, in coming years also agriculture will play a crucial role in foreign exchange earning (or savings). With high agricultural growth situation, agricultural exports, which are at present 1.08 times cereal imports, can rise to 1.27 times cereal imports. If the postulated rate of growth is not achieved and instead of high growth situation the low growth situation prevails, agricultural exports will barely be able to finance 30 per cent of the necessary cereal imports. This obviously is not a tenable situation.

To this audience I need not point out the pitfalls of such aggregative models. But the lessons that ADSETS has thrown up should not be lost. It is clear that the minimum rate of growth in agricultural production for the next decade, which will be consistent with a desirable rate of growth in per capita incomes, domestic food supply, employment, and exports, will be 3.9 per cent per annum. An achievement lower than the one indicated by this figure will exacerbate existing difficulties to unmanageable proportions.

To achieve a rate of growth postulated in high variant, though not impossible, is certainly not an easy task. It is true that in the early fifties we achieved a rate of growth approximating to this figure but then the bulk of increases came from the expansion in cropped area. Once the possibility of area expansion (barring that from

multiple cropping) is discounted and the major reliance is placed on the growth in productivity, it will be clear that the rate of growth in productivity will have to be more than doubled. Be that as it may, while there is room for manoeuvring in setting targets for different sectors, the target for agricultural production in the coming years is more or less given. The rate of growth in agriculture has to be postulated at around 4.0 per cent per annum and other planning exercises have to begin by taking this as a base.

III
STRATEGIES ATTEMPTED SO FAR

Can we raise a significantly large production from the same land surface? This is the most pertinent issue. Many eminent Indian and foreign scholars have looked at the sector's performance and have pointed out important lacuna in agricultural planning and implementation of agricultural programmes. Much can be learnt from these analyses. However, a puzzling factor in the Indian situation is that virtually every measure one could suggest for revitalizing agriculture, has been tried out on a small or a large scale at one point of time or another.

Within the socio-political framework where not only market forces favour the rich but even the action of the state benefits those with wherewithals, the best one can hope for is that the effect of growth will trickle down to other sections of the society. With this "percolation effect" syndrome it is difficult to find a new initiative or a radically different thrust, either in technology or in institutional change or in the organisation of supportive services.

Whatever has been done so far, in aggregative terms, is not insubstantial. An extensive infrastructure for supporting agricultural production has already come into existence. We have, for example, a very large and competent research establishment. The country has an extension system whose size is unmatched by any similar system in the world. Supportive services in marketing and credit are being progressively streamlined and extended. Several land reform measures, which purport to affect relationship in land in a revolutionary way, have been enacted. Nor can one find much fault with the prices and investment policies. By and large, the agricultural producer has been fairly treated in regard to the product prices once the paying capacity of the consumer is also taken into consideration. Similarly, in spite of certain lack of emphasis for brief periods, *e.g.*, during few years covered by the Second Five-Year Plan, the state's concern for agricultural growth as reflected in agriculture's share in

the total public outlay has remained quite substantial. Differences of opinion can exist on the extent of support needed for an action or a programme, but it will be difficult, more so after Dantwala's persuasive writings on this subject (Dantwala 1976), to establish that in aggregative measures—legislative, fiscal, or organizational—agriculture as an economic activity has been neglected.

Inspite of the contrary impression in certain sections, the fact is that in all plan periods, the package of technological change, public outlay, institutional reforms, and organizational innovations—all aimed at imparting vigour to this sector—continuously found an important place. The First Five-Year Plan not only boosted irrigation but also introduced a series of land reform measures to eliminate functionless intermediaries. During the Second Five-Year Plan agricultural programmes coincided with the reorganization of the cooperative movement and a radical land reform measure like "land-to-thetiller". The Third Five-Year Plan period can be remembered as much for the Intensive Agricultural District Programme experiment as for ushering in the Panchayati Raj. During the Fourth Five-Year Plan not only wheat revolution was ushered in through the High Yielding Varieties Programme, but several states in the country enacted more stringent ceiling legislation. The emphasis on one or the other programme during a particular year or two could have been influenced by fluctuations in agricultural production—periods of euphoria and alarm have alternated quite frequently in the policy making circles—but if one were to look into successive quinquenniums, it can be concluded that all the major elements of an agricultural strategy exist in our plans right from their inception. It is futile, therefore, to search for an answer in terms of neglect of the sector as a whole or indifference towards major variables, such as technology or institutional change. This is the situation as far as planning is concerned.

At the same time, inclusion of all desirable elements in the plans does not necessarily imply the same seriousness in their execution. The most glaring lacuna in implementation is the lack of coordination among various measures. Different programmes are implemented more or less in a parallel fashion. For example, at no stage was a conscious effort made to bring the supportive systems of credit and marketing in line with the institutional reform, or to relate the public outlay with the desired direction in supportive systems, or to adapt the research systems to the merging socio-economic realities.

