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## **Income Growth in Poor Dryland Areas of India's Semi-Arid Tropics**

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The relationship between agricultural growth and poverty has been a major issue after the introduction of the green revolution in the mid sixties in India. The spread of the new technology was not the same across regions and was concentrated mainly in the regions with assured rainfall and irrigation. There were divergent views about the effects of green revolution. The most notable view in favour of new technology is that of Ahluwalia (1978, 1985) who indicated that the benefits of new technology percolated down to the poor. He maintained that increased agricultural growth was able to reduce poverty. Another view is that agricultural growth associated with new technology resulted in large scale impoverishment (see Khan and Griffin, 1976; Griffin and Ghose, 1979; Bardhan, 1985). However, as mentioned above, the spread of new technology was more localised and all the regions could not benefit from the green revolution. Dryland agriculture has not benefited much from technical change. It is necessary to know to what extent the semi-arid regions with harsh environment, un dependable low rainfall and low irrigation have been able to reduce poverty.

The paper addresses the issue: how poverty has changed for different households in relation to their assets and demographic structure? We have used longitudinal data from three rural regions of India's semi-arid tropics (SAT). The use of panel household data allows us to study the performance of initially poor and non-poor households over time - a considerable improvement over the usual practice of comparing poor households from different samples (Gaiha, 1987, 1988). Therefore, based on successive samples, panel data allow one to ask the question to what extent poverty is a permanent or transitory attribute of a household, and to study the factors associated with growth and decline in income. Income is defined as the net return to family owned resources encompassing family labour, owned land, bullocks, other capital and land.

### I

#### DATA

The information used in this paper is based on the panel data collected from 218 rural households from six villages in three agro-climatic regions of India's SAT. Detailed records of farming practices and personal characteristics of the sample households were collected for a period of nine cropping years from 1975-76 to 1983-84. From each of the six villages, 40 sample households were selected on the basis of operational holdings representing four sub-groups, namely, landless labour, small, medium and large farmers. From each group ten households were randomly selected in each village (Singh *et al.*, 1985).

All the sample households did not remain for the whole period and hence only 218

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households for which detailed information was available for the whole period were covered in the analysis. Also data from one of the two villages in each region were collected retrospectively and less intensively. A brief description of the regions and sample households is given in Singh *et al.*, (1982), Walker and Ryan (1990), Bhende (1986) and ICRISAT (1984).

Using panel data has the advantage of enabling a close look at the same households over time. However, the sample for the later period may no longer be representative of the total population of the households of the village as newly formed households and those who migrated out are not represented. For example, if all newly formed households were much poorer than the existing ones, the average income of the sample could have increased while the average income of the population stagnated or declined. Also other life cycle effects could have confounded measurement of poverty (Deolalikar and Singh, 1989). Thus panel data are best used to look at the dynamics of poverty rather than at the instruments of poverty measurement. However, the sample households are not truly representative of the regions under study and any generalisation should be made with caution.

## II

### INCOME GROWTH

Table I presents the changes in real incomes of the sample households and the major structural changes in the important factors associated with the income change in the three regions. Income is measured in rupees per person at constant prices of 1975-76 using village specific consumer price indices (Walker *et al.*, 1983). In order to eliminate the year to year fluctuation we compare the three-years' average for the crop years 1975-76 to 1977-78 and for 1981-82 to 1983-84. It is to be noted that these regions vary considerably in respect of soil type, rainfall, cropping pattern and level of technological development. Hence, income growth also has been quite different across regions. A detailed analysis of the fluctuations in the income of rural households is given elsewhere (Walker *et al.*, 1983; Walker and Ryan, 1990).

It is clear from Table I that over the period (1975-77 to 1981-83) the average annual per capita real income for the sample as a whole increased by 35 per cent from Rs. 622 to Rs. 835. The percentage increase in income was the highest in the Sholapur region, where the income increased by nearly 42 per cent from Rs. 515 to Rs. 730. The agricultural year 1975-76 was the first year after the great Maharashtra drought of 1972-74 when the Sholapur region suffered greatly. Some of the income growth may therefore be associated with the recovery from drought. However, most of the income gain must be attributed to an increase in the irrigated area from 11 per cent to 33 per cent of the cropped area - a concomitant rise in the area planted to grape garden, fruits and vegetables in one of the two Sholapur villages. Moreover, the region also started planting sunflower during the monsoon season when land was previously kept fallow.

The gain in income was about 30 per cent in Akola region, which has an agro-climatic environment with most reliable rainfall. During this period, the government in this region also started to invest substantially in irrigation, with the proportion of cropped land irrigated increasing from 3 per cent to 16 per cent (Table I). The region also experienced technical

change in cotton and sorghum. Both the Sholapur and Akola regions in Maharashtra State had benefited from the Maharashtra Employment Guarantee Scheme, which ensures employment to rural people during the agricultural lean season.

