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# AGRICULTURAL INSTABILITY AND FARM POVERTY IN INDIA*

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I am grateful to the members of the Indian Society of Agricultural Economics for conferring upon me this singular honour to preside over their 48th Annual Conference. My association with this Society goes back to the last over two decades, and I have always cherished this association. I am particularly beholden to those stalwarts who have helped to build this humble Society into a mighty force, which it is today. A galaxy of luminaries have presided over the deliberations of the Society since its inception. They were the real doyens in their respective fields. Against this backdrop, I feel both embarrassed and honoured to venture to deliver the presidential address of the 48th Annual Conference of this august body. I certainly feel somewhat ill-at-ease to address such a learned gathering as yours. I adore your love and affection and hope my address, rather submission, would receive a similar consideration.

I would be failing in my duty if I do not recall the services of the great masters of yesterday and the doyens of today. As you know, the first Annual Conference of the Indian Society of Agricultural Economics was held in February 1940 in Delhi and was presided over by Sir Malcolm Lyall Darling. However, it was left to Shri Manilal B. Nanavati to give a new dimension and direction to the Society. It was under his dynamic and able stewardship that the Society attained the status and stature of nationally and internationally known body of Agricultural Economics. The Society has been fortunate to have the guidance and support of renowned scholars and distinguished Agricultural Economists, such as, Professor D.G. Karve, Shri J.J. Anjaria, Professor M.L. Dantwala and now Professor V.M. Dandekar. They have been a great source of strength and inspiration. On my own behalf and on behalf of this learned gathering, I express my sincere gratitude to them.

The subjects which have been selected for discussion in the Conference this year are also such as to provide ample scope for analytical acumen as well as practical results. For instance, the question of raising the productivity of commercial crops has acquired great importance in recent years, particularly due to the grave resource crunch posed by the large scale imports of edible oils and oilseeds. Similarly, a discussion on farm forestry is appropriate, not only to meet the current needs of fuel and fodder, but also for its effects on environment and ecological balance. A discussion on rural credit too is very timely for productive use of rural credit as also its recovery. It also offers opportunity to assess the real impact and implications of waiving off of agricultural loans as done by some States.

True, in this entire gamut of discussion, the importance of rains cannot be overlooked, more so in the context of the grave drought last year and still graver floods of this year.

Because of uncertain rains, practically, every year, in one part of the country or the other, food crops are affected. The so very unpredictable pattern of rains has lent much of the instability to our agriculture. It is not that efforts have not been made to thwart the ill-effects of this unpredictable pattern, but, by and large, the success has been only marginal. The drought of the last year, which was perhaps the severest of the century threw our economy off the rails. The buffer stocks of grains built over the years dried up almost in a blinker under the impact of this drought. It has struck a blow to many of our

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ill-conceived notions. However, as they say, some good is always hidden behind every action of the nature. This grave drought too had a lesson. It woke us up from the stupor caused by our false sense of accomplishment on the farm front. It has been a well timed and well needed jolt indeed! It has provided us an opportunity to assess various developmental programmes and projects as also to reset the priorities and the goals.

Here, it may not perhaps be necessary to restate the fluctuations in agricultural production over the years. The point is already well emphasised. The Indian Society of Agricultural Economics too is not unaware of this aspect. In fact, it is precisely in recognition of this situation that I intend to speak on the theme of agricultural instability with all its manifestations.

## AGRICULTURAL INSTABILITY

Varieties of uncertainties and risks face agriculture. These adversely affect the optimisation process of investment and production decisions. Among different types of risks and uncertainties, yield, which accounts for most of the uncertainties, is the most important. In the time-series data as used in this Address, the non-uniform technology varies gradually in a strictly chronological fashion. Two possibilities exist for dealing with this phenomenon. Explicit trend variables can be introduced in the equations, or trends can be extracted from each of the variables prior to the estimation of the parameters. Thus for proper analysis of yield variability, it should be detrended. However, for simple analysis, I have used the coefficient of variation statistics. The relative yield variability for some major crops and crop groups are presented in Table I. During 1971-86, the yield variability in the case of rice crop was the highest, *i.e.*, 29.14 per cent for Punjab, followed by Rajasthan, Uttar Pradesh, Andhra Pradesh, Orissa, Gujarat, Bihar, West Bengal, Himachal Pradesh and Jammu & Kashmir. It was the lowest, being 6.11 per cent, for the State of Assam. It may be noted that the States having the highest yield variability were found to be having the highest average yield per hectare, except for Rajasthan. Punjab, having the highest yield variability, harvested the highest average rice yield of 2,802 kg. per hectare, followed by Haryana. The higher average yield and higher yield variability in the case of non-traditional rice growing States are due to intensive cultivation and increasing area and yield of rice. As against this, the position in the case of wheat was quite the reverse. The yield variability of wheat swung between the lowest of 8.38 per cent for Orissa to the highest of 23.79 per cent for Maharashtra. The States having higher yield variability also had lower average yields in general. These findings reveal that wheat is a more assured and stable crop than rice.

Maize crop showed the highest yield variability, *i.e.*, 41.66 per cent in Tamil Nadu, followed by Gujarat (33.11 per cent), Maharashtra (30.33 per cent), Rajasthan (29.14 per cent), Uttar Pradesh (28.16 per cent) and Andhra Pradesh (23.61 per cent). It was the lowest in Assam, being 3.82 per cent. The rest of the States in the country experienced yield variability in the range of 10 to 20 per cent. No particular relationship could be established in average yield and yield variability in maize. However, this crop showed some stability in the States having higher average yields per hectare. Except for Punjab, where bajra is no more an important crop, bajra, in general, showed lower mean yield and higher yield variability. Rajasthan, where bajra is the most important kharif crop, had the highest yield variability and a lower mean yield per hectare. Among the important bajra growing States, Andhra Pradesh and Madhya Pradesh showed less than 20 per cent yield variability with an average yield of 579 kg. and 626 kg. per hectare respectively. The higher yield variability and lower mean yield for bajra crop may be attributed to the total dependency of this crop on nature and higher susceptibility to various pests and diseases.

