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Rural Poverty in India, 1973-86

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and
Kalinidhi Subbarao

Growth (trickle-down) and poverty alleviation (pull-up) programs are not substitutes for each other, but complements, the Indian data on poverty show.

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Policy, Research, and External Affairs

WORKING PAPERS

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This paper — a product of the Welfare and Human Resources Division, Population and Human Resources Department — is part of a larger effort in PRE to understand better the impact of general and targeted policies on poverty. Preliminary results of this study were reported in the paper "Poverty and Its Alleviation in India," in *Economic and Political Weekly*, 1990. This version was extended to cover 1986-87 and was substantially revised to accommodate the new evidence. Copies are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Brenda Rosa, room S9-137, extension 33751 (79 pages).

The effects of economic growth can trickle down — but it rarely happens automatically, conclude Kakwani and Subbarao, after assessing the impact of consumption growth on India's poor and ultrapoor between 1973 and 1986.

Conversely, growth's beneficial effects on the incidence of poverty can, but need not, be offset or even nullified by increased inequality of consumption. In India, in 1973-77, they were.

The policy response — a series of antipoverty (consumption-equalizing) interventions since the mid-1970s, aimed at raising the income and consumption levels of the poor and the ultrapoor — was basically sound.

In 1977-83, average consumption grew slowly but inequality of consumption fell in many states — and poverty and the poverty gap were reduced more than in the earlier period. Why is not clear, but the role of direct interventions cannot be minimized.

Program effectiveness is clearly weaker in the poorer states, however, and needs to be strengthened. Employment programs especially — which substantially increased rural employment and income growth — require more effort in Bihar and West Bengal.

Just as increased inequality hurts the ultrapoor disproportionately, so a decline in inequality benefits the ultrapoor more than the poor. From 1983 to 1987, growth was high and there was almost no change in inequality between states. The growth effect dominated a substantial decline in poverty.

Between 1973-74 and 1986-87, rural poverty declined substantially. The incidence of poverty declined from 60.6% to 41.5% and its severity (the gap between the poverty line and an average poor person's income) fell from 18.8% to 10.5%. Even the absolute number of poor declined by about 37 million. The poverty ratio has become more responsive to (1) growth and (2) changing inequality in consumption, except in Bihar and West Bengal.

Both growth and poverty alleviation efforts contributed to this success, conclude Kakwani and Subbarao. But on the whole investments and performance in health, education, and nutrition are unimpressive. It is their impression that the social policies that can raise the capabilities of the Indian people have generally been relegated to the background in Indian policymaking.

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Rural Poverty in India: 1973-86

by
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Rural Poverty In India: 1973-86[1/]

1. INTRODUCTION

Much has been written about poverty in India over the last two decades. Initially attention was concentrated on estimating poverty. Recently, more efforts have gone into explaining its variations, across regions and over time. While controversy still prevails over both estimation and explanation, several insights have been gained - above all, that faster agricultural growth tends to reduce poverty.

The central issues are two: Does overall economic growth reduce poverty, i.e., is there a "trickle-down" mechanism? Has economic growth been accompanied by increased inequality of income or consumption? In the past analysts have examined these issues by looking at the distribution of assets (land) or income or consumption in the high and slow-growing districts/states, often using single-year cross-section data. To understand the impact of economic growth on poverty, we should measure separately the impact on poverty, over time, of changes in <u>average</u> income (consumption) and in its <u>inequality</u>. This paper, therefore, examines trends in the growth of consumption and its distribution and assesses its relative impact on the poor and the ultra poor, over time and across states of India.

During the period 1973-87, Indian GNP per person has grown by about

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1/ Preliminary results of this study were reported in a paper entitled "Poverty and its Alleviation in India" in <u>Economic and Political Weekly</u> 1990. The present version is extended to cover 1986-87 and has undergone substantial revisions in view of the new evidence.

20 percent. The share in GNP of investment and current public expenditure has grown; the average private consumption per person has also grown annually at an average rate of 2 percent. If that had been so for all the households, it would have resulted in a significant reduction in poverty. However, if the distribution of per capita consumption had worsened, the impact of growth on poverty would be much less. The important questions, therefore are:

How has the distribution of per capita consumption changed over time across the states, and to what extent has it nullified the beneficial impact of growth on poverty?

How have the poor and ultra poor fared in the wake of changes in consumption and its distribution?

What have been the regional patterns and to what degree can these patterns be explained considering our knowledge of the structural characteristics of these states and the state-wise performance indicators of anti-poverty programs?

Using the National Sample Survey data for sixteen major states of India the paper addresses the above questions, in Part I.

This is followed by an analysis of India's poverty alleviation strategies (Part II). The potential indirect role of agriculture and manufacturing, as well as the contribution of direct poverty alleviation interventions are analyzed, against the backdrop of the results pertaining to poverty and inequality in Part I.

In particular, we examine the extent to which the regional allocation of funds for direct poverty alleviation programs is sensitive to the regional distribution of the poor and the ultra poor, and whether the recent evidence

on the impact of these programs is consistent with the observed patterns in poverty and inequality.

So far the debate on poverty has focused exclusively in terms of "income" or "expenditure" needed to command the critical minimum basket of goods. This concentration of attention on "income" has resulted in the neglect of other influences -- notably education and health -- which expand and ensure the long-run capabilities of the population. This paper also makes a modest attempt to relate these capabilities to the observed patterns in poverty at the state level. Thus, concluding sections of this paper deal with the trends in social sector expenditures and their outcomes, and assesses the performance of different states in relation to their perceived needs. The last section ties together the main findings and draws some inferences for policy.

2. METHODOLOGY

To analyze poverty, we need to measure the economic welfare of each individual in the society. Although income is widely used to measure economic welfare, it has many serious drawbacks.[2/] One major drawback of using income as a measure of economic welfare is that it may have substantial fluctuations which are averaged out in the long run. Therefore, it has been suggested that consumption is a better indicator of the actual economic position of a household than its current income.[3/]

The National Sample Surveys provide reasonably comparable time series data on the levels and distribution of household consumption expenditures. These data are available in grouped form, giving for each group: (a) the estimated number of persons, and (b) the average consumer expenditures in rupees per person. The monthly per capita expenditure levels are generally grouped into 13 to 14 expenditure classes. To estimate poverty from such data, one needs to employ some intrapolation device. A commonly used procedure is to fit a density function to the entire consumption range and then compute poverty measures from the parameter of the fitted function. Most of the Indian studies have employed a two-parameter lognormal distribution (Minhas, Jain, Kansal and Saluja, 1987). The difficulty with this approach is that the lognormal distribution tends to overcorrect the positive skewness of

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2/ For a detailed discussion of this issue see Kakwani (1986).

3/ It would be more appropriate to use permanent income as a proxy for welfare or capability to escape poverty. Since there exists no reliable measure of permanent income, we have used household consumption expenditure, which is regarded as a more suitable measure of the household's economic welfare than the current income.

the income distribution and thus fits poorly to the actual data.

In the present paper we used a general interpolation device proposed by Kakwani (1980). This method utilizes, within each expenditure range, a separate, continuous differentiable function which exactly fits to the data points. The inequality and poverty measures are then computed by linking this function. We used a polynomial of the third degree to represent the Lorenz curve within each income class, except the first and the last open-ended classes. For the first and last expenditure ranges, a Pareto curve is used as a further refinement.[4/]

In this paper we used per capita household expenditure as a measure of household economic welfare.[5/] Expenditure comprises all expenditures incurred by the household exclusively on domestic account including consumption out of home-grown produce or out of transfer receipts like gifts, loans, etc. The expenditure on household enterprises is excluded from consumer expenditure. Consumption out of home-grown produce is evaluated at

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4/ It is not clear from the NSS whether the food given to poorer households (often permanent laborers) by richer households (large rural landowners and employers) gets "counted into" the consumption of the richer households. If this is so, the estimates of poverty and inequality will be overestimated. The fitting of the Pareto curve for the first and last expenditure ranges does not remedy this situation. The curve is used only as an interpolation device because information on individual households is not available.

5/ A better measure of household welfare will of course be the per equivalent adult consumption which corrects for the differing needs of adults and children. But this measure could not be employed because the NSS data were available only in grouped form (the groups formed on the basis of per capita household expenditure). We could have remedied this only by asuming that the ranking of households by per capita consumption is the same as that by consumption per equivalent adult. This assumption which is unlikely to hold will result in more serious estimation errors.

ex-farm rates. Ideally, one should include the depreciated value of consumer durables which are in stock in the household. Because of non-availability of information on stock values, the monetary value of consumer durables acquired during the reference period is included in the total expenditure. This may in some cases distort the results on consumption inequality.

When the index of household welfare is constructed, the next step is to determine the welfare of the individuals in the households. In this paper individual welfare was derived by assigning every individual in a household a welfare value equal to the per capita consumption for that household (Kakwani 1986). If there are severe intrahousehold inequities in the distribution of food and non-food items, poverty and inequality will both be underestimated. This problem could not be corrected because of non-availability of information concerning the intra-household distribution of resources.

Once we have decided upon a suitable index of economic welfare for individuals, the next step is to find a threshold welfare level below which an individual is poor. In the present paper we have used two poverty lines. The Planning Commission (1979) has defined poverty threshold as the per capita monthly expenditure of Rs49.09 in rural India at 1973-74 rural prices. Following the Planning Commission, we adopted a round figure of Rs50 as our first poverty line. This poverty line corresponds roughly to the per capita expenditure which a typically-structured, typically-spending household exactly meets its per capita daily requirement of 2,400 calories in rural areas. Our second poverty line is equal to the per capita consumption of households of less than 80 percent of the Planning Commission's poverty threshold of Rs50. We define the households whose per capita consumption is below Rs40 per month

as "ultra-poor"; those whose physical personal maintenance is unstable (Lipton 1988). The ultra-poor cut off point of Rs40 corresponds closely to the poverty line used by Bardhan (1970) and Dandekar and Rath (1971), which is Rs15 at 1960-61 prices (this line at 1973-74 rural prices is equivalent to the per capita expenditure of Rs42.5).

To compare poverty across different time periods, one needs to adjust the distributions given in current prices for price changes over time. Minhas (1970) and Dandekar and Rath (1971) used the national income deflator, which has been criticized by Bardhan (1974). This deflator does not reflect the prices which people actually pay for their consumption goods. We have followed Bardhan in using the Consumer Price Indices for Agricultural Labourers (CPIAL) prepared by the Labor Bureau. This index, constructed on the basis of the monthly retail prices of 75 consumer items collected from selected rural centers, uses the consumption pattern of rural agricultural labour households observed in 1956-57. A major objection that has been raised against this index is that the agricultural labor households constitute only about 30 percent of the total rural population and the remaining 70 percent of the rural households which constitute a large number of poor small farmers may have a quite different consumption pattern (Minhas, et al 1987). This objection is, of course, relevant but Bardhan (1974) has observed that the consumption patterns of agricultural labor households are not very different from those of the other household groups in the rural areas.

Recently, Minhas, et al (1987) have constructed a new price index which depicts the movement of consumer prices for the entire rural population. An attractive feature of this index is that it is based on the

consumption patterns observed in more recent years than the CPIAL. This index has been made available only recently for individual states. In the present paper we decided to use the consumer price index for agricultural labourers because it is the only index available for the most recent years 1986-87 for which the poverty estimates are presented here. Also since majority of the poor in rural India are agricultural labourers, their consumption bracket will be closer to that of the poor.[6/]

Minhas, et al (1987) have applied the index to compute the incidence of poverty in the entire rural and urban areas of India for 5 different periods ranging from 1970-71 to 1983. They performed the poverty computations on the All India expenditure distributions which are published by the NSS separately for rural and urban areas. These aggregate distributions are derived from the state distributions by means of population weighted averages. This procedure of obtaining the aggregate distributions is not satisfactory because of widely observed differences in price levels in different states. The expenditures in current prices given for each state have to be adjusted for state-wise price differences before they can be aggregated. Since this procedure was not adopted in the Minhas, et al study, their All India estimates of rural poverty are inaccurate notwithstanding the advance made on the construction of a new price index.

To obtain comparable poverty levels across different states, we need

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6/ Gaiha (1989) points out that since agricultural labourers are typically net buyers of food, the CPIAL can be expected to provide a close approximation to the prices confronting the net buyers of food among the rural poor.

relative price levels in the rural areas of different states in a given year. Bhattacharya and Chatterjee (1974) worked out these state-wise price relatives for the year 1963-64, which also formed the basis for the Bardhan (1973) study. These price relatives were for the entire rural population. In the present paper we have used the price relatives (obtained from Minhas 1989) which were based on the weighting diagram of the middle group of the rural population. These estimates were considered more appropriate for estimating

Table 1: Consumer Price Index For Agricultural LABOURERS and State Specific Price Relatives

States	Price Relatives	Consumer Price Indices			
	60-61	73-74	77-78	83	86-87
ANDHRA PRADESH	100.9	242	297	426	484
ASSAM	110.8	260	315	508	606
BIHAR	102	337	341	545	594
GUJARAT	112.1	246	285	429	530
HARYANA	104.7	273	332	497	602
JAMMU-KASHMIR	104.2	263	342	505	618
KARNATAKA	98.6	275	308	490	557
KERALA	106.6	276	317	531	665
MADHYA PRADESH	93.8	309	345	506	585
MAHARASHTRA	105.5	276	320	482	581
ORISSA	97.9	322	351	555	616
PUNJAB	104.7	273	332	497	602
RAJASTHAN	103.3	284	327	459	565
TAMIL NADU	108.2	242	306	496	575
UTTAR PRADESH	94.6	303	336	506	593
WEST BENGAL	116	276	321	512	607
ALL INDIA	100	283	323	511	578

Source : For Price Relatives : Minhas and Jain (1989)
and for Consumer Price Indices :Monthly Abstract of Statistics

Table 2: State Specific Poverty Lines for Rural Areas

(Rupees per person per month at current prices)

States	Poor				Ultra Poor			
	73-74	77-78	83	86-87	73-74	77-78	83	86-87
ANDHRA PRADESH	43.2	53.0	76.0	86.3	34.5	42.4	60.8	69
ASSAM	50.9	61.7	99.5	118.7	40.7	49.3	79.6	94.9
BIHAR	60.8	61.5	98.3	107.1	48.6	49.2	78.6	85.7
GUJRAT	48.7	56.4	85.0	104.9	39	45.1	68	83.9
Haryana	50.5	61.4	92.0	111.4	40.4	49.1	73.6	89.1
Jammu-Kashmir	48.4	63.0	93.0	113.8	38.7	50.4	74.4	91
KARNATAKA	47.9	53.7	85.4	97.0	38.3	42.9	68.3	77.6
KERALA	52.0	59.7	100.1	125.3	41.6	47.8	80	100.2
MADHYA PRADESH	51.2	57.2	83.9	97.0	41	45.7	67.1	77.6
MAHARASHTRA	51.5	59.7	89.9	108.3	41.2	47.7	71.9	86.6
ORISSA	55.7	60.7	96.0	106.6	44.6	48.6	76.8	85.2
Punjab	50.5	61.4	92.0	111.4	40.4	49.1	73.6	89.1
RAJISTHAN	51.9	59.7	83.8	103.2	41.5	47.8	67	82.5
TAMIL NADU	46.3	58.5	94.8	109.9	37	46.8	75.8	87.9
UTTAR PRADESH	50.7	56.2	84.6	99.2	40.5	44.9	67.7	79.3
WEST BENGAL	56.6	65.8	104.9	124.4	45.2	52.6	83.9	99.5
ALL INDIA	50.0	57.1	90.3	102.1	40	45.6	72.2	81.7

the incidence of rural poverty (Minhas 1989). Using these price relatives and the CPIAL available at the state level (see Table 1) we worked out the state-specific poverty lines at the current prices for the years 1973-74, 1977-78, 1983, and 1986-87 (see Table 2).[7/]

The poverty line varies substantially across the states as well as over time, due entirely to differences in prices. For instance, West Bengal

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7/ We performed calculations for both 1972-73 and 1973-74 years but in the present paper the results are presented only for 1973-74 because this was a normal agricultural year.

has the highest poverty line for each of the 5 years; it means that West Bengal is the most expensive state for the poor to live. It also had the highest inflation rate particularly over the 1977-78 to 1983 period.