TABLE I. CHANGES IN IMPORTANT CHARACTERISTICS OF FARMING IN THREE AGRO-CLIMATIC REGIONS OF INDIA'S SAT DURING 1975-77 AND 1981-83

Particulars (1)	Agro-climatic region							
	Mahbubnagar		Sholapur		Akola		All regions	
	1975-77 (2)	1981-83 (3)	1975-77 (4)	1981-83 (5)	1975-77 (6)	1981-83 (7)	1975-77 (8)	1981-83 (9)
Per person real income (Rs.) from								
(i) Crops	291	411	226	338	390	549	302	433
(ii) Wage earnings	150	194	185	259	203	298	180	250
(iii) Livestock	118	135	68	89	114	123	100	115
(iv) Others <sup>a</sup>	56	80	36	44	28	-15	40	37
Total income	615	820	515	730	735	955	622	835
		(33)		(42)		(30)		(34)
Gross output <sup>b</sup> (Rs./ha)	1,250	1,550	450	680	770	1,250	825	1,160
Operated area (ha)	3.4	2.9	5.8	5.5	4.3	4.2	4.5	4.2
Irrigation (per cent) <sup>b</sup>	36	42	11	25	3	16	17	28
HYV area (per cent) <sup>b</sup>	26	43	1	1	10	14	12	19
Fertiliser <sup>b</sup> (Rs./ha)	80	130	7	15	38	90	42	78
Real agricultural wages (Rs./day)	2.4	3.1	2.3	3.2	3.1	3.5	2.6	3.3

a. Other incomes include income from trade and handicrafts and remittances, etc.

b. Refers to percentage of gross cropped area.

Figures in parentheses are percentage changes during 1975-77 and 1981-83.

Compared to the Sholapur region, the growth in real income in Mahbubnagar villages was somewhat lower (33 per cent). Mahbubnagar is an area with very poor soils, undependable rainfall and low use of new cultivars. The region had already fully exploited its irrigation potential, which increased from 36 per cent to only 42 per cent of the total cropped area (Table I). However, this region continued to increase the use of fertiliser and benefited from new castor and paddy varieties. Also, income growth in one of the two villages in this region was considerably high, where irrigation was already very high and most of the farmers cultivated high-yielding paddy and groundnut.

### III

#### SOURCES OF INCOME GAINS

The analysis of sources of income gains showed that for the sample as a whole, the largest absolute income gain was associated with gains in net crop income (+ Rs. 113) and in wage earnings (+ Rs. 70). The absolute gain in net crop income was the largest (+ Rs. 169) in Akola, where, as noted earlier, technical change occurred both in cotton and sorghum. The crop income gains in Sholapur and Mahbubnagar were relatively low, but as mentioned earlier, in Sholapur and Akola the Employment Guarantee Schemes were in operation; gains in income from wage earnings were considerably high compared to Mahbubnagar. Income gains from livestock was not significant in any of the three regions. However, income from other sources increased in all the regions, except in Akola but it was substantially higher in

Mahbubnagar where most of the low caste and poor households actively participated in the palm liquor trade (Table I). It is also clear from the table that the gains in crop income were mainly due to increased productivity (from Rs. 825 to Rs. 1,160 per hectare) for the sample as a whole. This was possible because of increased use of fertiliser, irrigation, and upto some extent new cultivars. Similarly, wage earnings also increased due to increase in real farm wages (from Rs. 2.6 to Rs. 3.3) and additional employment generated both in the farming sector and outside the farm.

#### IV

##### INCIDENCE OF POVERTY

The data were disaggregated for two groups of households, the initially poor and the initially non-poor based on whether their real income in 1975-77 was below or above the poverty line. The poverty threshold of Rs. 15 per capita monthly expenditure at 1960-61 prices (Dandekar and Rath, 1971) was used, which translated to Rs. 540 per capita annual income in 1975-76 prices, using village specific consumer price index (Walker *et al.*, 1983). The mean real income of the sample households as a whole in the initial period (1975-77) was only slightly above (by Rs. 82) the poverty threshold.

Since the average income rose by about 34 per cent for the sample from Rs. 622 to Rs. 835, the incidence of poverty (head count index) obviously declined from 60 per cent of the population to 37 per cent. However, the decline in poverty was quite sharp (53 per cent) in Akola region compared to Mahbubnagar (20 per cent). Initially, in Sholapur region, the incidence of poverty was quite high compared to other regions, but it declined substantially from 74 per cent to 42 per cent during the period (Figure 1). The head count index of poverty considers only the number of people having an income less than the poverty line and hence does not give a clear idea of the depth of poverty, the difference between income and the poverty level. Thus the head count poverty index<sup>1</sup> was modified by various researchers to incorporate the income gap within the poor. The most commonly used index of poverty was described by Sen (1979) who added another dimension to the commonly used head count index of poverty. He included the mean gap in the income of the poor. This measure was further modified by Foster *et al.* (1984). The Foster poverty index<sup>2</sup> takes into account the income gap of individual poor households from the poverty line and gives more weight to those who have a higher gap (difference in the income of a poor individual from the poverty line). The Foster poverty index also indicates a marginal decline in poverty from 0.16 to 0.14 for the sample as a whole. The decline in poverty was more in Mahbubnagar than in other regions. The Foster poverty index was quite high in Mahbubnagar indicating that many poor households were extremely poor, *i.e.*, the income of most of the poor was far below the level of poverty line whereas in other regions poor households were marginally poor and their income gap was not as high as in Mahbubnagar.

