

THE PERFORMANCE OF THE INTEGRATED RURAL DEVELOPMENT PROGRAM IN INDIA: AN ASSESSMENT

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I. INTRODUCTION

THIS paper evaluates the performance of the Integrated Rural Development Program (IRDP) in India which is among the world's most ambitious efforts aimed at alleviating rural poverty by providing income-generating assets (including working capital where necessary) to the poorest of the poor. This program was first introduced in 1978-79 in some selected blocks; however it covered all the blocks in the country by November 1980. During the Sixth Five-Year Plan period (1980-85), assets worth Rs 47.6 billion were distributed to about 16.6 million poor families (India 1987). During 1987-88, the fourth year of the Seventh Five-Year Plan (1985-90), another 4.2 million families were assisted with an average investment of Rs 4,471 per family or Rs 19 billion overall (India 1988). Given the importance attached and the resources devoted to the IRDP in recent years, a number of efforts have already been made to evaluate the program. For instance, Kurian (1987), Saxena (1987), Thimmaiah (1988), and Dreze (1990) have thrown light on certain operational problems connected with bank financing of the program, status of assets, and leakages and other related inefficiencies. Rao and Rangaswamy (1988) have focused largely on the efficiency of IRDP investment. Dantwala (1985), Hirway (1985), Subbarao (1985), Sundaram and Tendulkar (1985), India (1988), and many others have assessed the performance of the program based on the "criterion of crossing the poverty line" (see Pulley [1989] for a detailed survey). All these studies have shown that only about 5 per cent of IRDP families were able to cross the poverty line over a period of two years. This unimpressive figure should not, however, be taken as a sign of failure for the program since the assessment criterion itself suffers from serious flaws. First, as recognized in Dreze (1990), it ignores all those families who register incremental income increases but are

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unable to cross the poverty line. The poorest of the poor may not be able to cross the poverty line, but if they get off the floor, their poverty-reducing benefits must be taken into account. Second, it overlooks all those who might have become poorer due to their failure to earn enough from IRDP projects to compensate for the decline in income from traditional activities.¹ Third, it ignores the initial income levels of the poor families and this causes problems in comparing the performance of the program across regions. To illustrate, suppose state A selects all the families with a poverty gap of 10 per cent while state B selects all the families with a poverty gap of 50 per cent. After a period of two years, if all the selected families cross the poverty line in each state, then the criterion of crossing the poverty line will suggest that both the states have performed equally well. But common sense tells that the IRDP has done a better job in state B than in state A.

Another weakness of the existing studies is that they all have completely ignored family size in identifying poverty. At the time of selection, say in 1985, a family was identified as poor if its annual income was less than Rs 6,400. Note that Rs 6,400 is a poverty line in 1985 prices specified by the government of India for an average family of five members. But since IRDP families differ significantly in their family size, the identification of poverty based on family income is erroneous. A family with a lower income may not be poor if there are few members in the family. Conversely, a family even with a higher income may be poor if there are too many to share that income. This problem can however be overcome by identifying a family as poor if its per capita family income falls short of Rs 1,280. Needless to emphasize, per equivalent adult income is even better than per capita income as a measure of a family's living standard. But the identification of poverty in terms of per equivalent adult income is ruled out since the data on age and sex characteristics of family members have not been collected in the IRDP surveys.

This paper examines the performance of the IRDP using the family-level data relating to the Second Concurrent Evaluation Survey conducted in 1987 (January–December) by reputed research institutions in the country on behalf of the Department of Rural Development, Ministry of Agriculture, Government of India.² These families were selected in 1985. The entry schedule of the concurrent evaluation, however, records two entries for measures of income for each family for 1985. One is for income “as per record” and the other for income “as assessed by the investigator” two years after the event. The incomes “as per record” are self-reported incomes. The families are likely to underreport their incomes in order to

¹ The possibility of impoverishment can not be ruled out if the family does not have enough entrepreneurial skills, or if its assets are structurally defective, or they are sold off under financial pressure. This issue will be taken up again in Section III.

² I am thankful to Mr. N. J. Kurian, Director, Ministry of Agriculture, Government of India, for making available to me family-level data on some variables required for this study.

qualify for benefits. But since these pressures are somewhat less in the evaluation after the event (the respondents might still be eager to show that their original replies were honest), the income assessed by the trained investigators is likely to be more reliable.³ Therefore, the self-reported incomes are discarded by almost all the researchers; the incomes assessed by investigators are used for evaluating the performance of the program. Based on investigator's assessment, 371 families (4.5 per cent) out of the total 8,190 were found to have per capita income above the poverty line of Rs 1,280. Given the size of the program and the inherent problems in the identification of poverty, the leakage to the nonpoor is not large.⁴ The present study uses the incomes as assessed by the investigator and thus is restricted to 7,819 (= 8,190 - 371) poor families.

