International Scholars Journals

International Journal of Agricultural Economics and Extension ISSN 2329-9797 Vol. 7 (1), pp. 001-015, January, 2019. Available online at www.internationalscholarsjournals.org © International Scholars Journals

Full Length Research Paper

Linkage between rural poverty and agricultural productivity across the districts of Uttar Pradesh in India

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Accepted 26 January, 2018

Improvement in agricultural productivity can reduce rural poverty in a major way. In India, various studies inferred that rural poverty is inversely related to the agricultural productivity and argued that agricultural productivity growth reduces rural poverty effectively as it generates income for poor farmers. Indian states are characterized by high variations in rural poverty levels, particularly, in Uttar Pradesh which is the most populous state of India. The economy of the state is rural-based, predominantly agrarian, with 80% of population living in villages. The incidence of rural poverty in the state is very high as compared to most of the other states of India. It demands for an in- depth analysis of rural poverty in Uttar Pradesh and the role of agricultural productivity in reducing rural poverty. Present study attempts to estimate rural poverty and disparity in it within the state. The linkage between rural poverty and agricultural productivity has also been examined. The study analyses that there exists no significant differences in the incidence, depth and severity of rural poverty across the regions, while variations are significant across the districts. The linkage between agricultural productivity and rural poverty are found to be significant in the state. This shows that as agricultural productivity increases, the incidence, depth and severity of rural poverty decreases in all the districts. The findings of regression analysis further provide evidences that the negative impact of agricultural productivity on the incidence, depth and severity of rural poverty is statistically significant across the districts of Uttar Pradesh.

Key words: Rural poverty, agricultural productivity, districts, Uttar Pradesh.

INTRODUCTION

Improvement in agricultural productivity can reduce rural poverty in a major way. Many researchers have studied this aspect of the overall socio-economic development of different countries and the states in these countries involving India. They, however, could not arrive at any specific conclusion. Their findings widely vary in respect of the causes behind the continuation of poverty in the states and regions within. However, quite a good number of studies have pointed out that there is a close relation between agricultural productivity and poverty in rural areas as around 75 per cent of the poor work and live in rural areas, and projections suggest that over 60 per cent will continue to do so in 2025 (Ravallion, 2000).

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Therefore, there is a need to focus on reducing rural poverty and to redirect attention and expenditure for agricultural development that generates employment in rural areas, as agriculture comprises largest component of rural economy in developing countries, particularly in India.

Agricultural productivity growth may have more immediate multiplier effects in improving the well-being of the poor. Wichmann (1997), using a dynamic general equilibrium model showed that an increase in agricultural productivity can lead to a significant increase in the household consumption of the poor. Strong agricultural growth, particularly increased productivity, has been an important feature of countries that have successfully reduced poverty, particularly rural poverty. Gallup et al. (1997) in a cross country examination established that one per cent increase in agricultural GDP led to 1.61% increase in income of the poorest quintile, while the

corresponding values for the manufacturing and services sectors were only 1.16 per cent and 0.79 per cent respectively. Thirtle et al. (2001) concluded from a major cross country analysis that, on an average, every 1 per cent increase in agricultural yields or land productivity reduced 0.83 per cent of people living on less than US$1 per day.

A host of studies shows that higher agricultural productivity in Asia consistently raised farmer's incomes despite declining market prices resulting from increased output. Small and medium sized farmers have not been excluded from these benefits (Lele and Agarwal, 1989; Lipton and Longhurst, 1989). Similarly, in a developing country like India, agricultural productivity has been identified as an important contributing factor in attaining food security and in reducing poverty (Saith, 1981; Gaiha, 1989; Ghose, 1989). Ahluwalia (1978) in a study for India spanning the period 1956 - 57 to 1973 - 74, inferred that rural poverty is inversely related to the agricultural productivity. Mellor (2001) also argues that agricultural productivity growth reduces poverty effectively as it generates income for poor farmers. Increased agricultural productivity also creates employment opportunities in farms, although not necessarily resulting in higher wages (Hazell and Ramasamy, 1991). Recent studies of poverty reduction in India support the view that poverty reduction is the result of growth within agriculture in both rural and urban areas (Datt and Ravallion, 1990, 1996, 1998).

Despite this fact, poverty still continues to be a major concern in India. The magnitude of rural poverty is larger than that of urban poverty in the country. The incidence of rural poverty in Uttar Pradesh (UP) is very high as compared to most of the other states of India (Deaton and Dreze, 2002). UP alone holds 473 million rural poor below the poverty line which is the highest number of absolute poor in the country for the 61st round of NSS (Govt. of India, 2007). In 2004 - 05 rural poverty in UP is 33.4 per cent, which is higher than all India figure of 28.3 per cent. UP being the most populous state of India comprises about 17.9 per cent of India's rural population and 20.3 per cent of country's poor (Govt. of Uttar Pradesh, Department of Economics and Statistics, 1999 - 2000). The economy of the state is rural-based with 79.2 per cent of population living in villages (Census of India, 2001). According to 1983 and 1993 - 94 rounds of NSS, nearly two-third of rural households employed as agriculture laborers (66.3 and 63.5% respectively) were below the poverty line as compared to half of the households working as casual laborers in rural non farm sector (48.2 and 52.3% respectively).

In India inter-state and intra-state, disparities are studied in different dimensions but disparities in poverty levels have been examined extensively (Sundaram and Tendulkar, 2003; Kozel and Parker, 2003; Sen and Himanshu, 2004a; Himanshu, 2007; Prabha et al., 2009). Similarly, UP is characterized by large variations in rural poverty levels across the regions and districts. Bundelkhand (Southern) region is marked by highest incidence of poverty followed by Eastern and Central regions. Western region has the lowest incidence of poverty and is also the most developed region in the state. Here, the yield of food grain crops is 25.55 q/ha for the Western region, while it is only 19.66 q/ha in the Eastern region (Govt. of Uttar Pradesh, Department of Economics and Statistics, 2007).

Thus, an apparent link between the productivity of crops and the income of the people, and hence the poverty, particularly the rural poverty, is observed in UP. The variation in the levels of rural poverty also appears to be linked to the variations in agricultural productivity. Theoretically also a relation appears to exist between these two since in many states and their districts a large number of people earn their livelihood from agriculture, even the productivity of workers, working in factories, industries, trade and commerce depend upon the availability of food. Many workers who earn a bare minimum just to maintain their families can hardly improve their productivity if food production is not sufficiently high and the price (which depends on the demand for and supply of food) is well within their reach. This apparent link needs to be meticulously looked into before any conclusion on the link between agricultural productivity and the rural poverty in particular and poverty in general is drawn.

