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ON THE DYNAMICS OF POVERTY IN RURAL INDIA

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Abstract

Our study confirms high vulnerability of segments of the rural population to aggregate and idiosyncratic shocks in the semi-arid tract of South India. A case is then made for broadening the anti-poverty strategy to include those who might not be poor but are highly vulnerable to such shocks. As risk reduction is likely to involve large investments over a long period, and few risks are likely to be mitigated except partially, the pay-off to a combination of risk-mitigating and coping measures is likely to be high. From this perspective, the income smoothing potential of workfare is examined. A concern, however, is whether such schemes have the flexibility to expand quickly to ensure quick and effective relief, given the budgetary and other constraints.

Key words: Poverty, Vulnerability, Risks, Income Stabilisation, Workfare

JEL Codes: C21, C23, C61, I 32.

Introduction

Despite its obvious importance in designing anti-poverty strategy, the distinction between chronically poor and temporarily poor is seldom emphasised in the Indian literature[2]. This is because most of the recent empirical analyses are based on either National Sample Survey Consumer Expenditure distribution estimates (hereafter referred to as the NSS) or on village surveys for specific years. Specifically, none of these studies analyse a panel of rural households over a period of time. Whether poverty is chronic or temporary is an issue which can only be addressed with a panel survey over a period of time.

A key question is whether the chronically poor are also the poorest (or its obverse: whether the poorest are also chronically poor). It is argued below that an income/expenditure rank (or level) is a poor predictor of the chronic poverty of a household. What characterises the chronically poor is not so much low per capita income/expenditure in any year as low variation in it over time[3]. An attempt will be made to illustrate that this low variation is due to low/negligible endowments (e.g. cultivable land, labour power, education) and/or inability to augment substantially the returns from them[4].

A related issue is vulnerability of households to shocks-both idiosyncratic and covariate. In Indonesia, for example, even though the incidence of poverty was low before the financial crisis of 1997, the proportion of vulnerable households (in retrospect) was very high, as evidenced by the large number of households that were pushed into poverty in the aftermath of this crisis. Identification of vulnerable households is, however, more difficult than that of poor households, since a household's vulnerability depends, in large measure, on the severity of the shock to which it is exposed. The illness of a male wage earner lasting several days may push a few households into poverty for a short spell but in the event of a male earner dying many rural households are likely to slip into acute deprivation over a much longer period. Usually, households are able to cope well with household-specific shocks in the presence of well-functioning markets (e.g. credit or labour markets) and community support[5]. However, their ability to deal with community-wide shocks is much lower since these shocks affect everyone in the community. What is worse is that some of the poorest may not be able to recover from such shocks over a period.

From a policy perspective, a distinction between persistent and transient poverty is of considerable importance. Since the persistently poor are not a negligible subset of the poor, it is important to identify who they are.[6] But, more importantly, careful attention must be given to identifying sections of the rural population that are likely to be persistently poor as a result of community-wide shocks. Failure to identify them may divert resources to those suffering only from temporary misfortunes (i.e. errors of inclusion) at the expense of those likely to be poor over the longer-term but temporarily out of poverty due to favourable short-term circumstances (i.e. errors of exclusion). Apart from measures designed to reduce the severity of such shocks, a deeper understanding of the vulnerability of specific sections to them may also help design more effective safety nets for them (World Bank, 2001).

The main objectives of the present study are: to examine (i) the persistence of poverty in rural India, based on (not-so-recent) panel surveys; (ii) identify the sources of vulnerability; (iii) vulnerability of rural population to crop-shocks; and (iv) assess the income stabilising role of rural public works.

Data

The evidence reviewed below comes from two panel surveys. One is Additional Rural Income Survey (hereafter ARIS), which was carried out by the National Council of Applied Economic Research (NCAER, 1975). This survey contains data on a panel of 4118 rural households from the whole of rural India, each of which was surveyed in 1968-69, 1969-70 and 1970-71. It was designed to capture the impact of the new agricultural technology on income, saving and investment[7]. Although this panel survey is old, some valuable insights into the nature and causation of chronic poverty are obtained. These are briefly reviewed below.

The second panel survey, which has also been extensively used, is the ICRISAT village-level studies data sets that cover the semi-arid tract (SAT) in selected villages in Maharashtra and Andhra Pradesh. As the present review relies largely on studies based on this panel survey, some salient features are described below[8].

Agroclimatologically, the SAT includes those tropical regions where rainfall exceeds potential evaporation 4-6 months in a year. Mean annual rainfall ranges from about 400 to 1200 mm.

A random stratified sample of 40 households was selected in each of the six sample villages. These comprised a sample of 30 cultivator and 10 landless labour households. To ensure equal representation of different farm size groups, the cultivating households were first divided into three strata, each having an equal number of households. A random sample of 10 households was drawn from each tercile. 10 landless labour households were also randomly selected.