The methodology that we adopt in this paper overcomes the major limitations of the earlier studies. First, unlike the earlier studies, a family will be identified as poor if its per capita income falls short of Rs 1,280. Second, rather than using the criterion of crossing the poverty line, we shall assess the performance of the program by comparing the values of the Foster-Greer-Thorbecke (FGT hereafter) poverty measure before and after the program (Foster, Greer, and Thorbecke 1984). The advantages in using the FGT indices for analyzing changes in poverty between the two dates are thoroughly illustrated in Ravallion and Huppi (1991). Third, since the income gains/losses may vary from family to family, we shall classify IRDP families into the groups of (1) poor becoming nonpoor (PNP), (2) poor becoming less poor but not crossing the poverty line (PLP), and (3) poor becoming poorer (PP), and examine the changes in their poverty gaps. Finally, we recognize that the evaluation of the program in terms of its impact on poverty takes into account only the poverty-reducing income gains. The income gains to those who cross the poverty line might be much higher. Thus, if one is interested in assessing the success of the program in terms of its impact on the average level of living, then the average per capita income gains to the beneficiaries is the appropriate statistic. On the other hand, if one is interested in assessing the effectiveness of the program per rupee

³ The investigator assessed family income for the base (1985) and the current year (1987) by asking probing questions regarding various sources of income and earnings of different members of the family. The values of goods and services, which were not traded or which were bartered, were imputed based on ongoing market prices. Net farm income, if any, was assessed after accounting for all paid-out costs. The income from IRDP assets was estimated after netting the loan repayments. See Kurian (1987, pp. A174-76, fn. 8 and 61).

As a precaution, it is important to note that the base-year income assessed by the investigator may not be very perfect. It most likely suffers from some "recall bias" and there is no way to correct for this.

⁴ The observed leakages to the nonpoor is not unusual. This problem is also frequently reported in other studies (see, e.g., Dreze 1990). Kurian (1987, p. A163) however believes that the leakages to the nonpoor are because of the nonavailability of genuine poor. In my view, this may not be the case because of the high incidence of absolute poverty (over 30 per cent) in the rural sector.

spent, then the income benefits from the assets need to be related to the cost. The program will be satisfactory relative to the cost only if it is unlikely that alternative ways of helping the poor would be more cost effective. It is perhaps too ambitious to cover all these in a single study. We will try to assess the program using all possible statistics to the best we can and show our awareness to the problems where the work was not feasible.

The paper is organized as follows. Section II briefly discusses measures of the performance of the IRDP. Section III assesses the performance of the program and Section IV concludes the study.

II. MEASURES OF PERFORMANCE OF THE IRDP

The assessment of the IRDP in terms of its impact on poverty requires the comparison of the values of an acceptable poverty index before and after the program. Among the alternative poverty measures available in the literature, the FGT index takes into account the poverty gaps of families and satisfies all other desirable properties including Sen's "transfer axiom" (1976) which requires that a transfer of income from a poor person to someone who is poorer should indicate a decrease in aggregate poverty. Moreover, the FGT index is additively decomposable which enables us to identify the contribution of group-specific poverty to aggregate poverty. In an empirical study for Indonesia, Ravallion and Huppi (1991) have thoroughly illustrated the advantages of using the FGT indices in measuring and analyzing changes in poverty over time. Thus if we quantify poverty by the FGT index, then

$$P(\alpha) = FGT(\alpha)_{1985} - FGT(\alpha)_{1987} \quad (1)$$

$$= \left[\sum_{i=1}^N \left(\frac{z - x_{0i}}{z} \right)^\alpha \frac{n_i}{n_0} \right] - \left[\sum_{i=1}^q \left(\frac{z - x_{1i}}{z} \right)^\alpha \frac{n_i}{n_0} \right], \quad \alpha > 1,$$

can serve as a perfectly acceptable measure of the performance of the IRDP. The first and second terms on the right hand side of equation (1) are FGT indices respectively for 1985 and 1987; z denotes the poverty line (Rs 1,280 per capita in 1985 prices); x_{0i} denotes the real per capita income of the i -th ($i = 1, 2, \dots, N$) poor family in 1985, and x_{1i} denotes the real per capita incomes of the i -th ($i = 1, 2, \dots, q$) family who is still poor in 1987. Also note that

