THE ROLE OF AGRICULTURE IN POVERTY REDUCTION: THE INDIAN EXPERIENCE

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I. INTRODUCTION

Poverty alleviation has been a pre-eminent goal of India's development efforts since its Independence. In pursuing this objective, the country's planning process during the last six decades has been a fertile ground for devising interventions, often successful but sometimes overlapping and ill-conceived too. Public measures directed at poverty alleviation have focused on creating adequate livelihood opportunities for the marginalised segments of the population, provisioning of public services and goods that have a direct bearing on an individual's living standard and quality of life, strengthening of institutions and delivery mechanisms that empower the poor, and targeted development of backward regions through resource transfers and supportive policy measures. In recent years, the emphasis on having a more desirable composition of GDP growth by targeting an average 4 per cent per annum growth in agriculture GDP has found favour with the policy makers in the country's Eleventh Five Year Plan (2007-12).

Though there has been a significant decline in the incidence of poverty at the national level in India, there are several concerns that take away the shine from this achievement. To begin with, the magnitude of poverty continues to be unacceptably high on any count. India has the largest number of poor among all countries and is home to one-fourth of the world's poor. Secondly, there are many pockets in the country where poverty is endemic and persistent. There is ample evidence to show that inequalities in income, per capita consumption and socially valued human development outcomes have increased between rural and urban areas and across some regions /states. Thirdly, despite a significant improvement in the growth rates of the economy, particularly in the more recent years, it has not necessarily translated into a sharper reduction in poverty. Growth though visible has not been adequately inclusive, and perhaps even sufficiently widespread. Fourthly, a considerable step-up in public allocations to poverty alleviation programmes have not yielded commensurate results. It has been argued that besides serious implementation bottlenecks and accountability issues, enhanced public allocations to social sectors and rural development programmes at the expense of public investment in agriculture may have held back the full impact of these programmes on poverty alleviation. Finally, there are changes in the composition and distribution of the poor across regions and sectors of the economy that are perhaps not being recognised and adequately addressed in the current policy measures or those being put in place.

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It is necessary that these concerns are not brushed aside in the wake of the current growth momentum of the Indian economy, for it may compromise the very sustainability of the growth process in the medium to long run. The conceptualisation of poverty, its measurement, the identification of the poor and measures to eradicate poverty are all inter-related issues that require a concerted and comprehensive analysis in the light of the changes in the domestic economy and the global development environment, at the present juncture of India's development.

The scope of this paper is however limited. It seeks to examine the role and implications of agriculture in the country's poverty alleviation efforts. There are three parts to the analysis. The second section relates to documentation of the major trends in the socio-economic profile and the magnitude of incidence of poverty in India on alternative criteria for measurement. The third section relates to the analysis of empirical evidence on the linkage between agricultural development and poverty reduction in the country. The concluding part identifies agricultural strategies that are conducive to poverty alleviation and the conditions that make their impact most effective.

This analysis is however constrained by the fact that there is considerable limitation of data. The Government of India estimates the incidence of poverty ('official estimates', based on the representative quinquennial household consumer expenditure surveys) are not yet available for 2009-10. The last available estimates are for 2004-05. Thus, for the period when macroeconomic focus on setting a 4 per cent target rate of growth in agriculture was explicitly articulated in the planning framework of the country, and when the realised average growth in agriculture improved to over 3 per cent (though less than the target growth of 4 per cent but higher than around 2 per cent in the 1990s and the first half of the new millennium), there are no comparable poverty estimates available to analyse the impact of improved agricultural performance on poverty reduction. Secondly, though the official methodology to estimate poverty has been revised by the agency (Planning Commission, Government of India) responsible for the mandate in 2009, the estimates on the revised methodology are not yet available retrospectively for the years of earlier estimates. Hence, the analysis in this paper is based on comparable estimates as per the old official methodology. Thirdly, an adequate multidimensional measure of poverty incidence is not available uniformly for the country for the recent years. The Government of India had estimated Human Poverty Index at the national and provincial level in 2002, based on a modified UNDP methodology and detailed census and related data, broadly for the period covering 1981 to 2001. However, the said index has not been updated for 2011. The other available estimates in the literature on multidimensional criteria for poverty are not strictly comparable. As a result, the analysis in the next section (II) of this paper is confined principally to trends in consumption-expenditure based poverty incidence that covers the period up to 2004-05 as well as a brief discussion of the multidimensional measures of poverty taking into account non-economic factors.

II. POVERTY INCIDENCE AND SOCIO-ECONOMIC PROFILE OF POOR

Poverty is a state of deprivation. In absolute terms, it reflects the ability of an individual to satisfy certain basic minimum needs for sustained, healthy and reasonably productive living. There is no unique approach to estimate a poverty line

for measuring the incidence of poverty in conformity with the absolute notion of poverty. In the Indian context, a consensus emerged in the early 1970's on the adoption of an energy adequacy norm to anchor the minimum consumption level, for defining the poverty line (Dandekar and Rath, 1971). It enabled a focus on 'food poverty'– undoubtedly the most ugly of all deprivations for any individual. In subsequent work at the Planning Commission, the poverty line approach and measurement methodology was refined and a series of consistent estimates were made available at regular intervals of time.

The criteria to measure income/consumption poverty gradually gave way to the notion of basic minimum needs as a framework to address the poverty issue. This, in turn, evolved into the notion of human poverty as epitomised in UNDP's human development approach in the 1990's. The broadening in the notion of poverty has had implications both for the measurement issues as well as for policy prescription. While the policy framework for poverty alleviation has responded to this evolved notion of poverty, the same is not true for a multidimensional measurement criterion for estimating poverty. Though of late, the Oxford Poverty and Human Development Initiative (OPHI) has tried to fill this gap at the international level (for supporting cross-country comparisons), the national initiative (Planning Commission, National Human Development Report 2002) has not been followed through in the recent years.[1]

Approach to Estimating Poverty Incidence

The official poverty line approach in India, based on an absolute notion of poverty defines the poverty line as the minimum consumption expenditure at which the national energy adequacy norms, specified separately for the rural and urban areas, are met for an average individual. The energy adequacy norms were estimated to be 2,400 and 2100 kilo calories per capita per day for rural and urban areas respectively, and were derived from the age-sex-occupation specific energy norms using the all India demographic data from the Census 1971. On an average, the minimum consumption expenditure at which these norms were satisfied for the National Sample Survey (NSS) 28th round (1973-74) data on household consumer expenditure were Rs 49.09 and Rs 56.64 per capita per month at the 1973-74 prices for the rural and urban areas, respectively (Planning Commission 1979). Proportion of the population not able to attain the specified level of expenditure is segregated as poor. For estimating the poverty ratios for subsequent years, option was exercised to update the estimated poverty lines for 1973-74 to take care of changes in price levels and apply them on the NSS consumption distribution of the relevant years to identify the poor from the non-poor. This method of defining the poverty line, for a given year, aims at estimating the purchasing power, at current prices, required to meet the expenditure associated with the '*standardised national consumption basket*', separately for the rural and urban areas, which satisfies the calorie norm in the base year 1973-74.

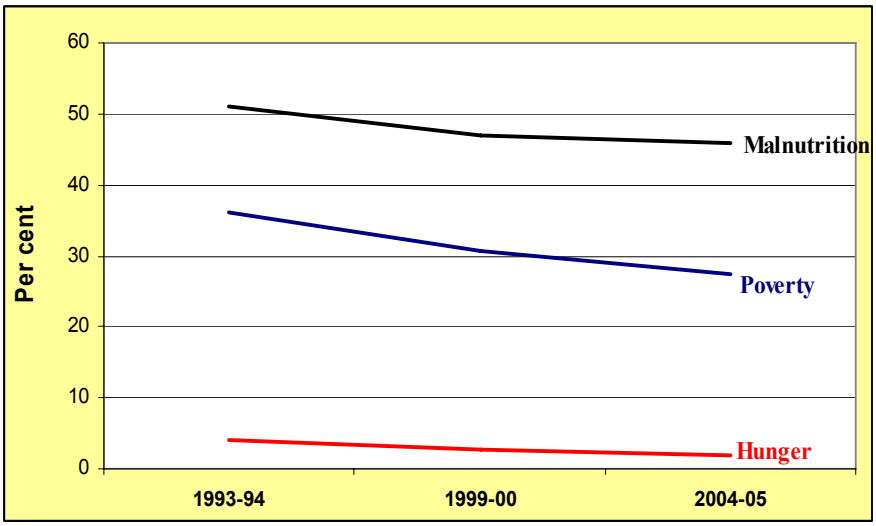
[1] The Human Development Report 2010 features the MPI, an international measure of poverty in 104 developing countries, which complements income based poverty measures. The MPI, created by OPHI with UNDP support, identifies deprivations across the same dimensions as the HDI— health, education and living standards—and shows the number of people who are multi-dimensionally poor and the deprivations that they face at the household level.