The data collected are based on panel surveys carried out at regular intervals from 1975 to 1984 covering production, expenditure, time allocation, prices, wages and socio-economic characteristics for 240 households in 6 villages, representing three agro-climatic zones in the semi-arid region in South India. Given the agro-climatic conditions and purposive selection of the villages, the VLS data are not representative of all of rural south India or even of its semi-arid region. Nevertheless, the longitudinal nature and richness in terms of variables included are what make the ICRISAT VLS data unique. More importantly, for the present review, this is by far the longest panel data available for any region in India.

Extent and Characterisation of Chronic Poverty

(a) ARIS Evidence

Using ARIS and a poverty cut-off point (i.e. Rs 15 per capita per month at 1960-61 prices), the incidence of poverty in 1968 was about 57 per cent. About 47 per cent of them remained poor over the period 1968-70. The incidence of chronic poverty was thus about 27 per cent over the sample period. The gap between the poverty cut-off point and average per capita income of the chronically poor was 41 per cent. The chronically poor, however, were not the poorest - as a matter of fact, a substantial number were only moderately poor[9]. Nor were the poorest necessarily chronically poor- a substantial number were not. But the bulk of them were landless or near-landless with virtually no formal schooling. The majority of the chronically poor households were large with a high dependency burden (or, equivalently, with a low participation rate). What distinguished them from the rest of the poor was not so much low income in any year but low variation in income over a period.

Three decompositions were carried out. In the first, variation in (incremental) household income, Var (Δ HHINCM), was decomposed into (i) variation in (incremental) wages, Var (ΔWGES), (ii) variation in (incremental) income from cultivation, Var (ΔINCMCULTV), and (iii) twice their covariance, 2 Cov (ΔWGES, ΔINCMCULTV). Comparison of variation in (Δ HHINCM) between the chronically poor and the just poor confirmed the larger variation among the latter, arising from larger variations in (ΔWGES) and (ΔINCMCULTV). The contrast was sharper between the chronically poor and not-poor, with the latter showing a much larger variation in

(Δ HHINCM). This resulted from larger variations in (ΔWGES) and (ΔINCMCULTV)-especially in the latter[10]. The (absolute value) of the covariance component was larger among the just poor and smaller among the not-poor, relative to the chronically poor (Gaiha, 1992).

In the second decomposition, variation in income per capita is broken up into variation in (i) participation rate (workers /household size), (ii) in income /earnings per worker, and (iii) twice the covariance between (i) and (ii)[11]. This decomposition is carried out separately for 1968 and 1970. Other things being equal, the larger the number of workers in a given household size, the higher would be the per capita income. In other words, the composition of a household (in terms of workers and dependants) matters. In addition, what matters are the endowments and the ability of workers (e.g. skills) to augment their earnings from them. Differences in earnings per worker represent the combined effect of differences in endowments (e.g. arable land) and in the ability to raise income from them. Finally, part of the variation in earnings may be due to the covariation between participation rate and earnings per worker[12].

The contrast between the chronically poor and the just poor was striking. In *both* 1968 and 1970, the variation in per capita income was larger among the just poor. This reflected the larger variation in earnings per worker, which more than neutralised the effect of the larger (absolute) value of the covariance component among the just poor.

The contrast between the chronically poor and the not-poor was even more striking-especially in 1970. While the variation in income per capita was lower among the latter in 1968, it was significantly larger in 1970[13]. Each of the first two components (the participation rate and earnings per worker) was in fact substantially higher among the not-poor in both 1968 and 1970. Thus, even though (the absolute value of) the covariance between the two components was in fact substantially higher among the not-poor, it was the substantially higher variations in the participation rate and in earnings per worker –especially the latter-which accounted for the higher variation in per capita income among the not poor in 1970 (Gaiha, 1992).

In a third decomposition, variations in (incremental) per capita income are analysed. The pattern is not surprising in so far as the lowest variation was associated with the chronically poor, the next larger with the just poor and the largest with the not-poor.

Considering that the ARIS covers a short period, and that no explicit allowance is made for a random component in income, the estimate of chronic poverty is no more than an approximation. Hence the characterisation of the chronically poor delineated here is subject to further validation.

Some of these limitations are sought to be overcome in the analysis based on the ICRISAT sample. An additional advantage is that it covers a longer and more recent period.

(b) ICRISAT Evidence

Using the ICRISAT panel data covering the period 1975 to 1983, alternative estimates of persistent poverty are constructed.[14] Contrary to an assertion in Dreze et al. (1992), it is demonstrated that income purged of a random component yields useful measures of persistent poverty. That persistence of poverty is closely linked not just to lack of assets but also to certain innate disadvantages (e.g. lack of industriousness and managerial ability) is illustrated.