OBJECTIVES

In the present study we make an attempt to estimate rural poverty and its variations across the districts in UP. The study also attempts to establish the linkage between rural poverty and agricultural productivity in UP. If any such link is found between them the degree of dependence or effect of agricultural productivity on rural poverty is examined. In other words, study also examines how much of the total variation in rural poverty is accounted for by the variation in agricultural productivity. The objectives in this study are set out in the following ways:

-To measure the incidence, depth and severity of rural poverty across regions and districts in UP.
-To analyze the regional and district level variations in incidence, depth and severity of rural poverty in UP, and -To examine the linkage between agricultural productivity and incidence, depth and severity of rural poverty across the districts of Uttar Pradesh.

HYPOTHESES

To fulfill the objectives following hypotheses are formulated related to objectives two and three.

H1: There is no statistically significant difference in the incidence, depth and severity of rural poverty across the regions and districts.

H2: There is no linkage between the agricultural productivity and the incidence, depth and severity of rural poverty in the regions and the districts in the state.
H3: There is no effect of agricultural productivity on the incidence, depth and severity of rural poverty.

The method used to test the above three hypotheses and the method to measure the incidence, depth and severity of rural poverty are described in the following section of methodology.

METHODOLOGY

Present study estimates the rural poverty over four quinquennial years for the four regions and 48 districts of UP. The estimation of rural poverty is based on the National Sample Survey Organization (NSSO) data for the 43rd (1987 - 88), 50th (1993 - 94), 55th (1999 - 2000) and 61st (2004 - 2005) rounds of Household Consumption Expenditure Survey reports. The 55th round of NSS is not comparable with other rounds of NSS due to modifications in the estimation and survey techniques of NSSO. However, rural poverty has been estimated for the 55th round also for the regions and districts of UP through adjusted pooled State and Centre data of NSSO. Therefore, the estimates of rural poverty are not comparable with other rounds in the present study. The data considered in this study exclude the Hill region, as it became a new state that is, Uttarakhand in 2001. The data for the newly created districts have been combined with the respective parent districts for comparability purposes.

The study takes the help of rural poverty line of UP as defined by the Planning Commission of India (Appendix I). The poor are defined here as those whose monthly per capita income is less than the poverty line as estimated by the Planning Commission of India. The incidence, depth and severity of rural poverty for the regions and the districts are the weighted estimates. The weights attached to the incidence, depth and severity of rural poverty are the multipliers, as suggested by the NSSO and the Planning Commission of India.

Present study uses the widely used Foster-Greer-Thorbecke (FGT) measure of poverty (Datt and Ravallion, 1990; Datt, 1998; Jha, 2000). This approach assumes that individuals and households are poor if their income or consumption falls below a certain minimum threshold that is, the poverty line. Here, for estimation of incidence, depth and severity of rural poverty, the monthly per capita expenditure data are used, as consumption data are readily available, stable and reliable than the income data especially in the rural sector. The method is also used by NSSO and other researchers (Datt and Ravallion, 1990; Datt, 1998; Jha, 2000). FGT poverty measure for a given population is expressed as:

$$PG_\alpha = \frac{1}{N}\sum_{i=1}^{q}\left(\frac{z-y_i}{z}\right)^\alpha$$

Where; N = sample size, y = monthly per capita consumption expenditure, z = poverty line, and
q = population below the poverty line.

Incidence, depth and severity of rural poverty are estimated on the basis of three values of .

(1) Incidence of poverty or Head Count Index (PG_0) with = 0 is represented by;

$$PG_0 = q / N$$

This measures the number of people below the poverty line.
(2) Depth or Poverty Gap (PG_1) with = 1 is represented by;

$$PG_1 = \frac{1}{N}\sum_{i=1}^{q}\frac{z-y_i}{z}$$

Poverty Gap captures the acuteness of poverty since it measures the total shortfall of the poor from the poverty line. Individuals above the poverty line have a zero poverty gap. But this does not consider the importance of the number of people who are below the poverty line. That is why it is necessary to use together both the measures of poverty that is, incidence and depth to evaluate the extent of poverty. However, neither of the two is sensitive to the destitute. If a poor individual receives an income transfer from much poorer one, then neither incidence nor depth will change. Therefore, higher order such as severity of poverty is used. This is measured through the equation as mentioned below.
(3) Severity or Squared Poverty Gap (PG_2) with = 2 is represented by;

$$PG_2 = \frac{1}{N}\sum_{i=1}^{q}\left(\frac{z-y_i}{z}\right)^2$$

The severity of rural poverty gives greater weightage to those who are further away from the poverty line. The regional and district level variations in incidence, depth and severity of rural poverty have been analyzed through mean variance test, as defined by the ratio of Between-column Variance (σ_b^2) and Within-column Variance (σ_w^2). The Between-column variance (σ_b^2) has been estimated using the formulae

$$\sigma_{b^2} = \frac{\sum_{j}^{n}\left(\overline{X}_j - \overline{\overline{X}}\right)^2}{k-1},$$

Where; k = number of columns representing regions and districts in the state, $\overline{X}$ = mean of the j^{th} column, $\overline{\overline{X}}$ = mean of the means of the columns, that is, the grand mean and n_j = number of observations in the j^{th} column.

Similarly, the Within-column (σ_w^2) variance has been estimated using the following formulae.

$$\sigma_w^2 = \sum_{j=1}^{k}\frac{n_j - 1}{n_T - k}S_j^2$$

Where;

$$S_j^2 = \frac{\left(X_j - \overline{X}_j\right)^2}{n_j - 1}$$

, n_j = number of observations in the j^{th} column, $n_T = \sum_{j=1}^{k} n_j$ is the total number of observations, k = number of columns. The ratio $\frac{\sigma_{b^2}}{\sigma_{w^2}}$ will have F distribution with degrees of freedom for numerator as k-1 and for the denominator

Table 1. The incidence, depth, and severity of rural poverty across the regions of Uttar Pradesh for the years 1987-88, 1993-94, 1999-00 and 2004 - 05.

Years	Variables	Regions			
		Western	Central	Eastern	Bundel khand
1987-88		32.24	44.15	50.51	64.76
1993-94	Incidence	29.29	50.23	48.78	67.36
1999-00*	(%)	21.75	42.20	36.43	20.92
2004-05		17.01	24.01	32.07	30.00
1987-88		7.277	10.263	12.217	17.167
1993-94	Depth	6.082	13.784	11.976	20.168
1999-00*	(%)	3.618	8.619	6.822	4.755
2004-05		2.355	4.158	5.910	5.494
1987-88		2.387	3.354	4.085	6.109
1993-94	Severity	1.845	5.005	4.030	8.086
1999-00*	(%)	0.960	2.495	1.868	1.595
2004-05		0.504	1.062	1.667	1.347

Note: *based on 30 days recall period.

as n_T - k. Hypothesis to be tested in this case is, H_0: $_1^2 = {}_2^2 = \ldots = {}_k^2$ against the alternate hypothesis, H_1: H_0 is not true. The 55th round that is, 1999 - 2000 is not considered in the analysis of variance (ANOVA).