$$n_0 = \sum_{i=1}^N n_i, \quad (2)$$

where n_i is the number of persons in the i -th family. $\alpha > 1$ serves as a poverty aversion parameter which makes the FGT measure to satisfy Sen's "transfer axiom": the larger α is, the greater the weight attached to a larger poverty gap. For $\alpha = 1$,

the FGT index reduces to the standard poverty gap ratio which ignores the severity of poverty (see Ravallion and Huppi 1991). Since $0 \leq FGT(\alpha) \leq 1$, we expect $-1 \leq P(\alpha) \leq 1$. $P(\alpha) = 0$ implies that the program has not reduced the level of poverty over the period. The negative values of $P(\alpha)$ will mean that the extent of poverty has increased among the IRDP families. When all the families cross the poverty line, $P(\alpha) = FGT(\alpha)_{1985}$. This tells us that if all the families cross the poverty line in two regions, then the performance of the IRDP should be considered better in that region where the initial level of poverty was higher.

The criterion of crossing the poverty line fails to capture such differences in the performance between the regions. If N_1 families cross the poverty line, N_2 become less poor, and N_3 become poorer, then the measure $P(\alpha)$ can be decomposed as

$$P(\alpha) = \sum_{k=1}^3 w_k P_k(\alpha), \quad (3)$$

where

$$P_k(\alpha) = \sum_{i=1}^{N_k} \left(\frac{z - x_{0ik}}{z} \right)^\alpha \frac{n_{ik}}{n_{0k}}, \quad \text{for } k = 1$$

$$= \left[\sum_{i=1}^{N_k} \left(\frac{z - x_{0ik}}{z} \right)^\alpha \frac{n_{ik}}{n_{0k}} \right] - \left[\sum_{i=1}^{N_k} \left(\frac{z - x_{1ik}}{z} \right)^\alpha \frac{n_{ik}}{n_{0k}} \right], \quad \text{for } k = 2, 3, \quad (4)$$

is the performance index for the k -th group of families (1 = group of PNP, 2 = group of PLP, and 3 = group of PP) and $w_k = n_{0k}/n_0$ is its share in the total population of IRDP families. Note that

$$n_{0k} = \sum_{i=1}^{N_k} n_{ik}, \quad (5)$$

and $P_k(\alpha)$ is positive for $k = 1, 2$ and negative for $k = 3$. Clearly for $\alpha = 1$, $P(\alpha)$ reduces to the weighted average of changes in poverty gap ratios of the three groups.

The assessment of the program in terms of its impact on poverty takes into account only the poverty-reducing income gains. The income gains to those who cross the poverty line might be much higher. Thus, if one is interested in assessing the success of the program in terms of its impact on average level of living, then the over-time per capita income gains to the beneficiaries are the appropriate statistics. If \bar{x}_0 and \bar{x}_1 represent the average per capita family incomes respectively in 1985 and 1987, then $Q = \bar{x}_0 - \bar{x}_1$ will measure the change in the level of living. On the other hand, if one is interested in assessing the effectiveness of the program per rupee spent, then the income benefits from the assets need to be related to the cost. The program will be satisfactory relative to the cost only if it is unlikely that alternative ways of helping the poor would be more cost effective. But since we do not

have information on benefit-cost ratios for alternative rural antipoverty programs, the latter approach could not be attempted in the present study.

III. PERFORMANCE OF THE IRDP IN INDIA

We now analyze the performance of the IRDP during 1985–87 based on $P(\alpha)$ for $\alpha = 2$, Q , and other useful statistics such as changes in poverty gap etc. All these indices are computed using data on income for 1985 and 1987 for 7,819 IRDP families interviewed during the Second Concurrent Evaluation Survey of 1987. At the time of selection, all these families were below the poverty line of Rs 1,280 per capita. The income data for 1987 are expressed in 1985 prices using the consumer price index for agricultural laborers.⁵

The statistics presented in Tables I and II reveal that the FGT index declined from 0.3989 in 1985 to 0.3117 in 1987 showing about 22 per cent decline in the level of poverty among the participating families. While the proportion of families crossing the poverty line is quite small (7 per cent), about two-thirds of families showed a substantial reduction in their poverty levels. The families who crossed the poverty line were closer to the poverty line, their average family size was smaller, and their average per capita income from assets was much higher than those who became less poor but could not cross the poverty line.

