

# **Chronic Poverty in Rural India, An Analysis using Panel Data: Issues and Findings<sup>1</sup>**

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## **I. Introduction**

The distinction between chronic or extended duration poverty and transient poverty is rarely made in the substantial literature on poverty in India. Determination of poverty as chronic or temporary requires that the same households be tracked over time through a panel data set and/or use of life or event history and other qualitative approaches. This paper reviews the limited panel data based literature on chronic poverty in India and a subset of the literature on other countries. It then uses panel data that longitudinally track 3,139 households in rural India to try to identify and understand the factors that influenced or constrained changes in poverty status over time.

The paper analyses the impact of selected variables at the household, village and district level on poverty incidence at each of the two points of time. It tries to identify the characteristics of households that exhibit mobility into and out of poverty and of those that simply stay poor. It also tries to understand the policy implications arising out of differences in the importance of various factors in influencing chronic poverty and exit from it.

In the next section of the paper, we present a review of some of the panel data based literature on chronic poverty. In section III, we outline the approach we have taken to the analysis in this study. Section IV presents the results of analysis and section V concludes the paper.

## **II. Panel data based research on Chronic Poverty: A Brief review of findings**

Research using panel data shows that in several countries and/or geographic locations where poverty incidence is high, there is considerable movement into and out of poverty. Demanding immediate attention however is the argument in recent literature

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that very few households remain poor over the entire duration of the panel. Questions that need to be addressed are:

- 1) While there may be considerable movement into and out of poverty, does the data allow us to argue (as has been postulated in the recent literature) that very few households remain poor over time?
- 2) Do the correlates of poverty status and of entry/exit differ?
- 3) If in a 5-wave panel data set a household moves marginally above the poverty line in wave 3 and remains in poverty in 4 out of 5 waves should we conclude that the household is not chronically poor?

In view of the serious implications of these issues for the millions of people living below or around the poverty line, we examine some of the more important policy related research in this field more closely.

In a comprehensive review of chronic poverty research using panel data, McKay and Lawson (2002) point out that few panel data sets suitable for poverty analysis have been collected and these vary with regard to time duration (1 to 19 years), the number of waves in the panel (2 to 9), the sample size (146 to 5854 households) and geographic coverage (a few communities to the entire country).

They stress the value of panel data as a tool for looking at inter-temporal variations in living conditions of individual households but note that they suffer from measurement errors due to attrition of households, inability to capture household-level variations between two rounds and changes in willingness or attitude of households to a second interview. They draw attention to the distinction made by Yaqub (2000) between two main methods that can yield different results; a “spells” approach (variation in number of periods of poverty experienced could change the results considerably) and a “components” approach (people who may temporarily move marginally above the poverty line but are generally below it, would be included among the chronically poor).

**Baulch and Hoddinott (2000)** emphasise the importance of data sets that permit analysis of poverty dynamics to help reduce errors of inclusion and exclusion, and design safety net and other policies intended to protect the vulnerable. Some of the poverty observed in one time surveys is due to consistently low welfare levels while some of it is due to short term shocks. They provide information on households that are always poor, sometimes poor and never poor for 13 different panels located in 10 different countries (Table1). The range of estimates of those in chronic poverty varies from an unbelievably low 3% for Pakistan to a high 33% for India and 54% for Chile.

**Table 1 here**

**Baulch and McCulloch (2001)** use the results of a 5- year longitudinal household survey of 686 households in rural Pakistan to show that while the incidence of income poverty was high at 60% only 35% remained in poverty for two years or more and **only 3% of sample households were poor in all 5 years** of the panel.

Their research extends the boundaries of existing work by investigating the factors that are associated with movements into and out of poverty and show that the correlates of entries and exits differ from correlates of poverty status. Important

correlates of poverty status are dependency ratio and geographic variables. Important correlates of increasing exit and decreasing entry include education and livestock ownership. They argue that there is considerable movement in and out of poverty and this occurs as shocks and changing circumstances force households below or above the poverty line before opportunities or shocks help them surface above or push them under it and that this has important implications for policy interventions. Therefore, reducing the poverty headcount would require that attention is focused on increasing exits from and decreasing entries into poverty rather than on the correlates of poverty status.

However, they also note that the relatively few longitudinal household studies for South and East Asia “**seem to confirm this characterization of poverty as a temporary phenomenon.**”

Two data sets that have been used to analyse long duration poverty in India are the NCAER panel data for rural households and the ICRISAT panel data for semi arid areas. Some of the findings from both sets of panel data are given below.

**Gaiha (1989)** used a panel survey of 4118 rural households of India, carried out by the National Council of Applied Economic research in 1968-69, 1969-70 and 1970-71. He identified the chronically poor as households that were below the poverty line in each of the three years under consideration.

He found that about 47 per cent of the poor households in 1968 (on an income criterion) were chronically poor. Among the chronically poor, casual agricultural labourers were the largest and cultivators the second largest groups. Most of the chronically poor were either landless or near-landless and were more dependent on wages. Household size was about the same and dependency burden and illiteracy was slightly higher among them than the just poor.

Gaiha’s results (47% of the poor households in 1968 were chronically poor) **contradict** the argument made by Baulch and McCulloch that the “poverty problem is one involving a large turnover of vulnerable people rather than a hard-core of the chronically poor.”

In an earlier paper **Gaiha (1988)** analysed income mobility among the rural cultivating poor also on the basis of the NCAER panel survey. (see table 2)

**Table 2 here**

**Gaiha (1988)** notes that the factors that enabled the cultivating poor to overcome poverty included greater access to cultivable land combined with modern agricultural inputs and “escape from poverty was not a result of growth trickling down to the rural poor...”.

**Adelman, Subbarao and Vashishtha (1985)** also used NCAER panel data for 1968-69 to 1970-71 to provide a dynamic dimension to the discussion of poverty trends by calculating the long run dynamics implicit in household mobility among rural Indian households. However, their analysis was primarily focused on performance of Indian

states and found that 7 states were likely to experience a reduction in the poverty ratio while 3 states were likely to experience long run high poverty.

**NCAER(1986a and 1986b)** provides an analysis of the mobility of the rural households in India based on the panel data of 3139 households collected for 1970-71 and 1981-82. The study notes both upward and downward movement of the households across income classes. The factors associated with the upward movement of households in the lower income categories were identified as more 'intensive use' of labour resources and acquisition of land. The factors associated with the downward mobility were loss of land and rigidities in inter-occupational mobility. The study notes that education, caste and demographic factors were important in explaining changes in per capita income over the period.

Kurosaki (1999) used a household panel data set collected by ICRISAT covering three villages from 1975-1984 to investigate the dynamics of individual consumption and its fluctuation due to shocks across households. The complete panel data set comprised 35 households in Aurepalle, in Andhra Pradesh, 33 in Shirapur, Maharashtra and 36 in Kanzara, Maharashtra.

The econometric results indicated that risk was shared among villagers in that more wealthy households served as implicit insurance providers. This also implied that more landed households were likely to extract more on average from less wealthy villagers in exchange for the insurance service. In the long run, this could lead to increased inequality in asset accumulation and isolation of the poor from economic growth.