There are, however, a number of issues that have been raised from time to time on the methodology adopted for estimating the incidence of poverty in the country. These could be clubbed into issues related to (i) continued validity of the estimated calorie norms for benchmarking the reference consumption basket to define the poverty line; (ii) relevance of the 1973–74 reference consumption basket in view of significant changes in consumption patterns across all population groups for estimating the poverty line; (iii) relying solely on National Sample Survey data on household consumption expenditure for estimating poverty in the face of dramatic differences with the National Accounts Statistics estimates of private consumption expenditure; and (iv) appropriate price indices for updating the poverty lines over time. While these methodological issues have been addressed over time (see for instance, Malhotra 1997 and Planning Commission 1993), there has been considerable discussion on the relationship between nutrition adequacy, hunger and poverty.

Hunger, Malnutrition and Poverty

The notion of hunger, malnutrition and poverty though related are distinct in nature, both conceptually and in terms of policies required to address them. While hunger refers to inadequacy of food, malnutrition refers to an imbalance of both macro and micro-nutrients, which could be because of inadequate or inappropriate intake and/or inefficient biological utilisation due to physiological or environmental factors. As indicated, the notion of poverty in India for estimating the incidence of poverty involves the use of a minimum consumption expenditure, anchored in an average (food) energy adequacy norm. At the all-India level 1.9 per cent of the households suffer from hunger (NSS data) and it is more prevalent in certain states like West Bengal, Orissa, Assam and Bihar. Malnutrition, as measured by underweight children below three years, is estimated at 45.9 per cent as per National Family Health Survey, 2005-06. The comparable estimates for 1998-99 at 47 per cent show a relatively stable incidence of malnutrition. The incidence of poverty at the all-India level in 2004-05 was estimated at 27.5 per cent. Thus, the levels and changes therein in malnutrition, poverty and hunger differ widely (Figure1). There is often a tendency to use these concepts loosely, which is not only incorrect, but also does not help in creating the right focus for policy redress.

Figure 1: Incidence of Hunger, Poverty and Malnutrition



In India's case, self-sufficiency in food production for nearly three decades, with mounting public food stocks at its command, has not ensured eradication of hunger in the country. At the same time malnutrition is entrenched and widespread. Policy measures that have helped in improving agriculture productivity and brought about a significant increase in food grain production, perhaps impacting poverty incidence favourably, have not helped in addressing malnutrition.

Trends in Poverty Reduction

The latest estimates on poverty based on NSS data show that poverty in India in 2004-05 was around 28 per cent. In other words, more than 300 million people are still below poverty line in India. Table 1 provides these official estimates based on Uniform Reference Period and Mixed Reference Period methods.[2] The poverty estimates in 2004-05 based on URP consumption distribution (27.5 per cent) is comparable with the poverty estimates of 1993-94, which was 36 per cent. The poverty estimates in 2004-05 based on MRP consumption (21.8 per cent) is roughly (but not strictly) comparable with the poverty estimates of 1999-2000, which was 26.1 per cent. In both the estimates, the annual decline in percentage was higher for rural areas as compared to urban areas. The rate of decline was higher with MRP data for the period 1999-00 to 2004-05 as compared to longer period 1993-94 to 2004-05 with URP data.

Table 1: Poverty Ratios: All India

Years	Rural	Urban	Total
		Uniform Reference Period	
1993-94	37.3	32.4	36.0
2004-05	28.3	25.7	27.5
		Mixed Reference Period	
1999-00	27.1	23.6	26.1
2004-05	21.8	21.7	21.8

Source: Press release by Planning Commission, March 2007

One of the debates on poverty trends is whether the extent of decline is higher or lower in the post-reform period as compared to pre-reform period. Mahendra Dev (2010) has examined the trends in head count ratio, poverty gap, FGT index, very poor category and, inequality measured by Gini coefficient at all India level. The very poor are those who are below 75 per cent of the poverty line. He has also look at the trends in poverty and inequality for the two sub-periods in the post-reform period.

The poverty ratios and rates of change given in Table 2 show that total (rural + urban) poverty declined by 8.9 per cent in the pre-reform period and 7.8 percentage in the post-reform period. One can look at the annual changes in two ways: one is to look at

[2] Till 50th Round (1993-94), NSS had uniform reference period (URP) of 30 day questions for food and non-food. In the 55th Round (1999-00) NSS used mixed reference period (MRP). The reference periods for 1999-00 were changed from the uniform 30 day recall to both 7 day and 30 day questions for food and intoxicants and only 365 day questions for items of clothing, footwear, education, institutional medical expenses and durable goods.

changes in percentage per annum normalised for length of the time. In our case, length of time is 10.5 years for the period 1983 to 1993-94 and 11 years for the period 1993-94 to 2004-05. Second way is to further normalise these annual average changes with base year values. Both these methods have been used in the study for analysing changes in poverty and inequality. Total poverty declined at the rate of 0.85 per cent per annum in the pre-reform period while the corresponding figure for the post-reform period was 0.70 per cent. From this one can say that the rate of decline in total poverty was slower in the post-reform period. However, if we normalise with base year value, the extent of decline seems to be more or less the same in both the periods.

In the case of very poor category, the ratio declined from 24.8 per cent in 1983 to 15.5 per cent in 1993-94 and further to 10.3 per cent in 2004-05. In other words, we have about 10 per cent of the population who are hard core poor. The per annum changes normalised by base year show that the rate of change was more or less similar in both pre- and post-reform periods – marginally lower in the latter period.

Table 2 : Percentage of Poor and Very Poor in Rural and Urban areas
(Surveys of 30 day uniform reference period)

	Poverty Ratios (%)			Changes in poverty (percentage points per annum)		Changes in poverty (per annum changes as percentage of base year)	
	1983	1993-94	2004-05	1983-94	1993-05	1983-94	1993-05
Rural							
Poor	45.76	37.26	29.18	-0.81	-0.73	-1.77	-1.97
Very Poor	25.52	15.38	9.64	-0.97	-0.52	-3.80	-3.38
Urban							
Poor	42.27	32.56	26.02	-0.92	-0.59	-2.18	-1.81
Very Poor	22.45	16.00	12.00	-0.61	-0.36	-2.72	-2.25
All							
Poor	44.93	36.02	28.27	-0.85	-0.70	-1.89	-1.94
Very Poor	24.79	15.54	10.32	-0.88	-0.48	-3.55	-3.09

Source: Estimated from Published data of NSS 43rd, 50th and 61st Rounds of Consumer Expenditure Surveys. For 1983: Sarvekshana vol. 13 no. 2 Oct-Dec 89; For 1993-94: NSSO report 402, May 1996. For 2004-05: NSSO report 508, December 2006

There are, however, differences between rural and urban areas regarding trends in poverty at all India level. The percentage per annum in rural areas was slightly lower in the post-reform period but when normalised with base year, the rate of change was marginally higher. On the other hand, percentage decline in urban areas was much lower in the period 1993-05 as compared to 1983-94. This holds true even when normalised with base year although the gap is much lower. As compared to rural areas, the rate of decline in urban areas was higher in the pre-reform and lower in the post-reform period (Table 2). This needs further investigation.

The absolute number of total poor in India declined to around 315.5 million in 2004-05 from around 324 million in 1993-94 – a decline of about 9 million over 11 years (Table 3). There was a decline of 15 million in rural areas and increase of about 6 million in urban areas during the same period. The number of very poor declined over time and it was about 115 million in 2004-05. These are hard core and chronic poor. The share of very poor in total poor declined in both rural and urban areas – the fall in the share being higher in rural areas. It indicates that the share of poor around the poverty line has been increasing over time. However, the share of hard core and chronic poor is still quite high around 37 per cent with an absolute number of more than 115 million.

Table 3 : Number of Poor and Very Poor in Rural and Urban Areas (in millions)
(Surveys of 30 day uniform reference period)

	1983	1993-94	2004-05
Rural			
Poor	252.05	247.18	232.16
Very Poor	140.57 (55.8)	102.03 (41.3)	76.70 (33.1)
Urban			
Poor	72.29	77.38	83.31
Very Poor	38.39 (53.1)	38.02 (49.1)	38.42 (46.1)
All			
Poor	324.34	324.55	315.48
Very poor	178.96 (55.2)	140.05 (43.2)	115.12 (36.5)

Note: Figures in parenthesis refer to the percentage share of very poor to the poor
Source: Same as Table 2

The distribution sensitive measures of poverty such as poverty gap index (PGI) and squared poverty gap (FGT) and Gini coefficient as a measure of inequality have also been estimated. These estimates are given in Table 4 for the pre- and post-reform periods. In contrast to the head count ratio, the rate of decline in the distribution sensitive measures (poverty gap and FGT) in rural areas was lower in the post-reform period as compared to pre-reform period. In the case of urban areas also, the decline in percentage was lower in the post-reform period. The decline for FGT when normalised with base year seems to be higher during 1993-05 as compared to 1983-94. However, inequality in consumption represented by Gini coefficient seems to have increased significantly for both rural and urban areas in the post-reform period – the rate of increase being much higher for urban as compared to rural areas (Table 4).