The data in Table II show that, for the sample as a whole, the absolute income gain was about Rs. 225 for the initially poor and Rs. 200 for the non-poor households, *i.e.*, the gain in absolute terms was lower for the initially non-poor households. The income of the poor grew much more (by 64 per cent) than that of the non-poor households (by 20 per cent). The initially poor households did better both in absolute and relative terms. These results agree with the findings of Gaiha (1987), who observed that the poor households improved their income position and resource base while the non-poor households were not able to

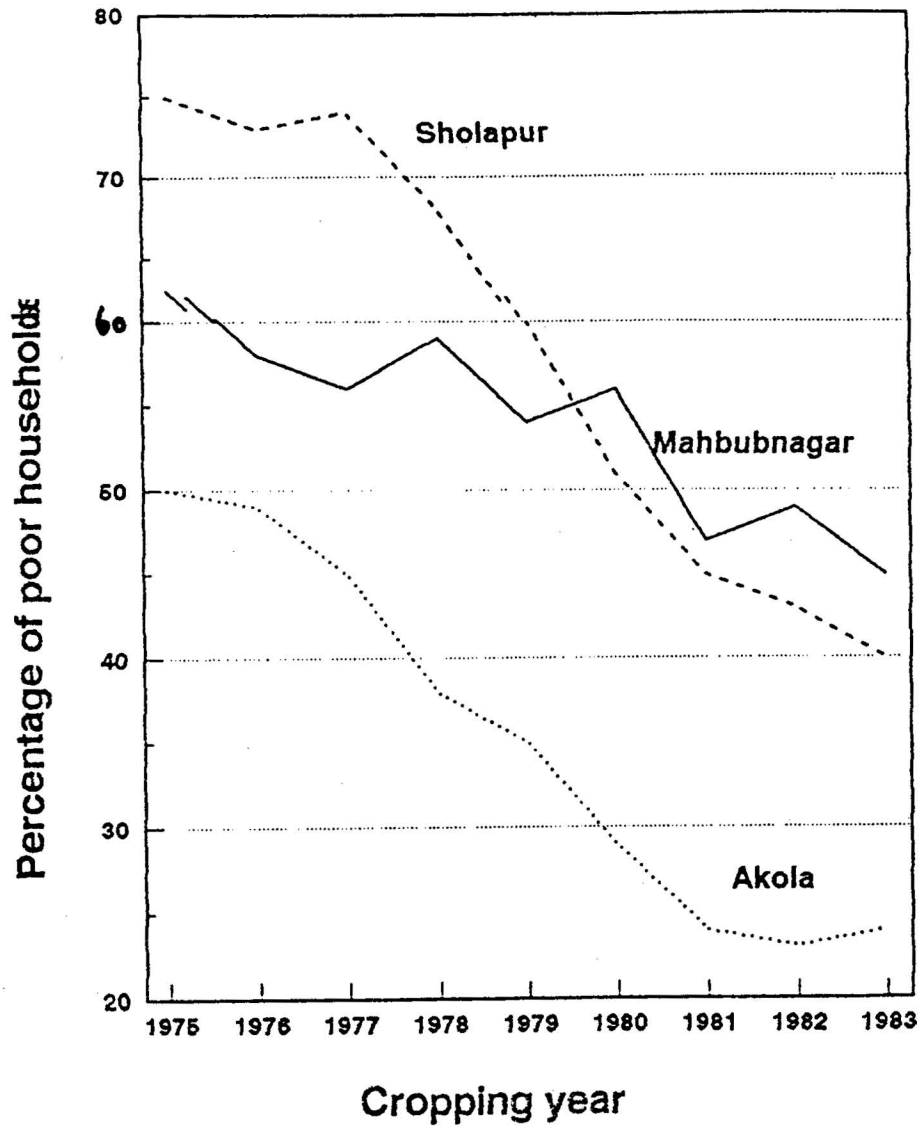


Figure 1. Percentage of Poor Households in Three Regions of India's SAT during 1975-83