Using the ICRISAT panel survey of 240 households in six villages in the semi arid region of rural South India covering the period 1975-76 to 1983-84, **Gaiha and Deolalikar** (1993) found that 87.8% of sample households were poor some time during the 9 year panel period. Over 60% of households were poor roughly half the time (i.e. during 5 out of 9 sample years). And more than one-fifth of households were poor during all 9 years. They conclude that “**the persistently poor are by no means a small subset of the poor.**” And further that persistence of poverty is the result of “deep-rooted characteristics” such as schooling of head of household, that drastic measures such as income transfers on a continuing basis are needed to compensate subsets of the poor for their innate disadvantages.

**Singh and Binswanger (1993)** also used longitudinal data collected by ICRISAT from 218 rural households from six villages in India’s semi-arid tropics (SAT) for a period of nine cropping years from 1975-76 to 1983-84. They found that:

- Poverty was 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 gains in their cropping pattern (Jodha and Singh, 1982).
- The initially poor, who escaped poverty 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.

- Poor households who remained poor neither accumulated wealth nor reduced liabilities.
- 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 was also able to increase its irrigation level.
- The percentage gains in income over the period did not differ much across these caste groupings.
- Out of 218 rural households studied over time, 131 were initially poor. After nine years, 48 of these households had income above the poverty line threshold. Nine of the initially 87 non-poor households became poor despite considerable growth in the average income of the sample.

However, they point out that generalizations 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.

**Jalan and Ravallion (2000)** use panel data from 5854 households in China to identify factors that determine transient and chronic poverty. They include as explanatory variables household specific human and physical assets, and community effects. They find that while 6.21% of the population was persistently poor or poor at all dates, 14.38% had mean consumption below the poverty line, but was not poor at all dates. Further these estimates rose to 39.56% and 30.46% respectively if the poverty line was raised by 50%. Both chronic and transient poverty are reduced by greater access to physical capital and life-cycle effects are also similar between the two types of poverty. Demographic characteristics and human capital indicators such as literacy, having a household member with a job outside the village or town, living in a revolutionary base area or a minority area as also higher grain yields seem to be more important for chronic poverty than for transient poverty.

The household's stage of life cycle, wealth holdings and the standard deviation of the household's wealth holdings and cultivated land holdings are important in determining transient poverty. While higher physical wealth tends to decrease transient poverty, greater volatility in a household's wealth holdings is likely to increase it. There is little sign that education reduces transient poverty, and very few of other demographic and country characteristics seem to be important factors. Hence they suggest that different types of policies will be needed to deal with the two types of poverty.

**McCulloch and Baulch (2000)** use a 5 year panel of 686 households to show that different types of anti-poverty interventions may be needed to address chronic and transitory poverty. They examine the impact on chronic and transitory poverty of two types of policy simulations – those designed to smooth incomes over time (such as safety nets, micro credit and insurance schemes) and those designed to promote income growth. Interventions that enable households to smooth their incomes might achieve large reductions in transitory poverty but make little difference to chronic poverty, which is reduced by large and sustained growth in real incomes. They also find that provision of child benefits of as little as Rs.100 to each child could

dramatically reduce poverty as also improving education via educational subsidies, especially education of the household head. They conclude that while interventions to improve human and physical capital of the poor are likely to be successful in the long run in reducing chronic poverty, in the short term large reductions in income poverty could be achieved through smoothing incomes for instance through provision of micro-credit, seasonal public works, crop insurance and food price stabilization schemes.

**Binayak Sen** analyses a panel data set of 379 rural households from 21 villages in Bangladesh for 1987-88 and 2000 to find that the drivers of escape from poverty and descent into poverty are not mirror images of each other. Escape from poverty is based on overcoming structural obstacles by pursuing multiple strategies such as crop intensification, agricultural diversification, off-farm activity and irrigation that permit rapid accumulation of a mix of assets. Descent into poverty is associated with lifecycle changes and crises like floods and ill-health. The likelihood of escape from poverty and entry into it is sensitive to initial asset position. The pattern of livelihood change has been of a lower quality and potential and increased at a slower pace in the case of the chronic poor than were changes observed for ascending households.

Ascending households were found to be faster accumulators of human, physical and financial assets, better diversifiers, with regard to adopting modern varieties of rice and occupational diversification to higher productivity non agricultural activities. They showed increased supply of labour with declining dependency. The pace of improvement in human capital (years of schooling) was highest for ascending households.

The key causes of downward mobility were crisis or discrete shocks, unfavourable lifecycle factors and structural factors such as loss of natural or human or financial assets or adverse market conditions.

**Grootaert and Kanbur (1995)** used the CILSS multi purpose panel data set for Cote d'Ivoire for around 700 households in 1985-86, 1986-87 and 1987-88 and found that over the 1985-88 period despite recession, there were numerous people who luckily bucked the trend and escaped poverty and that they were widespread regionally, although in some socioeconomic groupings the poor had higher chances of escaping poverty amidst general decline.

**Grootaert, Kanbur and Oh (1997)** build further on this work to explore the role of other household characteristics especially human and physical assets in addition to region of residence and socioeconomic status in differentiating those who escape from poverty from those who remain poor. Both initial conditions and pattern of changes in endowment affected changes in welfare.

In urban areas households that were more successful in raising their welfare levels and escaping poverty despite the economic decline, were those who were well educated, (skills more than diplomas) with young heads of household, few children and holding a wage job, preferably in the public sector. In rural areas, those households that had fewer members, heads younger than 45 years of age, with larger and better equipped farms and with a non-farm source of income (diversified sources of income) were most likely to achieve welfare gains. Education played a smaller role

in rural areas. Female headed households did better than male headed households and export crop farmers did better than food crop farmers. In both urban and rural areas, household size and composition were important. Region and socioeconomic status are strong predictors of welfare change.

Their suggestions for policy makers include the relevance of education in coping with economic declines, targeting social safety nets to larger households, providing support targeted at children through school lunches or subsidized uniforms, and support to small holders who are more vulnerable to welfare losses in periods of overall economic decline. They suggest using age of (older) head of household and number of durables owned by the household as useful in identifying target households.

**Helzi Noponen (1991)** used a panel of 300 poor women informal sector workers and their households in Madras city over a five-year period (1980-85) to focus on the key role women play in sustaining poor households despite constrained labour market choices. On average, 4 economic stress events affected the sampled households over the 5 year study period. The event with the greatest influence on the sampled households combining aspects of occurrence and magnitude was illness. The stress of fire or flood related house damage was also prominent. The overwhelming response to economic stress events was 'indebtedness'. As economic stress events hit the family over time, women helped by increasing earnings, adding on secondary jobs, utilizing their earning status to obtain loans from a variety of sources, sacrificing their subsidized business loan for family debt repayment, and foregoing personal expenditures and leisure.

**Gaiha and Imai (2003)** use panel data for 183 households belonging to 5 sample villages in Andhra Pradesh and Maharashtra (i.e., two states of India - ICRISAT data) for 1975-84 to assess the impact of crop shock. They note that large segments of rural households experience long spells of poverty (over 3 years) even without negative crop shocks. Occurrence of crop shocks leads to an increased proportion of households experiencing short spells of poverty (1 to 2 years). There is greater vulnerability of low caste households and small farmers to long spells of poverty when large or severe crop shock occurs. They note with concern that much larger transfers of land and non land assets are needed if vulnerable sections such as landless households in the lowest caste category are to protect themselves better against crop shocks. Anti-poverty strategy needs to be reoriented in view of this.