Four different measures of poverty are calculated. The first is simply the head-count measure of poverty calculated separately for each sample year (referred to as annual poverty hereafter). The second measure (expected poverty) is based on expected (as opposed to actual) income falling below the poverty line. Expected income is predicted from an estimated reduced- form income equation-akin to an earnings function but including income from all (not just wage labour) sources.[15] Since predicted income is purged of transitory (random) shocks, the estimate of expected poverty identifies that subset of the poor likely to remain poor on average in any year[16]. The third measure of poverty (innate poverty) is similar to the second, but with the refinement (made possible by the availability of panel data) of control for unobserved household fixed-effects (representing managerial ability, industriousness) in the estimation of the income equation. This measure provides a more stringent definition of poverty than the expected poverty measure, since it controls for transitory random shocks to income and allows for the time- varying household characteristics, such as ownership of assets, household size, to be fixed at sample mean values. The fourth and last measure of (persistent) poverty is the head-count of households whose actual incomes fall under a real poverty line consistently over a number of years. Because the choice of number of years in which a household's income needs to be below the poverty line for it to qualify as persistently poor is arbitrary, the number of persistently poor are computed for different durations[17].

Table 1
Annual, Expected, and Innate Poverty Estimates: Rural South India, 1975-76 to 1983-84

Year	No. of obs.	Poverty Estimate (proportion of household poor) Actual	Expected	Innate
1975-76	170	0.70	0.74	0.69
1976-77	170	0.68	0.74	0.62
1977-78	170	0.61	0.68	0.58
1978-79	170	0.54	0.59	0.46
1979-80	170	0.56	0.59	0.44
1980-81	170	0.59	0.53	0.39
1981-82	170	0.54	0.54	0.38
1982-83	170	0.44	0.55	0.36
1983-84	170	0.51	0.58	0.36
All 9 years	1530	0.57	0.61	0.48

Source: Gaiha and Deolalikar (1993)

Over the 9 years, the extent of poverty based on annual income data averaged 57 per cent, but with a wide range of 44-70 per cent. The incidence of expected poverty is somewhat higher at 61 per cent, but declined from 74 per cent in 1975-76 to 53 per cent in 1980-81, increasing thereafter to reach a level of 58 per cent by 1983-84. Finally, the magnitude of innate poverty, averaging 48 per cent during the sample period, is smaller than that of annual and expected poverty. But it is surprisingly large, considering that it allows for mean levels of assets and various household characteristics. While the secular and large decline in the magnitude of innate poverty over the sample period (from a level of 69 per cent in 1975-76 to 36 per cent in 1983-84) is encouraging, the fact that over one-third of the sample households during the last year of the sample were likely to remain poor despite mean assets and household characteristics is both disturbing and pessimistic.

Table 2
Persistent Poverty Estimates: Rural South India, 1975-76 to 1983-84

No. of years in which poor	0 (never)	1 (sometimes poor)	2	3	4	5	6	7	8	9 (always poor)
% of households poor	12.4	87.8	80.2	73.1	68.4	61.3	48.9	41.8	33.6	21.8

Source: Gaiha and Deolalikar (1993)

Table 2 shows the proportions of households whose income fall under the poverty line for varying number of years between 1975-1983 (the persistently poor). What is surprising - indeed startling - about these figures is the persistence of poverty. A very large number-indeed, an overwhelming majority-of sample households (87.8 per cent) were poor some time (i.e. in at least one year) during the 9-year period. Slightly more than 60 per cent of households were poor roughly half of the time (i.e. during 5 of the 9 sample years). And, finally, a little more than one-fifth of the households were poor during all 9 years. Thus, the persistently poor were by no means a small subset of the poor.

Some cross-tabulations show the following:

- Over 60 per cent of households classified as poor on the basis of annual income data and 52 per cent of the expected poor are also innately poor. About 70 per cent of the innately poor are annually and expected poor.
- However, because of the stringent definition of persistent poverty, only a small proportion of the annually, expected and innately poor households are also persistently poor. For instance, only 38 per cent of the annually poor, 34 per cent of expected poor, and 33 per cent of the innately poor are persistently poor.

The varying estimates of poverty reflect the heterogeneity among the poor and demonstrate that the poor are not a monolithic group; they are composed, *inter alia*, of households that are poor owing to transitory shocks, households that are poor owing to low levels of owned physical assets, and households that are poor owing to long-run inherited disadvantages.

Vulnerability and Persistence of Poverty

Vulnerability is distinguishable from poverty in the sense that there exist those who are non-poor but vulnerable, and those non-vulnerable but poor. However, as a measure of deprivation, vulnerability is more appealing as it takes into account not just fluctuating levels of living but also the resilience of subsets of households (e.g. landless, smallholders) against aggregate and idiosyncratic shocks. It is, however, more difficult to identify the vulnerable not only because there are different measures (e.g. *ex ante* versus *ex post* vulnerability) but also because tracking the well-being of a particular household over many years or before and after a shock requires reliable panel data that are seldom available. So there was no option but to analyse the ICRISAT panel data.