TABLE II. INCIDENCE OF POVERTY IN THREE AGRO-CLIMATIC REGIONS OF INDIA'S SEMI-ARID TROPICS DURING 1975-77 AND 1981-83

Particulars (1)	Agro-climatic region							
	Mahbubnagar		Sholapur		Akola		All regions	
	1975-77 (2)	1981-83 (3)	1975-77 (4)	1981-83 (5)	1975-77 (6)	1981-83 (7)	1975-77 (8)	1981-83 (9)
Mean per person real income (Rs.)								
(i) All households	615	820 (33.3)	515	730 (41.8)	735	955 (30.0)	622	835 (34.2)
(ii) Initially poor	304	457 (50.3)	351	573 (63.2)	400	716 (79.0)	352	579 (64.5)
(iii) Initially non-poor	967	1,044 (8.0)	928	1,150 (23.9)	1,058	1,348 (27.4)	984	1,181 (20.0)
Head count poverty index per cent <sup>c</sup>	59	47 (-20)	74	42 (-43)	49	23 (-53)	60	37 (-38)
Foster poverty index <sup>b</sup>	0.23	0.19	0.16	0.13	0.13	0.12	0.16	0.15
Ratio of income of initially poor to non-poor <sup>c</sup>	3.2	2.3	2.6	2.1	2.7	1.9	2.9	2.1
Percentage of households who changed the poverty group <sup>d</sup>		20		38		23		27
Percentage of initially poor who became non-poor		27		47		36		37
Percentage of initially non-poor who became poor		10		11		11		10

a. Head count poverty index =  $Q*100/N$ , where Q is the number of poor people with annual per capita real income of less than Rs. 540 (poverty line) at 1975 prices and N is the total population.

b. Foster poverty index:  $F = 1/n \sum_{i=1}^n [(Z - Y_i)/Z]^2$ , where Z is the poverty line,  $Y_i$  is the income of i-th household, q is the number of poor people and n is the total population.

c. A higher ratio indicates more disparity in the income of the poor and non-poor households.

d. Includes both the categories of households (poor and non-poor), who changed the group during 1975-77 and 1981-83.

Figures in parentheses are percentage changes during 1975-77 and 1981-83.

maintain their relative income position over time.

Nonetheless, there was high degree of mobility of households from one group to another, i.e., from the poor to the non-poor and vice versa. About 27 per cent of the households moved from one group to another. Mobility was quite high (38 per cent) in Sholapur compared to other two regions (from 20 to 23 per cent). These results are quite consistent with the findings of National Council of Applied Economic Research (NCAER, 1986), which were based on a much larger panel data set but a much less intensive data gathering method. Of the initially poor, 37 per cent were able to cross the poverty line while of the non-poor 10 per cent fell below the poverty line.

Initially, the non-poor households had three times higher income than the poor households but during the period the income of the poor not only increased but the gap also narrowed by 27 per cent (Table II and Figure 2). Again these results are quite similar to the findings of Gaiha (1987). The highest decline in the gap was in Mahbubnagar (40 per cent)