The incidence of rural poverty for each state was first computed using the state-specific poverty lines given in Table 1. The poverty for All India rural level was then derived from the rural poverty levels computed at the state levels. The trends in inequality and poverty at the All India rural level are discussed in the next section.

3. TRENDS IN INEQUALITY AND POVERTY: ALL INDIA RURAL

Having decided upon the poverty line, we next compute poverty indices which would measure the intensity of poverty. The head-count measure, while widely used, is a crude poverty index because it does not take account of the income-gap among the poor. If the degree of misery suffered by an individual is proportional to the income shortfall of that individual from the poverty line, then the sum total of these shortfalls may be considered an adequate measure of poverty. Such a measure is called the poverty gap ratio and can be written as:

$$g = \int_0^z g(x)f(x)dx = H(z-\mu^*)/z \qquad (3.1)$$

where $g(x) = \frac{(z-x)}{z}$, z being the poverty line, f(x) is the density function of income x, H is the head-count ratio and μ^* is the mean consumption of the poor.

The measure g will provide adequate information about the intensity of poverty if all the poor are assumed to have exactly the same income, which is less than the poverty line. In practice, the income among the poor is unequally distributed and, therefore, g cannot be an adequate measure of poverty. To make g sensitive to the income inequality among the poor Sen (1976) proposed a poverty measure which led to a large theoretical literature on the measurement of poverty.[8/] The main difficulty with Sen's measure is

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8/ See for instance Kakwani (1980), Clark, Hemming and Ulph (1981), Foster, Greer and Thorbecke (1984) and Takayama (1979).

that it is not additively decomposable. It is, therefore, awkward to compute its value for the All India rural population using the state level rural expenditure distributions. Moreover, additively decomposable poverty measures are useful because they allow assessment of the effects of changes in sub-group poverty upon total poverty.

In 1968, Watts proposed an additively decomposable poverty measure which can be obtained by substituting g(x) = (logz-logx) in (3.1):

$$W = \int_0^z (\log z - \log x) f(x) dx \qquad (3.2)$$

Although this is not a well-known measure, it is simple to compute and has all the important attributes: it satisfies Sen's monotonicity and transfer axioms and also Kakwani's (1986) transfer-sensitivity axiom. It is also closely related to income inequality. If, instead of z, we use μ, (the mean income of the entire population), and evaluate the integral (3.2) over the whole range of x, we obtain:

$$T = \int_0^\infty (\log \mu - \log x) f(x) dx \qquad (3.3)$$

which is one of Theil's (1967) two inequality measures. An attractive feature of this measure is that it can be expressed as the sum of the between and within group inequalities.

In the present exercise we have used only additively decomposable poverty and inequality measures. These measures have been employed to derive poverty and inequality in each of the 16 major states of India. The results

Table 3: Per Capita Real Consumption,Inequality and Poverty
Rural India 1973-74 to 1986-87

Indicators	73-74	77-78	83	86-87	Annual Growth Rates(%) 73-74 to 77-78	77-78 to 83	83 to 86-87	73-74 to 86-87
Per Capita Real Consumer Expenditure	51.6	56.5	62.5	67	2.3	1.9	2	2
Theil's Inequality Measure								
Within state inequality	12.3 (93.2)	15.6 (91.2)	13.6 (88.3)	14.5 (92.9)	6.1	-2.5	1.8	1.3
Between state inequality	0.9 (6.8)	1.5 (8.8)	1.8 (11.7)	1.1 (7.1)	13.6	3.4	-13.1	1.6
Total inequality	13.2 (100)	17.1 (100)	15.4 (100)	15.6 (100)	6.7	-1.9	0.4	1.3
Poor								
Head-count ratio(%)	60.5	56.2	47.7	41.5	-1.8	-2.9	-3.9	-2.9
Number of poor(millions)	270.7	271.1	253.4	233	0	-1.2	-2.4	-1.1
Poverty gap ratio(%)	18.8	17.4	13.4	10.5	-1.9	-4.6	-6.7	-4.4
Ultra poor								
Head-count ratio(%)	41.2	38	29.6	23.8	-2	-4.4	-6	-4.1
Number of poor(millions)	184.7	183.5	157.6	134	-0.2	-2.7	-4.5	-2.4
Poverty gap ratio(%)	10.6	9.9	7.1	5	-1.7	-5.9	-9.5	-5.6

obtained from individual states have then been aggregated to obtain the All India situation.9/

Table 3 presents the empirical results on inequality and poverty measures aggregated over the rural areas of 16 major states. Average consumption per capita rose by 2.3 percent per annum from 1977-78 and then the growth rate stabilized at around 2 percent per annum.

The total inequality in per capita consumption (measured by Theil's index) rose dramatically from 1973-74 to 1977-78, but fell from 1977-78 to 1983. However, from 1983 to 1986-87, inequality did not change significantly.10/

Between state inequality contributed 6.8 percent to the total inequality in 1973-74, which means that the within-state inequality is the major determinant of the inequality at the All India level. This suggests that policies aimed at redistribution of income and assets within the poorer states such as Bihar deserve greater emphasis. The share of between-state inequality grew, however, from 6.8 percent to 11.7 percent between 1973-74 and 1983, but fell dramatically to 7.1 percent between 1983 and 1986-87. Thus, the between state disparities in average living standards have shown a tendency to decrease over the most recent period. But this phenomenon is

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9/ It is worth repeating that this procedure, unlike the procedures adopted by many previous researchers, appropriately takes account of the regional price variations while deriving poverty at the All India level.

10/ It needs to be stressed that these are rural growth and inequality trends. These changes trigger off changes in urban growth and inequality - an aspect not examined in this paper.

accompanied by an increase in the within-State inequality, and, consequently, the net increase in the total inequality was negligible.

Aggregate poverty in the sixteen major states has declined quite substantially from 1973-74 to 1986-87. The percentage of poor has decreased from 60.5 in 1973-74 to 41.5 in 1986-87. The poverty gap ratio which takes into account not only the percentage of poor but also the consumption gaps of the poor, fell even faster. Even the absolute number of rural poor has declined substantially, from 270.7 million in 1973-74 to 233 million in 1986-87. These figures demonstrate India's substantial achievements in poverty reduction, particularly in the 1980s.

Further, poverty ratios for ultra poor fell to a greater extent than for the poor. From 1983 to 1986-87, the head-count ratio for the poor fell by 3.9 percent, but for the ultra poor by 6.0 percent. The trends in poverty gap ratio and Watts measures are similar. In general, the reduction in poverty is more for the ultra-poor than for the poor, and the magnitudes of reduction in poverty are higher after 1977-78 than before. This is interesting, because 1973-74 to 1977-78 was a period of higher growth (2.3 percent) with increasing inequality; 1977-83 was characterized by somewhat slower per capita growth of consumption (1.9 percent) but with a substantial decrease in within-state inequality. This decrease in inequality was the major factor behind the substantial reduction in poverty from 1977-78 to 1983. After 1983, the inequality did not change significantly, but growth at 2 percent led to an even greater reduction in poverty.

While no significant changes in the pattern of growth would be observed as between 1973-74/1977-78 and 1977-78/1983, the latter period

witnessed a spate of direct anti-poverty interventions. If this strategy were working with reasonable efficiency, one would expect a reduction in consumption inequality after 1977-78. This is indeed noticeable during the period from 1977-78 to 1983 in Table 3. Can it be attributed to the anti-poverty programs which started around 1977-78? Why then was there not a further reduction in inequality observed after 1983? To answer this and other related questions we need to analyze poverty trends at a disaggregated (state) level. This is done in the following sections.

4. STATE-WISE TRENDS IN AVERAGE CONSUMPTION PER CAPITA AND INEQUALITY

State-wise trends in average consumption per capita are shown in Table 4. From 1973-74 to 1977-78, all states except Assam and Maharashtra showed a positive trend. That trend continued from 1977-78 to 1986-87 except for Bihar from 1977-78 to 1983 and Karnataka from 1983 to 1986-87. Kerala's performance has been consistently good; its per capita consumption increased at an annual rate of 3 percent for the entire period (1973-74 to 1986-87). This is not surprising because Kerala received substantial overseas

Table 4:Trends in Rural Real Consumption Per Capita at 1973-74 Prices

States	Per Capita Consumption "(Rupees/month)				Annual Growth Rates (%)			
	73-74	77-78	83	86-87	73-74 to 77-78	77-78 to 83	83 to 86-87	73-74 to 86-87
ANDHRA PRADES	58.7	65.8	76.5	81.6	2.9	2.8	1.9	2.6
ASSAM	51.1	48.3	56.5	58.9	-1.4	2.9	1.2	1.1
BIHAR	46.1	46.7	46.2	54.8	0.3	-0.2	5	1.3
GUJARAT	56	62.3	71.6	72.8	2.7	2.6	0.5	2
HARYANA	71.8	75.2	82.9	89.2	1.2	1.8	2.1	1.7
JAMMU-KASHMIR	54.8	57.9	69.4	75.9	1.4	3.3	2.6	2.5
KARNATAKA	54.6	60.5	68.3	66.6	2.6	2.2	-0.7	1.5
KERALA	53.3	62.2	72.2	78.1	3.9	2.7	2.3	3
MADHYA PRADES	49.1	52.4	59.4	62.9	1.6	2.3	1.6	1.9
MAHARASHTRA	50.8	48.5	61.1	62.8	-1.2	4.3	0.8	1.6
ORISSA	38.3	43.2	51.5	53.6	3.1	3.2	1.1	2.6
PUNJAB	74.8	93.2	93.1	95.1	5.7	0	0.6	1.9
RAJASTHAN	61.7	70.6	76.2	76.2	3.4	1.4	0	1.6
TAMIL NADU	51.6	54.1	57	63.7	1.2	1	3.2	1.6
UTTAR PRADESH	50.6	60	60.3	70	4.4	0.1	4.4	2.5
WEST BENGAL	42	45.1	48.6	55.9	1.8	1.4	4.1	2.2
ALL INDIA	51.6	56.5	62.5	67	2.3	1.9	2	2

remittances during this period.[11/]

Table 5 presents the ranking of states by rural per capita consumption. The results show that Kerala has substantially improved its relative position from 9 in 1973-74 to 13 in 1986-87. The two largest states Madhya Pradesh and Utter Pradesh have also improved their relative position. The states whose relative position has deteriorated are Assam, Bihar, Gujarat, Rajasthan and Karnataka. The remaining states maintained more or less the same ranking.

Table 5 : Ranking of States by Rural Real Per Capita Consumption

States	Ranks			
	73-74	77-78	83-84	86-87
ANDHRA PRADESH	13	13	14	14
ASSAM	7	4	4	4
BIHAR	3	3	2	2
GUJARAT	12	12	11	10
HARYANA	15	15	15	15
JAMMU-KASHMIR	11	8	10	11
KARNATAKA	10	10	9	8
KERALA	9	11	12	13
MADHYA PRADESH	4	6	6	6
MAHARASHTRA	6	5	8	5
ORISSA	1	1	1	1
PUNJAB	16	16	16	16
RAJASTHAN	14	14	13	12
TAMIL NADU	8	7	5	7
UTTAR PRADESH	5	9	7	9
WEST BENGAL	2	2	3	3

11/ Whether or not these rural trends reflect state average real consumption per head depends on the trend in rural-urban inequality by state - an aspect not examined in this paper.

We now turn to trends in inequality in rural per capita consumption. These are shown in Tables 6 and 7. Table 6 presents the levels and annual percentage change in inequality measured by the Gini index, and Table 7 by Theil's measure.12/

of

Table 6 : State-wise Patterns in Inequality/Per Capita Consumption
Gini Index 1973-74 to 1986-87

States	Gini Index (%)				Annual Growth Rates (%)			
	73-74	77-78	83	86-87	73-74 to 77-78	77-78 to 83	83 to 86-87	73-74 to 86-87
ANDHRA PRADESH	29.4	30.2	29.6	31	0.7	-0.4	1.3	0.4
ASSAM	20.9	18.8	19.8	21.5	-2.6	0.9	2.4	0.2
BIHAR	28	26.2	25.9	25	-1.6	-0.2	-1	-0.9
GUJARAT	24	29	25.7	30.6	4.8	-2.2	5.1	1.9
HARYANA	29.8	29.5	27.7	29.3	-0.3	-1.1	1.6	-0.1
JAMMU-KASHMIR	23.2	22.7	22.6	28.1	-0.5	-0.1	6.4	1.5
KARNATAKA	28.6	32.5	30.3	28.8	3.2	-1.3	-1.4	0.1
KERALA	34.6	35.8	33.7	34.7	0.9	-1.1	0.8	0
MADHYA PRADESH	29.2	33.5	29.6	31.4	3.5	-2.2	1.7	0.6
MAHARASHTRA	27	29.4	28.7	29.9	2.2	-0.4	1.2	0.8
ORISSA	26.7	30.5	27	27.3	3.4	-2.2	0.3	0.2
PUNJAB	27.8	31.4	28.7	30.2	3.1	-1.6	1.5	0.6
RAJASTHAN	27.5	32.9	34.5	30.3	4.6	0.9	-3.6	0.7
TAMIL NADU	27.5	32.3	29.4	30.3	4.1	-1.7	0.9	0.7
UTTAR PRADESH	24.3	30.4	29.4	30.7	5.8	-0.6	1.2	1.8
WEST BENGAL	30.1	29.6	28.3	24.3	-0.4	-0.5	-4.7	-1.6

12/ In Maharashtra and Rajasthan in 1977-78 there was an implausibly large increase in expenditures on durables for the highest expenditure class; consultations with the NSS office confirmed that these were errors. We therefore adjusted the numbers to conform broadly to the temporal changes in the same states in the years immediately preceding and following 1977-78. The inequality estimates shown in Tables 6 and 7 reflect these adjustments. Since these were required only in the top expenditure range, they would have little effect on the poverty estimates.