Poverty, whether measured by incidence or depth or severity, is related to the level of income of the households. There is an inverse relationship between these two that is, poverty is an inverse function of income. For the rural people, however, the income data are not available directly from any records since most of them do not have any such sources of income for which records are kept. The major source of their income is agriculture which constitutes about 70 per cent to 90 per cent of the income of the rural people. However, data related to agricultural income of the rural people are not available from secondary sources. Given this limitation, agricultural productivity has been considered here as a proxy for the agricultural income of the rural people. Higher the agricultural productivity, higher will be the income of the rural households, given that the prices of agricultural products do not fall sharply. This is possible because of the implementation of the minimum support price policy by the central government.

Therefore, the present study uses agricultural productivity of 48 districts and four regions that is, Western, Eastern, Central and Bundelkhand (Southern) in the state separately as a variable that is inversely related with poverty of the rural people. The linkage between agricultural productivity and incidence, depth and severity of rural poverty are analyzed through the contingency tables for each dimension of the poverty measures. The variables have been grouped into different levels such as low, moderately low, moderately high and high for rural poverty and low, medium and high for agricultural productivity for preparing the contingency tables. The expected value for each cell has been estimated using the standard formula for the expected values, that is,

$$e_{ij} = \frac{n_{i0} \times n_{j0}}{n = N_{ij}}$$

Where; e_{ij} = expected value of the ijth cell, n_{ij} = total number of observations in the table (here it is 48 as there are 48 districts), n_{i0} = total number of observations in the ith row and n_{j0} = total number of observations in the jth column.

The inter-relationship between these two variables along with their different attributes is tested through ^{2} statistic as shown;

$$\chi^2 = \frac{(o_{ij} - e_{ij})^2}{e_{ij}}$$

Where; o_{ij} = observed frequency in the ijth cell and e_{ij} = expected frequency in the ijth cell. The ^{2} statistic has the ^{2} distribution with (r-1) (c-1) degrees of freedom where r is the total number of rows and c is the total number of columns in the table.

The effect of agricultural productivity on different aspects of rural poverty has been measured by regressing rural poverty on agricultural productivity, assuming linear relationship between these two, and then carrying out statistical significance test on the regression coefficient of agricultural productivity. Thus, we use the linear regression equation

$$Y_i = a + bX_i + u_i$$

Where; Y_i = rural poverty level (incidence, depth and severity of rural poverty for the ith regions/districts), X_i = agricultural productivity for the ith regions/districts, b = regression coefficient and u_i = random disturbance term with the properties such as, E (u_i) = 0, E (u_iu_j) = 0 if i j, E (u_iu_j) = 0 if i = j. The hypothesis here is, H_0: b = 0 against H_1: b 0 where b measures the effect of agricultural productivity on rural poverty.

RESULTS AND DISCUSSION

The incidence, depth and severity of rural poverty have been estimated across the four regions and the 48 districts of UP as mentioned in Table 1 and Table 2. From

Table 2. Incidence, Depth and Severity of rural poverty across the 48 districts of Uttar Pradesh for the years 1987-88, 1993-94, 1999-00 and 2004 - 05.

Regions	Districts	Incidence (%)				Depth (%)				Severity (%)			
		1987-88	1993-94	1999-00*	2004-05	1987-88	1993-94	1999-00*	2004-05	1987-88	1993-94	1999-00*	2004-05
	Saharanpur	17.14	37.54	15.71	14.64	3.17	8.16	2.53	2.51	0.96	2.84	0.76	0.57
	Muzaffarnagar	26.86	34.84	28.58	30.57	5.00	6.59	4.38	3.59	1.43	1.74	1.00	0.67
	Meerut	18.07	14.38	8.92	15.16	3.94	2.01	1.22	2.03	1.37	0.56	0.23	0.47
	Ghaziabad	7.10	15.33	12.89	10.45	1.49	2.10	2.62	1.03	0.36	0.40	0.47	0.14
	Bulandshahar	48.79	25.23	33.74	14.90	9.25	6.49	6.07	2.04	2.53	2.12	1.77	0.37
	Moradabad	60.15	48.02	16.53	13.39	17.34	10.65	2.37	1.69	6.75	3.32	0.50	0.37
	Rampur	61.28	42.59	18.70	31.73	14.96	8.43	1.67	5.93	5.14	2.21	0.23	1.41
	Bijnore	40.22	20.75	5.72	17.85	10.81	3.55	0.72	2.98	4.09	0.90	0.13	0.74
	Agra	47.52	16.21	30.42	23.85	11.04	2.48	4.10	3.35	3.27	0.57	1.01	0.75
Western	Aligarh	34.35	28.35	26.81	23.37	7.17	7.48	3.96	3.17	2.10	2.48	0.95	0.61
	Etah	51.71	34.22	22.85	30.80	12.28	6.72	3.95	7.00	4.23	1.81	0.98	2.10
	Mainpuri	13.88	37.57	19.14	22.92	2.42	7.93	2.49	3.41	0.65	2.63	0.54	0.68
	Mathura	31.17	26.02	22.35	41.01	7.59	6.55	3.09	8.71	2.77	2.19	0.60	2.75
	Bareilly	35.09	15.87	12.70	30.21	7.09	3.96	2.04	5.62	2.00	1.54	0.55	1.49
	Shahjahanpur	20.22	20.50	15.41	37.42	4.13	3.12	2.52	6.87	1.42	0.62	0.64	1.58
	Badaun	17.74	30.59	16.69	28.83	3.01	6.45	2.22	5.09	0.81	1.94	0.55	1.54
	Pilibhit	30.23	21.56	10.83	27.33	5.18	1.54	1.67	3.99	1.24	0.22	0.51	0.76
	Farrukhabad	11.79	44.27	39.02	27.06	2.72	9.08	9.13	3.24	0.91	2.95	2.96	0.75
	Etawah	35.18	29.77	35.71	30.63	7.61	6.21	8.29	6.10	2.26	1.69	2.83	1.95
	Lucknow	28.71	61.66	30.25	35.59	7.74	18.71	5.16	9.43	2.67	7.64	1.30	3.53
	Unnao	50.30	73.93	40.13	24.13	13.86	20.44	8.55	4.76	5.02	7.34	2.46	1.56
	Kheri	39.95	39.14	32.30	21.46	8.91	9.38	5.67	3.39	2.82	3.01	1.59	0.80
	Sitapur	48.47	30.73	40.13	27.63	10.02	6.33	7.81	4.94	2.89	1.90	2.41	1.14
Central	Rae Bareli	56.86	70.71	64.88	54.38	12.32	23.21	15.07	11.02	4.11	9.41	4.66	3.20
	Hardoi	60.39	46.17	38.29	34.18	13.19	11.69	8.66	6.07	3.98	4.17	2.62	1.48
	Barabanki	27.45	44.81	42.11	14.18	6.76	11.74	6.85	2.28	2.36	3.92	1.66	0.53
	Kanpur Dehat and Nagar	26.50	38.16	42.34	32.18	5.87	8.28	8.45	5.42	2.08	2.54	2.15	1.38
	Fatehpur	52.38	68.92	46.17	31.11	13.26	23.41	10.36	5.79	4.32	9.25	3.40	1.60
	Allahabad	50.74	41.49	26.03	36.92	13.91	8.81	5.04	7.17	5.06	2.65	1.52	2.12
Eastern	Gorakhpur	59.40	30.04	44.96	55.25	14.20	5.35	7.40	10.69	4.41	1.29	1.66	3.10
	Faizabad	40.72	65.74	33.40	37.47	9.38	20.02	6.09	8.35	3.00	7.77	1.71	2.67

Table 2 Contd.