**Wlodzimier Okrasa (1993-96)** used four-year panel data from Poland's Household Budget Survey to explore the distinction between transitory and long-term poverty and examine poverty mobility. The section of population that could minimize or avoid chronic poverty in Poland included those living in urban areas, headed by older and better educated, with few children and unemployed members and possessing financial or physical assets. Households with a larger kinship network faced significantly less danger of falling into chronic poverty or vulnerability.

### **Table 3 here**

In concluding this section of the paper, it is important to emphasise that while analysis of existing data sets reflects considerable movement into and out of poverty, it cannot be argued that very few households remain poor over a long duration of time. This

may be true in some specific cases or locations but cannot be generalized. In particular, in the Indian context the results of several studies clearly contradict this. Further the incomes corresponding to which poverty thresholds are set in most developing countries are so low that if the levels are raised marginally this will lead to dramatic increases in poverty estimates. For instance, Jalan and Ravillion show that a 50% increase in the poverty threshold leads to a dramatic more than six fold increase in population in chronic poverty (see table 3). Further, even if a household moves marginally above the poverty line at one point but remains in poverty during most years we may not easily be able to conclude that the household is not chronically poor. Estimates for Bangladesh, Ethiopia, Chile, South Africa and India in tables 1 and 3 clearly indicate that it cannot be argued that very few households remain poor over the entire duration of the panel.

### **III. Data Sources and the Approach to Analysis**

#### *a. Data*

The data set used in the present analysis was collected for a study by NCAER in the late 1960s to measure changes in income levels and income distribution and their impact during three consecutive years, 1968-69, 1969-70 and 1970-71<sup>3</sup>. Data was collected in each of the three years. The 1968-69 data was collected from a sample of 4363 households from 261 villages spread all over the country. Data for 1970-71 was also collected from the same households.

In 1981-82, a re-survey has carried out to conduct a longitudinal study of rural incomes and demographic variables. Because of the long time-gap between the surveys some of the households that were surveyed in 1970-71 could not be traced in 1981-82. The households that are considered to be part of the panel, have following features:

1. The head of the household in 1970-71 was alive (in 1981-82) and the household was intact.
2. The head of the household was alive, but all the members of the household had not stayed together and
3. The head of the household in 1970-71 was dead (in 1981-82) but rest of the household was intact. The number of households that formed the panel in the final analysis was 3139.

The data set provides information on a variety of socio-economic indicators. These variables are tracked for both the years of the survey. While some of the variables influencing income-earning or employment opportunities for the households are characteristics of the households themselves, others relate to the entire village or region. The factors relating to the household or individual level include characteristics such as the age of the household head, composition of the household in terms of the proportion of members who can earn income, education and health status of the household members, and access to or ownership of physical assets, with income-earning potential. Possession of assets may result from accumulated savings or from

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<sup>3</sup> NCAER(1986) provides a description of the sampling methodology adopted for the surveys.



transfers or subsidies. Caste and tribe are factors that affect the economic opportunities for the rural households.

The data set also provides information on some of the village level characteristics. One is the population of the village and the other is the state of infrastructure. The decennial Census data is used to supplement the survey data. The 1971 Census is used to supplement 1970-71 survey and 1981 Census is used to supplement 1981-82 survey. The list of variables used in the present analysis is provided in Appendix 1.

### *b. Approach to the Analysis*

This paper views 'chronic poverty' in two senses: in terms of duration and in terms of 'severity'. To examine the factors influencing 'chronic poverty' we analyse the data for each of the two years separately and also use the information from both the years. Separate analysis of the two periods provides insights into differences in the factors that are associated with poverty at a point in time from those associated with chronic poverty or over time<sup>4</sup>.

#### b.1 Factors Influencing Poverty

Although poverty is usually measured on the basis of observed levels of expenditure, conceptually, these measures are only 'proxies' for the living conditions of the poor. In reality the living conditions of the poor may not be captured by expenditure variables alone. With this in view, we attempt to classify the households based on 'expenditure' levels and then try to identify factors that are associated with the households as a 'group' rather than a specific expenditure level.

The basic model that depicts this approach is that of 'limited dependent variable regression' (Greene, 1997).

The 'outcome' in the present analysis is the status of the household with respect to poverty. The probability that a household is 'poor' or 'non-poor' would therefore be linked to a variety of factors described earlier. The basic model can be written as,

$$p(\text{POV}) = f[\text{H}; \text{V}; \text{M}; \text{H.V}; \text{H.M}; \text{V.M}]$$

Where

p = probability

POV = household's poverty status

H = vector of household level characteristics

V = vector of village level characteristics

M = other macro level factors

H.V, H.M and V.M identify the interactions between variables.

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<sup>4</sup> This household data set has been used in the past to study income mobility (NCAER, 1986a and 1986b). However, the past study did not focus on poverty. Also the past study adopted the 'linear probability model' which has significant limitations in obtaining appropriate estimates of the regression parameters.

Alternative regression equations were estimated to distinguish severity of poverty (for individual period analysis):

- 1) Poor (households below the poverty line defined in terms of real per capita consumption);
- 2) Moderately poor (real per capita consumption below the poverty line but within 25 percent of poverty line);
- 3) Severely poor (real per capita consumption below 25% of the poverty line).

Keeping in view the variety of information available in the data set we have carried out the analysis in two steps rather than formulating a general model. The steps are,

- (a) estimation of the model that provides for interaction terms for selected household characteristics, village characteristics and a district level variable, viz., percentage of urban population of the district of which the household's village is a part;
- (b) estimation of the model without the interaction terms.

## b.2 Analysis of Persistence or Exit from Poverty

The 'panel' nature of data allows us to distinguish households that have remained poor in both the survey years and those that were poor in 1970-71 and non-poor in 1981-82. Tracking other movements is also possible but we limit our present analysis to only the 'persistence of poverty' or conversely 'exit from poverty'. The basic model we utilise is that of 'limited dependent variable regression':

$$p(P\_P_i) = f[H_i; V_j; M_j \text{ interactions}]$$

Where

$P\_P_i$  = Poverty Status with value =1 for  $i^{\text{th}}$  poor household in 1970-71 remaining poor in 1981-82 as well; and value = 0 if the household becomes non-poor in 1981-82.

All other notations are as described earlier.

In both the sets of analysis (severity and duration), poverty status is distinguished between severely poor and non-poor, between poor and non-poor and between moderately poor and severely poor.

The analysis is carried out in the framework of 'probit model'. All the probit models were estimated using the econometrics package *Eviews*.

## **IV. The Results**

### ***IV. 1. Factors Affecting Poverty***

The causes of poverty have been linked to 'capability' with which households can utilise economic opportunities for income and employment. The capability is both

innate to the households and external. We examine the impact of such factors on the poverty status of the households. The analysis is important as it captures the 'transitory' poverty status as well as 'longer-duration' poverty. As the impact of various factors may vary over time, we analyse the factors for two periods of time separately. Probit models of limited dependent variables are estimated using three different measures of poverty status:

- (a) P\_NP: taking value = 1 for 'poor' households and zero for the 'non-poor';
- (b) SP\_NP: taking value = 1 for 'severely poor' and zero for the 'non-poor';
- (c) SP\_MP: taking value = 1 for 'severely poor' and zero for 'moderately poor'.

Estimates for the 'general model', which includes interaction between selected variables, are presented in Tables 4 and 5. In the discussion, we refer to the coefficient in the estimated regression model as the impact of the variable on the probability of a household's poverty status since the signs of the coefficient and the marginal effects are the same. The main patterns emerging from these results are summarised below.