Table 7 : State-wise Patterns in Inequality Per Capita Consumption
Theil Index 1973-74 to 1986-87

States	Theil Index (%)				Annual Growth Rates (%)			
	73-74	77-78	83	86-87	73-74 to 77-78	77-78 to 83	83 to 86-87	73-74 to 86-87
ANDHRA PRADESH	14.6	15.7	14.4	18	1.8	-1.6	6.6	1.6
ASSAM	7.2	6.2	6.4	7.6	-3.7	0.6	5	0.4
BIHAR	13	11.3	11	9.9	-3.4	-0.5	-3	-2.1
GUJARAT	9.4	13.9	10.9	18.9	10.3	-4.3	17	5.5
HARYANA	14.3	14.7	12	14	0.7	-3.6	4.5	-0.2
JAMMU-KASHMIR	8.6	8.7	8.4	13.3	0.3	-0.6	14	3.4
KARNATAKA	13.4	17.7	15	13.6	7.2	-3	-2.8	0.1
KERALA	16.6	21.5	18.9	20.5	6.7	-2.3	2.3	1.6
MADHYA PRADESH	13.8	19.5	14.2	16.8	9	-5.6	4.9	1.5
MAHARASHTRA	11.8	14.2	13.3	15.3	4.7	-1.2	4.1	2
ORISSA	11.4	15.7	12.2	12.4	8.3	-4.5	0.5	0.6
PUNJAB	12.3	19.2	13.4	15.1	11.8	-6.3	3.5	1.6
RAJASTHAN	12.9	18.3	19.7	15	9.1	1.3	-7.5	1.2
TAMIL NADU	12.1	19.3	14.1	15.2	12.4	-5.5	2.2	1.8
UTTAR PRADESH	9.5	15.5	14.1	15.3	13	-1.7	2.4	3.7
WEST BENGAL	15.1	14.6	13.9	11.6	-0.8	-0.9	-5	-2
ALL INDIA	13.2	17.1	15.4	15.6	6.7	-1.9	0.4	1.3

Source : NSS Various Rounds

The results show a wide variation in inequality across states as well as over time. In 11 out of 16 states, inequality measured by the Gini index increased, from 1973-74 to 1977-78. Theil's measure, which gives greater weight to income transfers at the bottom end of the distribution than the Gini index, shows that the inequality increased in 13 out of 16 states. Two states where inequality declined significantly are Assam and Bihar. However, this situation changed dramatically from 1977-78 to 1983, when 14 out of 16 states showed a decrease in inequality (all but Assam and Rajasthan). In the most recent period between 1983 and 1986-87, inequality increased in 12 states.

Was the widespread decline in inequality from 1977-78 to 1983 - especially in the states with better rural administration - due to the major policy change in the late 1970s, with the introduction of anti-poverty programs? The main objective of these programs was to raise the consumption levels of the poor. It is possible that this policy contributed towards an overall reduction in consumption inequality. Conversely, was the increase in inequality in many states from 1983 to 1986-87 due to a shift of emphasis towards growth-supporting policies with little emphasis on income redistribution? This and other relationships between consumption, inequality and poverty are investigated in the next section.

5. CORRELATES OF CONSUMPTION PER CAPITA AND INEQUALITY

The linear regression and correlation techniques are commonly used to measure relationships between variables. The relationships involving consumption, inequality and poverty are often non-linear and consequently the correlation coefficient which measures the deviations from the linearity may invariably show that the variables are either not related or weakly related. To take into account the non-linear features of these variables, some authors estimate linear regressions after applying some non-linear transformation of the original data. Since the exact forms of non-linear relationships are not known, one may wrongly conclude the existence or non-existence of these relationships. In these situations, the best procedure is to use the rank transformation procedures which have been found to be robust and powerful (Conover and Iman 1981). In this section we use Spearman's rank correlation coefficient to test whether there exists a relationship between any two variables. The test statistic

$$t = \frac{\rho \sqrt{n-2}}{\sqrt{1-\rho^2}}$$

where ρ being the rank correlation is distributed approximately as student's to distribution with (n-2) degrees of freedom. This approximation suggested by Pitman (1937) has been shown to perform better than the usual normal approximation (Iman and Conover 1978).

It must be stressed that we do not make any attempt to establish a causal relationships between the variables. Such an attempt would require a

more sophisticated model for which we do not have sufficient number of observations. Our purpose is limited to testing the hypothesis whether there exists a significant association between the variables. If the association is found to be statistically insignificant, it would most likely imply a non-existence of causal relationship. But if the association is statistically significant, it would only mean monotonicity in the relationship between variables. One would then require further investigations to establish causation.

In this section we apply the above methodology to investigate the correlates of consumption, inequality and related variables. Table 8 presents the correlates of per capita real consumption and inequality.

One of the important issues in development economics is whether there exists a relationship between per capita income levels and its inequality (Kuznets 1955). Much has already been written on this issue and we do not need to explore it in detail. The correlations between per capita real consumption and Gini index suggest that the association between the two is positive and significant only in the 1986-87 period. In other years the association is insignificant at 5 percent level. The states with higher average per capita consumption tended to have a greater degree of inequality in 1986-87. Since this relationship holds only for one period, one can not, therefore, say in general whether the higher per capita consumption will necessarily lead to higher inequality.

The next question of interest is whether the growth in per capita consumption is associated with the percentage change in inequality. The correlations in Table 8 suggest that this association is positive and

Table 8:Correlates of Per Capita Real Consumption and Inequality

Variables	Period	Correlation	t-Value
Per Capita Consumpion	73-74		
Gini Index	73-74	-0.07	-0.3
	77-78		
	77-78	0.29	1.1
	83		
	83	0.29	1.1
	86-87		
	86-87	0.54	2.7*
Per Capita Consumpion	73-74		
Gini Index	73-74	0.06	0.2
	77-78		
	77-78	0.36	1.5
	83		
	83	0.28	1.1
	86-87		
	86-87	0.51	2.3*
Per Capita Consumpion	73-74		
% Change in Per Capita Consumpio	73-74 to 77-78	0.27	1
	77-78		
	77-78 to 83	0.04	0.2
	83		
	83 to 86-87	-0.5	-2.2*
Gini Index	73-74		
% Change in Gini Index	73-74 to 77-78	-0.2	-0.8
	77-78		
	77-78 to 83	-0.5	-0.2
	83		
	83 to 86-87	-0.54	-2.2*
Theil's Index	73-74		
% Change in Theil Index	73-74 to 77-78	-0.16	-0.6
	77-78		
	77-78 to 83	-0.57	-2.2*
	83		
	83 to 86-87	-0.5	-2.1*

Table 8: Continued			
% Change in Per Capita Consumpio	73-74 to 77-78		
% Change in Theil Index	73-74 to 77-78	0.6	2.8*
	77-78 to 83		
	77-78 to 83	0.28	1.1
	83 to 86-87		
	83 to 86-87	-0.2	-0.8
Per Capita Food Production	73-74		
Gini Index	73-74	0.1	0.4
	77-78		
	77-78	0.3	1.2
	83		
	83	0.2	0.8
	86-87		
	86-87	0	0
Inflation Rate	73-74 to 77-78	-0.3	-1.2
% Change in Gini Index	73-74 to 77-78		
	77-78 to 83		
	77-78 to 83	-0.1	-0.4
	83 to 86-87		
	83 to 86-87	0.3	1.2
% Change in Gini Index	73-74 to 77-78		
% Change in Per Capita Food Prod	73-74 to 77-78	-0.14	-0.5
	77-78 to 83		
	77-78 to 83	-0.19	-0.7
	83 to 86-87		
	83 to 86-87	-0.27	-1
% Change in Per Capita Consumpio	73-74 to 77-78		
% Change in Per Capita Food Prod	73-74 to 77-78	-0.21	-0.8
	77-78 to 83		
	77-78 to 83	-0.06	-0.2
	83 to 86-87		
	83 to 86-87	0.63	2.4

significant only in the first period (1973-74 to 1977-78). The adverse effects of growth on inequality is not evident in the two subsequent periods. As argued above, although the factors that may have contributed to the virtual absence of this relationship in the subsequent periods are difficult to establish empirically, it is at the same time difficult to dismiss entirely the role of anti-poverty interventions introduced in this period especially because the scale and delivery of this effort stood in contrast to the piece-meal efforts of the past.

Next, we examine whether the richer states (in terms of per capita consumption) were growing faster, i.e., whether the initial level of per capita consumption is related to growth. The correlations (Table 8) suggest that the relationship is insignificant in the first two periods, but became significant from 1983 to 1986-87, with a negative sign, suggesting that the richer states tended to grow more slowly in this period. This is consistent with our earlier observation of declining between-states disparity in the average per capita consumption in this period.

Was the percentage change in inequality higher or lower in the states with already high levels of inequality? The relationship between the level of inequality and the percentage change in it was found to be insignificant in the first period 1973-74 to 1977-78, but was statistically significant with subsequent periods with a negative sign. From 1977-78 to 1986-87, the states with higher levels of inequality tended to have smaller increases (or larger decreases) in inequality.

Recently, there has been a considerable discussion on the impact of price changes on poverty (Mellor and Desai, 19..). Our results show no

significant relationship between the two variables. This appears counter-intuitive. A large majority of the poor are landless labourers, and are net purchasers of their subsistence requirements from the market, so that inflation would almost certainly hurt them and, ceteris paribus, lead to higher inequality. Quite clearly, the effect of price changes on inequality are complex and only well-specified price-endogenous models can help establish causality. We can, however, explore a simpler relationship. To what extent the state-wise changes in inequality over time be explained by the changes in per capita foodgrains production? For agricultural production, 1983 was an excellent year. Foodgrain production increased from 129.4 million tonnes in 1982-83 to 152.4 million tonnes in 1983-84.

Since we are concerned with inequality in rural areas, we computed per capita food production by dividing the total food production by rural population. The results do not suggest the existence of any relationship between per capita food production and inequality. This conclusion seems to hold for all years. We also correlated percentage change in per capita food production and percent change in inequality. Again, the results suggest no significant relationship between them. Thus, the higher growth rate of per capita food production does not necessarily imply a larger decline in inequality. In other words, the widespread decline in inequality between 1977-78 to 1983 could not be attributable to the larger increases in per capita food production as such. Probably the anti-poverty programs introduced around 1977 played an important role in reducing inequality.

6. REGIONAL TRENDS IN POVERTY

The regional trends in poverty for the poor and ultra poor for head-count and poverty gap ratios are presented in Tables 9 to 12. The last four columns in each of these tables present the annual percent change in poverty. Since the results on Watts' measure followed the same pattern as the head-count ratio, we did not present them.

From 1973-74 to 1977-78, the head-count ratio, both for the poor and ultra poor was reduced in 13 states; the two states where both increased were Assam (3.2 percent) and Maharashtra (2.1 percent). The head-count ratio for the ultra poor increased in Tamil Nadu (2 percent). Between 1977-78 and 1983, poverty incidence fell in all states except in Bihar. The decline in poverty was wider and more widespread than from 1973-74 to 1977-78. The same conclusion emerges whatever poverty measure is used.

From 1983 to 1986-87, poverty declined in 12 out of 16 states; exceptions being Gujarat, Haryana, Jammu-Kashmir and Karnataka. The increase in poverty is due to the increase in inequality in three states where the Gini index rose sharply. To the extent that the proportion of arid regions are high in Gujarat and Karnataka, region-specific climatic factors have also contributed to a rise in poverty.

Tables 13 and 14 rank states by head-count and poverty gap ratios for both poor and ultra poor (in ascending order of poverty), respectively. There has been substantial change in the ranking. The states which have considerably improved their relative poverty position over the whole period are Andhra Pradesh, Jammu-Kashmir, and Kerala. These results corroborate with trends in nutritional status of the ultra poor (Subbarao, 1989), which showed an improvement in these states during 1970-80.

Table 9:Trends in Head-count Ratio for Rural Poor by States "1973-74 to 1986-87

States	Head-count Ratio(%)				Annual Growth Rates (%)			
	73-74	77-78	83	86-87	73-74 to 77-78	77-78 to 83	83 to 86-87	73-74 to 86-87
ANDHRA PRADES	52.1	41.9	29.5	27.1	-5.3	-6.2	-2.4	-4.9
ASSAM	56.8	64.4	45.1	42.3	3.2	-6.3	-1.8	-2.2
BIHAR	69.2	67.1	68	53.3	-0.8	0.2	-6.7	-2
GUJARAT	50	44.6	29.2	32.2	-2.8	-7.4	2.8	-3.3
HARYANA	37.2	30.3	20.5	22.6	-5	-6.9	2.8	-3.8
JAMMU-KASHMIR	53.9	46.5	25.5	27	-3.6	-10.3	1.6	-5.2
KARNATAKA	56.6	50.8	38.7	39.5	-2.7	-4.8	0.6	-2.7
KERALA	60.9	52.5	40.1	35	-3.6	-4.8	-3.8	-4.2
MADHYA PRADES	65.1	64.3	51	49.3	-0.3	-4.1	-1	-2.1
MAHARASHTRA	61.2	66.4	47.7	46.5	2.1	-5.8	-0.7	-2.1
ORISSA	78.6	74.6	58.4	56.7	-1.3	-4.4	-0.8	-2.5
PUNJAB	29	18.4	15.4	15.3	-10.8	-3.2	-0.2	-4.8
RAJASTHAN	46.5	38.6	36	31.7	-4.5	-1.3	-3.6	-2.9
TAMIL NADU	60.6	60.5	55.8	44.8	0	-1.5	-6.1	-2.3
UTTAR PRADESH	59.9	51.3	49	38.6	-3.8	-0.8	-6.6	-3.3
WEST BENGAL	75.6	71.3	65	50.8	-1.5	-1.7	-6.8	-3
ALL INDIA	60.5	56.2	47.7	41.5	-1.8	-2.9	-3.9	-2.9

Table 10:Trends in Head-count Ratio for Rural Ultra Poor by States "1973-74 to 1986-87

States	Head-count Ratio(%)				Annual Growth Rates (%)			
	73-74	77-78	83	86-87	73-74 to 77-78	77-78 to 83	83 to 86-87	73-74 to 86-87
ANDHRA PRADESH	30.3	24.1	13.9	12.1	-5.6	-9.5	-3.9	-6.8
ASSAM	28.5	33.5	19	19.9	4.1	-9.8	1.3	-2.7
BIHAR	50	47.2	48.4	34.7	-1.4	0.5	-9.1	-2.8
GUJARAT	27.3	26.9	11.6	19.4	-0.4	-14.2	15.8	-2.6
HARYANA	19.3	14.4	8.6	8.1	-7.1	-8.9	-1.7	-6.5
JAMMU-KASHMIR	30.2	22.4	8.8	11.7	-7.2	-15.6	8.5	-7
KARNATAKA	38.9	34	24.1	23.3	-3.3	-6.1	-1	-3.9
KERALA	43.1	37.1	22.6	17.7	-3.7	-8.6	-6.7	-6.6
MADHYA PRADESH	48.2	46.9	31.2	28.5	-0.7	-7.1	-2.6	-4
MAHARASHTRA	41	48.3	28.7	29.2	4.2	-9	0.5	-2.6
ORISSA	65	58	37.5	36.6	-2.8	-7.6	-0.7	-4.3
PUNJAB	14.6	7.8	6.2	5.1	-14.5	-4.1	-5.4	-7.8
RAJASTHAN	27	23.7	21.8	16.6	-3.2	-1.5	-7.5	-3.7
TAMIL NADU	39.8	43.1	38.8	28.3	2	-1.9	-8.6	-2.6
UTTAR PRADESH	40	31.8	30.3	21.4	-5.6	-0.9	-9.5	-4.7
WEST BENGAL	59.4	54.3	45.7	27.1	-2.2	-3.1	-13.9	-5.9
ALL INDIA	41.2	38	29.6	23.8	-2	-4.4	-6	-4.1

Table 11:Trends in Poverty Gap Ratio for Rural Poor by States "1973-74 to 1986-87