	Bahraich	68.02	78.76	36.53	47.91	19.33	22.79	6.07	10.96	7.10	8.42	1.63	3.72
	Gonda	57.66	42.33	32.33	32.33	16.59	10.05	6.36	8.72	6.41	3.33	1.68	3.84
	Pratapgarh	49.84	53.31	25.82	65.23	14.09	14.95	4.31	16.68	5.42	5.62	1.04	5.57
	Sultanpur	27.16	63.18	30.58	28.48	4.80	17.84	5.63	3.78	1.26	6.52	1.49	0.78
	Deoria	59.21	67.42	42.81	48.54	13.94	15.61	8.13	9.63	4.46	4.83	2.22	2.55
	Basti	53.58	47.53	33.83	47.98	12.98	10.21	6.39	11.31	4.39	3.09	1.77	3.53
	Azamgarh	47.74	64.19	45.54	32.26	9.23	17.00	9.36	5.52	2.50	5.93	2.58	1.37
	Varanasi	37.62	24.64	31.06	33.43	7.39	4.91	4.72	4.87	2.29	1.52	1.24	1.08
	Ghazipur	68.10	42.24	43.96	53.67	18.28	10.99	9.66	13.07	6.50	3.87	3.23	4.87
	Jaunpur	41.71	40.76	38.82	27.88	8.53	8.81	6.26	4.57	2.58	2.68	1.50	1.08
	Ballia	39.87	30.81	51.93	51.52	7.76	7.30	10.51	9.40	1.98	2.32	2.64	2.34
	Mirzapur	46.09	52.91	37.98	27.41	10.90	12.64	8.90	4.15	3.50	4.23	2.84	1.06
Bundel khand	Lalitpur	73.92	80.52	9.54	42.67	19.57	17.69	2.23	6.53	6.11	5.10	0.57	1.52
	Jhansi	65.02	59.40	9.16	19.82	18.42	15.23	1.61	2.03	6.90	5.47	0.39	0.29
	Jalaun	54.73	60.61	4.11	15.27	16.79	19.80	0.23	3.97	6.38	8.08	0.03	1.56
	Hamirpur	67.27	53.06	10.58	35.05	15.97	14.92	1.63	8.72	5.12	5.49	0.35	2.87
	Banda	66.20	81.29	50.18	65.00	17.40	27.85	13.50	11.78	6.48	12.57	4.83	2.92

Note: *based on 30 days recall period.

From Table 1 it is observed that the Western region holds the lowest number of rural population below the poverty line in all the selected 4 years. Over the years the Western region shows a declining trend in incidence, depth and severity of rural poverty (Table 1) . Bundelkhand (Southern) region has the highest incidence of rural poverty for the years 1987 - 88 and 1993 - 94. However, the region shows sharp fall in the incidence, depth and severity of rural poverty in the year 1999 - 00. This may be attributed to the modified estimation and survey techniques of NSS for this particular year which makes it incomparable with other NSS rounds. Overall, the region shows declining trend in the rural poverty, except for the year 1993 - 94. Similarly, the Central region, except in the year 1993 - 94, shows a fall in the incidence, depth and severity of rural poverty over the years. In 1993 - 94, it holds 50 per cent of the rural population below the poverty line. The Eastern region also shows a decline in the rural poverty over the years. The region had approximately 50 per cent of the rural population below the poverty line in 1987 - 88 and 1993 - 94.

However, in the year 2004 - 05, this region experienced the highest incidence of rural poverty among all the regions (Table 1). However, in general, the incidence, depth and severity of rural poverty show a declining trend over the years in all the regions. From Table 2, it is observed that for the years 1987 - 88 and 1993 - 94, the districts falling in the Bundelkhand (Southern) region namely Lalitpur, Hamirpur, Banda, and Jhansi have the highest incidence of rural poverty. Lalitpur, Jalaun and Banda show higher incidence of rural poverty in 1993 - 94 in comparison to previous year that is, 1987 - 88.

However, all the districts in 1999 - 00 show sharp fall in the incidence of rural poverty due to modification in the survey technique for that particular year. The incidence again rises in the year 2004 - 05. This shows the fluctuations in the incidence of rural poverty in the districts over the years. The districts of Eastern region such as Ghazipur, Behraich, Gorakhpur, Deoria and Basti also show a higher incidence of rural poverty in 1987 - 88. However, in 1993 - 94, districts such as Mirzapur, Azamgarh, Deoria, Sultanpur, Behra

Table 3. Variations in rural poverty across the regions and districts of Uttar Pradesh for the years 1987 - 88, 1993 - 94 and 2004 - 05.

Variables	Between Column variance ($_b^2$)	Within Column variance ($_w^2$)	F-value
	Regional variations		
Incidence (%)	399.90	198.08	2.02
Depth (%)	41.05	25.80	1.59
Severity (%)	6.53	4.69	1.39
	District level variations		
Incidence (%)	523.73	192.73	2.72***
Depth (%)	50.14	22.32	2.25***
Severity (%)	7.90	3.87	2.04***

***Significant at 1%.

and Faizabad show higher incidence of rural poverty. In 1999 - 00, all the districts of Eastern region except Gorakhpur, Varanasi, Ghazipur and Ballia have depicted a reduction in the incidence of rural poverty. In contrast, in 2004 - 05, the districts show higher incidence of rural poverty in comparison to that in 1999 - 00. Overall, the districts in the Eastern region present a fluctuating trend of the rural poverty over the years. However, only two districts that is, Jaunpur and Gonda have shown a declining trend in the incidence of rural poverty (Table 2).