About 27 per cent of the participating families became poorer showing a 7.04 percentage point increase in their poverty gap ratio (Table II). This is a matter of serious concern and requires further discussion. First of all, it should be noted that the average income earned by these families from traditional sources in 1987 declined by about 40 per cent compared to the level of 1985. Three factors might have been responsible for this. First, these families perhaps spent relatively less time on traditional activities in order to devote some reasonable time on IRDP projects. Second, the massive drought which visited the country in 1987 might have

⁵ The consumer price index for agricultural laborers (CPIAL) has increased from 538 in 1985 to 608 in 1987 in rural India (Centre for Monitoring Indian Economy 1989). While CPIAL is most widely used for converting the incomes of the rural poor for various years into real values, it is not very perfect. This index, constructed on the basis of the monthly retail prices for seventy-five consumer items collected from selected rural centers, uses the consumption pattern of rural agricultural wage earner households observed in 1956–57. One objection raised against this index is that it is based on the consumption pattern of the rural agricultural wage earner households who constitute only 30 per cent of the total rural population. The consumption pattern of the rural small farmers who constitute a large proportion of the remaining 70 per cent of rural population may have a quite different consumption pattern (Minhas et al. 1987). While the objection is relevant, Bardhan (1974) has shown that the consumption pattern of agricultural labor households is not significantly different from other groups in the rural sector. Consumer prices may vary across states. The state-wise estimates of CPIAL or of any other superior price index for all the different states and union territories are, however, not readily available for 1985 and 1987. Given the regional variations in rural consumer prices, some degree of imprecision in our performance indices is unavoidable.

TABLE I
PERFORMANCE INDICES AND OTHER RELATED STATISTICS OF THE IRDP IN INDIA, 1985-87

Performance and Other Statistics	
Poverty severity (squared poverty gap ratio):	
<i>FGT(2)</i> ₁₉₈₅	0.3989
<i>FGT(2)</i> ₁₉₈₇	0.3117
<i>P(2)</i>	0.0872
<i>P(2)/FGT(2)</i> ₁₉₈₅	21.9 %
Poverty depth (poverty gap ratio):	
<i>FGT(1)</i> ₁₉₈₅	0.605
<i>FGT(1)</i> ₁₉₈₇	0.509
<i>P(1)</i>	0.096
<i>P(1)/FGT(1)</i> ₁₉₈₅	15.8 %
Average per capita income in 1985 (Rs)	
	505.5
Average per capita income in 1987 (Rs)	
	654.7
Improvement in average per capita income (Rs)	
	149.2
Percentage improvement in average per capita income	
	29.5
Average family size (no. of persons)	
	5.9
Average per capita income from IRDP assets in 1987 (Rs)	
	237.7
Average per capita income from traditional sources in 1987 (Rs)	
	417

TABLE II
PERFORMANCE INDICES AND OTHER RELATED STATISTICS FOR THE GROUPS OF PNP, PLP, AND PP

Performance and Other Statistics	Group of PNP	Group of PLP	Group of PP
Percentage of families	7	66	27
Poverty severity (squared poverty gap ratio):			
<i>FGT(2)</i> ₁₉₈₅	0.1554	0.4345	0.3544
<i>FGT(2)</i> ₁₉₈₇	0.0000	0.2837	0.4352
<i>P(2)</i>	0.1554	0.1508	-0.0808
Poverty depth (poverty gap ratio):			
<i>FGT(1)</i> ₁₉₈₅	0.337	0.641	0.564
<i>FGT(1)</i> ₁₉₈₇	0.000	0.495	0.634
<i>P(1)</i>	0.337	0.146	-0.070
Average per capita income in 1985 (Rs)			
	848.7	459.7	557.8
Average per capita income in 1987 (Rs)			
	1,829.1	646.9	467.6
Change in average per capita income (Rs)			
	980.4	187.2	-90.2
Percentage change in average per capita income			
	115.5	40.7	-16.2
Average family size (no. of persons)			
	4.05	6.03	6.01
Average per capita income from IRDP assets in 1987 (Rs)			
	790.7	240.2	130.7
Average per capita income from traditional sources in 1987 (Rs)			
	1,038.4	406.7	336.9

Note: PNP = poor becoming nonpoor, PLP = poor becoming less poor, and PP = poor becoming poorer.

adversely affected their earnings from traditional activities. Third, the observed loss in income could also have been due to transitory factors which might have caused an upward bias in the 1985 incomes or a downward bias in the 1987 incomes or both. That the average per capita income of these families in 1985 was about 21 per cent higher than of those in the group of PLP might refer to the existence of such transitory influences.⁶ But there is no accurate way of knowing what proportion of observed loss in income was due to drought, what proportion was due to their spending less time on traditional activities, and what proportion was due to transitory factors.