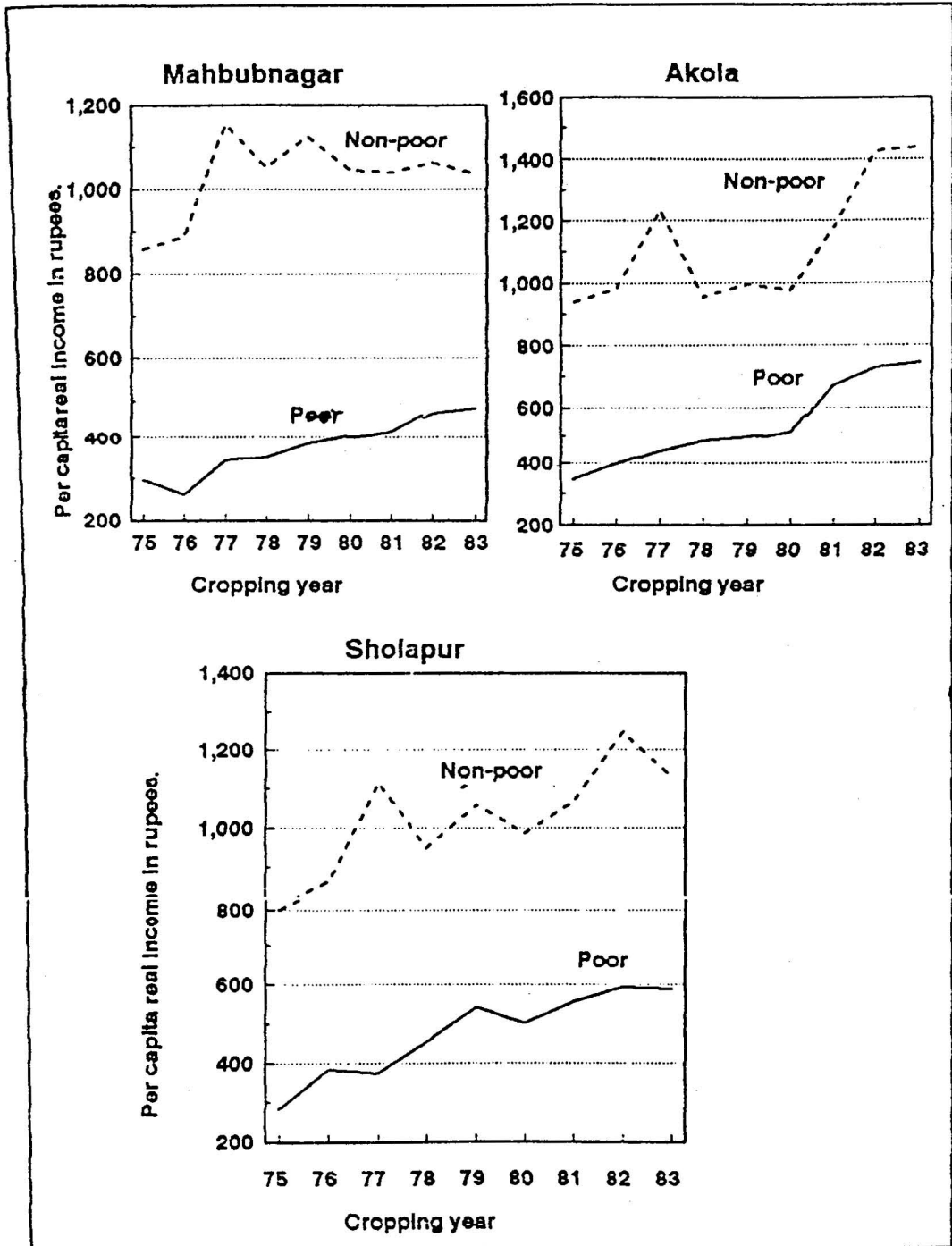


Figure 2. Development of Per Capita Real Income of Poor and Non-poor in Three Regions of India's SAT during 1975-83

compared to Sholapur (20 per cent) which recorded higher income growth. Income was more equitably distributed in the later period, and overall income growth in these regions was more in favour of poor people.

### *Characteristics of the Poor*

The characteristics of the poor and non-poor households indicate that there was no significant difference in their family size, but the non-poor households had fewer children and lower dependency ratios<sup>3</sup> than the poor households.

The mean age of the family heads of both the groups was the same, but the non-poor heads were relatively more educated than the poor ones. The poorer households owned less than half the land owned by the non-poor. They had also less irrigation and bullocks than the non-poor households (Table III).

TABLE III. CHARACTERISTICS OF INITIALLY POOR AND NON-POOR HOUSEHOLDS IN THREE AGRO-CLIMATIC REGIONS OF INDIA'S SAT

Particulars (1)	Agro-climatic region							
	Mahbubnagar		Sholapur		Akola		All regions	
	Poor (2)	Non-poor (3)	Poor (4)	Non-poor (5)	Poor (6)	Non-poor (7)	Poor (8)	Non-poor (9)
Per person real income (Rs.)	303	967	351	928	401	1,058	348	999
Age of head (years)	50	50	44	44	41	42	45	45
Schooling (years)	0.6	2.3	1.1	2.4	2.9	4.6	1.4	3.3
Family size	6.1	5.3	7.1	5.7	6.3	5.6	6.5	5.5
Children	2.6	1.9	3.1	1.9	3.0	2.0	2.9	2.0
Dependency ratio	0.41	0.30	0.44	0.29	0.48	0.29	0.44	0.29
Owned land (ha)	1.4	6.5	4.2	6.8	2.1	7.1	2.7	6.8
Irrigated area (ha)	0.3	2.0	0.4	1.5	0.04	0.3	0.3	1.2
Value of land (Rs. 00/ha)	33	55	33	46	22	34	30	44
Bullocks (No.)	0.4	2.3	0.8	1.2	0.4	2.1	0.6	2.0
Livestock (No.)	1.4	5.0	2.2	3.2	2.1	5.3	1.9	5.1
Crop output (Rs./ha)	1,190	1,557	382	587	596	895	724	1,062
Liabilities (Rs.)	648	1,389	1,279	2,468	793	2,403	933	2,055

Poverty is closely associated with the resource base of the people in addition to their personal characteristics (Singh, 1990). Compared to the non-poor households, the poor cultivating households had poorer quality land, poorer resource base, lower risk bearing capacity, stronger subsistence orientation and a stronger preference for coarse grains in their cropping pattern (Jodha and Singh, 1982).

For examining the changes in poverty, the households were further disaggregated into four groups: (i) those initially poor who remained poor (PP), (ii) those poor who escaped poverty (PR), (iii) those non-poor who remained non-poor (RR) and (iv) those non-poor who could not maintain their income position and became poor (RP) during the period from 1975-77 to 1981-83.

### *Demographic Factors*

Table IV compares the initial characteristics and changes therein for the four groups. There was remarkable similarity in the age of the household heads of all the groups. This implied that escaping from poverty was not just a life cycle phenomenon, *i.e.*, the initially poor households were not just newly formed households which were poor at the early stages of their life cycle and then caught up. However, the initially poor, who escaped poverty had a larger family size than all other groups in the first period and then experienced a *decline* in their family size by more than one member. At the same time, the initially non-poor households, who became poor, experienced an increase in their family size by more than one member. These changes correspond to changes in the number of children. The poor households who escaped poverty also had a higher dependency ratio in the beginning of the period than the non-poor households and their dependency ratio declined from 0.45 to 0.27, *i.e.*, nearly by half. For the other three groups, changes in the dependency ratio were small. These time-series findings confirm the importance of demographic composition as causes of changes in poverty and are consistent with Lipton's summary of the cross-sectional characteristics of the poor and non-poor households (Lipton, 1983).