There has been a surge of interest in measuring vulnerability. Recent contributions include Hoddinott and Quisumbing (2003), Kamanou and Morduch (2005), Ligon and Schecter (2003), Ligon (2005), Gaiha and Imai (2004), Dercon (2005), and Imai et al. (2007). These studies point to the need for designing anti-poverty policies to address vulnerability-especially in rural areas where agricultural yields and revenues fluctuate a great deal due to changes in weather, floods, insect infestation, and market forces. Besides, different segments of the rural population are exposed to idiosyncratic risks (e.g. illness, injury, death) in the absence of easy access to medical care, drinking water, unhygienic living conditions, and limited opportunities for diversifying income sources. These difficulties are compounded by lack of financial intermediation and formal insurance, credit market imperfections, and weak infrastructure. More specifically, if the policy makers design poverty alleviation policies in the current year on the basis of a poverty threshold of income in the previous year, the poor who receive income support may have already escaped from poverty, and the non –poor who do not may have slipped into poverty due to various unanticipated shocks (e.g. floods, injury, deaths). One approach would be to focus on poverty dynamics (e.g. Gaiha and Deolalikar, 1993, Baulch and Hoddinott, 2003) or chronic poverty (Hulme, Moore and Shepherd, 2001), taking into account poverty transition or the long-term poverty status *ex post.* Another, and, a more challenging, approach would be to rely on measures of vulnerability. This, however, presupposes that many of the risks-both aggregate and idiosyncratic- and resilience of households against such shocks can be anticipated. This is of course easier said than done. But some useful insights emerge from the evidence reviewed below.

(a) Different Measures of Vulnerability

Three approaches to measuring vulnerability have been used. The first is vulnerability as expected poverty (or VEP)[18]. Vulnerability is defined as the probability that a household will fall into poverty in the future.

$$V_{it} = \Pr\left(c_{i,t+1} \leq z\right) \tag{1}$$

where vulnerability of a household i at time t, V_{it}, is the probability that the i-th household's level of consumption at time t+1 , $c_{i,t+1}$, will be below the poverty line, z[19].

An alternative measure of vulnerability –Vulnerability as Expected Low Utility (VEU)-is defined as the difference between the utility derived from some level of certainty-equivalent consumption, z_{ce}, at and above which the household is not considered vulnerable, and the expected utility of consumption. In other words, this certainty-equivalent consumption is akin to a poverty line. Consumption of a household, c_i, has a distribution in different states of the world, so this measure takes the form:

$$V_i = U_i\left(z_{ce}\right) - EU_i\left(c_i\right) \tag{2}$$

where U_i is a (weakly) concave, strictly increasing function. Equation (2) can be rewritten as:

$$V_i = \left[U_i\left(z_{ce}\right) - U_i\left(Ec_i\right)\right] + \left[U_i\left(Ec_i\right) - EU_i\left(c_i\right)\right] \tag{3}$$

The first bracketed term on the right is a measure of poverty in terms of the difference in utility between z and c. The second term measures the risk that household i faces. The latter can be decomposed into aggregate or covariate and idiosyncratic risk, as shown below.

$$
\begin{aligned}
V_i = & \left[U_i\left(z_{ce}\right) - U_i\left(E\,c_i\right)\right] && (Poverty) \\
& + \left\{U_i\left(Ec_i\right) - EU_i\left[E\left(c_i \middle| x_t\right)\right]\right\} && (Co\,\mathrm{var}\,iate\,or\,\,Aggregate\,Risk) \\
& + \left\{EU_i\left[E\left(c_i \middle| x_t\right)\right] - EU_i\left(c_i\right)\right\} && (Idiosyncratic\,Risk) \qquad (4)
\end{aligned}
$$

where $\mathrm{E}(\mathrm{c}_{\mathrm{i}}|\mathrm{x}_{\mathrm{t}})$ is an expected value of consumption conditional on a vector of covariant variables, x_{t}.

Aggregating across households, an estimate of aggregate vulnerability is obtained:

$$
\mathrm{VEU} = (1/\mathrm{N})\sum_{\mathrm{i}}^{\mathrm{N}} \{[\mathrm{U_i}(\mathrm{z_{ce}}) - \mathrm{U_i}(\mathrm{Ec_i})] + \{\mathrm{U_i}(\mathrm{Ec_i}) - \mathrm{EU_i}[\mathrm{E}(\mathrm{c_i}|\mathrm{x_t})]\} + \{\mathrm{EU_i}[\mathrm{E}(\mathrm{c_i}|\mathrm{x_t})] - \mathrm{EU_i}(\mathrm{c_i})\}\} \qquad (5)
$$

This decomposition is useful as it allows an assessment of whether vulnerability is largely a result of factors underlying poverty (e.g. low assets and/or low returns from them) or of aggregate and idiosyncratic shocks, and the inability to cope with them[20].