TABLE I. STATEWISE MEAN YIELD AND COEFFICIENT OF VARIATION OF MAIN CROPS IN INDIA: 1971-1986

| Sr. No. | State | Rice | Wheat | Maize | Bajra | Total cereals | Gram | Total pulses | Total food grains | Groundnut | Total oilseeds | Cotton | Sugarcane |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) |
| | | | | | | Mean yield (kilograms per hectare) | | | | | | | |
| 1. | Andhra Pradesh | 1,768 | 596 | 1,509 | 579 | 1,177 | 347 | 308 | 1,044 | 829 | 735 | 182 | 73,284 |
| 2. | Assam | 1,030 | 1,135 | 578 | - | 1,029 | - | 416 | 1,001 | - | 439 | - | 38,560 |
| 3. | Bihar | 922 | 1,317 | 1,041 | - | 999 | 662 | 560 | 937 | - | 469 | - | 33,965 |
| 4. | Gujarat | 1,213 | 1,814 | 1,150 | 831 | 946 | 745 | 451 | 872 | 777 | 777 | 187 | 58,652 |
| 5. | Haryana | 2,242 | 2,008 | 1,081 | 560 | 1,585 | 638 | 639 | 1,372 | 969 | 637 | 325 | 41,433 |
| 6. | Himachal Pradesh | 1,145 | 1,033 | 1,707 | - | 1,279 | - | 389 | 1,212 | - | - | - | - |
| 7. | Jammu & Kashmir | 1,904 | 926 | 1,405 | 570 | 1,391 | - | 598 | 1,348 | - | 885 | - | - |
| 8. | Maharashtra | 1,318 | 759 | 1,354 | 349 | 683 | 341 | 359 | 611 | 742 | 533 | 84 | 87,123 |
| 9. | Madhya Pradesh | 801 | 898 | 982 | 626 | 764 | 602 | 484 | 689 | 619 | 472 | 80 | 80,126 |
| 10. | Punjab | 2,802 | 2,509 | 1,615 | 1,056 | 2,503 | 761 | 743 | 2,372 | 953 | 803 | 347 | 53,943 |
| 11. | Karnataka | 1,876 | 587 | 2,883 | 446 | 1,045 | 393 | 370 | 911 | 728 | 586 | 108 | 76,800 |
| 12. | Uttar Pradesh | 1,026 | 1,491 | 866 | 720 | 1,192 | 771 | 810 | 1,133 | 711 | 465 | 127 | 43,328 |
| 13. | Tamil Nadu | 2,005 | - | 1,394 | 879 | 1,550 | - | 312 | 1,384 | 1,040 | 938 | 244 | 94,897 |
| 14. | West Bengal | 1,277 | 2,046 | 1,138 | - | 1,336 | 716 | 552 | 1,268 | - | 475 | - | 67,589 |
| 15. | Orissa | 935 | 1,777 | 855 | - | 919 | - | 515 | 835 | 1,349 | 707 | - | 62,435 |
| 16. | Rajasthan | 1,060 | 1,467 | 833 | 282 | 656 | 692 | 420 | 586 | 634 | 438 | 208 | 40,657 |
| | All-India | 1,243 | 1,541 | 1,045 | 478 | 1,082 | 658 | 502 | 976 | 870 | 584 | 154 | 53,312 |
| | | | | | | Coefficient of variation | | | | | | | |
| 1. | Andhra Pradesh | 15.25 | 15.91 | 23.61 | 19.94 | 18.88 | 16.39 | 18.54 | 17.63 | 16.20 | 15.22 | 46.45 | 3.17 |
| 2. | Assam | 6.11 | 14.95 | 3.82 | - | 5.95 | - | 8.79 | 5.70 | - | 10.56 | - | 9.12 |
| 3. | Bihar | 12.30 | 12.83 | 15.62 | - | 11.63 | 17.73 | 14.41 | 11.55 | - | 16.83 | - | 8.96 |
| 4. | Gujarat | 13.82 | 11.73 | 33.11 | 26.40 | 19.37 | 19.69 | 16.20 | 20.85 | 37.92 | 30.23 | 17.46 | 15.06 |
| 5. | Haryana | 19.55 | 16.76 | 11.72 | 38.32 | 20.96 | 19.69 | 26.96 | 22.29 | 22.10 | 22.57 | 10.06 | 10.44 |
| 6. | Himachal Pradesh | 12.71 | 19.90 | 10.52 | - | 5.78 | - | 31.47 | 5.75 | - | - | - | - |
| 7. | Jammu & Kashmir | 12.31 | 11.67 | 14.88 | - | 9.77 | - | 11.61 | 9.62 | - | 26.38 | - | - |
| 8. | Maharashtra | 20.68 | 23.79 | 30.33 | 25.73 | 23.24 | 18.07 | 12.69 | 21.93 | 24.84 | 21.33 | 26.25 | 10.72 |
| 9. | Madhya Pradesh | 18.26 | 15.62 | 19.76 | 19.48 | 13.32 | 11.90 | 8.50 | 11.34 | 15.20 | 16.81 | 20.03 | 10.09 |
| 10. | Punjab | 29.14 | 14.27 | 11.78 | 12.15 | 16.31 | 21.17 | 15.58 | 18.09 | 12.10 | 7.67 | 16.46 | 13.10 |
| 11. | Karnataka | 7.98 | 21.63 | 13.79 | 19.74 | 8.66 | 20.60 | 15.74 | 8.21 | 22.79 | 11.85 | 20.35 | 6.52 |
| 12. | Uttar Pradesh | 20.43 | 19.68 | 28.16 | 29.25 | 19.62 | 14.32 | 11.54 | 18.61 | 19.39 | 11.49 | 28.13 | 8.15 |
| 13. | Tamil Nadu | 9.58 | - | 41.66 | 22.25 | 9.83 | - | 13.33 | 9.09 | 11.14 | 10.37 | 23.56 | 8.82 |
| 14. | West Bengal | 12.21 | 11.91 | 17.69 | - | 12.00 | 14.74 | 9.00 | 12.17 | - | 17.91 | - | 8.51 |
| 15. | Orissa | 15.13 | 8.38 | 11.83 | - | 14.16 | 13.10 | 11.16 | 12.19 | 7.66 | 10.51 | - | 5.02 |
| 16. | Rajasthan | 23.35 | 18.74 | 29.14 | 42.17 | 17.14 | 16.49 | 16.84 | 16.21 | 18.05 | 24.09 | 12.37 | 10.49 |
| | All-India | 11.89 | 11.91 | 12.08 | 20.79 | 13.43 | 8.77 | 6.56 | 12.57 | 12.01 | 17.44 | 13.95 | 7.49 |

There was not much inter-State variation in yield variability of gram. However, the mean yield per hectare varied from the lowest of 340 kg. for Maharashtra to the highest of 771 kg. for Uttar Pradesh. The coefficient of variation of yield for this crop varied between the lowest of 11.90 per cent for Madhya Pradesh to the highest of 21.17 per cent for Punjab. The average yield of gram was also low in general. A perusal of yield variability and mean yield shows that the States having higher average gram yield showed a higher yield variability.