### *Resource and Poverty*

The next question examined is whether the changes in poverty status are associated with the accumulation of productive wealth or reduction in liabilities or both; *i.e.*, is the escape from poverty likely to be a permanent or a transitory phenomenon?

Considering the sample as a whole, the total real net wealth of the initially poor households who escaped poverty increased by about Rs. 954 per person or by 36 per cent during the period 1975-77 to 1981-83.<sup>4</sup> Since the family size of these households decreased by 5 per cent, the real increase in per capita family wealth was about 31 per cent. However, the percentage increase in the net wealth seems to be quite high during the period but the value of increase in absolute terms was not much as this started from a very low level. Of the total wealth increase of Rs. 954, nearly one-half came from increase in owned land, while most of the remaining is due to an increase in 'other wealth', which includes stocks of non-agricultural assets and consumer durables. Finally, the initially poor households who escaped poverty also had a decline in liabilities of Rs. 560 (Table IV).

Poor households who remained poor neither accumulated wealth nor reduced liabilities. In contrast, the per capita real net wealth of the initially non-poor households who became poor, decreased marginally by Rs. 325 per person or by 13 per cent. These households were also able to reduce their liabilities by Rs. 395. They also lost about 1.4 hectare of land, *i.e.*, a decrease of 32 per cent on a household basis. As their average family size also increased by 24 per cent from 5.4 to 6.7, owned area per capita declined even more, by nearly 44 per cent. Thus there is no question that changes in poverty status have been associated with corresponding changes in ownership of land and other productive assets, and are not simply a reflection of changes in demographic characteristics. Given these changes in ownership of holdings, what happened to the operational holdings?

Table IV shows that those households who remained poor or became poor lost considerable operational area while those who escaped poverty were able to maintain their operational holding sizes in the face of increased demographic pressure. The same group also was able to increase its irrigation level.

TABLE IV. COMPARATIVE PERFORMANCE OF THOSE INITIALLY POOR WHO CROSSED POVERTY AND REMAINED POOR, AND THOSE INITIALLY NON-POOR WHO BECAME POOR AND REMAINED NON-POOR DURING 1975-77 AND 1981-83

Particulars (1)	Initially poor households				Initially non-poor households			
	Remained poor		Became non-poor		Remained non-poor		Became poor	
	1975-77 (2)	1981-83 (3)	1975-77 (4)	1981-83 (5)	1975-77 (6)	1981-83 (7)	1975-77 (8)	1981-83 (9)
Mean per person real income (Rs.)	310	350	425	845	1,030	1,290	750	400
Demographic factors								
Age of the head (years)	45	51	45	51	45	51	47	53
Education (years)	1.1	1.2	1.8	1.8	3.4	3.5	3.5	3.5
Family size	6.3	6.6	6.8	5.6	5.5	6.3	5.4	6.7
Children	2.6	2.8	3.1	1.7	2.1	2.4	2.4	2.8
Dependency ratio	0.44	0.41	0.45	0.27	0.50	0.48	0.52	0.54
Resources								
Owned land (ha)	2.3	2.2	3.2	3.5	7.1	6.6	4.4	3.1
Operated land (ha)	2.1	1.3	3.7	3.9	7.9	6.8	4.8	2.6
Irrigation	17	19	16	24	15	16	16	14
Gross output (Rs./ha)	730	820	720	1,100	1,085	1,535	910	1,045
Livestock (No.)	1.4	1.5	2.5	2.9	5.4	5.6	2.9	3.1
Liabilities (Rs.)	640	620	1,290	730	2,125	1,775	1,460	1,065

To test the statistical differences pairwise comparison was made between the four groups of households. The results of 't' test are presented in Table V.

TABLE V. PAIRWISE COMPARISON OF THE DIFFERENCES IN THE MEAN CHANGES OF MAJOR RESOURCES AND DEMOGRAPHIC CHARACTERISTICS OF INITIALLY POOR AND NON-POOR HOUSEHOLDS DURING 1975-77 AND 1981-83

Resource (1)	PP vs PR (2)	PP vs RR (3)	PP vs RP (4)	PR vs RR (5)	PR vs RP (6)	RR vs RP (7)
	't' values					
Income	-7.83**	-3.15**	4.15**	2.06**	5.50**	3.09**
Owned area	-1.73	1.02	2.66**	1.87*	2.86**	0.89
Operated area	-1.01	1.34	2.19**	1.80*	1.74	0.55
Irrigated area	-0.57	-1.71	0.73	-1.14	0.87	1.06
Crop productivity	-0.32	-0.87	-1.44	-0.87	2.90**	2.78**
Family size	3.44**	-1.34	-1.16	-4.46**	-2.19**	0.64
Children	5.02**	0.47	2.00*	5.35**	4.35**	-1.65
Liabilities	2.66**	1.00	1.04	0.57	0.32	0.06

Figures in the table are 't' values for pairwise comparison to test the differences in the changes in mean income and other factors between two groups of households.