### 1. Caste Status and Poverty

The results show that in 1970-71 and in 1981-82 a household belonging to the scheduled caste SC or scheduled tribe ST category was more likely to be poor than households belonging to other castes. The regression results support this view particularly in the case of severely poor (SP). Similarly, the probability of a household being severely poor (SP) rather than non-poor was greater for SC and ST households than the other castes in both 1970-71 and 1981-82. Caste, therefore, is a more critical factor in influencing poverty in its severe form than just around the poverty line.

However, the likelihood of a household being moderately poor (MP) rather than non-poor' (NP) was not significantly higher for ST households in 1970-71 and for both SC and ST in 1981-82. Neither SC nor ST households were more likely than other castes in falling into MP rather than NP category in 1981-82.

### 2. Physical Assets and Poverty

Possession of all three physical assets considered in the study, cropland, house and livestock, are significant in reducing the probability of any household being poor: severely or moderately. This result holds for both the data sets: 1970-71 and 1981-82. Irrigated land further reduces the probability of being poor. While land and livestock are productive assets that generate income, ownership of a house is more of a reflection of accumulated savings of the households. As ownership of a house does provide income opportunities for households, along with farming income from land and livestock, it is important in reducing the risk of poverty in rural areas. Without land and livestock, the probability of a household being poor is greater.

### 3. Literacy and Poverty

Being literate did not influence the probability of being poor (using the standard poverty line) or otherwise in 1970-71. However, for a sub-section of the poor, viz. the moderately poor the results show that this sub-section was more likely to be poor

than NP if their heads were illiterate. But in 1981-82, there was a strong association between literacy of the head of household and the probability of a household being poor. Literacy reduced the probability of being poor for SP as well as MP. Although the mechanism by which literate household heads lead to better economic outcomes for the household are not captured in the regression results, the results are unambiguous and they show a change over time.

#### 4. Demographic features of households and Poverty

Age of the head of household had no significant effect on the probability of the household being poor in 1970-71. However, in 1981-82, the probability of the household being poor declined for older head of household. While there may well be non-linearity in the relationship, the change in the estimated relationship over time may relate to the emergence of new techniques of agricultural production, assimilation of which is facilitated by greater experience of farming indicated by higher age.

Larger household size increases the probability of being poor in 1970-71 as well as 1981-82. The larger percentage of children (under 14 years' age) in the household, captures one dimension of dependency and implies greater probability of being poor. Larger proportion of females in the household increased the probability of a household being severely poor than non-poor in 1970-71. This may be related to relatively lower income earned by the females in the household. In 1981-82, however, this was no longer a factor affecting the probability of a household being poor. The change in the influence of gender-composition of the household is an important finding that needs further examination.

#### 5. Infrastructure and Poverty

We have used a composite index of infrastructure at the village level as an independent variable in the regression to explain poverty status of households. For 1970-71, the infrastructure variable reflected the presence of an educational institution (school), health center, veterinary hospital and a village level worker (extension). If all these facilities were available in the village the infrastructure variable received the highest score of 1. If none existed then the score is zero. For 1981-82, the infrastructure variable was defined at the district level, as comparable data was not available at the village level. The variable measures the proportion of rural population of the district covered by postal and telecom facilities and access to 'metalled roads (*pucca* roads)'.

In 1970-71, better infrastructure actually increased the probability of households being moderately poor and did not affect households in severe poverty. The results for 1981-82 were that variations in infrastructure did not affect the incidence of poverty at the household level. Possible explanations would be that the poor are insulated from the development activities. Alternatively, poor households may be attracted to areas with better infrastructure.

#### 6. Village Size and Urban Neighbourhood

In both 1970-71 and 1981-82, larger size of the village reduced the probability of being poor for the rural households. Both severe poverty and moderate poverty were less likely in larger villages than in smaller villages. However, a larger urban population in the district had no significant impact on the probability of a rural household being poor in 1981-82 and actually had an adverse impact on being severely poor in 1970-71. In other words, the urban areas did not necessarily benefit the poor in rural areas. These results show that poor are more likely to benefit from employment opportunities that exist within the villages than outside. The skills and contacts needed to benefit from opportunities in urban areas may not be available in the poor households.

## 7. Interaction Effects

### *Caste and physical assets*

The results for 1970-71 show that the only physical asset, possession of which made a greater difference to reducing the probability of SC and ST households being poor, was the possession of cropland. The effect of possession of a house or livestock on poverty was the same for SC and ST households as for the other households.

In contrast, for 1981-82, the results for interaction terms in the regression equations were surprising in that availability of cropland increased the probability of being severely poor than non-poor or moderately poor for the SC and ST households compared with other households. A 'better house' reflected in higher imputed income from own house did mean lower probability of being severely poor than non-poor or MP. For the moderately poor, better house actually meant greater probability of being moderately poor for SC households than the households belonging to other castes. One interpretation of the positive coefficient of the interaction term of land with SC variable is that the quality of land may vary for the SC household as compared to the other households. In the case of house, having a better house without any other assets (such as land) may be the result of transfer income (subsidies) rather than accumulated savings. And the transfer of such assets or income may have taken place because of the poverty status of the household.

### *Caste and literacy*

Does literacy reduce the incidence of poverty among SC and ST households more or less than other households? The results show no differential impact for SC households in 1970-71 while ST households saw a differential but adverse impact of literacy. One explanation could be that literacy reduces the willingness to continue the hunting, gathering, non timber forest produce collecting tasks for survival while geographic isolation of ST villages prevents access to literacy using income earning opportunities.

### *Caste, infrastructure and economic space*

We have also looked at the interaction of caste and factors above the household-level. The village population size is chosen as a variable to reflect income-earning

opportunities for households other than just farming. In 1970-71, for the SC households, probability of being SP or P was not affected by village size any differently from the households belonging to the other castes. However, in 1981-82, SC households were adversely affected by larger village size. In the case of ST households as compared to the other households, larger villages meant lower probability of being SP or P in 1970-71. But in 1981-82 the differential impact was less discernible. The income opportunities generated by the expanding villages during the 1970s may be such that the SC and ST households were less equipped to benefit from them.

Larger urban neighbourhood as measured by the percentage of urban population of the district in which the village is located, made a difference to the probability of being poor for the ST households in 1970-71. It decreased such probability for the ST households more than the rest. In 1981-82, this differential impact was not seen. For the SC households, there was no differential impact of larger urban neighbourhood either in 1970-71 or 1981-82. Again, the 'better' macro environment may not have an additional or greater positive impact on SC and ST households than the other households.

Village level infrastructure made no significant differential impact on SC and ST households than the rest either in 1970-71 or 1981-82.

#### *Larger economic space and infrastructure*

It was pointed out above that larger villages had an unambiguous poverty reducing effect in rural areas while the impact of an urban neighbourhood was less certain. The impact of infrastructure was also ambiguous. However, it can be argued that the combination of better infrastructure and urban neighbourhood may be expected to have a poverty alleviating effect as better infrastructure allows easier linkages with urban areas. Larger villages (in terms of population) may also complement better infrastructure in reducing incidence of poverty. In general, larger economic space within the immediate neighbourhood, within village, creates more income-earning opportunities, better infrastructure may not imply such effects for the poor. However, better infrastructure in combination with urban neighbourhoods may be poverty-reducing.