In the absence of an effective risk management strategy, shocks result in welfare loss to the extent that they lead to reduction of consumption. In this sense, the welfare loss is a consequence of uninsured exposure to risk. Vulnerability as uninsured exposure to risk (VER) is designed to assess *ex post* welfare loss from a negative shock (e.g. a flood), as opposed to an *ex ante* assessment of future poverty in VEP[21].

(b) Extent and Sources of Vulnerability

As details of the analysis using all three measures of vulnerability, based on the ICRISAT data, are available in Gaiha and Imai (2007), a summary of the results based on VEU is given below.

- Vulnerability in the aggregate sample is 0.74. It is not straightforward to give it an intuitive interpretation but it implies that the utility of the average household is 75 per cent less than the hypothetical situation without any risk or inequality in consumption.
- Vulnerability arising from risk (59 per cent of the total vulnerability), as the sum of aggregate (22 per cent) and idiosyncratic risks (37 per cent), is very large. Indeed, it is even larger than the vulnerability associated with poverty (35 per cent)[22].

- Household characteristics and endowments influence different components of vulnerability differently. Aggregate vulnerability, for example, falls with age of household head but at a diminishing rate; and rises with household size. The poverty component of vulnerability is similarly related to age of household head but also has a non-linear relationship to household size (i.e. rises with household size at a diminishing rate). Interestingly, this component of vulnerability diminishes with non-land assets but at a decreasing rate. The idiosyncratic risk component diminishes with owned land area.

(c) Aggregate Crop Shocks and Duration of Poverty

In a variation on VEP, Gaiha and Imai (2004) first estimate a per capita household income equation in which the explanatory variables include caste of a household, household size, land owned, and a measure of crop shock (defined as a deviation of village crop income from its trend value)[23]. Simulations are then carried out to assess the impact of four variants: (i) a small negative crop shock in the first year of the simulation (i.e. 1977); (ii) a small negative shock in the first 3 years of the simulation (i.e. 1977-79); (iii) a large negative crop shock in the first year (i.e. 1977); and (iv) and a large negative crop shock in the first 3 years (i.e. 1977-79), on poverty[24]. In order to overcome the arbitrariness of a poverty cut-off point, a range is used[25]. Also, different durations of poverty are considered. A selection of the simulation results is given in Table 3. Some comments are given below, followed by a brief comment on the disaggregated results[26].

- Under the first variant (i.e. a small negative crop shock in the first year), neither the proportion of never poor nor that of always poor (6-8 years) is substantially changed. Only a small increase is observed for always poor and poor for 3-5 years, when the 100 per cent poverty cut-off point is used.
- Where a small shock lasts three years, the share of always poor is slightly higher at the 100 and 125 per cent of the cut-off points, as compared with the previous case. That of never poor, on the other hand, falls.

Table 3
Simulation Results: Effects of Crop Shocks on Chronic Poverty

Duration of poverty (years)	Poverty cut-off point[a] (%)				
Case 1: reference case (without any crop shock)	125	100	90	80	50
6-8 years (always poor)	52.5	34.4	29.0	25.7	10.4
3-5 years	4.9	5.5	4.9	1.1	1.1
1-2 years	8.2	12.6	10.9	8.2	6.6
0 (never)	34.4	47.5	55.2	65.0	82.0
Case 2: With a small shock for the first year	125	100	90	80	50
6-8 years (always poor)	52.5	35.5	29.0	25.7	10.4
3-5 years	6.0	7.1	6.0	2.7	2.2
1-2 years	7.7	9.8	9.8	6.6	5.5
0 (never)	33.9	47.5	55.2	65.0	82.0
Case 3: With a small shock for the first 3 years	125	100	90	80	50
6-8 years (always poor)	55.2	36.1	29.5	25.7	10.4
3-5 years	4.9	7.1	6.0	3.8	3.3
1-2 years	7.7	10.9	12.0	7.1	6.0
0 (never)	32.2	45.9	52.5	63.4	80.3
Case 4: With a large shock for the first year	125	100	90	80	50
6-8 years (always poor)	52.5	35.5	29.5	26.2	10.4
3-5 years	8.2	8.2	7.1	2.2	2.7
1-2 years	10.4	16.4	17.5	14.2	9.3
0 (never)	29.0	39.9	45.9	57.4	77.6
Case 5: With a large shock for the first 3 years	125	100	90	80	50
6-8 years (always poor)	55.2	36.1	30.6	26.2	10.4
3-5 years	9.8	14.8	10.9	6.0	7.7
1-2 years	13.7	15.3	18.6	20.8	7.7
0 (never)	21.3	33.9	39.9	47.0	74.3

a The base poverty cut-off point is Rs 15 per capita per month at 1960-61 prices, updated using appropriate prices.
Source: Gaiha & Imai (2004)