\* and \*\* indicate significant differences at 10 per cent and 5 per cent levels respectively.

A positive sign marked with asterisk shows that the variable in the first group listed in each comparison was significantly higher in the second group.

A negative value with asterisk means that the second group had significantly higher values for that variable.

The increase in the income of the poor households who escaped poverty (PR) was significantly higher than the change in the income of all the other groups. These households were able to significantly increase their owned and operational holdings compared to the PP and RR groups. Similarly, there was a significant decline in the family size and number of children in PR group compared to the other groups. The decline in liabilities was significantly higher in the PR group than in the other groups of households.

### *Caste and Poverty*

Have the income gaps between the caste groups narrowed? In Table VI, the castes are classified into the highest, higher, lower and the lowest groups, using village-specific ranking of castes (Doherty, 1982). For the sample as a whole, the percentage gains in income over the period did not differ much across these caste groupings.

TABLE VI. CHANGES IN PER PERSON REAL INCOME OF DIFFERENT CASTE GROUPS IN THE THREE AGRO-CLIMATIC REGIONS OF INDIA'S SAT DURING 1975-77 AND 1981-83  
(Rs.)

Caste group (1)	Agro-climatic regions							
	Mahbubnagar		Sholapur		Akola		All regions	
	1975-77 (2)	1981-83 (3)	1975-77 (4)	1981-83 (5)	1975-77 (6)	1981-83 (7)	1975-77 (8)	1981-83 (9)
Highest	1,026	980 (-5)	519	766 (48)	829	1,127 (36)	791	958 (21)
Higher	564	616 (9)	570	895 (57)	746	1,012 (36)	627	841 (34)
Lower	390	472 (21)	403	562 (40)	558	678 (22)	450	571 (27)
Lowest	256	338 (32)	289	413 (42)	458	832 (82)	334	528 (58)

Figures in parentheses are percentage changes during 1975-77 and 1981-83.

In Mahbubnagar the highest caste people experienced a decline in their income by 5 per cent. This is the region where rigid traditional caste rules are still commonly followed and enforced. Nevertheless, this does not appear to enable the highest caste groups to maintain their relative position. In Sholapur the lowest caste groups had the lowest relative income gains, while in Akola the highest caste groups had the lowest relative income gains. Hence no generalisation is possible. However, the income gap between these caste groups was reduced by 24 per cent over time, except in Sholapur where it increased marginally by 3 per cent.

### V

#### DISTRIBUTION OF INCOME

What happened to the income distribution? In all the regions, the Lorenz curves for the two periods were nearly identical. Income in Sholapur was more equitably distributed than in Akola and Mahbubnagar. The cumulative distribution of per person income (Figure 3) showed that in 1981-83 the poor had a slightly higher proportion of income than in 1975-77. In Sholapur and Akola regions, which experienced a substantial income gain, the cumulative