States	Poverty Gap Ratio(%)				Annual Growth Rates (%)			
	73-74	77-78	83	86-87	73-74 to 77-78	77-78 to 83	83 to 86-87	73-74 to 86-87
ANDHRA PRADESH	14.1	11	6.5	6	-6	-9.1	-2.3	-6.4
ASSAM	13.8	14.5	8.7	8.7	1.2	-8.9	0	-3.5
BIHAR	23.3	21.5	21.8	14.2	-2	0.3	-11.5	-3.7
GUJARAT	12.2	12.1	5.5	8.6	-0.2	-13.4	13.6	-2.7
HARYANA	8.8	7	3.9	4.1	-5.6	-10.1	1.4	-5.7
JAMMU-KASHMIR	12.9	10	4.3	5.3	-6.2	-14.2	6.2	-6.6
KARNATAKA	16.7	15.8	10.6	10.7	-1.4	-7	0.3	-3.4
KERALA	20.4	17.2	10.1	8.3	-4.2	-9.2	-5.5	-6.7
MADHYA PRADESH	21.6	21.6	14	12.6	0	-7.6	-3	-4.1
MAHARASHTRA	18.6	22.1	12.5	12.05	4.4	-9.8	-1	-3.3
ORISSA	31.3	28	17.55	16.4	-2.7	-8.1	-1.9	-4.9
PUNJAB	6.4	4	2.8	2.7	-11.1	-6.3	-1	-6.4
RAJASTHAN	12.1	11	10	7.4	-2.4	-1.7	-8.2	-3.7
TAMIL NADU	18.2	19.5	17.9	12.6	1.7	-1.5	-9.5	-2.8
UTTAR PRADESH	16.8	14.1	13.4	9.5	-4.3	-0.9	-9.4	-4.3
WEST BENGAL	29.1	25.5	21.6	12.6	-3.2	-3	-14.3	-6.2
ALL INDIA	18.8	17.4	13.4	10.5	-1.9	-4.6	-6.7	-4.4

Table 12:Trends in Poverty Gap Ratio for Rural Ultra Poor by States "1973-74 to 1986-87

States	Poverty Gap Ratio(%)				Annual Growth Rates (%)			
	73-74	77-78	83	86-87	73-74 to 77-78	77-78 to 83	83 to 86-87	73-74 to 86-87
ANDHRA PRADESH	7.2	5.5	2.8	2.7	-6.5	-11.6	-1	-7.3
ASSAM	6.2	5.7	2.9	3.2	-2.1	-11.6	2.9	-5
BIHAR	14.1	12.5	12.6	6.6	-3	0.1	-16.9	-5.7
GUJARAT	5.5	6.2	1.9	4.4	3	-19.3	27.1	-1.7
HARYANA	3.8	3	1.4	1.4	-5.7	-12.9	0	-7.4
JAMMU-KASHMIR	5.5	3.81	1.3	1.8	-8.8	-17.8	9.7	-8.2
KARNATAKA	8.9	8.9	5.4	5.4	0	-8.7	0	-3.8
KERALA	12.3	10.3	4.7	3.9	-4.3	-13.3	-5.2	-8.8
MADHYA PRADESH	12.7	12.9	7.1	5.9	0.4	-10.3	-5.2	-5.7
MAHARASHTRA	10.2	13.2	6	6	6.7	-13.4	0	-4
ORISSA	21.2	18.3	10	8.5	-3.6	-10.4	-4.5	-6.8
PUNJAB	2.9	1.9	0.96	0.94	-10	-11.7	-0.6	-8.3
RAJASTHAN	6	6	5.2	3.3	0	-2.6	-12.2	-4.5
TAMIL NADU	10	11.3	10.4	6.7	3.1	-1.5	-11.8	-3
UTTAR PRADESH	8.3	7.1	6.8	4.2	-3.8	-0.8	-12.9	-5.1
WEST BENGAL	19.3	16	12.9	6.1	-4.6	-3.8	-19.3	-8.5
ALL INDIA	10.6	9.9	7.1	5	-1.7	-5.9	-9.5	-5.6

Computed from
Source : NSS Various Rounds

An important finding is that whatever way poverty is measured, all states (with no exception) show a considerable improvement in poverty reduction between 1973-74 to 1986-87. While the poverty reduction was more widespread between 1977-78 to 1983, the magnitudes of reduction were large in many poorer states (such as Bihar, Tamil Nadu, Uttar Pradesh and West Bengal) from 1983 to 1986-87. However, the movement in poverty incidence and inequality in different states and over time are irregular. This is to be expected. Indeed the purpose of regional disaggregation is to capture these differences.

What explains these differences and changing patterns? Much of this is of course driven by climatic factors and state specific policies - growth promoting and/or inequality reducing. It is difficult to empirically disentangle them and establish their relative role in different states. However, it is worth mentioning a few unique circumstances specific to some states, to underscore the point that our statewise results, despite being irregular, are yet in conformity with our knowledge of the changing situation in the states.

Maharashtra's impressive performance in poverty reduction in the 1977-78 to 1983 period (especially with respect to the ultra poor) is to be attributed to the states' Employment Guarantee Scheme. Kerala combined a fortuitous situation of overseas remittances with a wide-ranging state action equalizing access to food, health care and minimum wages and social security to landless agricultural labourers. From 1973-74 to 1983 growth performance was impressive in Andhra Pradesh, Gujarat, Karnataka, Orissa, and Rajasthan.

Table 13 : Ranking of States by Head Count Ratio Rural Poor and Ultra Poor

States	Head-count Poor				Head-count Ultra poor			
	73-74	77-78	83	86-87	73-74	7-78	83	86-87
ANDHRA PRADESH	5	4	5	4	7	5	5	4
ASSAM	8	12	9	10	5	8	6	8
BIHAR	14	14	16	15	14	13	16	15
GUJARAT	4	5	4	6	4	6	4	7
HARYANA	2	2	2	2	2	2	2	2
JAMMU-KASHMIR	6	6	3	3	6	3	3	3
KARNATAKA	7	7	7	9	8	9	9	10
KERALA	11	9	8	7	12	10	8	6
MADHYA PRADESH	13	11	12	13	13	12	12	13
MAHARASHTRA	12	13	10	12	11	14	10	14
ORISSA	16	16	14	16	16	16	13	16
PUNJAB	1	1	1	1	1	1	1	1
RAJASTHAN	3	3	6	5	3	4	7	5
TAMIL NADU	10	10	13	11	9	11	14	12
UTTAR PRADESH	9	8	11	8	10	7	11	9
WEST BENGAL	15	15	15	14	15	15	15	11

Source : NSS Various Rounds

Table 14 : Ranking of States by Poverty Gap Ratio Rural Poor and Ultra Poor

States	Poverty Gap Poor				Poverty Gap Ultra-poor			
	73-74	77-78	83	86-87	73-74	7-78	83	86-87
ANDHRA PRADESH	7	4	5	4	7	4	5	4
ASSAM	6	8	6	8	6	5	6	5
BIHAR	14	12	16	15	14	12	15	14
GUJARAT	4	6	4	7	4	7	4	9
HARYANA	2	2	2	2	2	2	3	2
JAMMU-KASHMIR	5	3	3	3	3	3	2	3
KARNATAKA	8	9	9	10	9	9	9	10
KERALA	12	10	8	6	12	10	7	7
MADHYA PRADESH	13	13	12	14	13	13	12	11
MAHARASHTRA	11	14	10	11	11	14	10	12
ORISSA	16	16	13	16	16	16	13	16
PUNJAB	1	1	1	1	1	1	1	1
RAJASTHAN	3	5	7	5	5	6	8	6
TAMIL NADU	10	11	14	12	10	11	14	15
UTTAR PRADESH	9	7	11	9	8	8	11	8
WEST BENGAL	15	15	15	13	15	15	16	13

Source : NSS Various Rounds

By contrast from 1973-74 to 1983, the two large states of Bihar and Tamil Nadu have had neither an impressive record of economic growth nor substantial interventions providing social security which explains their slow progress in poverty reduction.

From 1983 to 1986-87, the three major eastern states - Uttar Pradesh, Bihar and West Bengal - have substantially reduced their poverty incidence. In our view, this is largely attributable to the Intensive Rice Production Programme that led to the emergence of HYV rice as a second crop in many districts in the eastern Gangetic belt. West Bengal, however, combined production thrusts with state action protecting tenants, improving public distribution system and other anti-poverty programs by revitalizing local, decentralized institutions.

Interestingly, Assam's relative position is considerably higher on the basis of ultra poverty than the total poverty. This discrepancy is attributable to a very low degree of inequality in the predominantly tribal state of Assam. That appears to favour the ultra poor more than the poor.

Table 15 presents the correlates of poverty. First, we ask the question whether poverty declined faster in the poorer or richer states. The correlates indicate that the relationship between head-count ratio and percentage change in head-count ratio was positive and significant at the 5 percent level in the first period (1973-74 to 1977-78), but not in the second period (1977-78 to 1983). In the first period, the rate of reduction in poverty (but not ultra poverty) tended to be smaller in the poorer states. In the second period (1977-78 to 1983), the poorer states did neither better nor worse than the others, whether in reducing poverty or ultra poverty.

Table 15:Correlates of Poverty

Variables	Period	Correlation	t-Value
Head-count Ratio(Poor)	73-74		
% Change in Head-count Ratio	73-74 to 77-78	0.7	2.9*
	77-78		
	77-78 to 83	0.28	1.2
	83		
	83 to 86-87	-0.72	-2.9*
Head-count Ratio(Ultra Poor)	73-74		
% Change in Head-count Ratio	73-74 to 77-78	0.37	1.5
	77-78		
	77-78 to 83	0.25	1
	83		
	83 to 86-87	-0.53	-2.3*
Poverty Gap Ratio(Poor)	73-74		
% Change in Poverty Gap Ratio	73-74 to 77-78	0.34	1.4
	77-78		
	77-78 to 83	0.27	1.1
	83		
	83 to 86-87	-0.77	-3.2*
Inflation Rate	73-74 to 77-78		
% Change in Poverty Gap Ratio	73-74 to 77-78	-0.2	-0.8
	77-78 to 83		
	77-78 to 83	0.2	0.8
	83 to 86-87		
	83 to 86-87	0.4	1.5
Head-count Poor	73-74		
Per Capita Food Production	73-74	-0.5	-2.2*
	77-78		
	77-78	-0.5	-2.2*
	83		
	83	-0.6	-2.8*
	86-87		
	86-87	-0.3	-1.2

Head-count(Ultra Poor)	73-74		
Per Capita Food Production	73-74	-0.5	-2.2*
	77-78		
	77-78	-0.4	-1.6
	83		
	83	-0.5	-2.2*
	86-87		
	86-87	-0.3	-1.2
Poverty Gap(Poor)	73-74		
Per Capita Food Production	73-74	-0.4	-1.6
	77-78		
	77-78	-0.3	-1.2
	83		
	83	-0.5	-2.2*
	86-87		
	86-87	-0.3	-1.2
% Change in Head-count Poor	73-74 to 77-78		
% Change in Per Capita Food Prod	73-74 to 77-78	-0.3	-0.1
	77-78 to 83		
	77-78 to 83	-0.19	-0.7
	83 to 86-87		
	83 to 86-87	-0.34	-1.3
% Change in Head-count Ultra Poor	73-74 to 77-78		
% Change in Per Capita Food Prod	73-74 to 77-78	-0.07	-0.3
	77-78 to 83		
	77-78 to 83	-0.19	-0.7
	83 to 86-87		
	83 to 86-87	-0.49	-1.9

Interestingly, in the most recent period (1983 to 1986-87) the relationship became significantly negative, i.e., poverty and even more ultra poverty fell faster in the poorer states. As already noted, the principal impetus for downward movement in poverty in the poorer eastern states may have come from growth in the form of a second rice crop. To gain further insight on this issue, the effect of growth and changing inequality on poverty reduction are separated in the next section.

Finally, we examine whether or not there exists an inverse relationship between rural poverty and agricultural performance as postulated by Ahluwalia (1978, 1985). His analysis of individual states did not conclusively support this proposition. The correlations in Table 15 suggest that the inverse relationship between poverty and per capita food production is significant for head-count ratio for the poor in the first three periods, viz., 1973-74, 1977-78 and 1983. In the most recent period, the relationship becomes insignificant. For the ultra poor, the relationship is significant only in the first and the third period. But if we measure poverty by head-count ratio, the relationship is significant only in the third period, i.e., 1983. There appears to be no systematic relationship between either extent or intensity of poverty and foodgrain production per capita. Yet, do changes in foodgrain production induce systematic downward movements in the extent and intensity of poverty? To examine this, we correlated the percentage change in per capita food production, and the percentage change in poverty. Again, there is no relationship between the two. For analyzing the role of agriculture in explaining poverty, the present as well as past formulations in terms of per capita foodgrain production and poverty are clearly inadequate. We need to examine the growth and instability of the agricultural sector, region-wise, and then look for patterns in the geographical distribution of the poor and the ultra poor population. This is done in Section 9.

7. IMPACT OF ECONOMIC GROWTH AND INEQUALITY ON POVERTY

Suppose θ, a poverty index, which is a function of 3 factors: (1) poverty line income, z; (2) mean per capita consumption, μ; and, (3) inequality of consumption. Inequality can be measured by a single inequality index (many of which are available in the literature), but more generally it is represented by the parameters of the Lorenz curve. If the poverty line z is fixed, we can write

$$d\theta = \frac{\partial \theta}{\partial \mu} d\mu + \sum_{i=1}^{k} \frac{\partial \theta}{\partial m_i} dm_i \qquad (7.1)$$

where $m_1, m_2, \ldots m_k$ are the parameters of the Lorenz curve. This decomposes the change in poverty into: (1) the impact of growth when the distribution of income does not change, and (2) the effect of income redistribution when the total income of the society remains unchanged.

If consumption per capita is growing, the first component in (7.1) will always be negative. If there is any "trickle-down" mechanism at work, the second component in (7.1) is non-positive.[13/] It may be so even if inequality has increased during the observation period. We now estimate each of the two components of (7.1) in order to assess the extent of "trickle-down"

13/ Generally, economists talk of "trickle-down" when there is a reduction in poverty, howsoever small, for any positive growth in per capita income or consumption. According to this definition, the inequality component can be negative as long as its adverse effect on poverty is smaller than the pure growth effect. A non-positive value of inequality effect will imply that the poor are receiving benefits at least equal to the growth rate. Thus, our definition of "trickle-down" is somewhat more demanding.

in each state and at all-India level.

Initial inequality may itself reduce growth (i.e., because able people are too poor to compete or to train for jobs that they would do better than the wealthy), or increase it (i.e., because the average propensity to save increases faster than income per person). Our analysis does not answer these questions. Our concern is limited to expost assessment of the impact, on poverty reduction in different states, of whatever growth has taken place. However, if changes in inequality early in a period - say between 1977 and 1979 - cause changes in growth later (say 1979-83), then our estimates of the impact of growth upon poverty will be biased. Notwithstanding this limitation, due to our inability to capture this and other aspects of simultaneity - and hence causality - our analysis strongly complements previous attempts (e.g., Ahluwalia 1985) which focussed on regressing poverty on agricultural output per capita.