- If households experience a large negative shock only for a year, the shares of poor for 1-2 and 3-5 years are generally much higher-especially the former - while that of never poor is markedly lower. While these results hold for all poverty cut-off points, some of the changes are more pronounced at higher poverty cut-off points.
- If, however, a severe crop shock lasts 3 years, all categories of poor, including always poor at higher poverty cut-off points, are adversely affected by it. In all cases, there is a marked reduction in the share of never poor. Also, the shares of poor for 1-2 and 3-5 years rise sharply. This is yet another confirmation of the previous result that the adverse effects of large negative crop shocks do not generally extend beyond 3-5 years.
- A more disaggregated analysis shows that even relatively affluent sections i.e. households owning large amounts of land, possessing a few years of education and affiliated to upper castes are highly vulnerable to persistent poverty under such shocks, as they are harder hit by them. On the other hand, the vulnerability of low caste households stems from their limited endowments of education and land that limit their income diversification options, quite apart from social exclusion restricting returns from the assets that they possess[27].

Policy Options

Three policy goals must be distinguished: risk reduction; risk mitigation; and risk coping. Risk reduction refers to measures that reduce the probability of, say, a crop shock; in the context of the semi-arid region, digging of wells, for example, could reduce the risk of a crop failure from deficient rainfall. Risk mitigation involves measures in anticipation of of a crop shock that offset at least partly its impact; e.g. diversification of crops and plots, combining farm and non-farm sources of income, developing buffer stocks, crop insurance, and so on. As these measures may fall considerably short of protecting the vulnerable against severe shocks, it is often imperative to supplement them through risk-coping measures such as workfare programmes designed to provide emergency income and cash transfers. As key elements of a broad-based anti-poverty strategy along the lines sketched here are discussed elsewhere, it is unnecessary to summarise the arguments[28].

(a) Workfare

Instead, we shall concentrate here on the income-stabilising role of rural public works, based largely on Walker and Ryan (1990), Gaiha (1997), Gaiha and Imai (2002), Scandizzo et al. (2007)

When there are severe covariant shocks, such as droughts and floods, insurance mechanisms - both formal and informal - fail. There are two priorities in such a situation: provide immediate and extensive relief; and help the affected communities rebuild their homes and livelihoods. Rural public works or the National Rural Employment Guarantee Scheme (a nation-wide employment guarantee scheme inspired by the Employment Guarantee Scheme (EGS) in Maharashtra) in the present context have a potentially important role in both cushioning incomes against such shocks and in rebuilding communities and infrastructure. The experience of the Employment Guarantee Scheme in two Maharashtra villages in the ICRISAT sample from this perspective is reviewed below.

Walker and Ryan (1990) confirm the income stabilising benefits of the EGS. This finding is based on a comparison of levels of household income variability in villages with and without the EGS. Landless households that relied largely on earnings in the daily agricultural labour market in Shirapur and Kanzara, (two Maharashtra villages in the ICRISAT sample where the EGS operated), had about 50 per cent less variable incomes than those in Aurepalle, where rural public works facilities were not locally available. Since there is no control for contemporaneous changes in the sample villages, this evidence must be interpreted with some caution.

In another analysis focusing on variability of incomes of households participating in the EGS in Shirapur and Kanzara, Gaiha (1997) found a significant income stabilising effect of the EGS.

First, a comparison of the variance of household incomes in EGS participating and non-participating sub-samples confirms that incomes varied much less in the former. This is consistent with the income-stabilizing role of the EGS. Second, based on a variance decomposition procedure, an assessment of the marginal contribution of variances in the components of household income viz. income from cultivation, EGS and nonfarm activities was carried out. In each case, the effect is substantial. If, for example, variance in earnings from cultivation is reduced by a given amount, the variance in household incomes falls by a multiple of 1.11. The effect of a reduction in variance in earnings from nonfarm activities is slightly larger (as variance in household incomes falls by a multiple of 1.16). Compared with the effects of these two components, that of a reduction in variance in earnings from EGS is not so large. Since the corresponding multiple is 0.885, a given reduction in variance in earnings from the EGS is associated with a slightly smaller reduction in the variance in household incomes[29]. So, although the marginal contribution of variance of EGS earnings is the lowest, it is still substantial. Much of the variance in EGS earnings reflects differences in the duration of participation, among other reasons. To the extent that the poor are deterred by some organizational aspects of the EGS (e.g. elaborate registration procedure, time and energy wasted in long journeys to and from worksites, delays in payment of wages, etc.), some remedial measures (e.g., simpler registration procedures, greater dispersal of worksites) would help stabilize their household incomes.

But this analysis has a limitation too as it does not allow for any other differences between households other than participation in the EGS. For example, if those participating in the EGS also relied on a more diverse portfolio of income activities, the income stabilising effect of the EGS is likely to be exaggerated. To overcome this difficulty, a detailed econometric analysis was carried out by Scandizzo et al. (2007). Variability of household income is measured by an unconditional variance of residuals of an income equation. A (variant) of Heckman's sample selection model is employed to allow for the endogeneity of EGS participation and to assess its income stabilising role. The (instrumented) EGS participation reduces the residual variance of household income, implying consequent income stabilisation[30].