#### *Literacy and urban opportunities*

Larger urban neighbourhood did not reduce the probability of poverty differently for households with literate heads than illiterate heads in 1970-71 or 1981-82. Literacy alone may not be enough to benefit from urban opportunities wherever they exist.

### ***IV.2. Income Mobility of the Poor: Staying Poor or Escaping from Poverty***

An important objective of this paper is to determine the factors or characteristics that explain the persistence of poverty and escape from it. Households that were poor in both 1970-71 and remained poor eleven years later in 1981-82 are clearly chronically poor. What factors are significant in:

- Helping poor households escape or reduce poverty?
- keeping households in poverty?

Analysis of the data in Tables 6 and 7 shows that the percentage of the sample households that were below the poverty line was 48.14% in 1970-71 and 38.67% in 1981-82. Further, 28.19% of the households was in severe poverty in 1970-71 while the estimate was 21.34% for 1981-82.

**Table 6 here.**

More than half (52.61%) of the households who were poor in 1970-71 remained in poverty over a decade later. A little less than half (47.39%) of households below the poverty line in 1970-71 escaped from poverty and became non-poor. Conversely one fourth of households who were non-poor in 1970-71 became poor a decade later. There was considerable upward mobility of those who were severely poor and managed to become moderately poor (19.89%) and better yet, non poor (40.79%). Likewise, 22.04% of those who were moderately poor in 1970-71 became severely poor a decade later, and 56.71% escaped poverty. 11.3% of those above the poverty line in 1970-71 fell into severe poverty and 17.33% into moderate poverty in 1981-82.

**Table 7 here.**

Thus, while the data supports the view expressed in the literature that there may be considerable movement into and out of poverty, with more than half the households remaining in poverty eleven years later, it is not possible to argue that very few households remain poor over time.

Factors that can be identified as poverty reducing from the results of the analysis in the preceding subsection include:

Caste and tribe

Possession or access to physical assets such as cropland, own house and livestock;

Literacy;

Smaller household size and smaller proportion of children in the household;

Larger villages; and

Better infrastructure in combination with urban neighbourhood.

Results of the probit analysis of the movement of poor households across poverty status between 1970-71 and 1981-82 are presented in Table 8. The key results are summarised below<sup>5</sup>.

### 1. Caste Status and Chronic Poverty

Tribe, or ST household status emerges as an important factor in explaining persistence of poverty. However, caste or SC status, is not a statistically significant variable in explaining persistence of poverty. In other words, while SC is important in explaining the occurrence of poverty in a household at any given point in time, belonging to an SC household does not increase or decrease the possibility of moving out of or staying in poverty relative to non-SC and non-ST households.

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<sup>5</sup> We also estimated the models including state-level effects through dummy variables in the regression. While this augmentation improved the overall explanatory power of the model, it did not change the basic inter-relationships obtained without the state-level effects. The results are not reported in this paper due to space limitations but they are available with the authors.

The ST households that were poor in 1970-71 were more likely to remain poor in 1981-82 than households belonging to the other castes. This is true of households that were SP in 1970-71. In the case of households that were MP in 1970-71, their movement into non-poor category was not affected by caste. We also note that larger proportion of MP, irrespective of caste, in 1970-71 became non-poor in 1981-82. But relatively larger proportion of SP in 1970-71 remained SP in 1981-82 as well.

## 2. Demographic Factors and Chronic Poverty

Households that were poor in 1970-71 and had larger number of members tended to remain poor in 1981-82 relative to those with fewer members. Thus, even if poor households chose larger size for additional earning potential, it did not help them escape poverty. Increase in household size and in the proportion of children also increases the probability of persistence of poverty, whether moderate or severe.

The proportion of females among the household members has no impact on the persistence of poverty. In the analysis carried out separately for the two years also the impact of gender-composition on incidence of poverty was found to be significant only in 1970-71.

## 3. Physical Assets and Chronic Poverty

All three physical assets, namely, cropland, house and livestock, were significant determinants of poverty in both 1970-71 and 1981-82. However while the initial level of cropland is not a statistically significant variable in explaining the mobility of poor households out of poverty, the initial levels of ownership of house and income from livestock as also change in the area cultivated between the two data points, emerge as significant explanatory variables. An increase in the crop area cultivated by the poor household and increases in asset positions of house and livestock income are also significant in explaining the probability of reduction in persistence of poverty.

## 4. Literacy and Chronic Poverty

Households with literate heads in the initial period are found to have greater probability of moving out of poverty, more particularly in the case of households that were severely poor initially. Acquiring literacy over time does help moderately poor households escape from poverty although the results are ambiguous for the severely poor.

## 5. Economic Space and Chronic Poverty

Larger villages provide relatively more diverse opportunities for employment than the smaller villages and therefore can be expected to reduce the incidence of poverty. This result was strong and unambiguous in the regressions of individual periods. While the initial size of village does not have significant impact on the mobility of the poor out of poverty increase in the village size does seem to reduce the probability of persistence of poverty, particularly severe poverty.



Relatively larger urban population in the neighbourhood in the initial period reduces the probability of persistence of poverty. Increase in the urban population of the district also reduces the probability of persistence of poverty, although the results are not evident for severe poverty.

## 6. Infrastructure and Chronic Poverty

When we looked at the impact of status of infrastructure in the village on the incidence of poverty, i.e., the probability of a household being poor, the results were at best ambiguous. One explanation we offered was that the better infrastructure as it was captured in the variable, was geared towards agricultural production, which may not have affected the poor households directly, as many of them may have little land for crop production. However, better infrastructure is found to have significant positive impact on reducing the persistence of poverty. Better initial level of infrastructure reduces the probability that a poor household remains poor: severely poor or moderately poor. In addition, improvement in infrastructure also reduces persistence of poverty<sup>6</sup>.

Thus, intra-temporal variation in the incidence of poverty is not explained by variation in infrastructure at the village level but variation in infrastructure does influence the mobility of poor households out of poverty.

## V. Conclusions

The results of the analysis presented in this paper provide some important insights into the relationship between the poverty status of the rural households and a number of factors at the household, village and neighbourhood levels. Although the data set used is for the early 1970s and 1980s, the findings have considerable relevance for policy.

The data shows that more than half (52.61%) of the panel households who were poor in 1970-71 remained in poverty over a decade later. With more than half the households remaining in poverty eleven years later, it is not possible to argue that very few households remain poor over time. However, the data also supports the view expressed in the literature that there is considerable movement both out of and into poverty. 47.39% of poor households escaped from poverty. One fourth of households who were non-poor in 1970-71 became poor a decade later.

In the context of poverty related policy interventions then, it is important differentiate between factors and conditions driving:

- poverty
- persistence of poverty,
- escape from it and
- entry into it.

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<sup>6</sup> Infrastructure variable constructed for 1970-71 differed from that for 1981-82. To assess the 'change' in infrastructure status between the survey years, we first ranked the sample villages in ascending order of infrastructure in each year and then obtained the difference in the ranks as the measure.

The results of our regressions show that caste, tribe and demographic composition of households were very important determinants of poverty. Ownership of or access to income from cropland, house and livestock as also larger size of village had poverty reducing effects. Larger households with more children have greater probability of being poor than the smaller households. Larger proportion of females in the household increased the probability of a household being poor in 1970-71 but was not significant in 1981-82. Literacy and age of head of household were not significant in 1970-71 but older and literate head of household had poverty reducing effects in 1981-82.