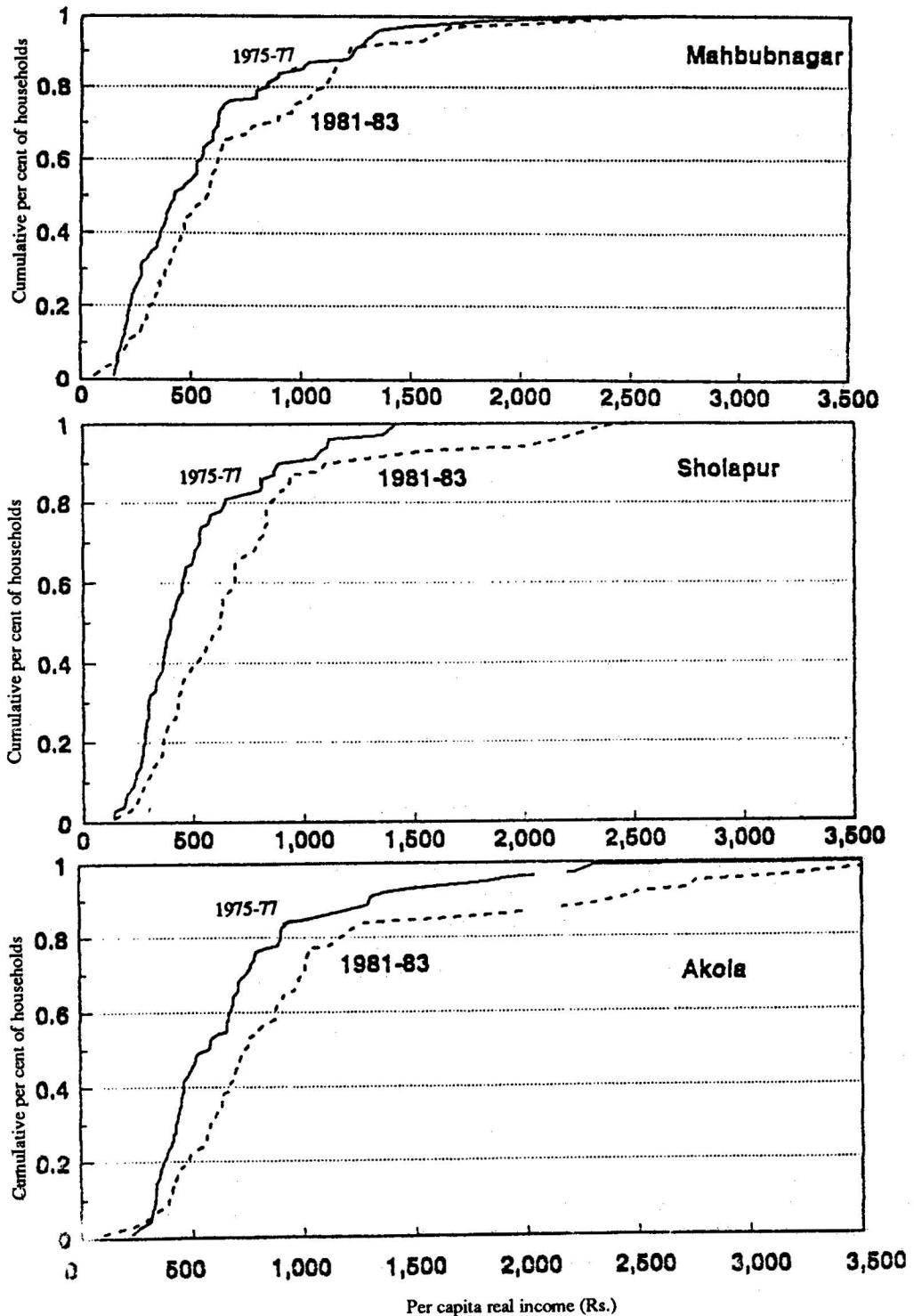


Figure 3. Cumulative Distribution of Households in Three Regions of India's SAT during 1975-77 and 1981-83

distributions of per person income for 1981-83 completely dominated those for 1975-77, *i.e.*, the average income of the sample households has gone up with a decline in poverty from 0.59 to 0.47 in Mahbubnagar, from 0.74 to 0.42 in Sholapur and from 0.49 to 0.23 in Akola region.

## VI

## CONCLUSION

In the regions studied, poverty is clearly not a permanent household characteristic. Out of 218 rural households which were studied over time, 131 (60 per cent) were initially poor. After nine years, 48 (37 per cent) of these households had income above the poverty line threshold. This is not just a reflection of improved average income in these villages, as at the same time nine (10 per cent) of the initially 87 non-poor households became poor despite considerable growth in the average income of the sample. This high degree of mobility (*i.e.*, 27 per cent of the households moved between the two groups) is consistent with the findings of NCAER (1986), which were based on a large panel data set but a much less intensive data gathering method. However, generalisations of these results should be made with caution because the sample selected for the study could not remain truly representative after a period of nine years. These villages directly and indirectly benefited more from the researchers' interventions and exposure to new technologies. This was not true in the case of all the villages in these regions. Also, various development programmes substantially influenced the income of the people in these villages.

In Mahbubnagar, where the scope for irrigation was limited, there was relatively less growth in income than in the other two study regions. Nevertheless, there has been a slight improvement in the poverty indicators with the initially poor improving their dependency ratio and resource base. In the best agro-climatic region, Akola, the improvement of the poor was the most impressive with their income gains coming from improved agricultural assets, from improved agricultural productivity and from improved wage income. The Sholapur region experienced the same trends, although to a lesser extent.

The most impressive finding, perhaps, is the fact that the average absolute income gains were about the same or larger for the initially poor as for the initially non-poor. Not only has the relative income distribution improved but the gap has declined. Moreover, because the initially poor have been able to accumulate productive wealth, their gain is not a transitory one attributable to weather, for example.

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## NOTES

1. Head count index of poverty is defined as  $q \cdot 100/n$ , where  $q$  is the number of poor individuals with annual per capita real income of less than Rs. 540 (poverty line) at 1975 prices and  $n$  the total number of individuals.

2. The Foster index is defined as  $P = 1/n \sum_{i=1}^q (Z - Y_i/Z)^\alpha$ , where  $Z$  is the poverty line,  $Y_i$  is the per person real income of individual  $i$ ,  $q$  is the number of poor people below the poverty line and  $n$  is the total number of individuals, and  $\alpha$  is the power for higher weight to poor people (in this case it is 2).

3. The dependency ratio is defined as  $D=1-(A/B)$ , where  $A$  is the number of able-bodied active persons above the age of 15 years and  $B$  is the total number of family members.

4. The measure of stock of assets we use is a strict stock measure which does not include changes in value of assets as all asset changes were valued at 1975-76 prices.

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