Essentially, the observed impoverishment is the outcome of failure on the part of families to earn enough from IRDP assets to compensate for the decline in income from traditional sources. As may be noted from Table II, the earnings of the impoverished families from IRDP assets was only one-fifth of what the families crossing the poverty line earned. While several factors could be responsible for their low earnings from IRDP projects, the important ones among them may be listed as follows: (i) the lack of managerial and entrepreneurial skills; (ii) procurement of poor quality / structurally defective assets which might have become inoperational after some time (Kurian 1987, p. A167); (iii) undue delay in the procurement of assets and in obtaining working capital due to bureaucratic behavior of government officials. (As reported in India [1987], the average time lag in the procurement of assets was about 129 days. Such a high lead time is undoubtedly counterproductive to the basic objectives of the IRDP); (iv) selling off of assets under certain pressures such as urgency to paying off old debt, marriage of a daughter, etc. (For the group of impoverished, in 22.9 per cent of cases assets were found sold off; in 6.8 per cent of cases they were found completely perished; in 15.2 per cent of cases they were

TABLE III
DISTRIBUTION OF IRDP FAMILIES BY THE STATUS OF THEIR ASSETS IN 1987

Family Group	DISTRIBUTION OF IRDP FAMILIES BY THE STATUS OF THEIR ASSETS IN 1987 (%)			
	Intact	Sold	Completely Perished	Partially Perished/ Defective
All families	69.3	15.5	5.0	10.2
Group of PNP	83.6	10.2	2.2	4.0
Group of PLP	73.6	13.0	4.5	8.9
Group of PP	55.1	22.9	6.8	15.2

⁶ The state-wise comparison of 1985 poverty gap ratios of impoverished families with those in the group of PLP (Table V) and the evidence presented in some earlier rural studies on income mobility in India also indicate the existence of transitory influences in current incomes. See, e.g., Gaiha (1988, 1989).

partially perished/defective; and in the remaining 55.1 per cent of cases the assets were found intact during the concurrent survey of 1987. In contrast, assets were found intact in 83.6 per cent of cases among those who crossed the poverty line [Table III]; (v) the high risk and low productivity of IRDP assets as discussed by Seabright (1989), Swaminathan (1990), and others; and (vi) the lack of infrastructure facilities. At the national level, input facilities were available to 4 per cent of participating families, marketing facilities to 14 per cent, and repairing and maintenance facilities were available to only 5 per cent of families (India 1987). Such poor infrastructure facilities can be expected to affect adversely the incomes of the participating families.

Regional Variations in the Performance of the IRDP

Tables IV and V present the performance indices for twenty different states/regions in India. These tables reveal that the performance of the IRDP varies across regions. The IRDP shows the best performance in Himachal Pradesh [$P(2) = 0.2871$] where 17 per cent of families crossed the poverty line, 73 per cent showed a decline of about 0.31 in their poverty gap ratio, and 10 per cent grew more impoverished showing about a 0.09 increase in poverty gap ratio. The second best performance of the IRDP can be observed in Orissa [$P(2) = 0.1449$] where a relatively small proportion of families crossed the poverty line but a very large proportion (85 per cent) showed a moderate reduction in their poverty gap ratio. The third best performance of the IRDP in terms of $P(2)$ can be seen in Rajasthan. The worst performance of the IRDP is in Haryana: $P(2)$ is negative which indicates an increase in poverty amongst the participating families. About 96 per cent of IRDP families showed an increase of about 0.05 in their poverty gap ratio; only 3.5 per cent showed some significant reduction in poverty gap ratio, and less than half a per cent crossed the poverty line in the region. The second worst performance of the IRDP is in Uttar Pradesh [$P(2) = 0.0348$] and the third worst in Arunachal Pradesh [$P(2) = 0.0422$].

As argued in Section II, the assessment of the program in terms of its impact on poverty takes into account only the poverty-reducing income gains. It is important to look at the average per capita income gains (Q) for the participating families to assess the extent to which the program has enhanced their living standards. The estimates of these presented in Table IV reveal that the participating families have seen the highest increase in their average per capita income in Himachal Pradesh. Thus Himachal Pradesh ranks first in terms of both poverty reduction and improvement in living standards. But this state is not the best in terms of deriving income benefits from IRDP assets. West Bengal has the highest per capita income from IRDP assets in India. Punjab ranks second, Himachal Pradesh third, and Andhra Pradesh ranks fourth in terms of their income benefits from IRDP projects.