Table 4 : Poverty Gap, FGT and Gini for Rural and Urban Areas
(Surveys of 30 day uniform reference period)

	Poverty and inequality			Changes (percentage points per annum)		Changes in poverty (per annum changes as percentage of base year)	
	1983	1993-94	2004-05	1983-94	1993-05	1983-94	1993-05
Rural							
Poverty Gap	13.46	8.58	5.9	-0.46	-0.24	-3.45	-2.84
FGT	5.27	2.55	1.47	-0.26	-0.10	-4.93	-3.92
Gini	30.79	28.55	30.45	-0.21	0.17	-0.68	0.60
Urban							
Poverty Gap	11.95	8.37	5.76	-0.34	-0.24	-2.85	-2.87
FGT	4.31	2.61	1.46	-0.16	-0.11	-3.71	-4.21
Gini	34.06	34.31	37.51	0.02	0.29	0.01	0.85

Source: Same as Table 1

Socio-religious Categories

Using NSS consumption data, the Sachar Committee Report (GOI, 2006) provides poverty ratios for socio-religious categories. These estimates are given in Table 5. The SCs/STs together are the most poor in rural areas with a poverty ratio of 41 per cent followed by Muslims at 33 per cent in 2004-05. The poverty of other Hindus (21 per cent) was lower than all India average (28 per cent) in rural areas. It is interesting to note that the incidence of poverty for Muslims was much higher in urban areas as compared to rural areas in 2004-05. It is also noteworthy that the poverty of Muslims in urban areas is closer to that of SCs/STs. In respect of the rate of decline, poverty declined 9 per cent for rural India between 1993-94 and 2004-05. During the same period, it declined by 11 per cent for SCs/STs and 12 per cent for Muslims. On the other hand, the decline was only 4 per cent for urban India, 5 per cent for urban SCs/STs and 3 per cent for urban Muslims.

Table 5: Poverty Incidence by Socio-Religious Categories : 1987-88 to 2004-05
(URP Method)

	Rural			Urban		
	1987-8	1993-4	2004-5	1987-8	1993-4	2004-5
All Hindus	40	36	28	36	31	27
SCs/STs	54	50	41	55	51	46
Other Hindus	33	29	21	32	26	22
Muslims	43	45	33	53	47	44
Others	25	27	18	27	23	16
Total	39	37	28	38	33	29

Source: Prime Minister's High Level Committee (Headed by Justice Rajindar Sachar) on Social, Economic and Educational Status of the Muslim Community of India, GOI (2006)

State-level Poverty Trends

The poverty ratios for total population (rural + urban) in major states show a significant decline in almost all the states since 1983. In spite of this reduction, some

of the states still have very high poverty ratios for total population. In the year 2004-05, it was more than 40 per cent in Orissa and Bihar and between 30-40 per cent in Madhya Pradesh and Uttar Pradesh and between 25-30 per cent in Maharashtra, Tamil Nadu, Karnataka and West Bengal. It may be noted that Orissa's poverty level (47 per cent) was almost six times that of Punjab (8 per cent) in 2004-05. Rural poverty has been high in all these states, except for Tamil Nadu. Urban poverty was 30 per cent or more in Bihar, M.P., Orissa, Rajasthan, Tamil Nadu and U.P in 2004-05.

The absolute number of rural poor increased in three states viz., M.P., Orissa and U.P in 2004-05 as compared to 1993-94. On the other hand, the number of urban poor increased in eight states. The number of poor for the total population (rural + urban) rose in M.P., Maharashtra, Orissa and U.P.

There appears to be an increasing concentration of poor in few states. A group of four states comprising Bihar, M.P., Orissa and U.P. had a share of 49.8 per cent among the rural poor of the country in 1983. This share increased to 55 per cent in 1993-94 and further to 61 per cent in 2004-05. Similarly, the share of seven states (Bihar, Karnataka, M.P., Maharashtra, Rajasthan, Tamil Nadu and U.P.) among the urban poor rose from 61.6 per cent in 1983 to 70 per cent in 1993-94 and to 76 per cent in 2004-05. Poverty for total population (rural + urban) has got concentrated in five states viz., Bihar, M.P., Maharashtra, Orissa and U.P. – their share being 65 per cent of the total poor in 2004-05.

The states with high incidence of rural poverty, such as Bihar, Jharkhand, Orissa, M.P., U.P. and Maharashtra (except western Maharashtra) also have high percentages of workers engaged in agriculture sector (except Maharashtra) and at the same time have experienced low rate of agriculture growth at least till the middle of the last decade. These states also account for high proportion of the population of deprived social groups such as schedules castes, schedules tribes and minorities.

Recent Estimates of Poverty

The official poverty estimates in India have been widely considered an underestimation as they did not take into account the changes in the consumption pattern, decline in social services provided by the state, and other factors. Consequently, the Planning Commission appointed an Expert Group (EG) headed by Suresh Tendulkar to review the methodology which submitted its report in November 2009. The Expert Group moved away from anchoring the poverty lines to calorie intake norm and suggested a new methodology to arrive at state-wise and country level rural and urban poverty lines for 2004-05. The new estimates show that rural poverty in the country was around 42 per cent in 2004-05 as against 27.5 per cent based on the earlier official poverty estimate. A comparison of the two estimates – old official estimate and the new estimates by the Expert Group (EG) are provided in Table 6.

Table 6 : Percentage of People Below Poverty Line in 1993-94 and 2004-5 as per Old Estimate and New EG Estimates

Year	Rural	Urban	Total
		Old official estimates	
1993-94	37.3	32.3	36.0
2004-05	28.3	25.7	27.5
		New estimates by EG	
1993-94	50.1	31.8	45.3
2004-05	41.8	25.7	37.2

Multidimensional Poverty

The old official estimates of poverty and the new EG estimates are based on income criterion and do not take into account the non-income factors such as education, health, access to amenities, etc. As mentioned earlier, a Multidimensional Poverty Index (MPI) has been developed under Oxford Poverty and Human Development Initiative (OPHI). The MPI has three dimensions: education (years of schooling and school attendance); health (child mortality and nutrition) and standard of living (electricity, drinking water, sanitation, flooring, cooking fuel and assets). A person is defined as multi-dimensionally poor if he/she experiences deprivation in at least 30 per cent of weighted indicators.

The study has been done for a large number of countries. For India it pertains to the year 2005. According to MPI, 55 per cent of India's population is multi-dimensionally poor. The five poorest states of Bihar, Jharkhand, Madhya Pradesh, Chhattisgarh and Uttar Pradesh account for more than 50 per cent of the poor people in the country, the percentages being 81 per cent and 77 per cent in Bihar and Jharkhand respectively.

Radhakrishna *et al*. (2010) have also attempted to measure multidimensional poverty in terms of income and nutrition by pooling two different sets of unit level data – NSS 61st Round consumer expenditure data and NFHS-3 unit level data. Three deprivations of a household have been considered: income poverty, child malnutrition and female chronic energy deficiency. This study indicates that income poverty estimates of Expert Group (2009), and child malnutrition and female chronic energy deficiency estimates of NFHS would help in approximate measurement of multidimensional poverty. The percentage of households either poor or with at least a stunted child (union of income poverty and child malnutrition) is estimated to be 75.1 per cent in rural and 54.0 per cent in urban areas (Table 7). These figures show that the incidence of multidimensional poverty is much higher than unidimensional poverty either in income or nutrition space. The percentage of households either poor or having a stunted child or women suffering from chronic energy deficiency is much higher at 83.3 per cent in rural and 64.2 in urban areas (Table 7). From this study it is clear that only about one-third of the households are income poor in unidimensional space, while nearly three-fourth of the households suffered from poverty in the multidimensional space. It should be noted that this multidimensional poverty is much higher in rural as compared to urban areas. Appendix Table 1 provides the figures for

various types of poverty measures – income poverty, nutritional poverty as well as some multidimensional measures of poverty. The state wise poverty estimates show substantial differences between unidimensional and multidimensional poverty. Although new income poverty estimates (EG estimates) largely correspond with multidimensional poverty, for some measures there are substantial differences. Some measures such as chronic energy deficiency are certainly doubtful as they are much higher even in the prosperous states. However, it is clear that overcoming income poverty does not ensure freedom from other forms of deprivations.

Table 7 : Multidimensional Poverty

	Percentage of Poor Households			
Sector	Union between Poverty and Child Malnutrition	Union between Poverty, child malnutrition and Adult female Chronic Energy Deficiency	Intersection between Poverty and Child Malnutrition	Intersection between Poverty, Child Malnutrition and Adult Female malnutrition
Rural	75.1	83.3	31.6	16.3
Urban	54.0	64.2	17.9	7.7
Combined	69.4	78.4	28.0	14.1

Note: Union represents all households either poor or have a stunted child or both. Intersection represents all poor households with a stunted child.