It is also true that even while pursuing a programme policy makers and administrators in most instances stopped short of taking hard decisions, and thus several measures remained as mere symbolic

gestures. One can cite several such measures to illustrate the lack of courage in executing them. Any effort to vitalize agriculture must resolve the problems of synchronization and administration.

IV

CONTRIBUTION OF DIFFERENT GROUPS OF CULTIVATORS

Mere streamlining of the existing measures, or shifting relative emphasis among different programmes, or allocating larger resources for different activities will not provide the answer. This is so because while engaged in all these manipulations we are still neglecting the mainsprings of agricultural growth. To my mind, the mainspring of agricultural growth consists of the whole multitude of men and women who form this sector, and only a few among them, today, are partners in the growth process.

This realization dawned on me when I started looking at the share of different groups of farmers in total agricultural production. The exercise was confined to foodgrains production and was admittedly based on a crude methodology. The method employed was to take the area under foodgrains in each size group of holdings in 15 states which accounted for 97 per cent of the total area under foodgrains in 1970-71. The average yield for the foodgrains for the state as a whole was applied to the foodgrains area in each size groups of holding. A computer programme was devised to identify the minimum number of farmers who could supply different proportions of the total output. The exercise had two limitations. It assumed that (*a*) the composition of different grains in different size groups was the same and (*b*) the yields on different holdings were the same. For a more realistic understanding, both these assumptions will have to be relaxed. But in this exercise, since the effort was to arrive at a broad order of magnitudes, the above listed assumptions, hopefully, did not vitiate the results.

It is evident from Table IV that out of 68 million holdings in the country less than one per cent of holdings account for 25 per cent of the foodgrains production. About 90 per cent of total foodgrains production comes from less than 50 per cent of the holdings. The remaining 50 per cent of the holdings in the country are by and large redundant from the production point of view. Naturally they do not attract serious attention when various agencies, which provide support to agricultural growth, search for a clientele. In other words, these producers are marginal to the production system.

It can well be argued that if the bulk of the production is accounted for by a relatively small number of larger farmers, what is wrong in concentrating efforts on them ? This line of argument is not tenable on two grounds. First, it assumes that there is enough "slack" on the large farms and that there is no "slack" on the marginal farms. There is no evidence to support this claim. On the other hand, the available evidence suggests that in terms of quality of land, extent of irrigation and, of course, availability of labour small farms have an edge, which with necessary complementary inputs may be easy to exploit. The factors which they lack are in the nature of "working capital". But more importantly, concentrated attention on the large farms will not generate adequate purchasing power among the left-out sections, and this lack of purchasing power itself will act as a bind on the expansion of the market for additional production.

There is another reason why it has become more urgent than ever before to bring the small and marginal cultivators on to the centre of the stage. Over a period of time due to various factors—market induced, institutional, but more importantly, demographic, the proportion of small and marginal farmers is increasing and Indian agriculture is progressively acquiring not only a small farmer but also a small farm complexion. The results of two NSS surveys, one pertaining to 1961-62 (17th round) and the other pertaining to 1970-71 (26th round), corroborate this statement.

In brief, the comparison between the two surveys revealed the following :

(*i*) The number as well as proportion of households in the marginal holding group have significantly increased.

(*ii*) Acreage under marginal holdings has slighly declined.

(*iii*) The number of small land owners has increased, but their importance in terms of praportion of total number of land owners has marginally declined.

(*iv*) Area under small holdings has increased both in acreage as well as in proportion to the total owned area in the country.

(*v*) In numbers, total area and per household area, medium sized holdings displayed trends more or less similar to small sized holdings.

(*vi*) The number as well as proportion of big and large holdings have declined.

(*vii*) Acreage under big and large holdings has doclined both in absolute terms and as proportion of total acreage (Vyas 1977).

Given the present social and political milieu, it may be possible to stop the erosion of holdings of the small and marginal farmers, but it will not be possible to stop the division of large holdings and their further expansion is out of question. It is imperative, therefore, to adjust existing institutions, technologies, and supportive agencies to the needs of a small farm agriculture. And this has to be done without secrificing the growth target of 4 per cent increase in agricultural production per year, which, as suggested earlier, is the irreducible minimum for ensuring adequate food supplise, employment, and export surplus from agriculture.

V

BROADENING THE PRODUCTION BASE

There is a wide spread feeling that an emphasis on small farms may be justified on egalitarian grounds but cannot be defended on grounds of production efficiency. In fact, measures to assist small farmers are cited as perfect examples of trade-off between growth and justice. In countries like ours, where a precarious balance exists between demand and supply of agricultural commodities, policy makers are naturally cautious on such matters. They are even more cautious when the need to accelerate the growth rates of agricultural production is emphasised.

It is true that with the constraints imposed by imperfections in factor and product markets, absence of appropriate technology, and lack of supportive systems attuned to small farms' requirements, the small farmers cannot contribute to production efforts in a meaningful way. But none of these constraints is insurmountable. Many of these constraints can be relaxed through appropriate social interventions.