The ranking of all other states per Q is not the same as that per $P(2)$. For instance,

TABLE IV
STATE-WISE ESTIMATES OF PERFORMANCE INDICES OF THE IRDP, 1985-87

State	Squared Poverty Gap Ratio [FGT(2) ₁₉₈₅]	Squared Poverty Gap Ratio [FGT(2) ₁₉₈₇]	P(2)	Average Per Capita Income, 1985 (Rs)	Average Per Capita Income, 1987 (Rs)	Change in Average Per Capita Income, 1985-87 (Q)	Average Per Capita Income from IRDP Assets, 1987 (Rs)
Andhra Pradesh	0.3499	0.2424	0.1075	553.4	742.3	188.9	336.4
Arunachal Pradesh	0.4551	0.4129	0.0422	442.0	515.5	73.5	68.9
Assam	0.2984	0.2458	0.0526	619.6	731.5	111.9	156.5
Bihar	0.4694	0.3967	0.0727	433.0	524.7	91.7	155.7
Gujarat	0.3437	0.2361	0.1076	552.9	715.4	162.5	225.3
Haryana	0.3834	0.4371	-0.0537	514.5	458.9	-55.6	135.9
Himachal Pradesh	0.5101	0.2230	0.2871	389.9	852.7	462.8	346.8
Jammu & Kashmir	0.5409	0.4192	0.1217	350.3	556.5	206.2	277.3
Karnataka	0.5088	0.4496	0.0592	389.5	464.4	74.9	156.6
Kerala	0.4495	0.3618	0.0877	442.5	572.0	129.5	140.0
Madhya Pradesh	0.3873	0.2859	0.1014	510.5	669.5	159.0	297.0
Maharashtra	0.3966	0.2687	0.1279	499.5	723.5	224.0	302.7
Orissa	0.4729	0.3280	0.1449	425.8	627.9	202.1	262.6
Punjab	0.3211	0.1961	0.1250	595.4	838.7	243.3	359.0
Rajasthan	0.4660	0.3376	0.1284	431.4	621.4	190.0	125.7
Tamil Nadu	0.4211	0.3368	0.0843	481.0	607.5	126.5	224.2
Uttar Pradesh	0.3273	0.2925	0.0348	590.4	676.5	86.1	265.1
West Bengal	0.2507	0.1935	0.0572	679.6	840.5	160.9	504.3
Northeast Region	0.3435	0.2720	0.0715	575.3	758.9	183.6	194.5
Union Territories	0.3554	0.3035	0.0519	552.6	681.7	129.1	207.9

Note: Northeast region consists of Manipur, Nagaland, Tripura, Meghalaya, and Sikkim. Union territories include Chandigarh, Delhi, Andaman & Nicobar Islands, Dadra & Nagar Haveli, Lakshadweep, Pondicherry, and Goa-Daman-Dip. All these regions are put together because the sample size for each region was too small to carry out any sensible statistical analysis.