The decomposition given in (7.1) is a linear approximation. Since the poverty measures are non-linear, there will be an interaction term which will be equal to the residual of total change in poverty and growth and inequality effects. We compute each of these components after taking into account the non-linear nature of poverty measures. The procedure is as follows:

Let H_1 and H_2 be the head-count ratios for the first and second periods, respectively; the proportionate change in poverty will be $(H_2 - H_1)/H_1$. The pure growth effect on poverty, as computed here, simply assumes unchanged relative distribution - all people's real consumption rise as fast as average per capita consumption in each state. Thus, the Lorenz curve in

both periods is the same; only the mean consumption has changed. Suppose $L_1(p)$ is the Lorenz curve in the first period and μ_2 the real mean consumption in the second period, then H_2^* given by

$$L_1'(H_2^*) = \frac{z}{\mu_2}$$

will be the head-count ratio in the second period. Thus, the growth effect on poverty will be given by $\left(\frac{H_2^* - H_1}{H_1}\right.$, which will be negative (positive) if μ_2 is greater (less) than μ_1 (the mean consumption in the first period). Similarly, to compute the impact of income redistribution, we assume zero growth of real mean consumption per person, but the Lorenz curve changed from $L_1(p)$ to $L_2(p)$. Then H_3^* given by

$$L_2'(H_3^*) = \frac{z}{\mu_1}$$

will be the head-count ratio in the second period under the assumption that the mean income remained the same in the two periods. Thus, the inequality effect on poverty will be given by $\frac{H_3^* - H_1}{H_1}$, which will be negative (positive) if $L_2(p)$ is greater (less) than $L_1(p)$ for all p in the range $0 \leq p \leq 1$. If the two curves $L_1(p)$ and $L_2(p)$ cross, then we cannot a priori determine the sign of the inequality impact.

The total percentage change in poverty is given by $\frac{H_2 - H_1}{H_1}$. Because of the non-linear nature of the relationships involved, the total effect may not be equal to the sum of growth and inequality effects.

The numerical estimates of the growth and inequality effects on head-count ratio are presented in Tables 16 and 17 for the poor and the ultra poor, respectively. Tables 18 and 19 show the estimates of these effects on the poverty gap ratio for the poor and the ultra poor, respectively.

At the All India level total poverty declined at an annual rate of 1.8 percent between 1973-74 and 1977-78. If the inequality as measured by the Lorenz curve had not changed between the two periods, the poverty would have declined at an annual rate of 3.0 percent. Thus, the change in the relative distribution which occurred between 1973-74 and 1977-78 resulted in an increase in poverty at an annual rate of 0.8 percent. Thus, a less than proportionate share of the benefits of high growth rates during this period trickled down to the poor.

From 1977-78 to 1983, total poverty declined annually at 2.9 percent. This faster decline in poverty occurred despite a slightly lower growth in the per capita consumption observed in this period. However, the impact of growth on poverty continues to be high at -2.2 percent. The change in the distribution contributed to a modest reduction in poverty at an annual rate of 0.3 percent - the opposite impact to that of the earlier period. In the absence of anti-poverty interventions in the earlir period, one could have concluded that the trickle down effects of growth were more dominant in the second period. However, the inequality-reduction in this period could instead be due in part to their possible greater success in 1977-78 to 1983 than in 1973-74 to 1977-78. Although the growth rate in the 1983 to 1986-87 period was 2 percent per annum, not very different from that in the 1977-78 to 1983 period, it led to a substantial reduction in poverty of 4.6 percent per annum,

Table 16 : Annual Percentage Change in Head-count Ratio for Rural Poor Growth,Inequality and Total Effects

States	73-74 to 77-78			77-78 to 83			83 to 86-87		
	Growth	'Ineq	Total	Growth	'Ineq	Total	Growth	'Ineq	Total
ANDHRA PRADES	-5.9	-0.3	-5.3	-6.2	0.3	-6.2	-5.3	2.9	-2.4
ASSAM	2.5	-0.1	3.2	-7.2	0.3	-6.3	-3.5	1.1	-1.8
BIHAR	-0.4	-0.4	-0.8	0.2	0	0.2	-6.9	-0.1	-6.7
GUJRAT	-5.7	1.8	-2.8	-5.2	-1.2	-7.4	-1.6	4	2.8
Haryana	-1.9	-2.2	-5	-4.4	-1.2	-6.9	-7.2	8.2	2.8
Jammu-Kashmir	-2.3	-0.3	-3.8	-9.6	0.6	-10.2	-10.8	8.1	1.6
KARNATAKA	-3.7	0.8	-2.7	-3.4	-1.1	-4.8	1.5	-0.4	0.6
KERALA	-5.3	0.6	-3.6	-3.9	-0.2	-4.8	-4.8	0.4	-3.8
MADHYA PRADES	-1.7	1.4	-0.3	-2.8	-0.8	-4.1	-2.9	1.9	-1
MAHARASHTRA	1.2	0.6	2.1	-5.8	0	-5.8	-1.4	0.5	-0.7
ORISSA	-2.4	0.8	-1.3	-0.7	-0.4	-4.4	-2.2	5.8	-0.8
Punjab	-15.8	3.7	-10.8	0.1	-3.2	-3.2	-2.1	1.8	-0.2
RAJISTHAN	-7.4	1.9	-4.5	0	1.4	-1.3	0	-3.6	-3.6
TAMIL NADU	-1.6	1.5	0	-1.2	-0.1	-1.5	-4.4	-1.8	-6.1
UTTAR PRADESH	-6.7	2	-3.8	-0.2	-0.7	-0.8	-8.2	1.3	-6.6
WEST BENGAL	-1.6	0.1	-1.5	-1.3	-0.3	-1.7	-5.7	-0.7	-6.8
ALL INDIA	-3	0.8	-1.8	-2.2	-0.3	-2.9	-4.6	0.8	-3.9

Table 17 :Annual Percentage Change in Head Count Ratio for Rural Ultra Poor:Growth,Inequality and Total Effects

States	73-74 to 77-78			77-78 to 83			83 to 86-87		
	Growth	'Ineq	Total	Growth	'Ineq	Total	Growth	'Ineq	Total
ANDHRA PRADES	-8	1.8	-5.6	-8.3	-0.3	-9.5	-7	3.5	-3.9
ASSAM	6.7	-1.6	4.1	-11.6	1.7	-9.8	-5.7	5.6	1.3
BIHAR	-0.6	-0.9	-1.4	0.3	0.1	0.5	-10.5	0.3	-9.1
GUJRAT	-8.3	6.5	-0.4	-7	-4.2	-14.2	-2.3	17.3	15.8
Haryana	-3.8	-1.3	-7.1	-6.4	-2	-8.9	-10.6	9.7	-1.7
Jammu-Kashmir	-4.4	-1.7	-7.2	-15.4	-0.8	-15.6	-15.4	19.3	8.5
KARNATAKA	-6.2	1.8	-3.3	-5.3	-1.4	-6.1	1.5	-3	-1
KERALA	-7.8	2.7	-3.7	-5.9	-1.5	-8.6	-7	0.3	-6.7
MADHYA PRADES	-3	2	-0.7	-4.6	-1.8	-7.1	-4.5	2.1	-2.6
MAHARASHTRA	2.6	2	4.2	-8.8	0	-9	-2.4	2.9	0.5
ORISSA	-3.7	1	-2.8	-1.1	-1.6	-7.6	-2.8	10.4	-0.7
Punjab	-29.5	5.7	-14.5	0	-4.1	-4.1	-2.4	-2.9	-5.4
RAJISTHAN	-8.9	4.7	-3.2	0	2.1	-1.5	0	-7.5	-7.5
TAMIL NADU	-2.4	4.2	2	-1.8	-0.1	-1.9	-7	-2.4	-8.6
UTTAR PRADESH	-12.6	3.9	-5.6	-0.2	-0.7	-0.9	-11.6	2.1	-9.5
WEST BENGAL	-2.6	0.4	-2.2	-2.3	-0.7	-3.1	-7.8	-3.3	-13.9
ALL INDIA	-4.4	1.9	-2	-3.1	-0.7	-4.4	-6.8	1.3	-6

Table 18 :Annual Percentage Change in Poverty Gap Ratio for Rural Poor
Growth,Inequality and Total Effects

States	73-74 to 77-78			77-78 to 83			83 to 86-87		
	Growth	'Ineq	Total	Growth	'Ineq	Total	Growth	'Ineq	Total
ANDHRA PRADES	-8	1.4	-6	-7.9	-0.7	-9.1	-6.7	4.2	-2.3
ASSAM	4.3	-3.8	1.2	-10.7	1.3	-8.9	-4.9	4.6	0
BIHAR	-0.7	-1.3	-2	0.4	-0.2	0.3	-10.8	-0.4	-11.5
GUJRAT	-8.4	6.7	-0.2	-7	-4.5	-13.4	-2.1	15.1	13.6
Haryana	-3.6	-2.1	-5.6	-5.9	-3.4	-10.1	-8.1	10.9	1.4
Jammu-Kashmir	-4.6	-2.2	-6.2	-13.9	-0.6	-14.2	-12.5	16.8	6.2
KARNATAKA	-6.4	4.1	-1.4	-5.2	-1.8	-7	1.8	-1.7	0.3
KERALA	-8.2	3	-4.2	-5.9	-2.3	-9.2	-6.8	1.1	-5.5
MADHYA PRADES	-3.4	3.1	0	-4.8	-2.3	-7.6	-4.3	1.6	-3
MAHARASHTRA	2.5	2	4.4	-9.2	-0.2	-9.8	-2.1	2	-1
ORISSA	-4.8	1.9	-2.7	-1.3	-1.9	-8.1	-2.8	9.3	-2
Punjab	-18	7	-11.1	0.4	-6.3	-6.3	-2.1	1	-1
RAJISTHAN	-9.5	5.9	-2.4	-3.6	1.7	-1.7	-0.3	-8.2	-8.2
TAMIL NADU	-2.9	4.1	1.7	-2.1	0.5	-1.5	-7	-2.5	-9.5
UTTAR PRADESH	-11.9	5.7	-4.3	-0.3	-0.7	-0.9	-11.6	2.1	-9.4
WEST BENGAL	-3	-0.2	-3.2	-2.5	-8.2	-3	-8.5	-4.5	-14.3
ALL INDIA	-4.6	2.3	-1.9	-3.3	-1.6	-4.6	-6.7	1.1	-6.7

Table 19:Annual Percentage Change in Poverty Gap Ratio for Rural Ultra Poor
Growth,Inequality and Total Effects

States	73-74 to 77-78			77-78 to 83			83 to 86-87		
	Growth	'Ineq	Total	Growth	'Ineq	Total	Growth	'Ineq	Total
ANDHRA PRADES	-9.2	2.7	-6.5	-9.4	-1.7	-11.6	-6.7	5.7	-1
ASSAM	5.6	-8.7	-2.1	-14.6	2.4	-11.6	-6.4	8.8	2.9
BIHAR	-0.9	-2.2	-3	0.6	-0.4	0.1	-14.1	-0.9	-16.9
GUJRAT	-10.1	12.1	3	-9	-9	-19.3	-3.1	28.7	27.1
Haryana	-5	-1.3	-5.7	-6.3	-5.5	-12.9	-11.9	10.7	0
Jammu-Kashmir	-6.5	-3.9	-8.8	-18.9	-1.5	-17.8	-16.2	25.8	9.7
KARNATAKA	-9	7.3	0	-6.1	-2.1	-8.7	2.1	-2.7	0
KERALA	-10.2	4.9	-4.3	-7.3	-4.5	-13.3	-8.8	2.9	-5.2
MADHYA PRADES	-4.6	4.6	0.4	-6.3	-3.5	-10.3	-5.6	0.8	-5.2
MAHARASHTRA	3.5	3.3	6.7	-12.1	-0.6	-13.4	-3	2.8	0
ORISSA	-6.8	2.4	-3.6	-1.8	-3	-10.4	-3	11	-4.5
Punjab	-35.6	8.4	-10	0	-12.7	-11.7	-5.1	1.2	-0.6
RAJISTHAN	-12	10	0	-4	1.7	-2.6	0	-12.2	-12.2
TAMIL NADU	-3.4	6.6	3.1	-2.9	1.1	-1.5	-8.6	-3.1	-11.8
UTTAR PRADESH	-17.2	9.9	-3.8	-0.3	-0.5	-0.8	-14.7	2.8	-12.9
WEST BENGAL	-3.8	-0.5	-4.6	-3.3	-10.1	-3.8	-10.4	-7.8	-19.3
ALL INDIA	-5.6	3.8	-1.7	-4	-2.3	-5.9	-9	0.4	-9.5

dwarfing the effect of the increase in inequality (which increased poverty annually at 0.8 percent). Although the poor did not receive full benefits of growth, the poverty reduced at an impressive annual rate of 3.9 percent between 1983 and 1986-87. It seems that the structure of distribution has changed in 1983 (from that in 1977-78) so that the poverty has become more responsive to the growth rate. This change has occurred because the distribution in per capita consumption became more equal in 1983, probably as a result of anti-poverty programs. If this is the case, inequality reducing policies followed intensively in the 1977-78 to 1983 period may have enhanced the favorable effect of growth on poverty in the subsequent period. Another explanation is that the pattern and regional distribution of growth from 1983-87 was more labor-absorbing and hence poverty-reducing than in the past. From 1983-87, there has indeed been a substantial agricultural growth in states with high concentration of poverty (Bihar, Uttar Pradesh and West Bengal). This led to modest reductions in inequality in two states, and substantial reduction in poverty in all the three states. This suggests that regional relocation of production in favor of the poorer states is greatly desirable from a poverty alleviation point of view, even if the overall, all-India inequality may not show any decline.

India's experience suggests that increasing inequality does reduce progress in poverty reduction. It retarded poverty reduction in many states from 1973-74 to 1977-78. The reduction in poverty occurred only because rapid growth more than compensated the adverse effects of increasing inequality on the poor. The effect of inequality on poverty was especially high and unfavorable in Gujarat, Madhya Pradesh, Punjab, Rajasthan, Tamil Nadu, Uttar

Pradesh, and to some extent, Karnataka and Orissa. However, this situation changed from 1977-78 to 1983 when reduction in inequality as well as the growth process benefited the poor proportionally more than the non-poor in all states except Andhra Pradesh, Assam, Jammu-Kashmir and Rajasthan.

From 1983 to 1986-87, increases in inequality had high and unfavorable effect on poverty in Andhra Pradesh, Gujarat, Haryana, Jammu-Kashmir and Orissa. The damage was modest in Kerala and Punjab. In Rajasthan, Tamil Nadu and West Bengal, the inequality reduction reduced poverty quite substantially. Many states witnessed high growth rates in per capita consumption which led to a substantial reduction in poverty. Per capita consumption did not increase in Rajasthan but inequality declined significantly to induce a net reduction in the total poverty.

The above decomposition was also done for the ultra poverty. Broadly, the direction of results and inter-state differences remain the same. However, growth seems to benefit the ultra poor proportionately more than the poor; conversely a rise in inequality seem to hurt the ultra poor more than the poor. These results hold good irrespective of the measure used for decomposition (see Tables 18 and 19 for results with poverty gap measure).

8. RESPONSIVENESS OF POVERTY TO GROWTH AND INEQUALITY CHANGES

Even if growth is trickling down, because of initial high inequality levels the effect on poverty may be small. To see how growth in real consumption per head affects poverty, we computed the poverty elasticities with respect to the mean per capita consumption. These growth elasticities of poverty (GEPs) have been derived by Kakwani (1989) for all the existing poverty indices. The GEPs used in the present paper are:

$$\text{Head-count ratio} - \frac{z\, f(z)}{H}$$

$$\text{Poverty-gap ratio} - \frac{\mu^*}{(z-\mu)^*}$$

$$\text{Watts' measure} - \frac{H}{W}$$

where W represents Watts' measure, H is the head-count ratio, and μ^* is the mean per capita consumption of the poor.