The districts of the Central region such as Hardoi, Rae Bareli, Fatehpur, Unnao holds high percentage of rural people below the poverty line. Only Kheeri and Hardoi show a declining trend in the incidence of rural poverty. Other districts show a fluctuating nature in the incidence over the period. In 1993 - 94, the incidence of rural poverty in Lucknow, Unnao, Rae Bareli, Kanpur Dehat and Nagar and Fatehpur is marked with a rising trend in comparison to that in 1987 - 88. The incidence thereafter follows a declining trend in 1999 - 00 (with exceptions of Sitapur and Kanpur Dehat and Nagar) and also in 2004 - 05 (with the only exception of Lucknow). In the Western region of UP the majority of the districts are characterized with lowest incidence of rural poverty for the years under study (Table 2). Only Moradabad and Aligarh show a decreasing trend in the incidence of rural poverty over the years. The rising trend in the incidence in 1993 - 94 over 1987 - 88 might be explained with the rise of the poverty line in the rural areas by Rs. 100 (Appendix I). Such elevation of poverty line by Rs. 100 has caused a rise in the percentage of people below the poverty line. In 1999 - 00, although there is a rise in the poverty line by Rs. 123, majority of the districts show a fall in the incidence of rural poverty due to the change in the survey method of the NSSO for 1999 - 00 round of household consumption expenditure survey. Overall, a fluctuating trend has been observed in the incidence of rural poverty over the years in Western UP. The depth and severity of rural poverty also show similar results for the districts of Western UP (Table 2).

The declining trend of rural poverty across the districts might be attributed to the poverty alleviation programmes and other schemes implemented in the rural areas to generate employment and raise the income of the poor households. The schemes such as IRDP, SGSY, and Jawahar Rozgaar Yojana (JRY) have been effectively implemented in most of the districts of UP. Although the poverty levels in the districts have fallen over the years, in majority of the districts, poverty levels have been very high for the year 1993 - 94. In many studies, this phenomenon has been explained as a result of the introduction of economic reforms in India in 1991 - 92 (Sen, 1996; Patnaik, 1999). On the contrary, some researchers such as Tendulkar and Jain (1995), Joshi and Little (1997) attributed it to bad weather resulting in low rainfall. Therefore, economic reforms and weather conditions were suspected to cause sudden increase in rural poverty. The regional variations in the incidence, depth and severity of rural poverty, shows that the null hypothesis is accepted. The F values are found to be statistically insignificant for the incidence, depth and severity of rural poverty. It means that there exists no disparity in the levels of rural poverty among the four regions of the state over a period from 1987 - 88 to 2004 - 05. Here, in the analysis, 1999 - 00 year has not been considered for comparability purposes. On the contrary, the variations across the districts are found to have significant variations in the state, with F values significant at one per cent level of significance, indicating differences in the incidence, depth and severity of rural poverty across the districts of UP (Table 3).

The inter-relationship between agricultural productivity and rural poverty has been examined through contingency test. From the contingency tables (Tables 4, 5 and 6) it is found that the calculated values of ^{2} for each year are statistically significant and different from zero at one per cent probability level for six degrees of freedom. This indicates that our null hypothesis of no association between agricultural productivity and poverty does not hold true. In other words, this means that a significant inter-

Table 4. Contingency table for different levels of agricultural productivity and different levels of incidence of rural poverty across the districts of Uttar Pradesh for the years 1987 - 88, 1993 - 94, 1999 - 00 and 2004 - 05.

Years	Agricultural productivity	Incidence or headcount (%)				Total	χ^2 value
		Low (= < 20)	Moderately low (> 20 and = < 35)	Moderately high (> 35 and = < 50)	High (> 50)		
1987 - 88	High (>20)	3 (1.00)	2 (1.50)	2 (2.33)	1 (3.17)	8	15.62***
	Medium(=>15and<20)	3 (2.88)	6 (4.31)	8 (6.71)	6 (9.10)	23	
	Low (<15)	0 (2.13)	1 (3.19)	4 (4.96)	12 (6.73)	17	
	Total	6	9	14	19	48	
1993 - 94	High (>20)	2 (1.58)	10 (5.54)	5 (5.54)	2 (6.33)	19	14.30***
	Medium(= > 15and < 20)	2 (1.75)	4 (6.13)	9 (6.13)	6 (7.00)	21	
	Low (< 15)	0 (0.67)	0 (2.33)	0 (2.33)	8 (2.67)	8	
	Total	4	14	14	16	48	
1999-00@	High (>20)	11 (10.93)	12 (10.93)	11 (10.93)	1 (2.18)	35	8.16***
	Medium (= > 15 and <20)	2 (3.13)	3 (3.13)	4 (3.13)	1 (0.63)	10	
	Low (<15)	2 (0.93)	0 (0.93)	0 (0.93)	1 (0.19)	3	
	Total	15	15	15	3	48	
2004 - 05	High (>20)	7 (4.88)	14 (14.08)	4 (5.42)	1 (3.25)	26	9.42***
	Medium (= >15 and <20)	1 (2.63)	7 (6.71)	4 (2.92)	2 (1.75)	14	
	Low (<15)	1 (1.50)	2 (3.83)	2 (1.67)	3 (1.00)	8	
	Total	9	23	10	6	48	

Note: @based on 30 days recall period. Figures in parentheses are the expected values. ***Significant at 1%.

Table 5. Contingency table for different levels of agricultural productivity and different levels of depth of rural poverty across the districts of Uttar Pradesh for the years 1987- 88, 1993 - 94, 1999 - 00 and 2004 - 05.

Years	Agricultural productivity	Depth or poverty gap (%)				Total	χ^2 value
		Low (= > 0 and = < 5)	Moderately low (>5 and =<10)	Moderately high (> 10 and = < 15)	High (> 15)		
1987- 88	High (>20)	4 (1.50)	2 (2.50)	2 (2.50)	0 (1.50)	8	21.08***
	Medium (=>15 and <20)	5 (4.31)	11 (7.19)	5 (7.19)	2 (4.31)	23	
	Low (<15)	0 (3.19)	2 (5.31)	15	9	48	
	Total	9	15	1 (3.56)	2 (5.15)	19	
1993- 94	High (>20)	6 (3.17)	10 (7.13)	6 (3.94)	5 (5.69)	21	22.35***
	Medium (=>15 and <20)	2 (3.50)	8 (7.88)	2 (1.50)	6 (2.17)	8	
	Low (<15)	0 (1.33)	0 (3.00)	9	13	48	
	Total	8	18	1 (2.19)	0 (0.73)	35	
1999-00@	High (>20)	18 (16.04)	16 (16.04)	1 (0.63)	1 (0.21)	10	8.01***
	Medium (=>15 and <20)	2 (4.58)	6 (4.58)	1 (0.19)	0 (0.06)	3	
	Low (<15)	2 (1.38)	0 (1.38)	3	1	48	
	Total	22	22	1 (3.13)	0 (0.52)	25	
2004- 05	High (>20)	15 (11.46)	9 (9.90)	3 (1.88)	1 (0.31)	15	
	Medium (=>15 and <20)	4 (6.88)	7 (5.94)	2 (1.00)	0 (0.17)	8	
	Low (<15)	3 (3.67)	3 (3.17)	6	1	48	
	Total	22	19				

Note: @based on 30 days recall period. Figures in parentheses are the expected values. ***Significant at 1%.

relationship exists between the agricultural productivity and the rural poverty. Lower the agricultural productivity, higher will be the rural poverty in the state. The districts falling under different categories of poverty such as low,

Table 6. Contingency table for different levels of agricultural productivity and different levels of severity of rural poverty across the districts of Uttar Pradesh for the years 1987 - 88, 1993 - 94, 1999 - 00 and 2004 - 05.