Source: Radhakrishna et al (2010)

However, the relevance of multidimensional poverty for policy formulation has been questioned by policy makers and several other experts, although it may be useful for analyses of deprivation. It has also been argued that although malnutrition and poverty may not be always correlated, nutrition in a country like India, particularly of children and women, are also determined by factors such as food habits, cultural practices, etc. Even in states like Kerala, where good health facilities exist and longevity is high, malnutrition levels are relatively high. In particular, the appropriateness of energy deficiency has been widely questioned. It is also substantiated from the fact that such levels are very high in even prosperous states of the country. Nevertheless, dimensions of deprivations such as illiteracy, malnutrition, lack of basic amenities, etc. have been widely considered to be very worrisome in the country and several important steps, many in the mission modes, have been taken up in recent years. At the same time it is felt that attacking poverty, as measured on the basis of income criterion, should be the most important dimension of poverty alleviation which will also help in the reduction of other forms of deprivations. As such, in the next section on agricultural growth and poverty, we have considered only the income measure of poverty for our discussion.

III. AGRICULTURAL DEVELOPMENT AND POVERTY REDUCTION

Changing Contribution of Indian Agriculture to Income and Employment

Indian agriculture has undergone significant changes during the last six decades after Independence. These are reflected in the changing share of agriculture in the national economy and employment. Agriculture contributed a little more than 51 per cent of total output of India's economy in early 1950s. Its share has steadily declined over time and was as low as 17.7 per cent in TE 2008 (Table 8). Obviously, the growth of industrial and services sectors have far outpaced the growth of agricultural sector. Transformation of Indian economy from agriculture to non-agriculture got a strong push after 1980-81. These changes are consistent with the processes of economic growth and development experienced in developed countries. The proportion of the workforce dependent on agriculture has also declined over time but the rate of decline has been much slower as compared to its share in the GDP. In TE 1952, agriculture was the principal occupation for more than 72 per cent of India's labour force. During the next two decades, share of workforce employed in agriculture did not show any decline as non-agriculture sector failed to make any significant withdrawal of workforce from agriculture. Share of workforce engaged in agriculture started declining, *albeit* slowly, after 1971. The latest estimates reveal that about 52 per cent of the total labour force was engaged in agricultural sector in 2004-05.

Table 8 : Share of Agriculture in GDP and Total Employment

Year (TE*)	Share of Agriculture	
	GDP	Employment
1952	51.4	72.4
1961	44.8	71.9
1971	43.4	72.0
1981	35.2	68.8
1991	29.6	61.0[b]
2001	24.7	56.6[c]
2008	17.7	52.1[d]

* – TE is the Triennium Ending

Source: National Accounts Statistics, Central Statistical Organization, Government of India; Decennial Population Census; Different Rounds of the NSSO Surveys on Employment and Unemployment.

Thus, the decline in agriculture's share in work force is much lower than the decline in its share in output. The slow absorption of the workforce in the non-agricultural sector raises concerns when seen along with the change in the structure of the national gross domestic product. The asymmetry between the income and the employment shares between agricultural and non-agricultural sectors implies a widening gap between the incomes of agricultural and non-agricultural workers. This has become a major source for growing rural-urban divide and inter-sectoral disparities. However, the share of agriculture in employment, which almost stagnated around 70 per cent for first three decades, declined by 18 percentage in the last two-and-half decades. Obviously, the opportunities in non-agricultural sectors have started growing relatively at a faster rate in the recent years, leading to decline in the share of agriculture in employment by 4.5 per cent in the most recent five year period. This

offers a ray of hope for declining dependence of workforce on agriculture if a similar trend continues in future.

Performance of Agriculture Sector

Agricultural growth is necessary not only for attaining high overall growth but also for accelerating poverty reduction in a developing country like India. The agricultural growth during the various decades after Independence is presented in Table 9. The annual compound growth rates of agricultural sector as a whole have been quite robust ranging from 2 to 3 per cent in all decades after Independence, except during the sixties. It was 2.6 per cent per annum during fifties but decelerated to 1.7 per cent per annum during sixties. It continuously accelerated, touching 3.4 per cent per annum, in the nineties. During 2000-08, it maintained the growth of 3.4 per cent per annum against the target of 4 per cent per annum (Table 9). The growth of agricultural sector in all decades remained higher than the growth rate of population in the country. However, the non-agricultural sector has grown faster than the agriculture and the divergence between agricultural growth rate and growth rate of the Indian economy as a whole increased consistently, particularly since 1980s. India's total GDP growth accelerated from 3.3 per cent per annum in the eighties to 6.0 per cent in the nineties, and further to 7 per cent during the current decade. The linkage between agricultural growth and rural poverty can be gauged from the fact that 74 per cent of households and 76 per cent of population live in rural areas. Among rural households, 34 per cent are self-employed in agriculture and 25 per cent are agricultural labour households. Their income from farming (crop cultivation plus animal husbandry) is about 50 per cent of the total household income. Disaggregation of agriculture into sub-sectors shows that livestock and fisheries have emerged as the main drivers of agricultural growth in the recent years.

Table 9 : Growth Rate in GDP Agriculture and Non-Agriculture, 1950-51 to 2008-09

(Per Cent/year)

Period	GDP Total	GDP Agriculture	Crop Sector	Livestock	GDP Fishery	GDP Non-agriculture
1950-51 to 1959-60	3.68	2.93	3.06	1.42	5.79	4.79
1960-61 to 1969-70	3.29	1.27	1.70	0.41	4.00	4.85
1970-71 to 1979-80	3.45	1.94	1.79	3.92	2.90	4.62
1980-81 to 1989-90	5.17	3.09	2.24	4.91	5.67	6.37
1990-91 to 1999-00	6.05	3.36	3.02	3.79	5.36	7.14
2000-01 to 2008-09	7.89	3.19	3.06	3.90	3.56	9.12

Source : National Accounts Statistics, CSO, GoI, Various Years.

The crop sub-sector growth in the first decade of India's planning phase (1950s) was very impressive (3.1 per cent). The First Five-Year Plan accorded highest priority to agriculture and allocated substantial part of the plan outlay to this sub-sector. Further, this period witnessed remarkable progress in land reforms, institutional changes, and operationalisation of some major irrigation projects (Chand, 2005). These initiatives played an important role in achieving higher growth of the sector during the period. The importance and priority given to agriculture was diluted in the Second and Third

Five-Year Plans, and as a consequence, the sub-sector witnessed a deceleration during the sixties (1.7 per cent). This led to severe shortage of food grains, and the country was compelled to import huge quantities of food grains. The food aid from the U.S. came with conditionality, which influenced economic and foreign policies of the country, and forced it to put greater efforts to increase food grain production. In mid sixties, a new agricultural strategy was adopted which emphasised on spreading dwarf and high-yielding varieties (HYVs) of wheat and rice. The new strategy paid dividends and resulted in well-acclaimed 'green revolution'. The crop sub-sector, which was growing at an annual rate of 1.8 per cent in the seventies, grew at the rate of 2.2 per cent in eighties and 3.0 per cent in the nineties. Though the same growth in the crops was maintained, it fell short of the targeted growth rate of 4 per cent in the Eleventh Five Year Plan (Table 9).

The policy support, adoption of improved production technologies and public investment in infrastructure, research and extension contributed to growth in the agricultural sector. However, investment on agriculture declined throughout the nineties, leading to a slowdown in the agricultural growth especially in the late nineties. This led to deceleration in growth of total factor productivity in the north western region, especially in rice and wheat growing areas (Kumar *et al.,* 2004). The continuous threat to the production and lowered factor productivity of rice and wheat forced the government to take corrective measures to reverse such trends. Conscious efforts have been made in the recent years to raise investment in agriculture.

Livestock

The growth registered by livestock sub-sector was modest till 1970. It was 1.4 per cent per annum in the fifties and as low as 0.4 per cent per annum in the sixties. An upsurge in livestock output was registered in the seventies and it rose to 3.9 per cent per annum. The acceleration continued in the eighties (4.9 per cent) but it slackened in the nineties and after 2000s. Even then, this sub-sector was able to maintain a respectable growth rate close to 4 per cent per annum. The impressive performance of the livestock sector is attributed to effective government interventions, success of the Anand pattern cooperatives, and rising demands for livestock products in response to rising incomes in urban and rural areas and growing urbanisation. Expenditure elasticities for livestock products are high with the tilt in favour of rural areas (Bhalla and Hazell, 1997; Gandhi and Zhou, 2010; Kumar *et al.*, 2010). Future increases in per capita income and changing consumption patterns would lead to still higher demand for livestock products, which would give further boost to this sector.

Rapid growth in livestock sub-sector is desirable for several reasons. Firstly, this sub-sector employs about 21 million people. Further, it is an important source of livelihood for smallholders and landless labourers. And the distribution of livestock is more egalitarian than that of land. The smallholders and landless labourers together control about 71 per cent of cattle, 63 per cent of buffaloes, 66 per cent of small ruminants (goat and sheep), 70 per cent of pigs, and 74 per cent of poultry.