Groundnut, which accounts for more than 40 per cent of the total oilseeds produced in the country, had the highest yield variability in the major groundnut producing State of Gujarat. Orissa showed the highest mean yield and the lowest yield variability for groundnut, whereas Madhya Pradesh harvested the lowest average yield of 619 kg. per hectare. Except for the States of Orissa and Tamil Nadu, having more than 1,000 kilograms mean yield per hectare, the average yield obtained in major groundnut producing States ranged between 634 kg. and 968 kg. in Rajasthan and Haryana respectively showing wide fluctuations in per hectare yields. The yield variability was more than 20 per cent in the States of Maharashtra and Karnataka and it was in the range of 10 to 20 per cent in the States of Andhra Pradesh, Madhya Pradesh, Punjab, Uttar Pradesh, Tamil Nadu and Rajasthan. Orissa showed the lowest yield variability, the coefficient of variation being 7.66 per cent and the highest average yield of 1,349 kg., whereas Gujarat had the highest coefficient of variation (37.92 per cent) and relatively lower mean yield at 777 kg. per hectare. Thus the fifteen-year (1971-86) analysis of groundnut yield and yield variability shows that groundnut production is more exposed to the vagaries of nature in the major groundnut producing States of Gujarat, Maharashtra, Karnataka, Haryana, Uttar Pradesh and Rajasthan.

For cotton crop, the coefficient of variation for yield was the highest, being 46.45 per cent in Andhra Pradesh, followed by 28.13 per cent in Uttar Pradesh, 26.25 per cent in Maharashtra, 23.56 per cent in Tamil Nadu, 20.03 per cent in Madhya Pradesh, 17.46 per cent in Gujarat, 16.46 per cent in Punjab, 12.37 per cent in Rajasthan and 10.06 per cent, being the lowest for Haryana. Cotton yield was the highest in Punjab, followed by Haryana, Tamil Nadu, Rajasthan, Gujarat, Andhra Pradesh, Uttar Pradesh, Karnataka, Maharashtra and Madhya Pradesh in that order. The States having higher per hectare cotton yields also had lower values of coefficient of variation. Thus the major cotton growing States, such as Punjab, Haryana, Gujarat, Tamil Nadu and Rajasthan showed greater yield stability. Therefore, cotton production seems to have stabilised in these States and there exists potential to further increase cotton production in these agro-climatic zones.

During the last fifteen years (1971-1986), per hectare sugarcane yield was the highest in Tamil Nadu, being 94,987 kg., followed by Maharashtra (87,123 kg.), Madhya Pradesh (80,216 kg.), Karnataka (76,800 kg.) and Andhra Pradesh (73,284 kg.). The State of Rajasthan had the lowest per hectare sugarcane yield of 40,957 kg. during the same period. The coefficient of variation was 8.82 per cent, 10.72 per cent, 10.09 per cent, 6.52 per cent and 3.17 per cent for Tamil Nadu, Maharashtra, Madhya Pradesh, Karnataka and Andhra Pradesh respectively. These findings show that the States which have comparative advantage in producing sugarcane also had lower values of coefficient of variation, reflecting stability of sugarcane production in these States. Uttar Pradesh, which has the largest number of sugar factories, had the lowest average sugarcane yield of 43,328 kg. per hectare during 1971-86.

## REGIONWISE CROP SPECIALISATION

An analysis of the average yield and variability of main crop categories like cereals, pulses, oilseeds, cotton and sugarcane in different States shows that there exists considerable scope for regional specialisation to achieve an overall higher and stable production of various crops at the national level. The cultivation of a crop or a group of crops in agro-climatic zones, which have comparative advantage in the production of such crops, will certainly give higher and stable yields in the long run. Theoretically, this may be considered a method of handling the two aspects of production instability. Firstly, the farmer may think in terms of the variability of income over his entire farming career. In this case, the number of years involved may be considered as a population of production periods from which he may wish to minimise the variability of crop yields. Secondly, the farmer may think in terms of large profits possible in a single year. In this case, the farmer may attempt to treat the single year as a 'sample' and organise his resources to minimise the chance of a large loss (Heady, 1952). While attempting to grow crops suited to a particular agro-climatic zone, the farmers treat the single year as a 'sample' and accordingly, organise their resource use to minimise the crop production risks. Indeed, this diversified use of farm resources is a measure towards stabilisation of crop yields (Singh, 1968) and lends support to the present thinking of the Planning Commission to undertake 'agricultural zoning' to facilitate cultivation of crops in the areas best suited for their production.

Thus based on the agro-climatic suitability of crops, the States of Punjab, Haryana, Tamil Nadu, Karnataka, Andhra Pradesh, West Bengal, Assam and to some extent Jammu & Kashmir and Himachal Pradesh may be encouraged to give more emphasis on cereals, whereas the States of Rajasthan, Uttar Pradesh, Madhya Pradesh, Bihar and West Bengal may be urged to lay more stress on pulse crops. Likewise, the States of Gujarat, Orissa, Andhra Pradesh, Tamil Nadu, Punjab, Maharashtra and to some degree Jammu & Kashmir need to give more attention to oilseeds production. Cotton crop deserves better emphasis in the States of Punjab, Haryana, Gujarat, Rajasthan, Karnataka and Andhra Pradesh. Similarly, the States of Maharashtra, Tamil Nadu, Andhra Pradesh and Karnataka can contribute much more to sugarcane production in the country. This regional specialisation in crop production may make a significant dent in farm poverty by achieving higher and stable per hectare crop yields.

## AGRICULTURAL INCOME AT FACTOR COST

Growth in production can take place either through increased use of factors, which would mean moving along a given production function, determined by a given set of production technology or it can come through an improvement in production technology which would mean an upward shift in the production function. In practice growth occurs through a combination of both of these changes. An analysis of agricultural income per unit of land for the past one and half decade 1970-71 to 1985-86 at 1970-71 prices shows that there has been no upward movement in agricultural incomes (Table II) in the country. However, when viewed at individual State levels, there have been significant increases in per hectare agricultural incomes in some States. For example, per hectare agricultural income of Punjab increased from Rs.1,990 in the year 1970-71 to Rs.3,667 in 1985-86. Similar increases took place in West Bengal, Orissa, Haryana, Maharashtra and Assam. The only exceptions are Gujarat and Karnataka which experienced a negative trend due to drought in 1985-86.