The computation of poverty elasticity with respect to inequality is more difficult because keeping per capita consumption constant, inequality in distribution can change in infinite ways. To compute this elasticity we need to make an assumption as to how inequality is changing; for instance, whether inequality is increasing by the decreasing the share of the poor or increasing the share of the rich. Increasing the share of the rich has little effect on poverty whereas decreasing the share of the poor will substantially increase poverty. In this section we simply assume that the entire Lorenz curve shifts according to the following formula:

$$L^{*}(p) = L(p) - \lambda[p-L(p)] \qquad (8.1)$$

which implies that when $\lambda > 0$, the Lorenz curve shifts downwards resulting in higher inequality. It can be shown that λ is equal to the proportional change in the Gini index. If $\lambda = 0.01$, it means that the Gini index is increased by 1 percent. Thus, one can derive the elasticity of a poverty measure with respect to the Gini index using this procedure.[14/] This elasticities for the three poverty measures used here are:

Head-count ratio - $\frac{(\mu-z)}{H} f(z)$

Poverty-gap ratio - $\frac{(\mu-\mu^{*})}{(z-\mu)^{*}}$

Watts' measure - $\frac{H}{W} \frac{(\mu-h)}{h}$

where h is the harmonic mean of the income distribution of the poor only.

The inequality elasticities of the poverty-gap ratio and Watts measures will always be positive, i.e., the higher income inequality leads to greater poverty. For the head-count measure this result is not always true. If and only if $\mu < z$, the head-count measure can decrease with an increase in inequality. This result casts down on the usefulness of the head-count measure for analyzing the impact of inequality on poverty.

[14/] Kakwani (1989) has provided the explicit expressions of this elasticity for all the additively decomposable poverty measures.

Because the mean consumption and inequality each affect poverty, an important question arises: What is the trade off between them? Put differently, we may ask, if the Gini index of the real private consumption increases by 1 percent, what would be the percentage increase in the mean real per capita consumption for poverty not to increase at all? This can be answered with the concept of the marginal proportional rate of substitution (MPRS) between mean consumption and inequality.[15/] It is given by:

$$\text{MPRS} = \frac{\partial \mu}{\partial G}\frac{G}{\mu} = -\frac{\text{inequality elasticity of poverty}}{\text{growth elasticity of poverty}}$$

which can be computed for each poverty measure.

Tables 20 and 21 present the growth and inequality elasticities for the poverty-gap ratio for the poor and ultra poor, respectively. The values of MPRS for the poverty-gap ratio are presented in Table 22. The conclusions emerging from these tables are summarized below.

The magnitudes of both growth and inequality elasticities have a general tendency to increase over time, the increase being slower in the poorer states. Thus, the poverty ratio is becoming more responsive to the changes in the mean income and income inequality. In the two poorest states, viz., Bihar and West Bengal, the elasticities have not changed much between 1973-74 and 1983 suggesting fairly stable distributions. But in 1986-87, the magnitudes of elasticities have increased quite substantially even in these

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15/ See Kakwani (1989).

Table 20 : Growth and Inequality Elasticity of Poverty Gap Ratio
Rural Poor

States	Growth Elasticity				Inequality Elasticity			
	73-74	77-78	83	86-87	73-74	77-78	83	86-87
ANDHRA PRADES	-2.7	-2.8	-3.5	-3.5	1.6	2.2	3.4	3.9
ASSAM	-3.1	-3.4	-4.2	-3.9	1.1	0.8	1.7	1.9
BIHAR	-2	-2.1	-2.1	-2.8	0.8	0.8	0.9	1.4
GUJRAT	-3.1	-2.7	-4.3	-2.7	1.5	1.9	3.4	2.7
HARYANA	-3.2	-3.3	-4.3	-4.5	2.8	3.2	4.4	5.3
Jammu-Kashmir	-3.2	-3.7	-4.9	-4.1	1.4	1.7	3.3	3.6
KARNATAKA	-2.4	-2.2	-2.7	-2.7	1.3	1.7	2.3	2.2
KERALA	-2	-2.1	-3	-3.2	1.2	1.7	2.8	3.4
MADHYA PRADES	-2	-2	-2.6	-2.9	0.9	1.1	1.7	2
MAHARASHTRA	-2.3	-2	-2.8	-2.9	1.1	0.9	1.9	2
ORISSA	-1.5	-1.7	-2.3	-2.5	0.4	0.6	1.1	1.2
Punjab	-3.5	-3.6	-4.5	-4.7	3.2	5	5.7	6.1
RAJASTHAN	-2.8	-2.5	-2.6	-3.3	1.9	2.4	2.9	3.2
TAMIL NADU	-2.3	-2.1	-2.1	-2.6	1.1	1.3	1.6	2
UTTAR PRADESH	-2.6	-2.6	-2.7	-3.1	1	1.7	1.9	2.6
WEST BENGAL	-1.6	-1.8	-2	-3	0.6	0.7	1	1.5
ALL INDIA	-2.2	-2.2	-2.6	-3	-	-	-	-

Table 21: Growth and Inequality Elasticity of Poverty Gap Ratio
Rural Ultra Poor

States	Growth Elasticity				Inequality Elasticity			
	73-74	77-78	83	86-87	73-74	77-78	83	86-87
ANDHRA PRADES	-3.2	-3.4	-4	-3.5	3	3.8	5.5	5.7
ASSAM	-3.6	-4.9	-5.6	-5.2	2.3	2.2	3.7	3.9
BIHAR	-2.5	-2.8	-2.8	-4.3	1.5	1.6	1.7	2.9
GUJRAT	-4	-3.3	-5.1	-3.4	3	3.4	5.9	4.6
HARYANA	-4.1	-3.8	-5.1	-4.8	5	5.2	7.5	8.1
Jammu-Kashmir	-4.5	-4.9	-5.8	-5.5	3	3.6	6	6.8
KARNATAKA	-3.4	-2.8	-3.5	-3.3	2.6	3	4.2	3.9
KERALA	-2.5	-2.6	-3.8	-3.5	2.2	3	4.9	5.3
MADHYA PRADES	-2.8	-2.6	-3.4	-3.8	1.9	2.1	3.2	3.8
MAHARASHTRA	-3	-2.7	-3.8	-3.9	2.1	1.8	3.6	3.8
ORISSA	-2.1	-2.2	-2.8	-3.3	0.9	1.3	2.1	2.5
Punjab	-4	-3.1	-5.5	-4.4	5.4	6.5	9.5	8.5
RAJASTHAN	-3.5	-3	-3.2	-4	3.4	4	4.7	5.6
TAMIL NADU	-3	-2.8	-2.7	-3.2	2.2	2.3	2.8	3.5
UTTAR PRADESH	-3.8	-3.5	-3.5	-4.1	2.3	3.2	3.4	4.8
WEST BENGAL	-2.1	-2.4	-2.5	-3.4	1.2	1.4	1.9	2.8
ALL INDIA	-2.9	-2.8	-3.2	-3.8	-	-	-	-

Table 22: Marginal Rate of Substitution between Growth and Inequality Poverty Gap Ratio

States	Growth Elasticity				Inequality Elasticity			
	73-74	77-78	83	86-87	73-74	77-78	83	86-87
ANDHRA PRADES	0.6	0.8	1	1.1	0.9	1.1	1.4	1.6
ASSAM	0.4	0.2	0.4	0.5	0.6	0.4	0.7	0.8
BIHAR	0.4	0.4	0.4	0.5	0.6	0.6	0.6	0.7
GUJRAT	0.5	0.7	0.8	1	0.8	1	1.2	1.4
HARYANA	0.9	1	1	1.2	1.2	1.4	1.5	1.7
Jammu-Kashmir	0.4	0.5	0.7	0.9	0.7	0.7	1	1.2
KARNATAKA	0.5	0.8	0.9	0.8	0.8	1.1	1.2	1.2
KERALA	0.6	0.8	0.9	1.1	0.9	1.2	1.3	1.5
MADHYA PRADES	0.5	0.6	0.7	0.7	0.7	0.8	0.9	1
MAHARASHTRA	0.5	0.5	0.7	0.7	0.7	0.7	0.9	1
ORISSA	0.3	0.4	0.5	0.5	0.4	0.6	0.8	0.8
Punjab	0.9	1.4	1.3	1.3	1.4	2.1	1.7	1.9
RAJASTHAN	0.7	1	1.1	1	1	1.3	1.5	1.4
TAMIL NADU	0.5	0.6	0.8	0.8	0.7	0.8	1	1.1
UTTAR PRADESH	0.4	0.7	0.7	0.8	0.6	0.9	1	1.2
WEST BENGAL	0.4	0.4	0.5	0.5	0.6	0.6	0.8	0.8

two states. Fluctuations in poverty have become more sensitive to changes in growth and inequality in recent years.

The inequality elasticity has increased slightly faster than the growth elasticity in most states. This pattern is quite evident from the increasing values of the marginal proportionate rate of substitution (MPRS) presented in Table 22. This suggests that inequality-reducing policies have an important role to play to help the poor not to lose their share of consumption in the process of growth. It also suggests that greater, not lesser, growth orientation is also required to maintain, if not to improve, the consumption shares of the poor.

Since the values of MPRS are generally higher for the richer states, it would appear imperative to follow policies for reducing consumption inequality even in the high growing states.

Both growth and inequality elasticities are considerably higher for the ultra poor than for the poor implying that increasing inequality will hurt the ultra poor more than the poor. Also, growth benefits the ultra poor proportionately more than the poor. From the point of view of the ultra poor, it appears even more imperative to combine a high growth profile with an emphasis on policies aimed at reducing inequality in real consumption per capita. To this extent, the basic anti-poverty policy response in the form of public employment and asset (resource) augmenting programme for the ultra poor and the poor, appears to be sound. However, their effectiveness needs to be evaluated. This and other poverty alleviation strategies of the government are assessed in the following sections.

9. POVERTY ALLEVIATION POLICIES

The government's strategy for reducing the incidence of poverty is based on a combination of accelerated overall growth and targeted direct anti-poverty interventions. In the long run, the outlook for poverty reduction depends on: (a) the supply of, and the demand for, labor, and (b) on the social policies that help raise the basic capabilities of people, especially education and health. These aspects are analyzed below.

A. Policies for Labor Absorption

Given that the entrants to the labor force are unlikely to register a downward trend over the next three decades, the critical issues are: (i) to what extent can future growth in agriculture and outside agriculture absorb the growing labor force? and (ii) to what extent can direct interventions help in expanding self-employment and wage employment especially among the ultra poor?

(i) Agricultural Growth and Poverty

We noted earlier that Ahluwalia (1977, 1985) and, across regions, Rao, et al. (1988), established a close link between agricultural growth and poverty reduction. Table 23 gives the distribution of states classified by the differences in the rates and stability of agricultural growth. 65.1 percent of the nation's rural poor as well as 69.8 percent of ultra poor in 1983 lived in states with low or moderate rates of agricultural growth with medium or high instability. The regions experiencing high growth and those with medium growth and low instability account for only 28 percent of the poor

and 25 percent of the ultra poor.

Notwithstanding the lack of any systematic relationship, agricultural progress is important in poverty reduction. What then are the prospects with stabilizing yields of growth with stability in the lagging regions? Would an accelerated growth in these regions lead to adequate labor absorption?

Recent evidence suggests a fall in aggregate employment elasticity of agriculture over the 1970s (Bhalla 1987) but this is a composite estimate over diverse regions and crops. Employment elasticities with respect to output continue to be higher in the low-wage eastern states for all crops than in the rest of India. Diffusion of agricultural technology to the low-wage regions is bound to result in greater labor absorption. This is already happening in eastern Uttar Pradesh with the emergence of HYV rice as a major second crop, which may have a bearing on a substantial poverty reduction in these states between 1983 to 1986-87.

Accelerating agricultural growth in the eastern region calls for strengthening of the small farm sector by significant reorientation not only of institutional policies but also of science and technology policies. Technology and infrastructure policies have to focus on promotion of higher cropping intensities; institutional policies have to be geared to enhance their resource base, especially via consolidation of holdings, and credit and marketing reforms (C.H.H. Rao, S.K. Ray, K. Subbarao, 1989). These have to be combined with the spread of rural non-farm activities - dairying, poultry, fisheries, forestry and agro-processing. Progress on all these fronts has been far from satisfactory.

Table 23: Distribution of the Poor According to Levels of Growth and Instability in Foodgrains Production

Category	States	Percent of new sown area with rainfall			Percent share in			Number of agricultural workers per 100 hectares of net sown area, 1980-83
		High (1,150 mm and above)	Medium (750 mm to 1,150 mm)	Low (up to 750 mm)	Rural population, 1983	Poverty population, 1983	Ultra poor population	
1	2	3	4	5	6	7	8	9
I. High growth and low instability	Punjab, Jammu-Kashmir	5.3	20.5	74.2	3.3	1.2	0.8	85
II. High growth and medium instability	Haryana, Uttar Pradesh	8.4	64.1	27.5	19.7	19.1	18.7	148
III. High growth and high instability	Gujarat	7.3	25.0	67.7	4.6	2.8	1.8	83
IV. Medium growth and low instability	Andhra Pradesh	1.0	66.0	33.0	7.9	4.9	3.7	145
V. Medium growth and medium instability	Karnataka	9.4	24.3	66.3	5.1	4.1	4.2	95
VI. Medium growth and high instability	Maharashtra, Orissa, Rajasthan	25.0	24.1	50.9	17.7	17.4	17.3	87
VII. Low growth and low instability	Assam, Kerala	100.0	0.0	0.0	7.5	6.7	5.3	173
VIII. Low growth and medium instability	Tamil Nadu, West Bengal	54.2	45.8	0.0	14.0	18.0	20.3	188
IX. Low growth and high instability	Bihar, M.P.	63.5	33.5	3.0	20.2	25.6	28.0	130
	All India	30.7	35.8	33.5	100.0	100.0	100.0	120

Source: All columns except 8, C.H.H. Rao, S.K. Ray, and K. Subbarao (1988); column 8 was computed in this paper.

Note: Growth rate refers to the average foodgrains production growth rate for the period 1961-1985: High-above 3.0; Medium-2.0 to 3.0; Low-below 2.0. Instability refers to the standard deviation in the annual output growth rates of foodgrains for the period 1961-1985; High-above 20; Medium-15 to 20; Low-below 15.

(ii) Nonagricultural Growth and Poverty

In the long run, agriculture's share in employment is bound to fall, so that growth in manufacturing and service sector employment would be crucial in the coming decades. Past experience is very disappointing. Capital intensity in manufacturing was maintained by a policy environment that favored existing workers and hence throw many potential new entrants out of jobs. Industrial labor demand elasticity with respect to the wage from 1973-74 to 1984-85 was around -0.75, implying a significant trade-off between real wages and employment (Hanson and Sengupta, 1989). The rising real wage of organized labor in both public and private sectors in the 1980s has also contributed to slow growth of employment in manufacturing. Prospects for nonfarm employment depend on (a) fiscal and other measures to stimulate light labor-intensive industry including export industry, and (b) public policy to stimulate service sector (including rural informal sector). As of now, there has been no specific policy framework that encourages labor-intensive manufacturing and service and informal sectors.