TABLE V
STATE-WISE ESTIMATES OF PERFORMANCE STATISTICS FOR THE GROUPS OF PNP, PLP AND PP: IRDP, 1985-87

State	Group of PNP				Group of PLP				Group of PP			
	Percentage of Families	Poverty Ratio [FGT(1) ₁₉₈₅]	Gap Ratio [FGT(1) ₁₉₈₅]	Percentage of Families	Poverty Ratio [FGT(1) ₁₉₈₅]	Gap Ratio [FGT(1) ₁₉₈₇]	Reduction in Poverty Gap Ratio [P(1)]	Percentage of Families	Poverty Ratio [FGT(1) ₁₉₈₅]	Gap Ratio [FGT(1) ₁₉₈₇]	Increase in Poverty Gap Ratio [-P(1)]	
Andhra Pradesh	8.9	0.328	0.606	74.3	0.446	0.160	0.160	16.8	0.470	0.584	0.114	
Arunachal Pradesh	3.2	0.192	0.647	68.2	0.535	0.112	0.112	28.6	0.692	0.755	0.063	
Assam	6.6	0.266	0.539	66.1	0.411	0.128	0.128	27.3	0.510	0.594	0.084	
Bihar	2.3	0.366	0.699	70.9	0.596	0.103	0.103	26.8	0.580	0.637	0.057	
Gujarat	7.1	0.193	0.586	88.9	0.460	0.126	0.126	4.0	0.533	0.662	0.129	
Haryana	0.4	0.062	0.638	3.5	0.442	0.196	0.196	96.1	0.597	0.650	0.053	
Himachal Pradesh	17.4	0.556	0.735	72.6	0.426	0.309	0.309	10.0	0.588	0.679	0.091	
Jammu & Kashmir	2.9	0.611	0.719	69.4	0.535	0.184	0.184	27.7	0.751	0.796	0.045	
Karnataka	2.8	0.498	0.741	51.7	0.596	0.145	0.145	45.5	0.652	0.712	0.060	
Kerala	4.0	0.374	0.682	65.6	0.544	0.138	0.138	30.4	0.612	0.662	0.050	
Madhya Pradesh	7.1	0.255	0.628	81.4	0.503	0.125	0.125	11.5	0.540	0.622	0.082	
Maharashtra	11.0	0.394	0.635	73.2	0.465	0.170	0.170	15.8	0.603	0.682	0.079	
Orrisa	5.2	0.323	0.688	85.3	0.529	0.159	0.159	9.5	0.599	0.735	0.136	
Punjab	18.3	0.258	0.583	72.2	0.410	0.173	0.173	9.5	0.514	0.633	0.119	
Rajasthan	7.4	0.438	0.693	74.5	0.539	0.154	0.154	18.1	0.584	0.655	0.071	
Tamil Nadu	6.8	0.276	0.655	67.7	0.512	0.143	0.143	25.5	0.600	0.686	0.086	
Uttar Pradesh	6.8	0.283	0.611	46.1	0.473	0.138	0.138	47.1	0.490	0.570	0.080	
West Bengal	9.6	0.272	0.534	52.8	0.380	0.154	0.154	37.6	0.409	0.483	0.074	
Northeast Region	9.8	0.295	0.566	59.3	0.424	0.142	0.142	30.9	0.580	0.622	0.042	
Union Territories	5.2	0.417	0.587	62.6	0.463	0.124	0.124	32.2	0.555	0.624	0.069	

Punjab ranks second in terms of Q but fifth in terms of $P(2)$. The IRDP seems to be performing very badly in states like Arunachal Pradesh, Bihar, Haryana, Karnataka, and Uttar Pradesh where the increase in average per capita family income is observed less than Rs 100 (equivalent to U.S.\$3) over the period 1985–87.

Various factors might be responsible for interstate differences in the performance of the IRDP. States differ in terms of bureaucratic rigidity and infrastructure facilities. The IRDP is likely to perform better in a region with good marketing, repairing, and input facilities. If the bureaucratic attitude of government officials unduly delays the sanctioning of loans etc., the performance of the program is likely to be hampered. Similarly, the IRDP's performance is likely to be poor in a state where the assets provided to the beneficiary families are of low quality. The IRDP can be expected to perform better in those regions where the assistance provided to families to purchase income-generating assets is larger than where it is lower. Thus, if s represents a measure of IRDP performance at the state level, then we can postulate

$$s = f(\text{DELAY}, \text{MARKET}, \text{REPAIR}, \text{INPUT}, \text{NODEFFECT}, \text{ASSIST}),$$

where

DELAY = average delay (in days) in the procurement of assets,

MARKET = percentage of IRDP families having access to marketing facility,

REPAIR = percentage of IRDP families having access to repairing facility,

INPUT = percentage of IRDP families having access to input facility,

NODEFFECT = 100 minus the percentage of families whose assets are found completely perished or partially perished or defective at the time of the survey. (This gives us the percentage of families reporting no defects in their assets at the time of the survey. The higher the percentage of such families in a region, the better is the quality of assets provided by the IRDP), and

ASSIST = average assistance (rupees) given to a family to purchase productive assets.

Using the state-level data on all these variables,⁷ we estimated two equations—the first with $P(2)$ and the second with Q as measures of performance. Since $P(2)$ lies between -1 and 1 , the estimated values must not exceed the permissible limits. We applied the OLS and found the estimated values of $P(2)$ lying very much within the accepted limits. Similarly, the OLS was applied to the second equation with Q as a dependent variable. The estimates of these equations are presented in Table VI. It is only the coefficient of *MARKET* which is statistically significant with

⁷ The state-level data on these variables except *NODEFFECT* are taken from India (1987) and Kurian (1987). The state-level figures for *NODEFFECT* are calculated from the survey data available to us. These are available from the author on request.