Factors that explain persistence of poverty are belonging to a scheduled tribe, larger household size, increase in household size, larger number of dependent children and increase in number of dependent children. Factors determining persistence of severe poverty were the same as those for poverty. Belonging to a scheduled tribe did not cause persistence of moderate poverty.

Factors that drive escape from poverty are literacy, ownership of or access to income from physical assets such as cropland, livestock, house and increases in incomes from these physical assets. Infrastructure and having a large urban population in the neighbourhood were other factors that helped exit from poverty. Escape from severe poverty was also driven by the same factors as in the case of escape from poverty except that increase in the size of the village was significant in creating opportunities while increase in literacy and larger urban population in the neighbourhood were not significant, possibly reflecting the fact that it is not enough to become literate but it is also important to have income-opportunities relating to literacy. Escape from moderate poverty was driven by access to and increase in income from cropland, increase in income from own house, increase in literacy and availability of infrastructure.

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**Table 1: Results of Panel Data Analysis for Different Countries**

Country, years and (source)	Number of Waves	Welfare measure	% of households Always Poor	% of households Sometimes Poor	% of households Never Poor
South Africa, 1993-98 {Carter, 1999}	2	Expenditures per capita	22.7	31.5	45.8
Ethiopia 1994-95 {Dercon and Krishnan, 1999}	2	Expenditures per capita	24.8	30.1	45.1
India (NCAER) 1968/69-1970/71 {Gaiha 1998}	3	Income per capita	33.3	36.7	30.0
India (ICRISAT) 1975/76-1983-84 {Gaiha and Deolalikar, 1993}	9	Income per capita	21.8	65.8	12.4
Cote d'Ivoire 1985-86 {Grootaert and Kanbur, 1995}	2	Expenditures per capita	14.5	20.2	65.3
Cote d'Ivoire 1986-87 {Grootaert and Kanbur, 1995}	2	Expenditures per capita	13.0	22.9	64.1
Cote d'Ivoire 1987-88 {Grootaert and Kanbur, 1995}	2	Expenditures per capita	25.0	22.0	53.0
Zimbabwe 1992/93-1995-96 {Hoddinott, Owens and Kinsey, 1998}	4	Income per capita	10.6	59.6	29.8
China 1985-90 {Jalan and Ravallion, 1999}	6	Expenditures per capita	6.2	47.8	46.0
Pakistan 1986-91 McCulloch and Baulch, 1999	5	Income per adult equivalent	3.0	55.3	41.7
Russia 1992-93 {Mroz and Popkin, 1999}	2	Income per capita	12.6	30.2	57.2
Chile 1967/68-1985/86 {Scott, 1999}	2	Income per capita	54.1	31.5	14.4
Indonesia {Skoufias, Suryahadi and Sumarto, 2000}	2	Expenditures per capita	8.6	19.8	71.6

Source:- Baulch and Hoddinott (2000),

**Table 2. Chronic Poverty in Rural India in the late 1960s.**

Poverty Status	% of Aggregate Sample
still poor or poor who remained poor without becoming poorer	21.09
poorer or poor who became poorer	12.18
ceased to be poor or poor who became non poor	24.00
never poor or not poor who remained not poor	39.94
new poor or not poor who became poor	12.69

Source: R. Gaiha (1988).

**Table 3: Staying Poor, Escaping Poverty and Entering Poverty: Estimates based on Panel Analysis in Bangladesh, China, India, Pakistan and South Africa**

	No of waves	P-P	NP-NP	P-NP	NP-P	Sometimes poor (mean consumption below poverty line at all dates)	Sometimes poor (mean consumption above poverty line but sometimes poor)
Bangladesh 1987-88 and 2000 Binayak Sen (2003)	2	31.4	25.1	25.8	17.7		
India NCAER 1968-70 Gaiha (1988)	3	33.27	39.94	24	12.69		
China 1985-90 Jalan and Ravillion (1999)	6	6.21	46.03			14.38	3.38
China 1985-90. Jalan and Ravillion (1999) with a 50% higher poverty line	6	39.56	9.84			30.46	20.15
Pakistan 1986-91 Baulch and McCulloch 2001 (JAAS)	5	2.6	42.3				
South Africa KwaZulu Natal Aliber (2001)	2	22.3	47	11.4	19.3		
India NCAER 1970-71 and 1981-82. Bhide and Mehta (CPRC 2003)	2	25	39	23	13		

Source: Estimates compiled from the articles cited in column 1 of the table.

Table 4. Factors Influencing Poverty Status in 1970-71 (Probit Models)

Independent Variables	Dependent Variable					
	Aris4 (MP=1, NP=0)		Aris5 (SP=1, NP=0)		Statusaris (P=1, NP=0)	
	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
C	-0.565352	0.04	-1.017971	0.00	-0.348043	0.12
SC	0.748724	0.02	0.678125	0.02	0.729498	0.00
ST	0.589732	0.31	1.687400	0.00	1.198375	0.00
Age of Head of HHD	-0.001876	0.45	-0.002458	0.37	-0.002418	0.25
HHD Size	0.113117	0.00	0.195846	0.00	0.154806	0.00
Children%	0.004723	0.01	0.012431	0.00	0.008741	0.00
Females%	0.002503	0.17	0.006555	0.00	0.004413	0.00
Crop area	-0.742729	0.00	-1.524877	0.00	-1.064516	0.00
Own house income	-0.000800	0.00	-0.002293	0.00	-0.001268	0.00
Livestock income	-0.000091	0.00	-0.000234	0.00	-0.000155	0.00
Literacy	-0.240174	0.06	0.055049	0.67	-0.094352	0.37
Irrigation	-0.403902	0.00	-0.679258	0.00	-0.570290	0.00
SC * Crop area	-0.580416	0.07	-1.020229	0.02	-0.784584	0.01
ST * Crop area	-0.618946	0.21	-1.474635	0.02	-1.066485	0.02
SC * Own house income	-0.000571	0.22	0.000259	0.62	-0.000340	0.39
ST * Own house income	-0.000069	0.94	0.000315	0.83	-0.000201	0.81
SC * Livestock income	0.079972	0.69	-0.073494	0.71	-0.007013	0.96
ST * Livestock income	0.754847	0.02	0.584988	0.06	0.537331	0.02
SC * Literacy	0.000022	0.84	-0.000161	0.26	-0.000060	0.52
ST * Literacy	0.000015	0.93	-0.000017	0.93	0.000007	0.97
Infrastructure_a	0.600302	0.05	0.396532	0.19	0.408863	0.14
Villagepop	-0.000100	0.01	-0.000182	0.00	-0.000147	0.00
Urbanpop%	0.004884	0.47	0.013730	0.04	0.007749	0.17
SC * Infrastructure_a	-0.044368	0.92	-0.128749	0.78	-0.017151	0.97
ST * Infrastructure_a	-0.347285	0.71	0.882045	0.32	0.133309	0.83
SC * Villagepop	-0.000058	0.34	-0.000046	0.34	-0.000051	0.20
ST * Villagepop	-0.000010	0.92	-0.000518	0.02	-0.000156	0.05
SC * Urbanpop%	-0.005270	0.63	-0.004859	0.62	-0.004040	0.60
ST * Urbanpop%	-0.014694	0.52	-0.050570	0.01	-0.031116	0.03
Villagepop *	0.000055	0.18	0.000169	0.00	0.000123	0.00
Infrastructure_a						
Literacy * Urbanpop%	0.007439	0.22	-0.005729	0.35	0.001067	0.83
Urbanpop% *	-0.043340	0.00	-0.032674	0.02	-0.035002	0.01
Infratrstructure_a						
Mean dependent variable	0.28		0.35		0.48	
S.E. of regression	0.41		0.36		0.42	
Sum squared residual	382.12		326.54		535.81	
Log likelihood	-1151.83		-1039.80		-1641.39	
Restr. Log likelihood	-1331.65		-1630.38		-2173.61	
LR statistic (31 df)	359.64		1181.17		1064.43	
Probability(LR stat)	0.00		0.00		0.00	
McFadden R-squared	0.14		0.36		0.24	
Obs with Dep=0	1628		1628		1628	
Obs with Dep=1	626		885		1511	
Total	2254		2513		3139	

Note: The 'coefficient' given above is the estimate of the impact of the independent variable on the poverty status although it is not strictly the measure of the impact on probability itself. The 'Prob' is the probability of the significance of the coefficient. This convention is followed in the remaining tables.