Years	Agricultural productivity	Severity or squared poverty gap (%)				Total	^{2} value
		Low (>0 and =<1.5)	Moderately low (> 1.5 and = < 3)	Moderately high (>3 and =<4.5)	High (> 4.5)		
1987 - 88	High (>20)	5 (1.67)	1 (2.33)	1 (1.83)	1 (2.17)	8	23.67***
	Medium (=>15 and <20)	5 (4.79)	10 (6.71)	6 (5.27)	2 (6.23)	23	
	Low (<15)	0 (3.54)	3 (4.96)	4 (3.90)	10 (4.60)	17	
	Total	10	14	11	13	48	
1993 - 94	High (>20)	6 (2.77)	9 (7.13)	2 (3.17)	2 (5.94)	19	21.89***
	Medium (=>15 and <20)	1 (3.06)	9 (7.88)	5 (3.50)	6 (6.56)	21	
	Low (<15)	0 (1.17)	0 (3.00)	1 (1.33)	7 (2.50)	8	
	Total	7	18	8	15	48	
1999- 00[@]	High (>20)	19 (12.50)	15 (10.42)	1 (1.04)	0 (1.04)	25	17.82***
	Medium (=>15 and <20)	3 (5.00)	5 (4.17)	1 (0.42)	1 (0.42)	10	
	Low (<15)	2 (1.50)	0 (1.25)	0 (1.25)	1 (0.13)	3	
	Total	24	20	2	2	48	
2004 - 05	High (>20)	19 (13.54)	6 (8.13)	1 (3.25)	0 (1.08)	26	17.91***
	Medium (=>15 and <20)	3 (7.29)	5 (4.38)	5 (1.75)	1 (0.58)	14	
	Low (<15)	3 (4.12)	4 (2.50)	0 (1.00)	1 (0.33)	8	
	Total	25	15	6	2	48	

Note: [@]based on 30 days recall period. Figures in parentheses are the expected values. ***Significant at 1%.

moderately low, moderately high and high corresponding to the categories of agricultural productivity such as low, medium, and high is shown in Appendix II, III, and IV.

From Appendix II, it is observed that, in 1987 - 88 and 1993 - 94, the districts with high as well as medium agricultural productivity and low as well as moderately low incidence of rural poverty primarily belong to the Western region. Such districts are Ghaziabad, Meerut, Saharanpur, Muzaffarnagar, Pilibhit, Badaun, Mainpuri, etc. However, in 1999 - 00 and 2004 - 05, the number of districts with higher agricultural productivity and low or moderately low incidence of rural poverty have increased. Majority of the districts in the above specified category belong to the Western region. Therefore, the lowest incidence of rural poverty in the districts of Western region might be explained by high agricultural productivity. Similarly, the highest incidence of rural poverty in the districts of Bundelkhand (Southern) region might be attached to the lower agricultural productivity in the region. The disparity in the levels of poverty in 1999 - 00 and other years has already been mentioned. The moderately high or high incidence with medium or low agricultural productivity is mainly depicted in the districts of Eastern region followed by a few districts of the Central region. Similarly, the results of the linkage of agricultural productivity and depth and severity of rural poverty across the districts have been presented in Appendix III and Appendix IV respectively.

A comparison of the inter-relationship between these two variables that is, agricultural productivity and levels of rural poverty over the years shows that the strength of this negative relationship has weakened over the subsequent five years during 1987 - 88, 1993 - 94, 1999 - 00 and 2004 - 05. This might be due to the fall in the growth of agricultural productivity in the state over the years (Figure 1). The agricultural productivity presented through an inverted U-shaped curve[1] during 1987 - 88 to 2004 - 5. The figure shows that the agricultural productivity has been increasing at a decreasing rate in UP over the years. The negative coefficient value (-0.027) of t^2 clearly confirms the above statement.

The findings of the regression analysis show that there exists an inverse relationship between agricultural productivity and the levels of rural poverty with statistically significant negative coefficients of agricultural productivity across the districts of UP over the years. It confirms that the rise in agricultural productivity leads to the decline of incidence, depth and severity of rural poverty in the state (Table 7). The F values for 1987 - 88, 1993 - 94 and 2004 - 05 are significant at one per cent while for 1999 - 00 it is significant at five per cent only. This may be explained due to the modifications in the survey methods of NSS for this particular round, which makes it incomparable with the other rounds of NSS considered in the present study. Similarly, the total variation explained by agricultural productivity in the levels of rural poverty is high for the years 1987-88, 1993-94 and 2004-05 in comparison to 1999-00 (Table 7). The impact of agricultural productivity in reducing the incidence of rural poverty is higher as compared to depth and severity of rural poverty in all the selected years, as observed from the coefficient values. It is found that for each measure of rural poverty 18 to

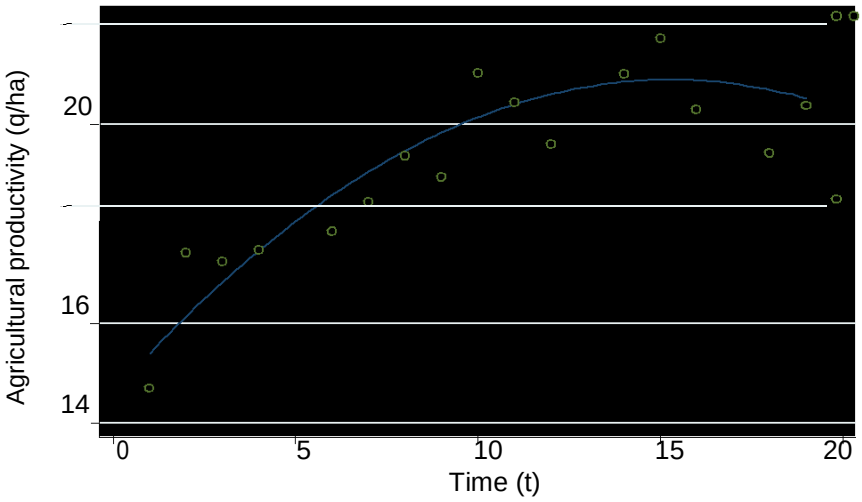

Figure 1. Trend in Agricultural productivity from 1987- 88 to 2004 - 05 in Uttar Pradesh.
Note: The polynomial regression model shows that the agricultural productivity has been increasing at a decreasing rate over the years in UP. The R^2 value is 0.826 with F value as 38.05 significant at one per cent level. The coefficients value for time t and t^2 are 0.824 and -0.027 with constant value of 14.60. The values are statistically significant at one per cent probability level.