Another way of assessing the role of the EGS (or, more generally, workfare) in the context of poverty dynamics is to verify its *protective* and *promotional* roles.[31] The former focuses on the protection of the vulnerable from falling into poverty and the latter on enabling the poor to escape persistent poverty. Drawing upon a methodology developed by Ravallion et al. (1995) which involves comparisons of joint distributions – such as with and without the EGS over time- Gaiha and Imai (2002) carried out detailed simulations involving a range of poverty thresholds, different distributions of EGS earnings among the poor and larger outlays. These simulations confirm significant protective and promotional roles in *specific* cases. One is a somewhat drastic Rawlsian variant with strong protective and promotional roles at low levels of income. In general, what these results suggest is that, despite accurate targeting, the poverty-alleviating potential of the EGS is limited. The point is that, if the overall outlay is small-relative to the aggregate income-poverty gap - no matter how it is distributed, the poverty outcomes are not likely to vary much. Nor would substantially larger outlays without any improvement in targeting make much of a difference - especially to the poorest. However, if a larger outlay is combined with greater participation of the poorest, the outcomes would be significantly greater.

Concluding Observations

A few observations are made below from a broad policy perspective.

Our review confirms high vulnerability of segments of the rural population to aggregate and idiosyncratic shocks in the semi-arid tract of South India. More specifically, large negative crop shocks-especially in consecutive years- result in longer spells of poverty. What is somewhat surprising is that even relatively affluent sections are highly vulnerable to persistent poverty under such shocks.

So an important point is that in a harsh production environment characterised by large fluctuations in yields and revenues, the focus of an anti-poverty strategy must be broadened to include those who might not be poor but are highly vulnerable to such shocks.

A second point is that as risk reduction measures involve large investments over a long period of time (e.g. development of irrigation potential), risk-mitigating and coping measures assume greater importance in the short or medium term. Among risk-mitigating measures, the potential of crop diversification and intercropping is likely to be limited when a covariate shock occurs (e.g. drought). Nor would diversification of village economies through non-farm activities help much, given that many of these are closely linked to agriculture. Crop insurance, on the other hand, is a promising option provided it is affordable, easily administered and financially viable. Area-based insurance contracts are a case in point. Since few risks can be mitigated except partially, there is a case for combining risk-mitigating measures with risk coping measures. From this perspective, rural public works-or, more specifically, a scheme such as the NREG-can play an important role in reducing income hardships and in rebuilding communities and infrastructure in the aftermath of a natural or a production or a market shock, but a concern is whether such schemes have the flexibility to expand quickly to ensure quick and effective relief, given the budgetary and other constraints.

In conclusion, a shift of emphasis in anti-poverty strategy from meeting income shortfalls of the poor to enabling the vulnerable to protect themselves better against various shocks is called for.

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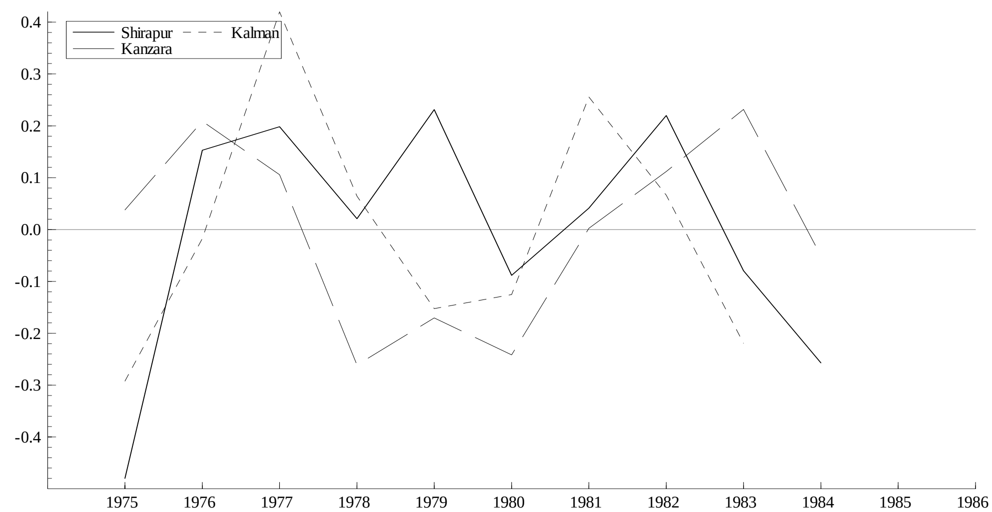
Annex

Figure 1: Crop Shock in Aurepalle and Dokur in Andhra Pradesh

Figure 2: Crop Shock in Shirapur, Kalman and Kanzara in Maharashtra



Source: Gaiha and Imai (2004)

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[2] Some exceptions are Gaiha (1989, 1992), Gaiha and Deolalikar (1993), Gaiha and Kulkarni (1998), and Mehta and Shah (2003). In the larger development literature, however, there has been a surge of interest following a symposium on chronic poverty in a special issue of *World Development*, edited by Hulme and Shepherd (2003), and the *Chronic Poverty Report* (2004). Among the more recent contributions, notable ones are Baulch and Hoddinott (2000), Osmani (2007), and Shepherd (2007), among others.