An important question which needs to be answered at the outset is how small a viable small farm can be. The institutional and market induced constrains broadly define the minimum size of a viable holding. However, the available technology and supply institutions do play an important part. With the present technology, cultivators with tiny holdings cannot obtain their subsistence from cultivation alone. In their case, there is a need to ensure fuller wage-paid employment. For the planned development in a country like ours, programmes for land reform, fuller employment and enhancing production capability on small farms are not mutually exclusive. There is, however, a large number of farms which are today considered to be non-viable, say, holdings between one to five acres. They constitute one-third of the total number of holdings. These holdings

can be brought into the mainstream of production. Even in their case, supplementary occupations, like dairying, poultry, or piggery, may be necessary. This means that a small farm oriented growth strategy should examine the problems of complementarity much more carefully. Physical and social scientists will have to address themselves to the task of evolving agricultural-cum-supplementary occupation systems for different micro environments.

In crop production also the picture is not as discouraging as it looks at the first sight. In many of the South-East Asian countries, a man with a one-hectare holding can make a decent living from its produce, and a man with a two-hectare holding has surpluses for reinvestment. I do not, however, like to leave the impression that in these countries all the problems connected with small farms have been solved. The situation is far from it. But we can certainly learn some lessons from these countries about a small farm agriculture.

In the Indian context, one can list some basic handicaps which prevent small farmers from contributing to the production in a meaningful way. The principal handicaps are as follows :

1. The small farmers and the small industrial entrepreneurs face input and output prices which do not truly reflect their relative scarcities. State should correct these distortions through taxes, subsidies, and interest rate policies. Since these price distortions are not specific to agriculture but pervade the whole economy, the scope of state intervention will have to be much wider and will have to include a reassessment and corrections in the tariffs and other protection devices.

2. Because of the small farmers' inability to bear risk, there is a sub-optimal use of production factors on small farms. Strategies which reduce risk and uncertainty will help small farmers in mobilizing and more efficiently utilizing resources on farms. Appropriate technology and input and output price policies will form important elements of such a strategy. Certain organizational forms which can help in socialization of risks also fall in this category.

3. The monopolistic control over some of the scarce inputs and easier access to useful information give an edge to the large farmers vis-a-vis the small farmers. Financial institutions and the extension machinery—as they function today —instead of restoring the balance, tilt the scales in favour

of haves. Correction of such distortions in input markets, particularly the credit, and output markets and dissemination of right type of information among small farmers is another priority area.

4. In several parts of the country, landlords continue to perform the "trinity" role by controling employment, credit, and product markets. Small farmers' dependence on large farmers in all these markets creates semi-feudal conditions. Under these conditions it is perhaps a "rational" decision on the part of the large farmers to restrain productive efforts on the small farms. These relationships have been overthrown or at least considerably weakened in areas where a neutral technology with the promise of measurable gains in productivity is available, as it happened in case of HYV wheat areas. But when the main thrusts of technology are towards only small though gains steady – and this seems to be present direction—it becomes difficult to break the semi-feudal stranglehold. State intervention in such situations should start with the recognition of the interdependence of these markets. The emphasis, however, should be on provision of adequate supplementary employment which, more than anything else, will enhance the small farmers' bargaining power.

5. Should the public agencies like credit or marketing agencies decide to work with the small farmers, the sheer large number of such farmers acts against them. A consolidation of decision making units in one form or another is necessary to facilitate public programmes for small farmers. The need for the organization of the disadvantaged section is felt on other grounds also. Problems of development cannot be divorced from the problem of sharing power. Only by organizing themselves, the have-nots can prevent diversion of goods and services which are their due. But the experience so far suggests that universalistic institutions like panchayats or cooperatives have failed to emerge as spokesman for the small farmers. Nor have the trade union type of organizations made much headway. New forms of organizations have to be devised to take advantage of group action without stifling individual initiative.

All these are obviously difficult tasks. But then hardly any soft options are left.

Development in agriculture, as development in other fields, is not accomplished by inputs or organization ; it is accomplished by the individual decision makers. The mainsprings of agricultural growth are the men and women toiling in the fields. The material inputs, technologies, and organizations are there to support them. Social scientists and physical scientists together with policy makers and administrators can play a significant role in devising and implementing a system which brings the bulk of workers in the agricultural sector into the mainstream instead of keeping them at the margin as at present.

TABLE IV

Share in Total Foodgrains Production Accounted by Cumulative Percentages of Holdings*

Cumulative percentage of total foodgrains production		*Cumulative percentage of holdings*
25	...	0.72
50	...	7.40
75	...	24.30
90	...	49.90

*Relates to production in fifteen states accounting for 97 per cent of the total foodgrains production of the country in 1970-71.

N.B. : See text for methodology.

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