(iii) Direct Anti-poverty Interventions

Since the mid-1970s, the central and the state governments have launched numerous direct anti-poverty interventions whose scale and variety is so vast that it is not possible to review them all in this paper.[16/] However,

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16/ The important direct interventions launched with the initiative of the central government are: Integrated Rural Development Program (IRDP), National Rural Employment Program (NREP), and the Rural Landless Employment Guarantee Program (RLEGP). There is also an important centrally-sponsored program for combating child and maternal malnutrition, i.e., the Integrated Child Development Services (ICDS). At the state level, the notable programs are: Maharashtra's Employment Guarantee Scheme (MEGS); public distribution systems in Kerala, Tamil Nadu, Gujarat, and Andhra Pradesh (Rs 2-a-kilo scheme); and Tamil Nadu Integrated Nutrition Project. With regard to each of these programs, there have been many evaluations and much debate (Subbarao, 1985, 1987a and 1989; Pulley).

since from 1977-78 to 1983, despite slower growth in average consumption per capita, the poverty ratio fell largely due to a decline in inequality in most states, we need to assess the role of anti-poverty programs initiated during this period. Any such assessment of their overall impact, however, must begin with the recognition of the fact that India is experimenting in many directions to reduce poverty-induced human suffering.

IRDP has been in operation long enough to be realistically evaluated. It has channelled unprecedented funds to enable the poor via loans and subsidies to obtain non-land assets. During the Sixth Plan period, assets worth some Rs 50 billion were created/distributed to about 17 million families -- a big achievement. During 1987-88, the fourth year of the Seventh Plan, another 4.2 million families were assisted with an investment of Rs4,471 per family, or Rs19 billion overall (see Table 24). So far, IRDP reached about 25 percent of India's rural households.

State-wise shares of IRDP and NREP expenditures are compared with their shares in the population of the poor and the ultra poor in Tables 25 and 26. On the basis of the incidence of either poor or ultra poor population in 1986-87, the eastern states of Assam, Bihar, Karnataka, Kerala and West Bengal deserved higher allocations.

Most past assessments of IRDP by the government have been favorable, but micro studies have been equivocal in supporting these claims. However, the divergence between macro indicators and micro performance seems to be narrowing in recent years.

Also, "success" or "failure" depend on the criterion adopted for assessment. Thus, Subbarao (1985) argued that the usual criterion of

Table 24: Major Poverty Alleviation Programs, 1987-88

	Rs million
A. Financial Expenditures	
1. Credit-based self-employment programs:	
a. Integrated Rural Development Program (IRDP)* (Investment per beneficiary = Rs4.471)	19,000
2. Wage employment programs:	
a. National Rural Employment Program (NREP)	7,850
b. Rural Landless Employment Guarantee Program (RLEGP)	6,480
c. Maharashtra's Employment Guarantee Scheme (MEGS)	2,650
3. Area development programs:	
a. Drought Prone Area Program	900
b. Desert Development	500
c. Watershed Development	2,400
	39,780
As percent of GDP	1 percent
As percent of Plan Outlay	9 percent
B. Physical Achievements, 1987-88	
1. Credit-based self-employment programs:	1987-88
a. IRDP: Number of beneficiaries covered (million)	4.2
2. Wage employment programs:	
a. NREP: Mandays of employment generated (million)	370
b. RLEGP: Mandays of employment generated (million)	100
c. MEGS: Mandays of employment generated (million)	150

Source: Progress Reports of the 20th Point Program, Ministry of Programme Evaluation, 1988 and 1989.

"crossing the poverty line" is inappropriate for judging the full benefits of this program, since households way below the poverty line (the ultra poor) may register incremental incomes and thus benefit from the program, even if they are unable to cross the poverty-income threshold.[17/] Pulley (1989) has shown

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17/ To illustrate, consider a state which assisted households close to the poverty line and helped them all cross the line, with another state that selected households way below the poverty line (i.e. the ultra poor), and helped their incomes grow, but not sufficiently enough to cross the poverty line. Previous IRDP evaluations hailed the former state and condemned the latter, following the criterion of "crossing the poverty line". Gaiha's (1989) critique misses this important consideration in the assessment of program effectiveness.

Table 25: Distribution of Poor and Ultra Poor by States
Rural India 1973-74 to 1986-87

States	Distribution of Poor(%)				Distribution of Ultra Poor(%)			
	73-74	77-78	83	86-87	73-74	77-78	83	86-87
ANDHRA PRADES	7	6	4.9	5.2	6	5.1	3.7	4
ASSAM	3	3.8	3.3	3.6	2.2	2.9	2.3	3
BIHAR	13.5	14.1	17	15.5	14.3	14.7	19.5	17.5
GUJRAT	3.7	3.6	2.8	3.5	3	3.2	1.8	3.7
Haryana	1.2	1.1	0.9	1.1	0.9	0.8	0.6	0.7
Jammu & Kashmir	0.8	0.7	0.5	0.6	0.6	0.5	0.3	0.4
KARNATAKA	4.8	4.6	4.1	4.8	4.9	4.6	4.2	5
KERALA	4.2	3.8	3.4	3.4	4.3	4	3	3
MADHYA PRADES	8.8	9.3	8.6	9.6	9.5	10	8.5	9.7
MAHARASHTRA	8.1	9.4	7.9	8.8	8	10.1	7.7	9.6
ORISSA	6.1	6.1	5.5	6.1	7.4	7	5.7	6.9
Punjab	1.1	0.8	0.7	0.9	0.9	0.5	0.5	0.5
RAJISTHAN	3.9	3.5	4	4.2	3.3	3.2	3.9	3.8
TAMIL NADU	6.7	7	7.3	6.7	6.4	7.4	8.2	7.3
UTTAR PRADESH	17.4	16	18.2	16.4	17	14.7	18.1	15.9
WEST BENGAL	9.8	9.9	10.7	9.6	11.3	11.2	12.1	9
All India	100	100	100	100	100	100	100	100

that depending upon the criterion adopted, program success rate varied (see Table 21). On the basis of the criterion of "investments remaining intact" (which suggests that households are deriving incremental incomes from the asset), the program is doing reasonably well even in relatively low income states like Bihar. But on the basis of the usual criterion of "crossing the poverty line", the success rate was very low (see Table 25, columns 3-5). State-wise performance also suggests an interesting relationship, between "percentage of eligible beneficiaries", and the proportion crossing the poverty line. Barring in the Hill States (Himachal Pradesh, Jammu-Kashmir),

Table 26: State-wise Distribution of IRDP Funds and their Measures of Success in 1987-88

States	Distribution of IRDP Expenditure*	% Eligible** Beneficiaries	% Investment Intact***	% Intact and No Credit Over	% Eligible and**** Crossed Poverty-line
Andhra Pradesh	7.8	68	76	34	9
Assam	2.8	27	70	6	10
Bihar	14.4	76	85	18	3
Gujarat	3.5	78	88	43	4
Haryana	1.4	71	46	15	0
Jammu-Kashmir	1.0	97	80	50	19
Karnataka	3.9	85	64	26	4
Kerala	2.8	89	74	19	5
Madhya Pradesh	11.2	81	73	27	6
Maharashtra	7.1	83	69	30	10
Orissa	5.6	83	68	19	7
Punjab	1.4	30	77	57	18
Rajasthan	4.6	72	48	15	9
Tamil Nadu	6.8	83	63	28	3
Uttar Pradesh	18.6	54	79	41	5
West Bengal	7.1	46	97	23	8
All India	100.0	70	73	29	7

Source: National Concurrent Evaluation of IRDP, Round 2, 1987, Ministry of Rural Development, as quoted in Pulley (1989), and Rural Development Statistics, 1988.

** Proportion of beneficiaries with pre-IRDP household income < = 4800.

* Includes central and state expenditures, but excludes credit mobilised.

*** Proportion of IRDP investments that remained fully operational after two years.

**** Proportion of beneficiaries with pre-IRDP household income < = 4800 and post-IRDP income > = 6400 after two years in current price terms.

the higher the proportion of eligible beneficiaries (i.e., the lower the percentage of non-poor) with low initial level of incomes, the more difficult it is for them to cross the poverty income threshold, i.e., very poor people are being brought into the program, such that (a) a big income increase still leaves them below the poverty lines, and (b) it is hard for them to overcome poverty; the proportion doing so is small.

A major criticism of IRDP is that the program benefits the households closer to the poverty line income threshold so that the ultra poor are unable to take advantage of the scheme. It is suggested that the poorest households may not be able to hold and manage assets. Recent evidence, however, effectively refutes this criticism. In fact, in an administratively weak and relatively poorer state like Uttar Pradesh panel data for 4 years show that the poorest households not only managed to hold on to assets, but derived income from them on a sustained basis (C.H.H. Rao, et al, and Pulley). Their problem was the continued reluctance of the institutional credit agencies to lend working capital on a regular basis even after the households have promptly repayed their IRDP loans. In other words, IRDP enabled access to institutional credit for the poorest households as a one-shot injection, but failed to open a continuing line of credit for the neediest households notwithstanding their proven creditworthiness.

The scale of investments in the IRDP, in combination with NREP, may give impetus for the development of supportive infrastructure and to raise the incomes of the poor at the margin, provided the choice of assets are matched with the level and structure of demand in the region; the assets supplied are labor-intensive in character; and supporting marketing networks are

simultaneously promoted. Decentralizing administration and involving the beneficiaries in the choice of the programs may help realize these preconditions of success. Wherever these conditions are satisfied, and the program reached the lower half of the poverty groups, its impact on the hard-core poor was substantial (Rao, et al). However, for sustained income generation, it would be necessary to ensure continued access to institutional credit for the very poor.

The overall assessment of the two employment programs (NREP and RLEGP) is similar. Together they provided, on average, about 450 million mandays of employment per annum. Here again, evaluations pointed out that: (a) the impact of the programs on the total income of poor households was insignificant because they met only about 9 percent of the demand for work from the poor in rural India; (b) the programs could not create sufficiently useful, wage-intensive works at times and in places most needed; (c) the poor could not benefit from the assets created; (d) the assets created were of poor quality; and (e) wages were lower than budgeted, owing to leakages and corruption. Some of these criticisms are misplaced. For example, NREP is not small, when compared to incremental employment generated in the rural areas. One recent estimate (Subbarao 1987a) suggests that NREP provided nearly 40 percent of the total incremental employment in rural India between 1985 and 1987.

However, MEGS, a state-level program, has a much better record, notably in generating supplementary employment for women, and in terms of a much better administered wage structure that reduced gender differences in wage rates. Nonetheless, recent moves to pay statutorily fixed minimum wages

Table 27: NREP - State-wise Distribution of Employment, 1987-88 (Actual)

	Employment (million mandays)	Percent women employed	Percent Distribution of	
			Employment	Ultra poor population
Andhra Pradesh	28.8	41.8	9.0	3.9
Assam	3.4	Nil	0.7	2.1
Bihar	46.8	10.0	12.8	20.0
Gujarat	17.2	28.6	3.5	1.7
Haryana	2.2	Nil	0.7	0.6
Jammu-Kashmir	-	-	-	-
Karnataka	1.9	13.4	5.8	4.6
Kerala	9.9	26.7	4.0	3.0
Madhya Pradesh	50.7	27.1	8.4	8.5
Maharashtra	26.2	26.2	6.9	7.5
Orissa	22.5	25.7	4.9	5.4
Punjab	1.9	Nil	0.8	0.5
Rajasthan	24.0	24.2	6.0	3.2
Tamil Nadu	32.2	44.1	11.8	8.2
Uttar Pradesh	55.3	3.1	21.6	18.3
West Bengal	15.5	3.0	3.1	12.7
All India	379.6	20.65	100.0	100.0

Source: Rural Development Statistics, 1988

may destroy some of the merits of this scheme (Subbarao 1987a) such as its self-targeting character.

Only two states - Andhra Pradesh and Tamil Nadu - have been successful in attracting women in large numbers to NREP work sites (see Table 27). The state with a large proportion of the ultra poor - Uttar Pradesh - has a dismal record in the employment of women in NREP projects.

However, the rank correlation between state-wise distribution of mandays of employment generated and the distribution of the ultra poor was

high at r=0.74, with t ratio 3.96 (significant at 1 percent level). In Bihar and West Bengal, however, the states' shares in NREP employment were substantially lower than in the ultra poor.

Most evaluations of employment have expressed concern that states have opted for rural roads, primary school building construction, etc. in preference to directly productive activities such as soil conservation and watershed development. Yet there is significant positive impact of rural infrastructure (markets and roads) on agricultural output (Binswanger, et al, 1989). Rural infrastructure, if appropriate, is "productive". The most immediate concern ought to be ensuring quality of works and maintenance of infrastructure created.

Employment programs, despite deficiencies, have desirable features: some self-targeting (through relative unattractiveness of this employment); capacity, in a sense, to substitute for a social security system, at least for those who are able to work. If deficiencies are tackled (especially in states where NREP lags far behind ultra-poverty: Table 27, last two columns) and if women are attracted to work sites as in MEGS, these programs can reach out to the "poorest fifth" more readily than most alternatives.

B. Nutrition, Health, and Other Social Sector Interventions

(i) Nutrition

The central objective is to protect specific vulnerable groups, such as children and women, from malnutrition. Food being the basic need, direct intervention to increase food security for the poor may have good pay-off in terms of human welfare. An important nationwide program is Integrated Child

Table 28: Regional Profile of Malnutrition Among Children (Percentage of Severely Malnourished Children (grades III and IV)) in ICDS Project Areas During 1984-85[a]

Sn no.	State	District name	Type of project[b]	Percent malnourished 0-3 (1)	Percent malnourished 3-6 (2)	Child mortality rate 0-2 (3)	Child mortality rate 0-5 (4)	District characteristics SC+ST[d] (5) (%)	District characteristics AVA POP[e] (6) (Rs)	District characteristics IRR[f] (7) (%)
1	Andhra Pradesh	Guntur	Rural	8.80	11.30	99	142.00	13.00	317.00	39.00
		Vizianagaram	Tribal	22.20	32.50	169	196.00	19.00	61.00	30.00
2	Karnataka	Dharwar	Rural	15.40	12.90	124	182.00	15.00	307.00	6.00
		Mysore	Rural	17.20	10.80	109	149.00	24.00	270.00	17.00
3	Tamil Nadu	Kanyakumari	Urban	5.70	4.60	70	80.00	5.00	161.00	52.00
		Salem	Urban	5.70	0.30	74	101.00	20.00	245.00	22.00
4	Kerala	Mallapuram	Rural	1.20	4.30	66	104.00	9.00	355.00	57.00
		Palghat	Rural	0.70	4.00	74	116.00	19.00	421.00	57.00
5	Madhya Pradesh	Jabalpur	Rural	34.40	16.90	220	265.00	29.00	152.00	5.00
		Dhar	Tribal	26.00	17.30	138	174.00	59.00	350.00	7.00
6	Uttar Pradesh	Pratapgarh	Rural	14.60	13.00	163	211.00	22.00	222.00	28.00
		Kheri	Rural	6.10	3.10	154	187.00	27.00	587.00	10.00
7	Rajasthan	Bharatpur	Rural	12.40	n.a.	214	252.00	24.00	369.00	20.00
		Banswara	Tribal	14.20	0.70	170	169.00	25.00	235.00	7.00
8	Maharashtra	Yaystmal	Rural	22.30	25.10	177	227.00	26.00	264.00	2.00
		Nanded	Urban	12.00	10.20	87	107.00	21.00	289.00	3.00
9	Gujarat	Valsad	Tribal	4.60	3.30	91	96.00	57.00	192.00	13.00
		Baroda	Tribal	7.30	5.60	115	129.00	31.00	206.00	21.00
10	Orissa	Cuttack	Rural	3.20	2.80	196	204.00	21.00	271.00	32.00
11	West Bengal	Nadia	Rural	21.30	12.20	115	149.00	28.00	268.00	33.00
		Bankura	Tribal	6.50	8.20	77	89.00	40.00	427.00	33.00
12	Haryana	Hissar	Rural	6.70	4.20	120	146.00	22.00	901.00	64.00
		Bhiwani	Rural	5.50	0.70	114	129.00	18.00	558.00	20.00

[a]The data in columns 1 and 2 are taken from ICDS Project-wise Progress Report for 1984/85, for those projects which were sanctioned during 1983/84. As such, these figures reflect the nutrition situation at/about the commencement of ICDS in these districts.