Table 7. Regression analysis for the agricultural productivity on the incidence, depth and severity of rural poverty across the districts of Uttar Pradesh for the years 1987- 88, 1993 - 94, 1999 - 00 and 2004 - 05.

Years	Dependent variable	Independent variables	coefficients (Std. error)	t values	R^2 (F values)
1987- 88	Incidence (%)	Agprod	-2.75 (0.62)	-4.43***	0.299 (19.65***)
		Constant	85.11 (9.68)	8.79***	
	Depth (%)	Agprod	-0.85 (0.18)	-4.75***	0.329 (22.55***)
		Constant	23.33 (2.80)	8.35***	
	Severity (%)	Agprod	-0.31 (0.07)	-4.48***	0.304 (20.05***)
		Constant	8.22 (1.09)	7.56***	
1993 - 94	Incidence (%)	Agprod	-2.85 (0.46)	-6.18***	0.453 (38.16***)
		Constant	98.18 (9.05)	10.85***	
	Depth (%)	Agprod	-1.01 (0.16)	-6.30***	0.463 (39.66***)
		Constant	30.17 (3.13)	9.63***	
	Severity (%)	Agprod	-0.42 (0.07)	-6.05***	0.443 (36.63***)
		Constant	11.83 (1.36)	8.70***	
1999 -00[@]	Incidence (%)	Agprod	-0.85 (0.40)	-2.13**	0.090 (4.53**)
		Constant	50.28 (9.31)	5.40***	
	Depth (%)	Agprod	-0.26 (0.10)	-2.49**	0.119 (6.20**)
		Constant	11.93 (2.42)	4.93***	
	Severity (%)	Agprod	-0.10 (0.04)	-2.60**	0.128 (6.76**)
		Constant	3.90 (0.84)	4.61***	
2004 - 05	Incidence (%)	Agprod	-1.12 (0.31)	-3.59***	0.219 (12.88***)
		Constant	55.35 (6.65)	8.33***	
	Depth (%)	Agprod	-0.28 (0.08)	-3.46***	0.206 (11.97***)
		Constant	11.89 (1.73)	6.88***	
	Severity (%)	Agprod	-0.10 (0.03)	-3.22***	0.184 (10.37***)
		Constant	3.73 (0.64)	5.85***	

Note: [@]based on 30 days recall period. ***Significant at 1%, **Significant at 5%.

46% of the total variation is accounted for by the agricultural productivity and each of them is statistically significant at approximately 30 per cent in 1987 - 88, approximately 45 per cent in 1993 - 94 and around 20 per cent in 2004 - 05.

Summary and Conclusion

The study concludes that there exists significant difference in the incidence, depth and severity of rural poverty across the regions and across the 48 districts of UP which have found to be significant at one per cent probability level. As rural poverty is still high across the districts in comparison to national average this needs to be addressed and taken care of. The linkage between agricultural productivity and rural poverty are found to be significant. The ^{2} values for rural poverty for the selected years are found significant at the district level. This shows that as agricultural productivity increases, the incidence, depth and severity of rural poverty decreases in all the districts. Further the regression results show that agricultural productivity has statistically significant effect upon the rural poverty.

Thus, all these empirical exercises establish a close link as well as cause and effect relationship between these two variables; rural poverty and agricultural productivity. Hence, to remove poverty in the rural areas of the state, the state government should make a sincere effort to improve the agricultural productivity in the tricts of the state, which have been paid only a lip service till date at both the economic and political level. Neglect of agriculture will hamper the growth of industries, particularly agro-based industries and weaken the macroeconomic fundamentals of the state and the country as a whole.

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APPENDICES

Appendix I. Poverty lines (Rs. MPCE) as per new official methodology.

Years	NSS Round	Rural	Urban
1987 - 1988	43rd	114.57	154.15
1993 -1994	50th	213.01	258.65
1999 - 2000	55th	336.88	416.29
2004 - 2005	61st	365.84	483.26

Source: Press Note, Planning Commission of India, 2007.

Appendix II. Distribution of districts based on the relationship between agricultural productivity and incidence of rural poverty for the years 1987 - 88, 1993 - 94, 1999 - 00 and 2004 - 05.

Years	Agricultural productivity	Incidence or Headcount (%)			
		Low (= <20)	**Moderately low (>20 and = <35)**	**Moderately high (>35 and = <50)**	**High (>50)**
1987 - 88	High (>20)	Ghaziabad/ Saharanpur/ Meeut	Muzaffarnagar/Pilibhit	Bijnore/Bulandshahar	Rampur
	Medium (=>15 and <20)	Farrukhabad/ Mainpuri/ Badaun	Shahjahanpur/Aligarh/ Lucknow/Barabanki Mathura/Sultanpur	Bareilly/Etawah/Ballia/Kheri/Faizabad/Agra Jaunpur/Azamgarh	Ghazipur/Hardoi/Etah/ Gorakhpur/Moradabad/Deoria
	Low (<15)		Kanpur Dehat and Nagar	Varanasi/ Sitapur/ Mirzapur/Pratapgarh	Unnao/Allahabad/Fatehpur/Basti/Jalaun/Rae Bareli/Gonda/Jhansi/Banda/Hamirpur/Behraich/Lalitpur
1993 - 94	High (>20)	Meerut/ Ghaziabad	Shahjahanpur/Varanasi Bijnore/Pilibhit/Etawah Bulandshahar/Aligarh/ Mathura/Gorakhpur/ Muzaffarnagar	Saharanpur/ Kheri/ Mainpuri/ Rampur/ Moradabad	Faizabad/Deoria
	Medium (=>15 and <20)	Bareilly/Agra	Badaun/Etah/Ballia/ Sitapur	Kanpur Dehat and Nagar/Hardoi/Basti/ /Farrukhabad/Jaunpur/Barabanki/Allahabad/Ghazipur/Gonda	Pratapgarh/Rae Bareli/ Lucknow/Azamgarh/ Sultanpur/Fatehpur/
	Low (<15)				Mirzapur/Jhansi/Banda Lalitpur/Jalaun/Behraich Hamirpur/Unnao
1999-00*	High (>20)	Ghaziabad/ Bijnore/BadaunMeerut/Bareilly Pilibhit/Rampur /Shahjahanpur/ Saharanpur/ Moradabad/ Mainpuri	Mathura/Aligarh/Basti Etah/Pratapgarh/Kheri /Muzaffarnagar/Agra/ Sultanpur/ Faizabad/ Bulandshahar/Varanasi	Etawah/ Azamgarh/ Hardoi/Gorakhpur/ Jaunpur/Ghazipur/ Barabanki/Deoria/ Kanpur Dehat & Nagar/Farrukhabad/ Sitapur	Ballia

Appendix II. Contd.