TABLE II. AGRICULTURAL INCOME AT FACTOR COST: 1985-86

| Sr. No. | State | Per hectare income in 1970-71 (Rs.) | Per hectare income in 1985-86 (Rs.) | Income per holding size (Rs.) | Average holding size(ha.) 1971 | Average holding size(ha.) 1981 | Average family size(No) 1971 | Average family size(No) 1981 |
|---|---|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| 1. | Andhra Pradesh | 1,025 | 3,611 (1,316) | 6,752 (2,461) | 2.51 | 1.87 | 4.89 | 4.87 |
| 2. | Assam | 1,898 | 7,160 (2,404) | 9,737 (3,269) | 1.47 | 1.36 | 6.02 | N.A. |
| 3. | Bihar | 1,261 | 4,803 (1,595) | 4,755 (1,579) | 1.50 | 0.99 | 5.76 | 6.03 |
| 4. | Gujarat | 1,021 | 2,284 (923) | 7,879 (3,184) | 4.11 | 3.45 | 5.78 | 5.81 |
| 5. | Haryana | 1,507 | 6,352 (2,264) | 22,359 (7,969) | 3.77 | 3.52 | 6.54 | 6.79 |
| 6. | Karnataka | 1,012 | 2,582 (983) | 7,049 (2,683) | 3.20 | 2.73 | N.A. | 5.80 |
| 7. | Madhya Pradesh | 583 | 2,416 (775) | 8,263 (2,650) | 4.00 | 3.42 | 5.43 | 5.62 |
| 8. | Maharashtra | 539 | 2,964 (837) | 8,743 (2,469) | 4.28 | 2.95 | 5.51 | 5.41 |
| 9. | Orissa | 973 | 3,696 (1,368) | 5,876 (2,170) | 1.89 | 1.59 | 5.28 | 5.31 |
| 10. | Punjab | 1,990 | 8,598 (3,667) | 32,586 (13,898) | 2.89 | 3.79 | 6.07 | 6.27 |
| 11. | Rajasthan | 603 | 2,033 (759) | 9,026 (3,370) | 5.46 | 4.44 | 5.76 | 5.92 |
| 12. | Tamil Nadu | 1,268 | 3,372 (1,519) | 3,608 (1,625) | 1.45 | 1.07 | 4.70 | 4.61 |
| 13. | Uttar Pradesh | 1,370 | 5,060 (1,873) | 5,119 (1,892) | 1.16 | 1.01 | 5.59 | 5.74 |
| 14. | West Bengal | 2,369 | 10,485 (3,624) | 9,855 (3,406) | 1.20 | 0.94 | 6.17 | 5.71 |
| | All-India | | 3,926 | 7,145 | 2.28 | 1.82 | 5.52 | 5.59 |

*Note*:-Figures in parentheses indicate agricultural income at 1970-71 prices.

Hence, from 1970-71 to 1985-86, the increase in agricultural income was marginal. In fact, considering the per hectare income at constant as well as current prices, the majority of the States in the country had stagnant agricultural incomes during this period. The rate of increase in the price of inputs used by the farmers has been much more pronounced than the increase in procurement prices of agricultural commodities over the years. According to a recent study completed by the Punjab, Haryana, Delhi Chamber of Commerce and Industry (1988), the farmers are not getting due price for their produce owing to the extremely limited network of Government procurement. Against this, the prices to be paid by the farmers for essential items of consumption are increasing at a rapid rate. Accordingly, the agricultural price policy has not been able to benefit a large section of small and marginal farmers. In addition, the fluctuating crop yields have become a regular feature to which the farmers have no alternative except to succumb to the vagaries of nature. Added to these miseries, the constant division and sub-division of land holding and increased population pressure are leading to further fragmentation and, consequently, to a reduction in the average size of holdings over the years. This aspect has been demonstrated with a telling effect by all the Agricultural Censuses. Table II

shows that during 1971-1981, the average farm size declined and the average family size increased in all the States of the country. The only exception was the State of Punjab where the average holding size increased from 2.89 hectares in 1971 to 3.79 hectares in 1981. This, obviously, is due to increased pace of industrialisation in Punjab and migration of small and marginal farmers to cities after realising that farming is a far less profitable proposition than other enterprises.

In view of the above scenario of almost stagnant agricultural incomes, increasing family size and declining average farm size, it is worthwhile examining the magnitude of farm poverty in different States. To know the magnitude of farm poverty, it is necessary to relate the net farm income derived from a given farm size holding to maintain an average family size of five adult members with the size of land holding, which just covers the minimum family living expenses. Such an exercise will tell us that, if we want to give our farmers a minimum standard of living, we have to have a minimum farm size holding, which should not be allowed to be fragmented further. Before we enter into this exercise, some explanation about the measurement of poverty is necessary.

## FARM POVERTY IN INDIA

Analysis of agricultural incomes according to the farm as well as for a family of average size may be useful in determining the dimensions of poverty on our farms. This is necessary because reduction of poverty is one of the major objectives of Indian planning process since the First Five Year Plan.

Wide differences exist in the estimate of poverty because of the differences in methodologies, data adjustments, and the price deflators used. Studies on poverty in India began with Dadabhai Naoroji in the 19th century (Naoroji, 1962). The only major work on poverty estimates during the pre-Independence period is that of V.K.R.V. Rao (1936) who revised Naoroji's estimates of per capita income. Mukherjee (1969) updated the poverty estimates of Naoroji and Rao at 1948-49 prices, thus laying the foundation of further work on this subject in independent India. Further in-depth studies on poverty in independent India are by Charan Singh (1964) and Tarlok Singh (1969 *a,b*). Charan Singh's major thrust was on working out an alternative strategy of economic growth with a special attention on small and medium farmers and entrepreneurs as well as utilisation of surplus labour and use of labour intensive techniques for capital formation. For Tarlok Singh, poverty in India is basically a rural phenomenon, which has its roots in the colonial past. However, a really meaningful and consequential debate on the subject followed after the publication of Myrdal's Asian Drama in 1969 when stalwarts like Bardhan (1970, 1971 and 1974), Minhas (1970 and 1971), Dandekar and Rath (1971) and Dandekar (1981) took upon the burden of the theme.

Researches in the field with the exception of Minhas have shown that, during the sixties, the incidence of poverty in India increased. This conclusion has been arrived at in spite of differences in methodologies, data as well as the price deflators used in these studies. In the following paragraphs, I have attempted to relate the incidence of farm poverty with net farm income at the State as well as national levels over the period 1970-71 to 1985-86 by using 'break-even' analysis.

BREAK-EVEN ANALYSIS OF FARM POVERTY

Assuming that the consumption fluctuates much less than proportionately to income (Baily, 1962), the break-even concept is shown in Figure 1, where net income of the farm family is measured along with vertical axis, and the gross output of the farm, which gives corresponding net income, is measured on the horizontal axis. The line CC′ which is parallel to the X axis, is the minimum necessary consumption and shows the family expenses of the farm. The curve SS′ is the farm's saving schedule. The net income of