Fisheries

Fisheries have been recognised as a promising source of augmenting income, generating employment and improving nutrition. It is an important source of livelihood for a large section of economically backward population. With the

changing consumption patterns, emerging market forces and technological developments, this sub-sector has assumed added importance and is undergoing rapid transformation in the country. On the whole, the growth of the fisheries in India has been remarkable; growth rate of more than 5 per cent per annum in the eighties and nineties is attributed to the rapid development of aquaculture. However the growth in this sunrise sub-sector has been decelerating since 2000-01.

Growth of Agricultural Productivity

Agricultural productivity, measured as AgNDP per ha at constant prices, has more than trebled in the post Independence period (Table 10). It increased from Rs 7003 in the TE 1952 to Rs 22,944 in the TE 2008 at constant (1993-94) prices.

Table 10 : Status and Growth of Agricultural Productivity in India

Period	AgNDP/ha at 1993-94 prices (Rs)	AgNDP/person at 1993-94 prices (Rs)	Compound annual growth rate (%)	
			AgNDP/ha	AgNDP/person
TE 1952	7,003	2,774	-	-
TE 1961	8,113	3,012	1.4	0.7
TE 1971	9,723	3,093	1.2	-0.4
TE 1981	11,125	2,977	1.5	-0.2
TE 1991	15,349	3,476	3.0	1.1
TE 2001	21,069	4,008	3.4	1.7
TE 2008	22,944	4,028	2.8	1.6

Source: Domestic Products, National Account Statistics, Central Statistical Organization, Government of India; Agricultural Statistics at a Glance (Various Issues); Decennial Population Census.

The growth pattern of AgNDP/ha has, however, varied overtime; it hovered between 1.1 and 1.5 per cent in the fifties, sixties and seventies and then grew at more than 3 per cent per annum in eighties and nineties. It decelerated slightly to 2.8 per cent per annum in 2001-08. The per capita agricultural NDP (income) did not increase in the sixties and seventies. However, it improved subsequently. The agricultural income grew at annual growth rate of 1.7 and 1.6 per cent during 1990s and 2000s, respectively.

Trends in Agricultural Performance and Rural Poverty Reduction

Table 11 presents data on the performance of the states in agricultural growth during the pre- and post-reform periods. The growth rate in AgNSDP has declined significantly in all the major states, except Andhra Pradesh, Gujarat and Orissa in the post-reform period. At the national level, the growth rate of AgNSDP declined from 3.25 per cent in the pre-reform period to 2.76 per cent in the post-reform period. However, the coefficient of variations (CV) in the growth of AgNSDP declined during the post-reform period as compared to the pre-reform period. Thus, slowing down of agricultural growth has been associated with decreasing regional disparities in growth during the post-reform period. The classification of states based on

agricultural growth and rate of rural poverty reduction (Box 1) indicates that the association of agricultural growth and poverty reduction is not pervasive to all states. Some of the states (Kerala, Tamil Nadu, West Bengal, Bihar, Himachal Pradesh, Jammu & Kashmir) witnessed a direct relationship between agricultural growth and rural poverty reduction. This relationship was not observed in Andhra Pradesh, Haryana, Karnataka, Madhya Pradesh, Maharashtra and Rajasthan. By and large, the direct relationship between agricultural growth and rural poverty reduction was observed in states where share of agriculture is high in the gross state domestic product (GSDP). The sharp reduction of poverty was observed in Assam, Haryana, Karnataka, Kerala, Andhra Pradesh, Orissa and Tamil Nadu despite sluggish agricultural growth. The non-agricultural sectors in fact have contributed to the reduction of agricultural productivity in these states.

Table 11: Compound Annual Growth Rate of AgNSDP in Various States

State	**Growth in AgNSDP**		**Share of AgNSDP in Total NSDP**		**Reduction in Rural Poverty (%)**	
	1983-84 to 1993-94	1993-94 to 2004-05	1983-84 to 1993-94	1993-94 to 2004-05	1983 to 1993-94	1993-94 to 2004-05
Andhra Pradesh	2.9	2.93	36.28	29.68	10.61	4.72
Assam	2.26	0.29	39.10	36.85	-2.41	22.71
Bihar	-1.06	3.1	42.74	33.68	6.16	16.11
Gujarat	0.8	1.43	28.48	20.14	7.62	3.08
Haryana	5.06	1.68	44.55	30.42	-7.46	14.42
Himachal Pradesh	2.99	4.62	29.95	24.01	-13.34	19.64
Jammu & Kashmir	1.8	3.62	35.76	31.24	-4.3	25.74
Karnataka	3.67	1.06	35.90	24.84	6.45	9.08
Kerala	4.72	1.3	34.27	21.30	13.27	12.56
Madhya Pradesh	3.5	-0.53	39.42	29.65	8.26	3.74
Maharashtra	5.78	2.47	21.06	15.02	7.3	8.33
Orissa	-0.51	-0.21	39.57	35.25	17.81	2.92
Punjab	4.98	1.97	45.76	41.63	1.25	2.85
Rajasthan	3.58	2.47	43.67	28.47	7.04	7.76
Tamil Nadu	4.09	-0.91	22.07	16.73	21.51	9.68
Uttar Pradesh	2.96	1.99	41.90	36.05	4.17	8.88
West Bengal	4.61	2.74	33.61	30.39	22.25	12.2

Source: Authors' calculations based on data from National Accounts Statistics, CSO, GoI.

Box1 : Agricultural Growth and Rural Poverty Reduction in States

		Reduction in rural poverty	
		High	**Low**
Agricultural growth	High	Jammu & Kashmir, Kerala, Maharashtra and West Bengal	Haryana, Punjab and Rajasthan
	Low	Assam, Bihar Orissa and Tamil Nadu	Andhra Pradesh, Gujarat, Himachal Pradesh, Karnataka, Madhya Pradesh and Uttar Pradesh

Food Prices

Relative food prices are also one of the important factors in explaining variations in poverty. There are divergent views about the impact of relative food prices on the poverty. A few studies have shown the positive impact of relative food prices on poverty reduction (Mellor and Desai, 1986; Sen, 1996). The debate regarding the impact of increasing food prices has intensified in the recent years. The impact of relative price of food on rural poverty needs an analytical and empirical understanding. In Indian context, the understanding about the impact of food prices on poverty is complex. Higher food prices hurt all households who are net purchasers of food. Besides the urban population, even among the rural households more than 50 per cent of the households are net purchasers of food (Mahendra Dev, 2010). Therefore, at least 50 per cent of the total rural population would be affected adversely by an increase in the relative price of food. Typically small producers sell the surplus immediately after harvesting when prices are generally low and buy food during the lean season when prices remain high. Trends in relative prices show that relative prices of food grains, food and primary sector increased significantly during 1990s and started declining after 2000. Even during the global food crisis, India did reasonably well as food price increased only by 20 per cent. However, the persisting food inflation of nearly 19 per cent is a matter of serious concern for the poor (Table 12).

Table 12 : Compound Annual Growth Rate (% Per Annum)

Period	Wholesale price index			Consumer price index of food labour
	Food article	Food grains	Primary article	
1970-79	7.17	7.18	4.04	6.65
1980-89	8.11	10.72	6.66	6.55
1990-99	9.39	10.01	8.69	8.37
2000-07	3.49	2.84	4.30	1.82
1970-07	7.84	7.42	7.43	7.19

Source : Office of the Economic Advisor, Department of Industry, GoI.

Rural Employment and Wages

Rural employment in India has undergone significant changes since 1970s. Total rural employment did not witness much growth during 1970s. But total employment in rural India has grown at almost 1.2 during 1980s and 1.3 per cent during 1990s. Non-agricultural employment has grown faster than agricultural employment and growth in non-agriculture has accelerated in recent years. Between 1993 and 2004 it grew at 3.33 per cent per year compared with 2.13 per cent per year in the 1970s and 1.7 per cent per year in the 1980s. As a percentage of total rural employment, non-agricultural employment increased from 19 per cent to 22 per cent in 1993, which further increased to 28 per cent in 2004-05 (Table 13).

Table 13 : Rural Employment and Wages, 1970-2006

Year	Total rural employment (thousand)	Agricultural employment (thousand)	Non-agricultural employment (thousand)	Real rural wage index (1970-71=100)	Non-agricultural employment as a share of total employment (%)
1972	221064	178399	42665	100	19.3
1983	235094	182433	52661	111	22.4
1993	286200	224085	62115	155	21.7
2004	332393	240960	91433	219	27.5
			Annual growth rate (%)		
1972-83	0.57	0.16	2.13	3.81	1.56
1983-93	1.23	1.06	1.71	2.05	0.48
1993-04	1.27	0.61	3.33	3.37	2.03

Source : NSSO (different years), GoI.