Table 5. Factors Influencing Poverty Status in 1981-82 (Probit Models)

Independent Variables	Dependent Variable					
	REDS4		REDS5		STATUSREDS	
	(MP=1, NP=0)	(SP=1, NP=0)	(P=1, NP=0)	(P=1, NP=0)	Coefficient	Prob.
C	-0.035439	0.89	0.102553	0.72	0.389219	0.09
SC	0.400954	0.21	0.639263	0.02	0.363012	0.07
ST	0.034064	0.95	0.812714	0.04	0.430662	0.22
Age of Head of HHD	-0.005703	0.05	-0.007810	0.02	-0.006901	0.01
HHD Size	0.123098	0.00	0.186858	0.00	0.159732	0.00
Children%	0.007397	0.00	0.016036	0.00	0.011523	0.00
Females%	-0.003316	0.15	-0.003123	0.22	-0.002932	0.12
Crop area	-0.000929	0.00	-0.001648	0.00	-0.001262	0.00
Own house income	-0.001091	0.00	-0.001665	0.00	-0.001364	0.00
Livestock income	-0.000139	0.00	-0.000320	0.00	-0.000217	0.00
Literacy	-0.237155	0.05	-0.608333	0.00	-0.387538	0.00
Irrigation	-0.324722	0.00	-0.587292	0.00	-0.469231	0.00
SC * Crop area	0.000282	0.44	0.001007	0.01	0.000608	0.04
ST * Crop area	-0.000466	0.49	0.000179	0.74	-0.000203	0.67
SC * Own house income	0.000631	0.08	-0.001185	0.10	0.000216	0.58
ST * Own house income	0.001121	0.00	-0.000246	0.74	0.000625	0.16
SC * Livestock income	-0.000062	0.37	-0.000100	0.32	-0.000096	0.19
ST * Livestock income	0.000028	0.86	-0.000023	0.89	-0.000073	0.54
SC * Literacy	-0.309863	0.17	-0.235890	0.31	-0.256842	0.17
ST * Literacy	0.055276	0.90	0.364889	0.27	0.129076	0.66
Infrastructure_r	-0.001569	0.38	-0.002356	0.21	-0.001726	0.24
Villagepop	-0.000062	0.09	-0.000158	0.00	-0.000114	0.00
Urbanpop%	-0.002393	0.75	-0.012470	0.16	-0.003961	0.53
SC * Infrastructure	-0.007441	0.12	-0.002778	0.34	-0.003360	0.10
ST * Infrastructure	0.001048	0.94	-0.008638	0.31	-0.005408	0.51
SC * Villagepop	0.000042	0.37	0.000081	0.03	0.000068	0.02
ST * Villagepop	-0.000352	0.09	-0.000075	0.34	-0.000111	0.27
SC * Urbanpop%	-0.001796	0.60	-0.006196	0.41	-0.004181	0.11
ST * Urbanpop%	0.001438	0.96	0.014214	0.50	0.013226	0.53
Literacy * Villagepop	0.000001	0.97	0.000039	0.09	0.000016	0.36
Villagepop * Infrastructure	4.95E-07	0.21	1.12E-06	0.01	8.90E-07	0.01
Literacy * Urbanpop%	-0.001807	0.58	-0.000315	0.95	-0.001773	0.52
Urbanpop% *	5.32E-07	1.00	9.47E-05	0.41	9.47E-06	0.91
Infratrstructure						
Mean dependent variable	0.2446		0.2946		0.4258	
S.E. of regression	0.3956		0.3424		0.4026	
Sum squared residual	296.9		238.5		406.2	
Log likelihood	-890.1		-746.8		-1225.0	
Restr. Log likelihood	-1073.6		-1253.1		-1731.8	
LR statistic (32 df)	367.0		1012.6		1013.6	
Probability(LR stat)	0.0000		0.0000		0.0000	
McFadden R-squared	0.1709		0.4040		0.2926	
Obs with Dep=0	1458		1458		1458	
Obs with Dep=1	472		609		1081	
Total	1930		2067		2539	

Table 6. Distribution (%) of the Sample Households by Poverty Status

Poverty Status	1970-71	1981-82
SP	28.19	21.34
MP	19.94	17.33
P	48.14	38.67
NP	51.86	61.33
Total	100.00	100.00

Table 7. Income Mobility of the Households across Poverty Status (%)

Poverty status in 1970-71	Poverty Status in 1981-82				Total
	SP	MP	P	NP	
SP	39.32	19.89	59.21	40.79	100.00
MP	22.04	21.25	43.29	56.71	100.00
P	32.16	20.45	52.61	47.39	100.00
NP	11.30	14.43	25.74	74.26	100.00
Total	21.34	17.33	38.67	61.33	100.00

Table 8. Factors Influencing Income Mobility of Poor (Probit Models)

Independent Variables	Dependent Variable			
	AA4(MPMP/MPNP)		AA4(MPMP/MPNP)	
	Coefficient	Prob.	Coefficient	Prob.
C	-0.458566	0.44	-0.567895	0.32
SC	0.120910	0.59	0.195336	0.37
ST	-0.403172	0.43	-0.384187	0.46
HHD Size_a	0.101919	0.00	0.109984	0.00
Children%_a	0.010438	0.14	0.011990	0.07
Females%_a	-0.011852	0.17	-0.010382	0.22
Crop area_a	-1.222723	0.00	-1.138827	0.00
Own house income(R)_a	-0.000367	0.41	-0.000450	0.30
Livestock income(R)_a	-0.000102	0.19	-0.000093	0.24
Literacy_a	-0.107039	0.64	-0.149802	0.50
Infrastructure_a	-0.940254	0.02	-1.066633	0.01
Villagepop_a	0.000052	0.21	0.000044	0.26
Urbanpop%_a	0.018078	0.04	0.010741	0.17
Del_HHD Size	0.165264	0.00	0.165104	0.00
Del_Females%	-0.006315	0.25	-0.006710	0.21
Del_Children%	0.004663	0.38	0.006225	0.21
Del_Crop area	-1.087237	0.00	-1.034917	0.00
Del_Own house income	-0.000892	0.00	-0.000933	0.00
Del_Livestock income	-0.000043	0.39	-0.000068	0.16
Del_Literacy	-0.320241	0.05	-0.336070	0.03
Del_Villagepop	-0.000488	0.67	-0.000407	0.71
Del_Urbanspop%	-0.006208	0.17	-0.010510	0.22
Del_infrank	-0.008630	0.00		
Mean dependent variable	0.30		0.29	
S.E. of regression	0.41		0.42	
Sum squared residual	58.77		63.71	
Log likelihood	-180.29		-193.85	
Restr. Log likelihood	-223.25		-234.60	
LR statistic (22 df)	85.92		81.49	
Probability(LR stat)	0.00		0.00	
Avg. log likelihood	-0.49		-0.50	
Mcfadden R-squared	0.19		0.17	
Obs with Dep=0	258		273	
Obs with Dep=1	109		114	
Total	367		387	