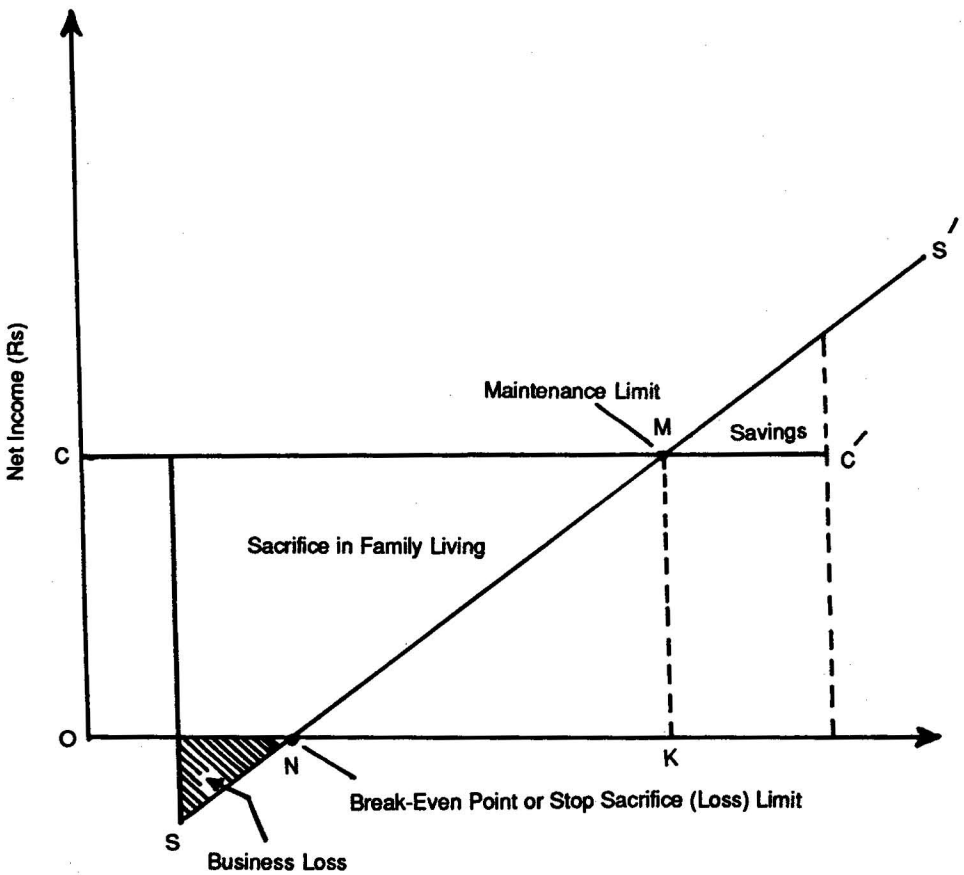


Figure 1- Maintenance and Stop-Sacrifice Limits

the farm is obtained by subtracting total farm expenses from the gross farm income under the assumption that the farm operates under perfect competition, and the prices of the farm's input and output are constant. In Figure 1, point M is the farm's 'maintenance limit'. That is, at point M, OK amount of output gives OC amount of net income which

just covers the necessary living expenses and nothing is saved. Nor is anything sacrificed. It would be noted that income from wages for small farms added to their net farm income will not exceed the maintenance level of income.

Any level of output, which is less than OK, will reduce the family and farming expenses below the previously acceptable levels. The farm-family may try to attain the 'maintenance limit' by reducing certain long run or short run postponable expenses.[1] If the family is very vulnerable, it may try to achieve the 'maintenance limit' by increasing debts as shown by point N (Figure 1). If the farm's output is less than ON, its survival will be in jeopardy. In our case, the farmer may likely start selling his farm property to repay his debts. He may even leave the farm. When this happens, then farm land and cattle begin to suffer. The equilibrium is constantly at the lower level and curve SS' may not remain a straight line. This will further reduce the level of farm resource use efficiency and linearity will no longer remain.

In official reports, the poor, *i.e.*, those below the poverty line, are divided into four categories: the 'destitutes', also called 'the poorest of the poor' with annual family incomes between Re.1 and Rs.2,265, 'the very very poor' with family incomes between Rs.2,266 and Rs.3,500, 'the very poor' with family incomes between Rs.3,501 and Rs.4,800 and 'the richest among the poor' with incomes between Rs.4,801 and Rs.6,400. These incomes are at current prices, and a family is defined as consisting of four or five adult members. The Seventh Five Year Plan (1985-1990) document considers two poverty lines for the purpose of determining the magnitude of poverty. The first poverty line is for the poorest among the poor and consists of Rs.4,800. The second poverty line is of Rs.6,400 for the richest among the poor. The Planning Commission, without categorising the poor, fixed poverty line income as Rs.1,728 for the year 1970-71. In 1970-71, there was no further classification of poverty incomes for rural and urban populations separately.

Table III presents Statewise magnitude of poverty of rural cultivating households at the two poverty lines mentioned above. The 1970-71 year is taken as the base to compare the magnitude of farm poverty among different States of India. An attempt has been made here to relate the holding size with the poverty line incomes so that the concept of poverty could be related to the farm size which just gives the poverty line income. It would be desirable to prevent further reduction in the farm size through fragmentation. The break-even farm size, which just gives the poverty line income of Rs.1,728 at the all-India level was 1.64 hectare in 1970-71. The corresponding figures in 1985-86 were Rs.6,400 and 1.63 hectare. This shows that during the fifteen-year period (1971-86), the progress of the agricultural sector in this regard has been almost negligible. Otherwise, the break-even farm size at the all-India level in 1985-86 would have been much lower as compared to the break-even farm size in 1970-71.

Statewise break-even holding sizes of poverty line income of Rs.1,728 in Figure 2 show that, among the seven States studied, the performance of agriculture in Maharashtra till 1970-71 was far from satisfactory. For example, to have the poverty line income of Rs.1,728 in the year 1970-71, the State of Maharashtra required 3.2 hectares as compared to only 0.73 hectare for the State of West Bengal. This is true because the existence of tea estates in West Bengal gave higher net income per hectare as compared to other States. The same picture emerges in Figures 3 and 4, which show the break-even holding sizes for different States to attain the poverty line incomes of Rs.4,800 and Rs.6,400. For example, Rajasthan requires the highest break-even holding size to attain these levels of poverty line income as compared to West Bengal requiring the lowest break-even holding sizes to attain these two levels of poverty line incomes. The poverty line income in