TABLE VI
ESTIMATED REGRESSION EQUATIONS

$P(2) = 0.0145 + 0.0002 \text{ DELAY} + 0.0026^{***} \text{ MARKET} + 0.0010 \text{ REPAIR} + 0.002 \text{ INPUT}$						
(0.12)	(1.06)	(3.74)	(0.78)	(0.13)		
+ 0.0007 <i>NODEFECT</i> - 0.00001 <i>ASSIST</i> , $DF = 13, R^2 = 0.59.$						
(0.48)	(-1.16)					
$Q = 61.0744 + 0.2798 \text{ DELAY} + 3.9930^{***} \text{ MARKET} + 1.2248 \text{ REPAIR} + 4.0468 \text{ INPUT}$						
(0.32)	(0.89)	(3.75)	(0.63)	(1.54)		
+ 1.1241 <i>NODEFECT</i> - 0.0392 <i>ASSIST</i> , $DF = 13, R^2 = 0.64.$						
(0.50)	(-1.56)					
$X_{\text{IRDP}} = -1,705.9924^* + 2.7787 \text{ DELAY} + 7.5520 \text{ MARKET} + 4.7677 \text{ REPAIR} + 37.8431^{***} \text{ INPUT}$						
(-1.92)	(1.70)	(1.53)	(0.52)	(3.11)		
+ 29.4930** <i>NODEFECT</i> - 0.0296 <i>ASSIST</i> , $DF = 13, R^2 = 0.74.$						
(2.81)	(-0.25)					

Note: ***, **, and * denote statistically significant at 1, 5, and 10 per cent respectively. Values within parentheses are *t*-values.

TABLE VII
CORRELATIONS BETWEEN INDEPENDENT VARIABLES

	<i>DELAY</i>	<i>MARKET</i>	<i>REPAIR</i>	<i>INPUT</i>	<i>NODEFECT</i>	<i>ASSIST</i>
<i>DELAY</i>	1.00	-0.35	-0.15	0.21	0.11	0.14
<i>MARKET</i>		1.00	-0.14	0.02	0.20	-0.07
<i>REPAIR</i>			1.00	-0.15	0.17	0.03
<i>INPUT</i>				1.00	0.23	0.17
<i>NODEFECT</i>					1.00	0.05
<i>ASSIST</i>						1.00

a positive sign; all other coefficients have turned statistically insignificant in both the equations. One might suspect this is due to high multicollinearity among the explanatory variables. This, however, does not seem to be the case. The values of the coefficient of correlation between pairs of explanatory variables are very low (see Table VII). Hence we rule out the possibility of multicollinearity and conclude that improvement in marketing facilities helps in raising the standard of living and reducing the level of poverty among IRDP families.

Finally, to investigate whether the income generated from IRDP assets is proportional to the level of assistance provided to the families, we regressed average income from assets (X_{IRDP}) on *ASSIST* and all other variables. The coefficients of *INPUT* and *NODEFECT* are found positive and statistically significant (see Table VI) implying that better input facilities and the improvement in the quality of assets help the families generate larger income. The coefficient of *ASSIST* is negative but statistically quite insignificant which implies that the income from IRDP assets does not vary significantly with the level of assistance provided.

IV. CONCLUDING REMARKS

This paper has assessed the performance of the IRDP in terms of its impact on poverty and living standards of the participating families during 1985–87. The methodology adopted in this paper overcomes some of the major weaknesses of the earlier studies. First, rather than using the criterion of crossing the poverty line, we have assessed the program by comparing the Foster-Greer-Thorbecke poverty indices before and after the program. Second, unlike the earlier studies, we have taken into account family size in identifying the poverty status of the participating families. The picture that emerges from our analysis is quite encouraging: over a period of two years, the level of poverty amongst IRDP families declined by 22 per cent with 7 per cent of families crossing the poverty line, the other two-thirds showing a substantial decline in their poverty levels and the remaining one-fourth becoming poorer. The families who became nonpoor were originally closer to the poverty line, their average family size was smaller and their average income from IRDP assets was much higher than those who became less poor. Impoverishment seems to be the outcome of a decline in income from traditional sources and the failure of families to earn enough from IRDP assets to compensate for that decline.

The performance of the IRDP varies from state to state. The regressions run using the state-level data suggest two things. First, the performance of the IRDP can be enhanced by providing better marketing facilities in the rural areas. Second, the incomes earned from IRDP projects are not proportional to the value of assets provided. However, better input facilities and an improvement in the quality of assets help the families generate larger income.

Among the ways in which our analysis can be extended and improved, the following appears to us to be particularly important. We estimated the regression model with state-level data largely because of the nonavailability to us of the complete set of family-level data. It is feasible and would be useful to estimate the regression model using family-level or block-level data. We evaluated the performance of IRDP families over a period of two years. How do these families perform over a longer period of time? If the assets provided to the IRDP families depreciate, there is a possibility that the recipient incomes may slip over time back toward the base-year income. This is an important empirical issue worth investigating.

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