[b]R = rural; T = tribal; U = urban.

[c]District-wise child mortality rates for 1981 for the age groups less than 2 and less than 5 years were made available for the first time in the Occasional Paper 5, 1988, Office of Registrar-General, Ministry for Income Affairs.

[d]Percent SC/ST to total population.

[e]Agricultural value-added.

[f]Irrigated area as a percentage of total cultivated area.

Note: Grades III and IV = $\leq$60 percent weight for age.

Source: Subbarao (1989)

Development Services (ICDS), launched in 1975, to provide a package of services such as child protection and development with stress on both pre-natal services including immunization, periodical health check up, and referral services. Growth monitoring and supplementary nutrition for 300 days of the year for all children are the other components of the scheme. About 6.5 million children below 6 years of age and 1.5 million women were covered under ICDS during 1985/86.

The survey data of the National Nutrition Monitoring Bureau (NNMB), covering ten states, show steady but slow decrease in severe malnutrition during 1974-81 (Subbarao, 1989). There has been no NNMB survey published since 1981. However, for 1984-85, baseline data on the incidence of severely malnourished children, collated by ICDS authorities for 23 project districts, are positively and significantly correlated with child mortality rates, and thus probably assess localized variations in malnutrition rather accurately.

Severe child malnutrition looms largest in tribal Andhra Pradesh, Bihar, Rajasthan and Madhya Pradesh and also in rural Karnataka, Madhya Pradesh, Uttar Pradesh, Maharashtra and West Bengal (see Table 28). Also Rao (1985), pointed out a substantial proportion of the nation's scheduled castes and tribes who are poor live in these states. Therefore, probably poverty-induced malnutrition continues to be rampant in pockets of India, especially in regions/states with a high proportion of scheduled castes and tribes.

As with other interventions, evaluations of ICDS have pointed out many shortcomings (Subbarao 1989). Immunization levels continued to be low and there was a drop from the first to the second dose in many cases; the regularity of feeding differed from center to center; there was little

community participation. The program, like most other interventions, has been relatively more successful in reaching the poor and poorer groups, but not the poorest. There are significant inter-project variations in impact (Heaver), with relatively poorer states/regions faring worse than others owing especially to the inability of poor states to put in their share of expenditure on nutrition supplements. Regions with low infrastructural levels also performed less well (Subbarao 1989).

ICDS is very promising and could become a good complement to other poverty alleviation programs provided children of the poorest groups are attracted to the scheme, if necessary by appropriate incentives such as provision of clothes. However, India's experience counsels caution in selection among strategies for filling nutrition needs of the poor. For example, in Tamil Nadu, which has a long experience in nutrition management, a package of nutrition and health services to children aged 6-to-36 months is being delivered under the Tamil Nadu Integrated Nutrition Project. This elicited much better community participation than ICDS. Important noneconomic factors helped, notably the recruitment of nutrition workers from among the deprived communities in which malnutrition was most severe (Subbarao 1989).

Health: Access to primary care directly affects the well-being of the rural poor. India is much behind other countries with comparable per capita incomes in South Asia in health care. Table 29 reveals significant regional variations in public efforts (as revealed by expenditures) and outcomes (as shown by infant mortality, life expectancy, etc.).

Absolute per capita expenditures are very low in Uttar Pradesh, Bihar

Table 29: Per Capita Public Expenditure (Revenue)[a/] on Health by States

	Per capita expenditure at 1980-81 prices		Rate of growth	Life Expectancy		Infant Mortality	
	1976-77	1986-87		1976	1986	1976	1985
Andhra Pradesh	18.1	30.4	5.3	47.9	53.1	122	83
Bihar	8.7	15.0	5.6	42.3	46.0	NA	105
Gujarat	20.2	39.6	7.0	50.2	52.4	146	98
Haryana	20.4	37.5	6.3	52.9	54.8	112	85
Karnataka	20.0	23.2	1.5	54.5	56.3	89	71
Kerala	24.8	29.3	1.7	61.7	65.5	56	32
Madhya Pradesh	17.6	18.3	0.4	46.9	49.0	138	122
Maharashtra	20.3	44.7	8.2	53.5	56.3	83	68
Orissa	15.7	32.2	7.4	44.0	49.1	127	130
Punjab	24.1	32.8	3.1	58.4	60.5	108	71
Rajasthan	21.4	32.8	4.4	49.3	51.9	142	108
Tamil Nadu	22.9	33.3	3.8	50.3	53.4	110	80
Uttar Pradesh	10.0	19.1	6.7	42.8	46.2	178	140
West Bengal	22.0	25.4	1.4	49.6	52.0	NA	77

Source: RBI Bulletins, Various Issues.

[a/] Includes expenditure on family welfare and water supply.

and Madhya Pradesh. These states have the highest concentration of poverty, the lowest life expectancy and the highest infant mortality. However, there appears to be no overall bivariate relationship - not even a high rank correlation - between health expenditures and outcomes. This is largely because life expectancy and infant mortality depend less on total health outlay than on its composition, together with other factors such as primary health care, immunization, protected water, female education, etc. Detailed break-up of health expenditures is not available state-wise.

Assuming that the relative share of various segments of health expenditure remained unchanged (which is by and large the case in most

states), life expectancy and infant mortality in 1986 may be expected to be a function of initial expenditure levels in 1976, and the rate of growth of expenditure over the period 1976-86. The estimated equations are as follows:

$$\text{Log(LE 1986)} = 3.3 + \underset{(0.061)}{0.25^{*}}\ \text{Log(PEH 1976-77)} - \underset{(0.78)}{0.066}\ \text{Log}(1+r) \qquad R^2=0.63$$

$$\text{Log(IMR 1986)} = 6.2 - \underset{(0.3)}{0.64^{*}}\ \text{Log(PEH 1976-77)} + \underset{(3.8)}{2.4}\ \text{Log}(1+r) \qquad R^2=0.39$$

* Statistically significant.

where

LE = Life expectancy.

PEH = Level of per capita expenditure on health (in different states).

IMR = Infant mortality rate.

r = Rate of growth of expenditure over the period 1976-86.

Initial levels of health expenditures and, ten years later, life expectancy do relate across states, although the rate of growth of expenditures is insignificant. The elasticity of life expectancy to expenditure was 0.25. The relationship between state-wise infant mortality rate and health expenditures is weak. As already noted, such factors as female education, immunizations and nutrition interventions are more relevant in this context than aggregate expenditures.

(iii) Education: There has undoubtedly been considerable growth of

institutions. Yet serious inequality in access to education persists by regions, social groups, and gender (Subbarao 1987b) (see Tables 30-32). Two out of three Indians (aged over ten years) were illiterate in 1981. Dropout rates are high and there is considerable wastage.

Despite a rise in government expenditure on education as a percent of GDP, the quality, physical facilities, and geographical coverage of schools are poor especially in rural areas. Even though social returns for primary education are known to be higher, government spending is biased in favor of higher education whose recipients are largely the rich and the elite. Cost recovery is poor at higher levels of education so that a substantial chunk of subsidy goes to the non-poor.

There are significant inter-state variations in expenditures and literacy rates are (Table 33). Literacy rates and educational expenditures are correlated:

$$\underset{(1981)}{\text{State Literacy Rate}} = 1.352 + 0.82^{*} \underset{(1981)}{\text{Ed. Exp.}}, \quad R^2 = 0.67$$

*Significant at the 5 percent level.

India's most challenging problem in education is to ensure that girls, and children of poverty groups (e.g., scheduled castes and tribes), are enrolled and retained in school. Given the resource crunch, how can one reconcile affordability with cost recovery? Charging the poor full cost will often put the services beyond their reach. On the other hand, fully subsidizing the services would place such a burden on the public budget as to affect other investments. Cross-subsidizing between the more affluent and the

poor seems to offer a promising way out. For example, Rs6,243 million was spent on higher and professional education during 1976/77. If 50 percent of the cost were recovered, there would have been a saving of Rs3,121 million, which, if diverted to primary education (assuming no constraints are on the demand side), could have provided primary education to about 20 million more children. If this were continued for 5 years (1976-81), the country would have had a slightly higher proportion of literates (38.8 percent) than the realized 36.2 percent in 1981.

Table 30: Urban and Rural Literacy Rates, By Age and Sex, 1981

Location/sex	Age Groups 10-15	15-35	35 and over	All ages over 10
		(a) Literacy rates		
Urban				
Male	82.6	81.5	69.4	65.8
Female	72.7	63.6	35.9	47.8
Both	78.1	73.1	54.3	57.4
Rural				
Male	62.8	56.1	38.0	40.8
Female	36.0	25.7	8.6	18.0
Both	50.2	41.5	23.2	29.7
Total				
Male	67.2	63.9	44.6	46.9
Female	44.4	35.3	14.4	24.8
Both	56.5	50.0	30.2	36.2
		(b) Percentage rise, 1971-81		
Urban				
Male	1.8	4.1	7.6	7.5
Female	3.7	13.8	18.9	13.5
Both	2.9	7.3	10.1	9.5
Rural				
Male	14.0	15.0	21.8	20.7
Female	20.8	41.2	32.3	37.4
Both	16.2	24.3	19.6	25.3
Total				
Male	11.4	14.1	18.0	18.7
Female	17.5	35.2	33.3	32.6
Both	13.7	21.1	19.8	22.7

Source: Census of India, 1981, Paper 2 (1983), as quoted in R.M. Sundaram (1987).

Table 31: Literacy Rates, 1981

Segment	Total Population	Scheduled Castes	Scheduled Tribes
Total	36.23	21.38	16.35
Male	46.89	31.12	24.52
Female	24.82	10.93	8.04
Rural	29.65	18.48	14.92
Male	40.79	27.91	22.94
Female	17.96	8.45	6.81
Urban	57.40	36.60	37.93
Male	65.83	47.54	47.60
Female	47.82	24.34	27.32

Source: Census of India, 1981, Primary census abstract.

Table 32: Retention Rates (Class I-V)

Period	For all communities	For scheduled castes	For scheduled tribes	For other communities
1968-72	33.5	27.8	20.3	35.3
1969-73	35.0	28.8	21.3	36.9
1970-74	36.2	30.3	22.9	38.0
1971-75	36.8	31.4	22.3	38.6
1972-76	37.2	32.2	21.9	39.1
1973-77	36.9	33.5	20.5	38.8
1974-78	38.6	35.6	23.3	40.5

Source: Ministry of Education, New Delhi.

Table 33: Per Capita Public Expenditure on Education and Literacy Rates by States

States	Per Capita Expenditure in Real Terms(1980-81 Prices)			% Change from 76-77 to	Literacy Rates		% Chang from 1971 to
	1976-77	1980-81	1986-87	86-87	1971	1981	1981
ANDHRA PRAD	36.5	43.3	67.7	85.5	29	29.9	3.1
BIHAR	17.9	34	37	106.7	33	26.2	-20.6
GUJRAT	60.7	53.3	81.4	34.1	42	43.7	4
Haryana	46.1	56	65.6	44.5	32	36.1	12.8
KARNATAKA	41.6	46.8	65.4	57.2	37	38.5	4.1
KERALA	80.7	84.4	103	27.6	70	70.4	0.6
MADHYA PRAD	30.1	33	46.5	54.5	26	27.9	7.3
MAHARASHTRA	47.3	61.2	79.6	68.3	46	47.2	2.6
ORISSA	35.8	40.9	49.8	39.1	31	34.2	10.3
Punjab	61.6	82.8	81.7	32.6	39	40.9	4.9
RAJISTHAN	37.5	42.9	60.3	60.8	23	24.4	6.1
TAMIL NADU	42.3	48.5	59.1	39.7	45	46.8	4
UTTAR PRADES	27.5	31.7	42.1	53.1	25	27.2	8.8
WEST BENGAL	34.9	45.3	68.2	95.4	39	40.9	4.9

10. CONCLUDING REMARKS

The basic conclusion of this study is: trickle-down can happen, but is seldom automatic. The beneficial effects of growth on the incidence of poverty can, but need not, be substantially offset or even be nullified by increases in the inequality of consumption. During 1973-77 they were; this is true whether analysed at the state-level or All India level. Therefore, the policy response - a series of anti-poverty interventions since the mid-1970s aimed at raising the income/consumption levels of the poor and the ultra-poor - was basically sound.

In 1977-83, average consumption grew slowly, but inter-state consumption inequality fell in many states, and the reduction in the incidence of poverty and in the poverty-gap was greater than in the earlier period of high growth. The beneficial impact of a reduction in inequality proved more pronounced for the ultra poor than for the poor; by the same token a worsening of inequality hurts the ultra poor proportionately more than the poor. This is not just a "dance of the monsoons" since reduction in inequality and poverty could not be explained systematically by the state-wise changes in foodgrain production in this period. While it is difficult to identify precisely the factors that may have contributed to the decline in inequality in many states during 1977-83, the role of direct interventions cannot be minimized.

From 1983 to 1986-87 growth was high, with almost no change in inter-state inequality at the national level. This led to a substantial reduction in poverty, dominated by the growth effect.

Looking at the entire period between 1973-74 and 1986-87, aggregate

rural poverty has declined substantially: the incidence of poverty has declined from 60.6 percent to 41.5 percent, and the severity (the gap between an average poor person's income and the poverty line) from 18.8 percent to 10.5 percent. Even the absolute number of poor declined by about 37 million. These figures demonstrate commendable achievements in poverty reduction particularly in the 1980s. Both growth and direct poverty alleviation efforts have contributed o this success.

It is noteworthy that the poverty ratio has become more responsive (elastic) to (a) growth, and (b) changing inequality in consumption, except in Bihar and West Bengal. Both the relevant elasticities are higher for the richer states, and for the ultra poor. This suggests that inequality-reducing policies are necessary in both rich and poor states to compound the beneficial impact of growth on the poor, especially the ultra poor. Increasingly, and especially for the poorest, growth and anti-poverty programs - trickle-down and pull-up - are not substitutes but complements.

These results lend credibility to the consumption-equalizing interventions initiated since the mid-1970s. Yet there is significant inter-state variation in their effectiveness which in general needs to be improved. However, our review of micro evidence suggests substantial benefits even in a poor state such as Uttar Pradesh. While this is consistent with our earlier finding of substantial reduction of consumption inequality, program effectiveness is clearly weaker in the poorer states.

Employment programs contributed substantially to incremental rural employment and income growth. Their state-wise distribution by and large corresponded with the distribution of the ultra poor. However, two poorer

states (Bihar and West Bengal) require relatively greater efforts under NREP.

Finally, our analysis of social sector investments and performance suggests that on the whole, the record on health, education and nutrition fronts is unimpressive. One is left with the impression that the social policies which can raise the long-run capabilities of the people have generally been relegated to the background in Indian policy-making.

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