TABLE III. RURAL CULTIVATING HOUSEHOLDS WITH NET FARM INCOME BELOW THE POVERTY LINE: 1985-86

| Sr. No. | State | Average holidng size (ha.) | | Break-even holding size (ha.) | | | Number of cultivating holdings below the poverty line (in hundreds) | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1970-71 | 1980-81 | At 1970-71 poverty line (Rs.1,728) | At Seventh Five Year Plan poverty line for poorest among the poor (Rs.4,800) I | At Seventh Five Year Plan poverty line for richest among the poor (Rs.6,400) II | At 1970-71 poverty line (Rs.1,728) | At Seventh Five Year Plan poverty line (Rs.4,800) I | At Seventh Five Year Plan poverty line (Rs.6,400) II |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| 1. | Andhra Pradesh | 2.51 | 1.87 | 1.68 | 1.33 | 1.77 | 32,156 (59.32) | 44,989 (58.76) | 52,038 (67.96) |
| 2. | Assam | 1.47 | 1.36 | 0.91 | 0.67 | 0.89 | 10,196 (51.90) | 9,085 (39.54) | 10,290 (44.78) |
| 3. | Bihar | 1.50 | 0.99 | 1.37 | 1.00 | 1.33 | 52,847 (69.74) | 85,206 (75.87) | 89,225 (79.45) |
| 4. | Gujarat | 4.11 | 3.45 | 1.69 | 2.10 | 2.80 | 8,988 (36.95) | 13,875 (47.35) | 16,909 (57.71) |
| 5. | Haryana | 3.77 | 3.52 | 1.15 | 0.75 | 1.01 | 2,692 (30.99) | 2,224 (21.98) | 3,256 (32.18) |
| 6. | Karnataka | 3.20 | 2.73 | 1.71 | 1.86 | 2.48 | 16,773 (47.23) | 23,275 (55.51) | 27,411 (65.37) |
| 7. | Madhya Pradesh | 4.00 | 3.42 | 2.96 | 1.99 | 2.65 | 31,753 (60.48) | 33,289 (51.92) | 38,791 (60.51) |
| 8. | Maharashtra | 4.28 | 2.95 | 3.20 | 1.62 | 2.16 | 28,389 (57.34) | 29,895 (43.44) | 37,441 (54.41) |
| 9. | Orissa | 1.89 | 1.59 | 1.77 | 1.30 | 1.73 | 23,385 (68.63) | 18,270 (54.89) | 22,102 (66.41) |
| 10. | Punjab | 2.89 | 3.79 | 0.87 | 0.56 | 0.74 | 3,868 (35.28) | 1,104 (10.75) | 1,460 (14.21) |
| 11. | Rajasthan | 5.46 | 4.44 | 2.86 | 2.36 | 3.15 | 20,223 (54.26) | 23,933 (53.34) | 28,012 (62.43) |
| 12. | Tamil Nadu | 1.45 | 1.07 | 1.36 | 1.42 | 1.90 | 36,246 (68.20) | 43,629 (61.02) | 58,377 (81.63) |
| 13. | Uttar Pradesh | 1.16 | 1.01 | 1.26 | 0.95 | 1.26 | 1,11,519 (71.30) | 1,21,702 (67.93) | 1,31,250 (73.26) |
| 14. | West Bengal | 1.20 | 0.94 | 0.73 | 0.46 | 0.61 | 18,458 (43.77) | 27,915 (47.49) | 29,350 (49.93) |
| | All-India | 2.28 | 1.82 | 1.64 | 1.22 | 1.63 | 4,42,785 (63.22) | 5,36,577 (60.36) | 6,02,473 (67.78) |

*Note:*-Figures in parentheses indicate percentages of cultivating households below the poverty line to the total cultivating households.

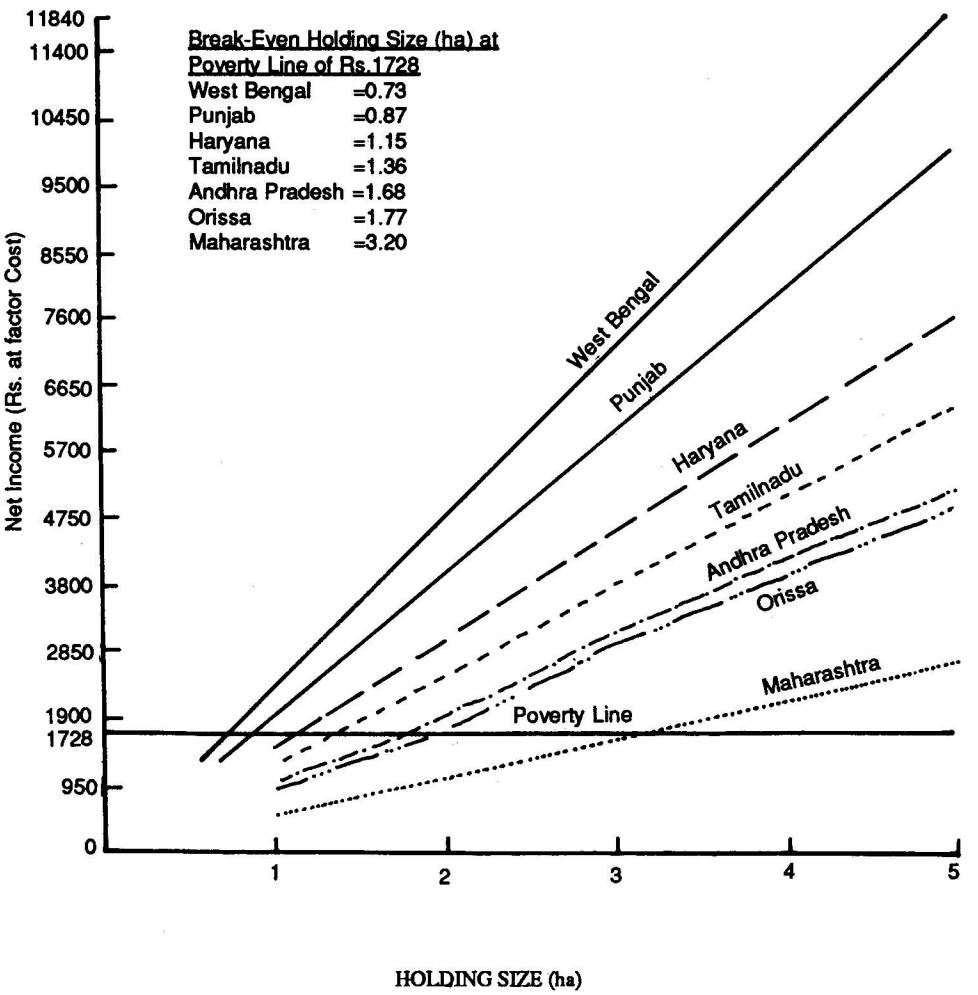


Figure 2- State-wise Break-even Holding Size and the Poverty Line for the Year 1970-71

1985-86 for the poorest among the poor was Rs.4,800 with a break-even farm size of 1.22 hectare at the all-India level. Compared to 1970-71 figure of 1.64 hectare, one may think that the process of development and growth in the agricultural sector during 1971-86 has benefited the poorest amongst the poor. The percentage of the cultivating households to the total rural households below the poverty line shows that in 1985-86, about 68 per cent of the richest among the poor and 60 per cent of the poorest among the poor were below the poverty line as compared to about 63 per cent in 1970-71. If we ignore the complexities of definition of poverty line, which is affected by inflation-indexing over time, we find that the percentage of farm households, which are poorest among the poor, declined from 63 per cent in 1970-71 to 60 per cent in 1985-86. However, the fact remains that, in absolute terms, the total number of farm households below the poverty line has increased by 9.3 million in about fifteen years.