[3] As emphasized by Hulme (2003) and, more recently, by Osmani (2007), it is important to distinguish between extreme and chronic poverty. While the former refers to the depth or intensity of poverty, the latter relates to the duration of poverty.

[4] Osmani (2007) makes the interesting point that it is not just lack of endowments but also their *mismatch* with opportunities that plays an important role in explaining chronic poverty. In other words, not just the levels of endowments but also their structure makes a difference. This is plausible except that it is not clear whether this distinction would matter greatly if credit and insurance markets were complete.

[5] Although evidence on the cumulative impact of shocks is limited and patchy, a series of short-lived shocks (e.g. illness followed by bad weather) is likely to propel some into chronic poverty. See, for example, the rich and insightful analysis in Scott (2000).

[6] For estimates, see Gaiha and Deolalikar (1993), and Baulch and Hoddinott (2000).

[7] An attempt was made to resurvey the panel households in 1980-81. However, the attrition rate of households was high, rendering it difficult to draw firm conclusions over the longer period. For a review, see Gaiha (1988).

[8] For a more detailed review of the ICRISAT panel survey, see Walker and Ryan (1990), and Gaiha and Imai (2004).

[9] A logit analysis shows that: (i) the highest risk of chronic poverty was associated with households which were moderately poor; and (ii) technological advancement of a village reduced the risk of chronic poverty (Gaiha, 1992).

[10] The ratios in question were significantly different from unity (Gaiha, 1992).

[11] Note that a logarithmic transformation of each variable is used. This does not create any interpretational problems.

[12] Among the more affluent sections, for example, a low participation rate may be induced by high earnings per worker (through a positive income elasticity for leisure).

[13] The difference in Var (log PCINCM) only in 1970 was statistically significant at the 5 per cent level.

[14] This draws upon Gaiha and Deolalikar (1993).

[15] The dependent variable is log of per capita income, and explanatory variables include household and village characteristics (e.g. relative caste rank, schooling of household head, owned land, all non-land assets owned, household size, age of household head, mean monthly rainfall in a village during the year and the coefficient of variation of monthly rainfall), and a stochastic term assumed to be independently, and identically distributed. Given the panel data, a household fixed- effects version is estimated. For details, see Gaiha and Deolalikar (1993).

[16] Lilliard and Willis (1978) have used a variant of this approach to estimate the probability of persistent poverty in USA. Their measure is different from the one presented here in that it is based on an earnings function estimated by random-effects (instead of fixed-effects) methods. Since Hausman-type specification tests suggested the superiority of the fixed-effects over the random-effects specification for the ICRISAT sample, the former was used (Gaiha and Deolalikar, 1993).

[17] Osmani (2007) formalises this measure over the working-life of an individual but stops short of elaborating how to estimate it.

[18] For an application to Indonesian data, see Chaudhuri et al. (2002).

[19] For a multi-period generalization, see Pritchett et al. (2000).

[20] Note that when an estimate is computed, an allowance is made for a residual component.

[21] For details of estimation procedures used, see Gaiha and Imai (2007).

[22] Recall that there is a residual component.

[23] This equation is estimated with the ICRISAT panel data using the generalized method of moments (GMM) developed by Arellano &Bond(1991) for dynamic panel data models. For further details, see Gaiha and Imai (2004).

[24] A small negative crop shock is defined as as the mean of annual negative crop shocks for all sample households. A large negative crop shock is defined as the largest value of the village-level negative crop shocks. Figures 1 and 2 in the Annex illustrate the frequency and severity of the crop shocks in the ICRISAT sample villages. For further details, see Gaiha and Imai (2004).

[25] An updated poverty cut-off point of Rs 15 per capita per month at 1960-61 prices is used (denoted as the 100 per cent poverty cut-off point). The range includes cut –off points of 50 to 125 per cent of this value.
[26] To avoid cluttering the text, the disaggregated results are omitted.
[27] See, for example, Kijima (2006).
[28] For an exposition of a comprehensive social protection strategy, see World Bank (2001), Gaiha and Imai (2004), Gaiha and Thapa (2005), and Gaiha et. al. (2007).
[29] For details of how these partial derivatives are computed, see Gaiha (1997).
[30] Kochar (1999) provides evidence based on the ICRISAT sample confirming income smoothing through an increase in hours worked on the EGS in response to an idiosyncratic crop shock.
[31] This distinction is due to Dreze and Sen (1989).