A healthy growth of real agricultural wages appears to be a sufficient condition for significant reduction in rural poverty (Deaton and Dreze, 2002). Rural wages in real terms have increased faster than both agricultural and non-agricultural employment. However, the real rural wages witnessed a fluctuating trend in its growth. It grew by about 3.8 per cent during 1983 to 93 and by 2.0 per cent during 1993 to 2004-05. The growth in real rural wages was about 3.4 per cent per year during 1993 to 2004. As per recent Labour Bureau data, there has been significant increase in real wages in rural areas. The tightening of rural labour market and significant increase in real wages of agricultural labourers have also been observed. The large government investment in rural infrastructure and rural development may have contributed to this growth. State level data reveal that in poor states such as Bihar, Orissa and Uttar Pradesh, non-agricultural employment has been less important in total rural employment than in developing states. However, in recent years, growth rate among the non-farm employment in these states have been substantial. It is widely believed that the large scale employment offered by the National Rural Employment Guarantee Scheme (NREGS) has also been an important factor in increasing rural wages (Sharma, Forthcoming).

Determinants of Rural Poverty Reduction

While the literature on the measurement of poverty is relatively abundant, studies about the determinants or causes of poverty are scarce and inconclusive. Agricultural growth has long been recognised as an important instrument for poverty reduction.

However, the reliable measurements of this relationship are still scarce (de Janvry and Sadoulet, 2009). Loayza and Raddatz (2010) on the basis of study of relationship between growth and poverty in more than 50 countries found that agriculture is the most poverty-reducing sector, followed by construction and manufacturing, while mining, utilities and services by themselves do not seem to help poverty reduction.

The debate on the linkage between agricultural growth and poverty reduction has been going on fiercely in India since the beginning of planned era of development. Some scholars argued that the agricultural growth process stimulated by the Green revolution brought little or no gain to the rural poor, while others pointed to farm output growth as the key to rural poverty reduction (Ahluwalia 1978, 1985; Saith 1981; van de Walle 1985; Gaiha 1989; Bhattacharya et al. 1991; Bell and Rich 1994; and Datt and Ravallion 1998. Ahluwalia (1978) was perhaps the first to examine the Indian evidence in a fairly comprehensive manner both at the all India level and at the state level. This study showed a strong inverse relationship between agricultural per capita value added and incidence of poverty during the period 1956-57 to 1973-74 at the all India level. The results at the state level were somewhat mixed. On the basis of this analysis, Ahluwalia indicated that 'trickle down mechanism' operated in rural India. However, Bardhan (1985) did not find any evidence of the existence of strong linkages between agricultural productivity and poverty reduction. Srinivasan (1985) says that the results should be interpreted with caution since there was very little evidence of trickle down mechanism at the all India level. Mahendra Dev (1988) showed that labour productivity in agriculture explained large part of the variations in poverty. Roy and Pal (2002) concluded that an improvement in agricultural productivity has a significant effect on reducing rural poverty in India. Further, rural literacy was also observed to be highly significant in reducing poverty. Sen (1997) found that agricultural growth, relative prices of food, developmental public expenditure and non-agricultural employment were the crucial variables influencing temporal variations in poverty. Tendulkar *et al.* (1996) showed that per capita income and relative prices were significant determinants for inter-temporal and inter-regional variations in poverty. Sen (1996) also analysed pooled time series and cross-section regression for explaining inter-state variations in rural poverty. His results exhibited that the relative food price variable was the most important in terms of its impact on poverty, followed by state development expenditure and agricultural output per capita. In one of the recent studies, Panda (2006) found that the poverty reducing effects of agriculture income growth was not robust. Aggregate growth in terms of overall GDP per capita has more significant effect on poverty reduction in rural areas.

The above discussions throw light on several dimensions which could influence the rural poverty. Different sets of determinants have emerged during different periods to influence poverty. While numerous variables could influence rural poverty directly or indirectly, AgNSDP per capita of rural person, rural literacy, real rural wages, non-farm sector employment, and commercialisation of economy, have been included to understand the determinants for rural poverty reduction in the analysis undertaken in this paper.

Finally the log-linear regression models were chosen based on the overall significance of the regression equation (F-statistics and R^2), and the stability and significance of the coefficients of the explanatory variables (Table 14 and 15). At the national level, TFP growth, non-farm employment, commercialisation of economy, rural wages and rural literacy turned out to be significant determinants of rural poverty reduction.

Based on pooled cross-sectional and time-series data at state level, AgNSDP per person, rural wages and rural literacy have emerged as the significant determinants of rural poverty reduction.

Table 14 : Determinants of Rural Poverty based on National Time-series Data

Dependent variable : Rural poverty (%)		
Exploratory variables	Coefficient	Standard error
Total factor productivity	-0.1452**	0.0526
Non-farm employment	-0.5105*	0.1610
Commercialisation of economy	-0.4149*	0.1590
Rural wages	-0.6282 *	0.2204
Rural literacy	-0.6215 *	0.0823
Constant	0.2100	0.0117
R^2	0.9898	

* Significant at 1 per cent level, ** significant at 5 percent level.
Source: Authors' estimates based on data from NSSO and CSO, GoI

Table 15: Determinants for Reduction in Rural Poverty Based on Pooled Cross-section and Time Series Data

Dependent variable : Rural poverty (%)		
Exploratory variable	Coefficient	Standard error
Agriculture NSDP per person (Rs.)	-0.97634*	0.147938
Rural literacy (%)	-0.31561**	0.157547
Rural wages (Rs.)	-0.19775*	0.068741
Constant	12.90185	1.285675
R^2	0.7152	

* Significant at 1 per cent level, ** significant at 5 percent level.
Source: Authors' estimates based on data from NSSO and CSO, GoI

All the included variables are significant and have the expected plausible signs. The significant negative coefficient of AgNDP per capita suggests that the improvement in agricultural performance has been associated with substantial reduction in rural poverty, indicating that the benefits of growth in agriculture have trickled down to the rural poor and the growth has been inclusive. Agricultural productivity, an indicator of real agricultural growth, has played an important role in poverty reduction in rural areas as indicated by its higher elasticity for poverty reduction. With one per cent growth in per capita agricultural output, the poverty would be reduced by 0.97 per cent. The agricultural growth can be achieved through strategic and accelerated public investment in infrastructure and education (Kumar *et al.* 2004). However, agricultural growth alone will not be sufficient to substantially reduce the incidence of poverty particularly among landless agricultural households. Diversification towards rural non-farm sector is critical to reduce rural poverty in India. With one per cent increase in share of rural non-farm employment, the rural poverty would be reduced by 0.5 per cent. The significant poverty reduction in China achieved through the route of increasing rural non-farm employment opportunities. The share of non-agriculture in the economy also plays a significant role in rural poverty reduction. This indicates the complementary role of agriculture and non-agriculture sector to significantly reduce rural poverty in India and efforts should be made to improve the rural-urban linkages. Wages are significant component of household income for majority of rural households and thus the improvement in wages is also significant to reduce the

poverty of these households. Therefore, the rural development programmes that have direct or indirect influence on the living conditions of farmers and landless labourers should be given importance in the forthcoming Twelfth Five Year Plan to ensure inclusive growth. Literacy helps people in many ways. Better education and skill up-gradation enables the individual to take advantage of labour market opportunities and income generating prospects. It also increases awareness and enhances skills to explore opportunities in the more lucrative sectors and thus help reduce rural poverty. The significant negative association between poverty and literacy suggests that education is playing an instrumental role in rural poverty reduction, asserting for greater investment in human development activities in rural areas for inclusive growth.

IV. POLICY IMPLICATIONS

The facts provided and analysis undertaken in this paper clearly bring out the importance of agricultural productivity, rural wages, non-farm employment opportunities and literacy in attacking rural poverty. For accelerated reduction of rural poverty, several structural, institutional, technological and policy issues have to be addressed. Some of the issues which have emerged in our analysis are discussed here.

Improving Agricultural Productivity

The continuing primacy of agriculture as the primary source of employment, particularly in the Indian rural economy, calls for considerable improvements in agricultural productivity. For increasing agricultural production and accelerating productivity, the need for raising public investment is well documented. There is an urgent need for substantial increase in public investments in irrigation, rural infrastructure (roads and power), research and development, etc. The increasing marginalisation of land holdings in most of the Indian states, accompanied with increasing fragmentation further compounds the challenges of increasing and accelerating agricultural productivity. Ensuring sustainability and economic viability of smallholders and improving their competitiveness in production and marketing by facilitating better access to improved technology, inputs, credit and markets should be accorded priority for higher and inclusive agricultural growth. It has been empirically demonstrated that where appropriate institutional alternatives are adopted, smallholders are as competitive as large farms. It is necessary to emphasise productivity-enhancing interventions and even subsidies should be geared towards promoting use of technologies that increase productivity and enable movement up the value chain in agricultural production. Shifting of agricultural processing into existing rural areas should be part of such changes. Reorientation of the entire agricultural extension to bring in systems' perspective is highly essential. The elements of change should be based on the actual needs of the stakeholders. Technology generation and extension must be in continuum. Further, policy measures like land reforms, enhanced rural credit, and greater public investment are important instruments to promote agricultural growth in less developed regions.