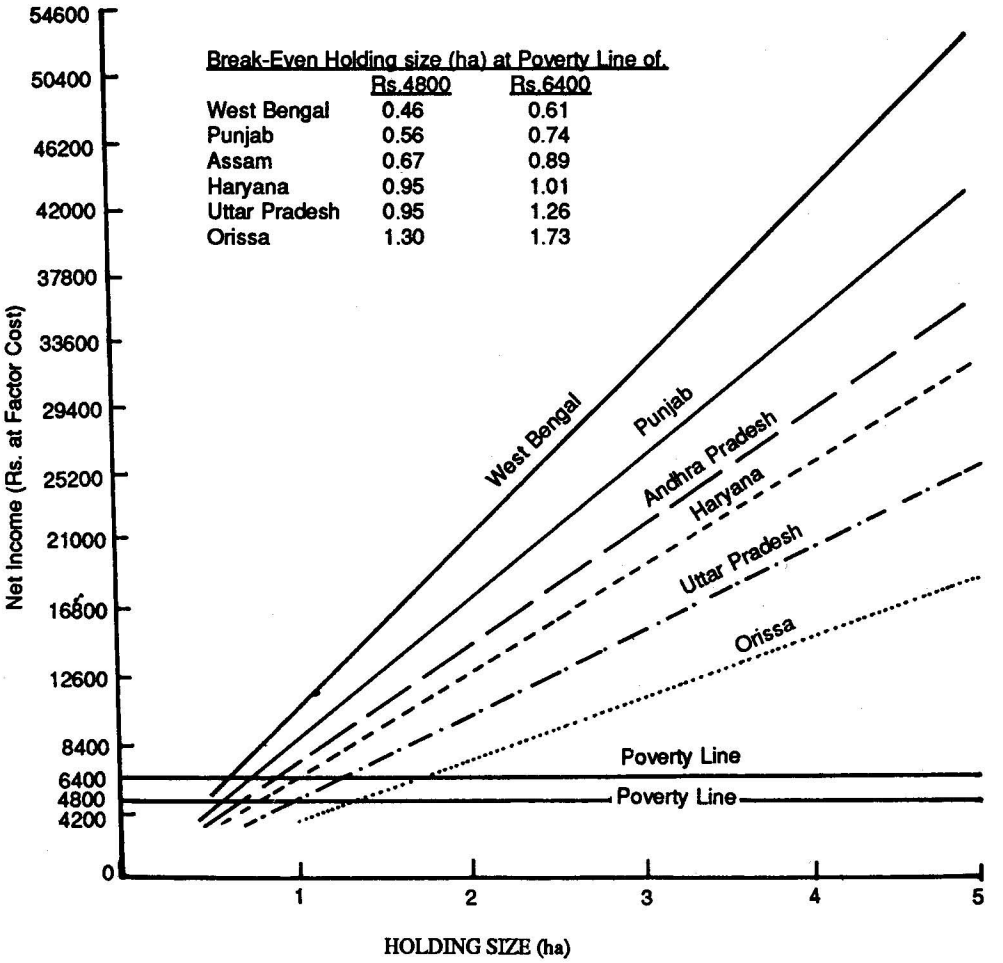


Figure 3- State-wise Break-even Holding Size and the Poverty Line for the Year 1985-86

Among various States the performance of Punjab has been spectacular because the total number of farm households, below the poverty line, was reduced by 0.24 million in 1985-86. These findings, thus, show that the States which have experienced steady agricultural growth and development have been able to reduce incidence of poverty not only in percentage terms but also in absolute terms. The break-even farm size has also been considerably reduced in these States over the base period of 1970-71, again reflecting not only the improved performance of the agricultural sector but also the fact that the benefits of growth and development in agriculture have percolated to the rural areas, thereby increasing farm incomes and reducing the incidence of poverty. This has been in spite of increased agricultural instability as a result of frequent occurrence of

droughts and floods in the post-green revolution period. The fact, however, remains that, during 1971-86, farm poverty increased despite poverty alleviation programmes. This, of course, is an outcome of increasing population and rural unemployment.

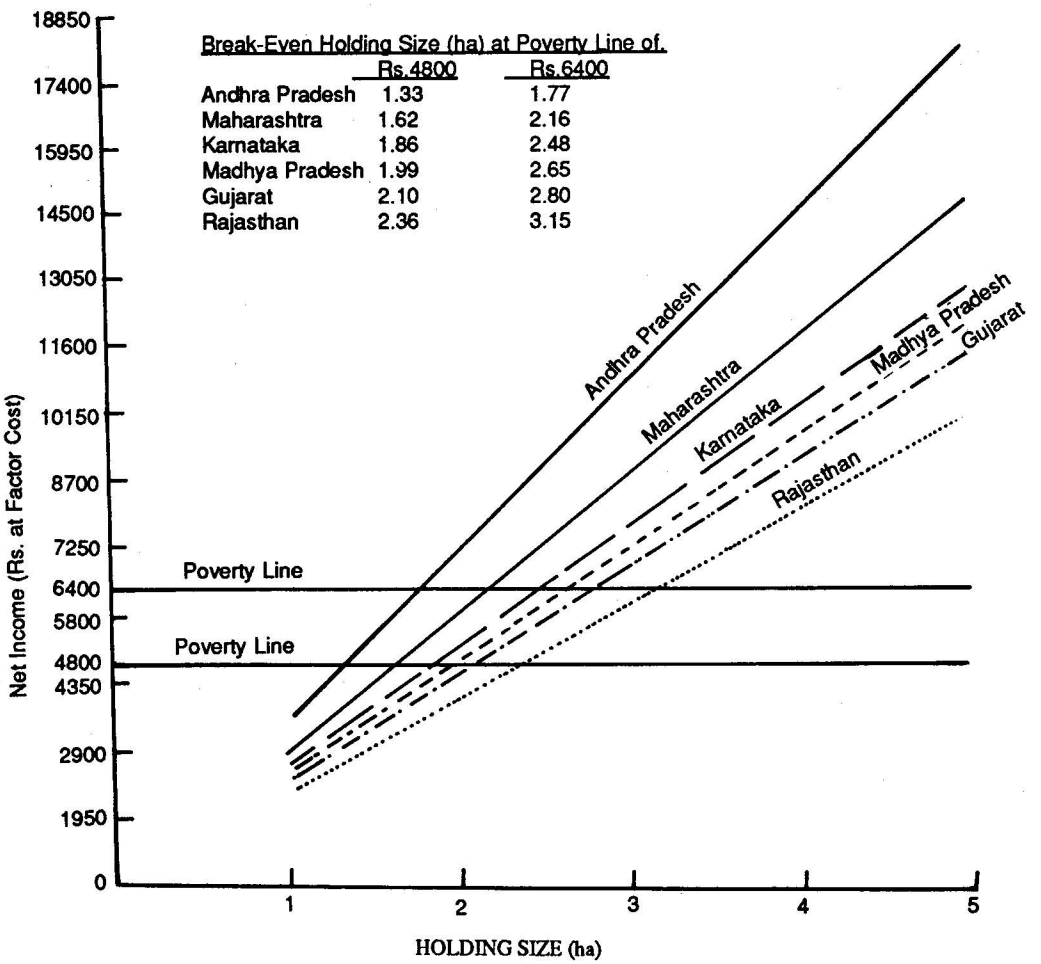


Figure 4- State-wise Break-even Holding Size and the Poverty Line for the Year 1985-86