Table 8 (Continued). Factors Influencing Income Mobility of Poor (Probit Models)

Independent Variables	Dependent Variable							
	AA5(SPSP/SPNP)		AA5(SPSP/SPNP)		AA1(PP/PNP)		AA1(PP/PNP)	
	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
C	0.545606	0.34	0.467299	0.41	-0.020533	0.95	-0.157412	0.64
SC	0.099692	0.58	0.183812	0.29	0.137393	0.23	0.171162	0.13
ST	0.192547	0.41	0.388764	0.07	0.391449	0.02	0.477607	0.00
HHD Size_a	0.137917	0.00	0.143243	0.00	0.150403	0.00	0.155679	0.00
Children%_a	0.016736	0.01	0.017686	0.00	0.015427	0.00	0.016509	0.00
Females%_a	0.000136	0.99	0.000917	0.90	-0.002172	0.64	-0.000619	0.89
Crop area_a	-1.226834	0.00	-1.087412	0.01	-1.410815	0.00	-1.344655	0.00
Own house income(R)_a	-0.003918	0.00	-0.004045	0.00	-0.001867	0.00	-0.001943	0.00
Livestock income(R)_a	-0.000486	0.00	-0.000410	0.00	-0.000261	0.00	-0.000244	0.00
Literacy_a	-0.314281	0.12	-0.325388	0.10	-0.254264	0.04	-0.275157	0.02
Infrastructure_a	-1.156158	0.00	-1.092904	0.00	-0.943469	0.00	-0.925346	0.00
Villagepop_a	-0.000005	0.88	-0.000017	0.59	0.000014	0.44	0.000006	0.73
Urbanpop%_a	-0.008909	0.23	-0.017661	0.01	-0.001269	0.77	-0.005010	0.20
Del_HHD Size	0.214670	0.00	0.221368	0.00	0.180362	0.00	0.186144	0.00
Del_Females%	-0.003191	0.50	-0.002400	0.61	-0.003363	0.25	-0.002812	0.33
Del_Children%	0.018426	0.00	0.020688	0.00	0.012978	0.00	0.014838	0.00
Del_Crop area	-1.114629	0.00	-1.189813	0.00	-1.435412	0.00	-1.396394	0.00
Del_Own house income	-0.002745	0.00	-0.002680	0.00	-0.001668	0.00	-0.001660	0.00
Del_Livestock income	-0.000431	0.00	-0.000422	0.00	-0.000188	0.00	-0.000200	0.00
Del_Literacy	-0.145856	0.33	-0.130418	0.37	-0.240992	0.01	-0.242095	0.01
Del_Villagepop	-0.001399	0.07	-0.001785	0.02	-0.000150	0.77	-0.000319	0.53
Del_Urbpop%	0.012393	0.13	0.006592	0.40	-0.005741	0.03	-0.007219	0.01
Del_infrarank	-0.006133	0.01			-0.003566	0.01		
Mean dependent variable	0.54		0.54		0.57		0.57	
S.E. of regression	0.37		0.37		0.41		0.41	
Sum squared residual	71.71		75.49		194.55		205.31	
Log likelihood	-228.24		-240.93		-592.45		-623.66	
Restr. Log likelihood	-373.44		-393.68		-804.79		-848.66	
LR statistic (22 df)	290.39		305.51		424.68		450.00	
Probability(LR stat)	0.00		0.00		0.00		0.00	
Avg. log likelihood	-0.42		-0.42		-0.50		-0.50	
McFadden R-squared	0.39		0.39		0.26		0.27	
Obs with Dep=0	250		261		508		534	
Obs with Dep=1	291		310		669		708	
Total	541		571		1177		1242	

## Appendix 1. Definition of the Variables Used in the Regression Analysis

### A. Variables for Regression Analysis to explain Incidence of Poverty

SC	Dummy variable with value =1 if the household belongs to Scheduled Castes, =0 Otherwise
ST	Dummy variable with value =1 if the household belongs to Scheduled Tribes, =0 Otherwise
Age	Age of the head of household in Years
Household Size	Number of persons in the household
Children%	% of children (14 years or younger) in the household
Females%	% of females in the household
GCA	Gross cropped area for the household (hectares)
Livestock income	Annual income from livestock (Rs, in 1981-82 prices)
Own house income	Annual imputed income from own house (Rs, in 1981-82 prices)
Literacy	Education level of the head of household, =1 if literate and above, =0 otherwise
Irrigation	Dummy variable for Irrigated area cultivated by the household; =1 if positive, =0 otherwise
Infrastructure_a (1970-71 data)	Infrastructure at the village level defined as $(ID1+ID2+ID3+ID4)/4$ where ID are defined as 0 or 1
ID1	Value =1 if there is an educational institution in the village, =0 otherwise
ID2	Value =1 if there is a medical health center in the village, =0 otherwise
ID3	Value =1 if there is a veterinary health facility in the village, =0 otherwise
ID4	Value =1 if there is a village level extension worker in the village, =0 otherwise
Infrastructure_r (1981-82 data)	Infrastructure at the village level defined as $(IDR1+IDR2+IDR3)/3$ where IDR are defined as:
IDR1	% of rural population in the district covered by postal facilities (Census data)
IDR2	% of rural population in the district covered by telecom facilities (Census data)
IDR3	% of rural population in the district covered by access to a metalled (pucca) road in the village (Census data)
Villagepop	Population of the village (Census data)
Urbpop%	% of Urban areas in the population of the district in which a particular village falls (Census data), Census data

### B. Variables for Regression Analysis to explain Poverty Mobility

HHD Size_a	Household size (number of members) in 1970-71
Children%_a	% of children (14 years or younger) in the household in 1970-71
Females%_a	% of females in the household in 1971-71
Crop area_a	Gross cropped area for the household in 1970-71
Livestock income_a	Annual income from livestock (Rs) in 1970-71
Own house income_a	Annual imputed income from own house (Rs) in 1970-71
Literacy_a	Education level of the head of household, =1 if literate and above, =0 otherwise in 1970-71
Infrastructure_a	Infrastructure as defined for 1970-71
Del_HHD Size	Difference in household size (1981-82 level minus 1970-71 level)
Del_Children%	Difference in % of children in household (1981-82 level minus 1970-71 level)
Del_Females%	Difference in % of females in household (1981-82 level minus 1970-71 level)
Del_Crop area	Difference in gross cropped area (1981-82 level minus 1970-71 level)
Del_Livestock income	Difference in livestock income (1981-82 level minus 1970-71 level)
Del_Own house income	Difference in imputed income from own house (1981-82 level minus 1970-71 level)
Del_Literacy	Difference in the literacy status of head of household (1981-82 level minus 1970-71 level)
Del_Infrastructure	Difference in infrastructure ranking of the village (1981-82 level minus 1970-71 level)

Note: Wherever relevant we have identified the variable for 1970-71 with suffix 'a' and for 1981-82 by 'r'.