Strengthening Rural Non-Farm Sector (RNFS)

The role of RNFS is crucial both in generating productive employment and alleviation of poverty in rural areas because of the limited absorptive capacity of the urban sector

and limitation of agriculture in providing employment to the increasing workforce. There has been long-term trend towards increasing share of RNFS, both in terms of employment and GDP shares. The significant negative relationship between non-farm sector employment and rural poverty asserts the important role of RNFS in poverty reduction in rural areas. Agriculture development and better infrastructure have been powerful factors which have impacted RNFS though production, income and development linkages. However, the growth of non-farm sector has been much slower as compared to countries like China and there is further evidence of distress-driven resource to low productivity RNFS activities in deprived regions of the country. Hence, there is urgent need to formulate appropriate strategies and policies with conducive macro environment and institutional and regulatory framework to give a big thrust to this sector. The roles of various institutions and organisations need to be clearly demarcated and the area of partnership among them – private sector, cooperation, NGOs, etc. – need to be fostered. There should be effective coordination among a wide range of promotional agencies which must have a focused strategy of intervention. A cluster approach based on region-specific conditions and specialities may be very effective (Nayyar and Sharma, 2005)

Rural-Urban Linkages

The low rate of urbanisation and weak rural-urban linkages have been important factors in slow shift of workers from agriculture to non-agriculture activities. There are several states/regions where urbanisation levels are less than 15 per cent and in some states even around 10 per cent. The rate of migration from rural to urban areas has also shown a decline recently (between 1991 and 2001) although there is large number of circulatory migrants. Due to poor transport infrastructure, rural-urban links are weak in most parts of the country, although there has been significant improvements over the years. A focused policy for establishing rural-urban linkages is critical for development in agriculture and non-agricultural activities. The link will help the rural producers in commuting to nearby urban centres and establish channels for the flow of commodities and information. For ensuring economic growth in distant rural areas in less developed regions, it would be important to promote infrastructural development to link villages with urban areas so as to ensure the sustained growth of agriculture and agro-based activities. The small and medium towns and their links with rural hinterlands are very important in rural development – both agriculture and non-agriculture. This has been rather a neglected aspect in the development policy in India. As a first step there is need to identify a large number of such towns, particularly in backward regions and develop infrastructure and formulate appropriate policies for rural-urban linkages. Development of corridors joining two or more big cities as has happened in some states should be replicated in backward regions too.(Nayyar and Sharma, 2010).

Development of Rural Infrastructure

Large parts of rural areas lack utterly in basic infrastructure such as schools, health care centres, all weather roads, means of transport and communication, drinking water facilities, and electricity for domestic and agricultural purpose. Although good progress has been made recently under various centrally sponsored programmes to provide the bare minimum infrastructure, there are several millions of people living in backward regions, particularly in remote tribal and hilly areas where not much has

been done. This is a major challenge in rural development which the country must seriously address.

Focussed Regional Development Strategy

As there is a large concentration of rural poverty in some states – Uttar Pradesh (mainly central and eastern parts), M.P. Bihar, Jharkhand, Orissa, Maharashtra (except Western Maharashtra), parts of Bengal and Andhra Pradesh – there is need for pro-active and concentrated rural and agricultural development strategy in these backward regions. Most parts of these states are rain-fed and occasionally afflicted with either flood or drought and have low agricultural productivity. These regions require a big push by way of large investment in rural infrastructure, irrigation and water management and strengthening of supportive institutions. These states lack adequate resources for such a big push. The central government and outside institutions and agencies can play an important role in this regard. Ofcourse, there is need for considerable reforms and strengthening of local institutions which can be initiated and undertaken only by the state governments.

Human Development

Apart from high evidence of poverty, the social and human development indicators in most parts of rural India are dismal. The literacy level in 2001 was about 60 per cent in rural areas. The level of literacy has turned out to be one of the most significant determinants of rural poverty. Higher level of illiteracy and the lack of skills among the majority of rural people are serious constraints to their socio-economic development and act as barriers for accelerated reduction of poverty. Notwithstanding the gains in recent years, a significant part of the country located mainly in central and eastern India (including central and eastern UP) have high levels of illiteracy. The expansion of literacy and education and skill will not just contribute to enhancing productivity of rural workers but also to the growth of non-agricultural activities in rural areas as such activities generally require literate and skilled workers. The enhanced levels of education and skill will enable more rural workers to take up jobs in urban areas, thus accelerating the process of transfer of workers from rural to urban areas. There have been serious attempts in recent years, through a series of flagship programmes, to address these issues and encouraging progress has been achieved in some parts of the country. These efforts have to be continued, broadened and enhanced to achieve the desired outcome.

Social Protection

Rural areas lack much of the social security networks that are in place in urban centres, although overwhelming majority of the urban informal sector workers are also devoid of social security measures. During the Asian crisis of late 90s, there were policy responses for urban areas, but not for rural areas, which thus put the burden of providing a cushion to the women-based household economy of the rural areas. In India, at present, NREGA has acted rather well as a safety net for returning migrants, who have lost their jobs due to global recession. But overall there is need to put in place a general safety net for rural areas, one that would raise the floor of rural incomes and guarantee access to educational and medical services.

There has been growing recognition by the government and other stakeholders of the huge challenges of addressing the lopsided growth in the country. The ongoing Eleventh Five Year Plan and the forthcoming Twelfth Five Year Plan have been giving heavy emphasis on rural development in general and agriculture and allied sectors in particular.

Besides, the above specific measures, general policy environments and institutional framework have to be made conducive for accelerated rural poverty reduction. Pro-poor tilt in macro policies is important for reducing poverty. Fiscal, trade, exchange rate and monetary policies should also have a pro-poor focus. The experiences show that rapid economic growth remains the best bet for reducing rural poverty in India. However, to harness the potential of economic growth on poverty reduction, a concerted effort must be made to ensure that the distribution of income doesn't further become skewed. This requires several initiatives, some of them include: (1) Tilting the composition of growth to encourage agricultural growth; (2) Making adequate provision for public expenditure for anti-poverty programmes. Besides, the efficiency of public expenditure and of the social safety net (like NREGA, ICDS, NFSM, etc.) should be improved. Policies that can sustain and enhance social expenditure levels and are more effective for the poor should be vigorously pursued; (3) Re-orienting the design of a sound social sector policy framework, which includes: (i) emphasis on developing lasting, flexible organisations to protect the poor from the effects of macroeconomic shocks, (ii) need for developing well targeted safety nets, which involve appropriate transfer and credit programmes. The expenditures for such programmes need to be protected in real terms even when macroeconomic adjustments are made, (iii) nurturing the groups of people working for the poor to ensure the availability of enough funds for social programmes and making those responsible for these expenditures accountable to the people.

Note

a : Data for employment is for single year. Data for employment for 1951 to 1981 are based on decennial population census, and the remaining years from the NSSO surveys on employment and unemployment.

b : Data pertain to 1993-94.

c : Data pertain to 1999-00.

d : Data pertain to 2004-05.

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Appendix Table 1

Multi-dimensional Rural Poverty in Major States States in India

State	Percentage of persons Below Poverty Line	Percentage of Poor HH among the HH with a Women & a Child below 5 Years of Age	Percentage of HH with stunted Child below 5 years of Age	Chronic Energy Deficiency (CED) Females	Union of Household with		Intersection of Households with		% of poor as estimated by OPHI
					Poverty and Child Malnutrition	Poverty, Child Malnutrition and CED Females	Poverty, Child Malnutrition	Poverty, Child Malnutrition and CED Females	
Andhra Pradesh	32.3	42.8	44.0	47.7	65.7	78.3	21.1	11.1	44.7
Assam	36.4	46.5	47.2	42.7	68.4	80.2	25.3	13.4	-
Bihar	55.7	68.9	65.2	49.3	85.5	90.2	48.6	26.4	81.4
Chhattisgarh	55.1	62.5	62.6	50.3	86.7	92.5	38.3	22.1	71.9
Gujarat	39.1	50.9	58.9	50.0	77.8	86.0	32.0	16.2	41.5
Haryana	24.8	31.4	53.6	39.7	64.1	74.3	20.9	11.1	41.6
Himachal Pradesh	25.0	34.7	41.5	35.1	57.7	71.6	18.5	8.3	31.0
Jammu & Kashmir	14.1	23.4	40.2	33.0	51.9	66.3	11.8	4.3	43.8
Jharkhand	51.6	60.9	54.4	49.7	81.3	90.5	34.1	18.5	77.0
Karnataka	37.5	51.0	42.2	43.0	70.4	79.7	22.7	11.8	46.1
Kerala	20.2	24.4	27.1	18.0	40.6	48.0	10.9	3.6	15.9
Madhya Pradesh	53.6	64.5	59.1	46.6	85.0	90.8	38.6	18.9	69.5
Maharashtra	47.9	56.0	46.2	48.7	72.5	83.8	29.8	18.3	40.1
Orissa	60.8	69.5	49.3	46.3	79.9	86.1	38.9	20.5	64
Punjab	22.1	26.7	43.7	23.5	53.9	63.4	16.4	5.6	26.2
Rajasthan	35.8	46.0	53.2	40.0	73.4	83.3	25.8	11.0	64.2
Tamil Nadu	37.5	44.5	33.3	33.5	60.6	69.7	17.1	8.2	32.4
Uttar Pradesh	42.7	54.5	58.9	40.5	79.9	86.5	33.5	16.3	69.9
Uttarakhand	35.1	47.6	54.0	35.8	71.5	78.7	30.1	12.4	40.3
West Bengal	38.2	49.7	51.6	49.9	71.1	82.2	30.2	17.5	58.3
All India	41.8	53.4	53.3	43.7	75.1	83.3	31.6	16.3	55.4

Note: This table provides poverty ratios of EG, 2009 and poverty ratios as estimated from NFHS-3. It may be noted that the coverage of households between the two estimates differs. Moreover, the poverty ratio of the EG refers to the proportion of poor persons, whereas authors estimates refer to the percentage of poor households

Source: Radhakrishna in et al (2010); except the last column which is from OPHI.