## ADJUSTING WITH AGRICULTURAL INSTABILITY

I am quite conscious of the fact that the solution to the problem does not lie in mere discussion of the various facts and factors of agricultural instability and consequential poverty. The measures to combat the problem too need consideration in detail. Here, it is to be noted that our farmer, on the whole, is quite a prudent individual. To overcome the problem of fluctuating farm incomes, he has evolved several adjustment devices. These include diversified farming, mixed cropping, spatial diversification, flexible factor use, periodic recourse to asset depletion-replenishment and limited ex ante commitment

of resources to current production. In addition to these home-evolved devices, extension of irrigation facilities, use of soil-moisture conservation practices in water-stressed areas (Singh and Gupta, 1971) and afforestation and plantation of perennial grass (Jodha and Purohit, 1971) have been suggested as measures for farm income stabilisation. Provision of credit facilities to the farmers in the form of production and consumption loans is often used as government relief measures when farm income falls below certain levels due to weather risks. Since yield risk is a more significant source of income variability than output price risk, crop insurance has long been suggested as an important measure of farm income stabilisation (Singh, 1967 and 1972; Walker and Jodha, 1986; Dandekar, 1976). It is heartening to learn that, during his visit to flood affected areas of Punjab, the Prime Minister hinted at increasing the scope and sweep of the Crop Insurance Scheme. The long-term implication of this very welcome step would be bringing more farmers above the poverty line.

A sound crop insurance programme will require continued participation of the farmers through the good as well as the poor crop years. Nothing will jeopardise the programme more if the farmers join the programme when the prospects for a good crop look dim and withdraw from it when crops are good. It must be emphasised again that crop insurance is based on the principle that "a portion of the crop in good years is used to compensate farmers for their low yields in years of natural calamities." On the other hand, there is no denying the fact that diversification or diversified use of farm resources can tend to stabilise farm income at a higher level than the crop insurance programme. However, crop insurance may be an alternative to diversification for those farmers who are unable to incur heavy initial investment on diversification for buying quality milch animals, etc. Decision-making under uncertainty of weather and prices becomes more complex when a farmer has multiple goals and when risky choice prevails (Singh, 1979). However, over the years, our farmers have not only learnt to live with uncertain weather conditions but also to adjust themselves with fall in income as a result of crop loss or low output price. These adjustments include reduction in consumption levels (Singh and Pandey, 1981), curtailment of current commitments, reduction or cancellation of a number of production activities, sale of durables, cattle, buffaloes and camels (Singh, 1968), and sale of household goods (Jodha, 1978). Farmers also seek to stabilise income by earnings through non-farm resources and occupations.

## POVERTY ALLEVIATION PROGRAMMES

A national programme to alleviate poverty was undertaken in the Third Five Year Plan (1961-66) as rural works and industrial projects. More concerted efforts were made from the Fifth Five Year Plan onwards to find a solution to rural poverty, and since then several programmes at the national level have been launched. These include IRDP (Integrated Rural Development Programme), RLEGP Rural Labour Employment Guarantee Programme), TRYSEM (Training of Rural Youth for Self-Employment) and DWCRA (Development of Women and Children in Rural Areas), which, in fact, are a part of IRDP. These beneficiary programmes are designed to reach the poorest section of the rural population. Whereas IRDP provides income earning assets to the poor families, other programmes are intended to provide additional employment to the rural people during slack agricultural seasons. In poverty alleviation programmes, however, the accent tends to be on number rather than on creating conditions in each area in which its

production and employment capabilities are developed systematically to the maximum. It is right that preference should be given to the poorest groups, but this has to be done within the framework of effectively integrating area development.

Launching of the poverty alleviation programmes was, indeed, based on the assumption that such programmes would produce a multiplier effect by generating employment and raising the living standards of the poor. But evaluation studies of these programmes have shown that this 'trickle down strategy' has not been very successful (Prasad, 1985), and the government assistance has been channelled to the not-so-poor classes (Myrdal, 1968). However, the Planning Commission in the Mid-Term Appraisal of the Sixth Plan claimed that the poverty percentage was reduced by 9.6 per cent, which, even if true, in my opinion, is tip of the iceberg. In fact, the Planning Commission's claim of poverty alleviation has been questioned by many scholars (Prasad, 1985). The fact remains that poverty, in general, and farm poverty, in particular, has not been effectively reduced, to say the least about elimination.

Summing up, I wish to make the following four simple points:

*(i)* In spite of the spectacular contribution of the improved agricultural technology in increasing foodgrain production, Indian agriculture continues to be unstable. Droughts, floods and other natural hazards are the main causes of this instability. Thus our problem, in the long run, is not low crop yields, but the unpredictable manner in which low yields alternate with high yields and result in fluctuating farm incomes. The main cause of farm poverty, therefore, is unstable farm production and low farm incomes.

*(ii)* The analysis of yield variability of major crops in India shows that there exists considerable scope for regional specialisation of crops to achieve an overall higher and stable production of various crops at the national level. Therefore, the Planning Commission's current emphasis on agricultural zoning is right. Indeed, regional specialisation in crop production may make a significant dent on farm poverty.

*(iii)* Whereas the farmers have traditionally evolved the adjustment devices to overcome the problem of fluctuating agricultural production within the farming system, the Government of India launched a national programme to alleviate poverty in the Third Five Year Plan (1961-66) as rural works and industrial projects. The poverty alleviation programmes, however, have not succeeded in bringing about the desired improvement in the economic level of the poor.

*(iv)* I would strongly argue to do a serious thinking to make poverty alleviation programmes result-based. These need to be drastically re-oriented and overhauled. Simultaneously, we must resort to the food price policy mechanism, which is an important diagnostic tool for poverty reduction. Subsidised food prices for the poor and higher support prices for agricultural produce, in turn, will benefit both the rural and the urban poor by checking the exodus of farm labour from the rural to the urban areas, as they will be largely employed on farm to handle increased agricultural production as a response to higher support price.

## NOTE

1. Postponable expenses during one crop year (defined as the short run) include expenses on fertilisers, insecticides and pesticides, expenses on consumption goods for non-farm use and other variable expenses such as seeds and machinery repairs, etc., which a farmer deems necessary to reduce.

Long run postponable expenses include investment on machineries, land, tubewell, irrigation, chemicals and livestock. These are the long run expenses since they are assumed to be used on the farm for more than one crop year.

The fixed farm expenses include the long-run expenses paid by the farmer during one or more than one crop year. Whether or not these expenses are postponed by the farmer would depend on his level of vulnerability. Vulnerability is defined as the farmer's susceptibility to crop yield in terms of cash and grain reserves. Vulnerability determines the amount of postponable farm expenses.

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