Appendix Table 2

Correlation Matrix – Rural Poverty and Explanatory Factors, 1973-2004

Variable	Rural poverty	Total factor productivity	Non-farm employment	Commercialization of economy	Rural wages	Rural literacy
Rural poverty	1					
Total factor productivity	-0.876	1				
Non-farm employment	-0.794	0.653	1			
Commercialization of economy	-0.977	0.830	0.812	1		
Rural wages	-0.982	0.885	0.738	0.966	1	
Rural literacy	-0.984	0.855	0.717	0.958	0.979	1

Source : Authors' estimates based on data from CSO and NSSO.

Appendix – Table 3

Correlation matrix – Rural Poverty and Other Variables, 1973-2004

Variable	Rural poverty	Irrigation	Fertilizer consumption	Road density	Electrified villages
Rural poverty	1				
Irrigation	-0.979	1			
Fertilizer consumption	-0.985	0.990	1		
Road density	-0.988	0.992	0.992	1	
Electrified villages	-0.903	0.921	0.926	0.923	1

Source : Authors' estimates based on data from Directorate of Economics & Statistics and NSSO, Government of India.

Appendix Table 4

Status of Agricultural Productivity

State	AgNDP/person at 1993-94 prices (Rs)			AgNDP/ha at 1993-94 prices (Rs)		
	1983	1993-94	2004-05	1983	1993-94	2004-05
Andhra Pradesh	2781	2819	3404	12180	15104	21736
Assam		2570	2299	14210	15189	16198
Bihar	2010	1630	1806	15204	19928	20894
Gujarat	3521	2560	3275	11394	10011	15282
Haryana	4467	5397	5319	11419	15963	18692
Himachal Pradesh	2880	2879	3765	13366	15803	24849
Jammu & Kashmir	-	-	3152	-	19404	30384
Karnataka	2589	3146	3100	8568	11773	14870
Kerala	1991	2695	3040	18190	26211	33655
Madhya Pradesh	2690	2830	2473	6626	7668	8523
Maharashtra	2096	2687	2651	7169	10508	12141
Orissa	2777	2263	2128	9120	7842	9385
Punjab	4932	6631	6920	12436	18473	22215
Rajasthan	2902	2422	3039	5683	5555	8414
Tamil Nadu	1704	2424	2221	14078	19588	26781
Uttar Pradesh	2283	2308	2330	10721	13083	16201
West Bengal	1909	2459	2959	15548	20246	25521
India	2495	2625	2742	10066	12365	15565

Source : Authors' estimates based on data from CSO, Government of India.

Appendix Table 5

Growth in AgNSDP and Trends in Poverty Reduction

State	Growth in AgNSDP		Reduction in Rural Poverty (%)	
	1983-84 to 1993-94	1993-94 to 2004-05	1983-1993	1993-94 to 2004-05
Andhra Pradesh	2.90	2.93	10.61	4.72
Assam	2.26	0.29	-2.41	22.71
Bihar	-1.06	3.10	6.16	16.11
Gujarat	0.80	1.43	7.62	3.08
Haryana	5.06	1.68	-7.46	14.42
Himachal Pradesh	2.99	4.62	-13.34	19.64
Jammu & Kashmir	1.80	3.62	-4.3	25.74
Karnataka	3.67	1.06	6.45	9.08
Kerala	4.72	1.30	13.27	12.56
Madhya Pradesh	3.50	-0.53	8.26	3.74
Maharashtra	5.78	2.47	7.3	8.33
Orissa	-0.51	-0.21	17.81	2.92
Punjab	4.98	1.97	1.25	2.85
Rajasthan	3.58	2.47	7.04	7.76
Tamil Nadu	4.09	-0.91	21.51	9.68
Uttar Pradesh	2.96	1.99	4.17	8.88
West Bengal	4.61	2.74	22.25	12.2
India	-	-	8.38	8.97

Source : Authors' estimates based on data from CSO and NSSO, Government of India.

Appendix Table 6

Farm size

(ha)

State	1985-86	1995-96	2005-06
Andhra Pradesh	1.72	1.36	1.20
Assam	1.31	1.17	1.11
Bihar	0.93	0.75	0.43
Gujarat	3.17	2.62	2.20
Haryana	2.76	2.13	2.23
Himachal Pradesh	1.30	1.16	1.04
Jammu & Kashmir	0.86	0.76	0.67
Karnataka	2.41	1.95	1.63
Kerala	0.40	0.27	0.23
Madhya Pradesh	2.91	2.28	1.87
Maharashtra	2.64	1.87	1.46
Orissa	1.47	1.30	1.15
Punjab	3.77	3.79	3.95
Rajasthan	4.34	3.96	3.38
Tamil Nadu	1.01	0.91	0.83
Uttar Pradesh	0.93	0.86	0.80
West Bengal	0.92	0.85	0.79
India	1.69	1.41	1.23

Source : Agricultural Statistics at a Glance (different years), Government of India.

Appendix Table 7

Rural Literacy Across States

	Rural literacy (%)			Female literacy (%)		
State	1981	1991	2001	1981	1991	2001
Andhra Pradesh	29.94	36.82	52.40	20.39	27.32	43.76
Assam		42.46	52.58		34.29	45.24
Bihar	26.20	30.57	37.48	13.62	18.06	26.32
Gujarat	43.70	51.15	58.87	32.30	40.62	49.39
Haryana	36.14	45.25	57.20	22.27	32.72	47.17
Himachal Pradesh	42.48	53.48	66.50	31.46	43.76	58.97
Jammu & Kashmir	26.67		47.39	15.88		36.52
Karnataka	38.46	46.72	57.59	27.71	36.96	49.22
Kerala	70.42	77.96	80.04	65.73	75.25	77.76
Madhya Pradesh	27.87	35.46	52.35	15.53	23.07	41.24
Maharashtra	47.18	53.77	66.03	34.79	43.30	57.62
Orissa	34.23	40.80	53.90	21.12	28.83	43.24
Punjab	40.86	48.97	60.58	33.69	42.22	55.52
Rajasthan	24.38	30.79	49.02	11.42	16.31	35.64
Tamil Nadu	46.76	54.31	64.94	34.99	44.58	57.14
Uttar Pradesh	27.16	33.17	45.56	14.04	20.03	34.11
West Bengal	40.94	47.91	58.87	30.25	38.44	51.00
India	36.23	42.84	54.50	24.82	32.17	45.15

Source : Population Census (different years), Government of India.

Appendix Table 8

Share of Urban Population in Total Population

(%)

State	1981	1991	2001
Andhra Pradesh	23.32	26.89	27.30
Assam		11.10	12.90
Bihar	12.47	13.14	13.35
Gujarat	31.10	34.49	37.36
Haryana	21.88	24.63	28.92
Himachal Pradesh	7.61	8.69	9.80
Jammu & Kashmir	21.05		24.81
Karnataka	28.89	30.92	33.99
Kerala	18.74	26.39	25.96
Madhya Pradesh	20.29	23.18	24.82
Maharashtra	35.03	38.69	42.43
Orissa	11.79	13.38	14.99
Punjab	27.68	29.55	33.92
Rajasthan	21.05	22.88	23.39
Tamil Nadu	32.95	34.15	44.04
Uttar Pradesh	17.95	19.84	21.02
West Bengal	26.47	27.49	27.97
India	23.70	25.73	27.81

Source : Population Census (different years), Government of India.

Appendix Table 9

Trends in Rural Wages

(Rs./day)

State	1983-84	1993-94	2004-05
Andhra Pradesh	12.0	35.8	68.7
Assam	16.6	45.1	86.3
Bihar	11.7	38.2	83.0
Gujarat	19.4	50.5	114.4
Haryana	24.1	83.0	133.1
Himachal Pradesh	18.6	55.7	151.6
Karnataka	10.8	29.8	87.7
Kerala	20.8	75.0	211.6
Madhya Pradesh	12.3	41.7	82.7
Maharashtra	11.9	48.8	64.6
Orissa	11.7	35.2	72.8
Punjab	25.6	88.4	135.6
Rajasthan	16.4	50.0	92.8
Tamil Nadu	12.7	40.0	90.4
Uttar Pradesh	13.9	47.4	91.9
West Bengal	4.2	42.7	80.5

Source : Agricultural Wages in India (different years), Government of India.