2004 - 05	Medium (=>15 and <20)	Jalaun/Jhansi	Allahabad/Gonda/ Lucknow	Behraich/Mirzapur/ Unnao/Fatehpur	Rae Bareily
	Low (<15)	Lalitpur/ Hamirpur			Banda
	High (>20)	Ghaziabad/ Bijnore/Meerut/ Saharanpur/ Bulandshahar / Moradabad/ Barabanki	Agra/Mainpuri/Etah/ Muzaffarnagr/Kheri/ Aligarh/Bareilly/ Pilibhit/Rampur/ Sultanpur/Hardoi/ Etawah/Farrukhabad/ Kanpur Dehat & Nagar	Shahjahanpur/ Deoria/ Faizabad/Mathura	Gorakhpur
	Medium (=>15 and <20)	Jalaun	Jaunpur/Azamgarh/ Sitapur/Fatehpur/ Badaun/Unnao/Gonda	Lucknow/Allahabad/ Behraich/Basti	Rae Bareily/Pratapgarh
	Low (<15)	Jhansi	Mirzapur/Varanasi	Lalitpur/Hamirpur	Ballia/Ghazipur/Banda

Note: *based on 30 days recall period.

Appendix III. Distribution of districts based on the relationship between agricultural productivity and depth of rural poverty for the years 1987 - 88, 1993 - 94, 1999 - 00 and 2004 - 05.

Years	Agricultural productivity	Depth or poverty gap (%)			
		Low (= >0 and = <5)	**Moderately low (>5 and = <10)**	**Moderately high (>10 and = <15)**	**High (>15)**
1987 - 88	High (>20)	Ghaziabad/ Saharanpur/Meeut	Muzaffarnagar/ Pilibhit	Bijnore/ Bulandshahar	Rampur
	Medium (=>15 and <20)	Farrukhabad/ Mainpuri/Badaun	Shahjahanpur/Aligarh/ Lucknow/Barabanki Mathura/Sultanpur Kanpur Dehat & Nagar	Bareilly/Etawah/ Ballia/Kheri/ Faizabad/Jaunpur /Agra/Azamgarh Varanasi/ Sitapur/ Mirzapur/ Pratapgarh	Ghazipur/Hardoi/ Etah/Deoria/ Gorakhpur/Moradabad Unnao/Allahabad/ Fatehpur/Basti/Gonda/ Rae Bareli/Hamirpur/ Jhansi/Banda/Jalaun Behraich/Lalitpur
1993 - 94	High (>20)	Meerut/Pilibhit/ Ghaziabad/Bijnore/ Shahjahanpur/ Varanasi	Etawah/Mainpuri/ Bulandshahar/Rampur /Mathura/Aligarh/ Muzaffarnagar/Kheri/ Gorakhpur/Saharanpur	Moradabad	Faizabad/Deoria
	Medium (=>15 and <20)	Bareilly/ Agra	Sitapur/Badaun/Ballia/ Etah/Farrukhabad/ Jaunpur/Allahabad/ Kanpur Dehat and Ngr	Ghazipur/Basti/ Barabanki/ Gonda/Hardoi/ Pratapgarh	Rae Bareli/Lucknow/ Sultanpur/Fatehpur/ Azamgarh
	Low (<15)			Mirzapur/ Hamirpur	Jhansi/Banda/Unnao/ Lalitpur/Jalaun/Behraich

Appendix III. Contd.

1999 -00*	High (>20)	Ghaziabad/Bijnore/ Badaun/Meerut/ Bareilly/Mathura/ Pilibhit/Rampur/ Shahjahanpur/Agra /Saharanpur/Etah/ Moradabad/Aligarh /Mainpuri/Varanasi/ Muzaffarnagar/ Pratapgarh	Basti/Kheri/Sultanpur/ Faizabad/Bulandshahar/Jaunpur/Barabanki/ Gorakhpur/Sitapur/ Deoria/Etawah/ Farrukhabad/Hardoi/ Azamgarh/Ghazipur/ Kanpur Dehat & Nagar	Ballia	
	Medium (=>15 and <20)	Jalaun/Jhansi	Allahabad/Gonda/ Lucknow/Behraich/ Unnao/Mirzapur	Fatehpur	Rae Bareli
	Low (<15)	Lalitpur/Hamirpur		Banda	
2004 - 05	High (>20)	Ghaziabad/Meerut/ Bijnore/Saharanpur Bulandshahar/Agra Moradabad/Aligarh Barabanki/Pilibhit/ Farrukhabad/Kheri/ Muzaffarnagar/ Sultanpur/Mainpuri	Etah/Rampur/Hardoi/ Etawah/Mathura/ Deoria/Kanpur Dehat & Nagar/ Faizabad/ Shahjahanpur	Gorakhpur	
	Medium (=>15 and <20)	Jalaun/Jaunpur/ Unnao/Sitapur	Azamgarh/Fatehpur/ Badaun/Gonda/Bareily/ Lucknow/Allahabad	Behraich/Basti/ Rae Bareli	Pratapgarh
	Low (<15)	Jhansi/Mirzapur/ Varanasi	Lalitpur/Hamirpur/ Ballia	Ghazipur/Banda	

Note: *based on 30 days recall period.

Appendix IV: Distribution of districts based on the relationship between agricultural productivity and severity of rural poverty for the years 1987 - 88, 1993 - 94, 1999 - 00 and 2004 - 05.

Years	**Agricultural productivity**	**Severity or squared poverty gap (%)**			
		Low (>0 and =<1.5)	**Moderately low (>1.5 and =<3)**	**Moderately high (>3 and =<4.5)**	**High (>4.5)**
1987- 88	High (>20)	Ghaziabad/Pilibhit/ Saharanpur/Meeut/ Muzaffarnagar	Bulandshahar	Bijnore	Rampur
	Medium(=>15 and <20)	Farrukhabad/Mainpuri/ Sultanpur/Badaun/ Shahjahanpur	Ballia/Bareilly/Aligarh/ Lucknow/Barabanki/ Mathura/Etawah/Kheri/ Azamgarh/Jaunpur	Faizabad/Etah/ Deoria/Hardoi/ Gorakhpur/Agra	Ghazipur/ Moradabad

Appendix IV Contd.

			Kanpur Dehat and Nagar /Varanasi/Sitapur	Mirzapur/Basti/ RaeBareli/ Fatehpur	Unnao/Allahabad/ Gonda/Hamirpur/ Pratapgarh/Jhansi/ Banda/Jalaun Behraich/Lalitpur
	Low (<15)				
	High (>20)	Meerut/Pilibhit/Bijnore/ Ghaziabad/Gorakhpur/ Shahjahanpur	Etawah/Mainpuri/Aligarh Bulandshahar/Rampur/ Mathura/Muzaffarnagar/ Saharanpur/Varanasi	Moradabad/ Kheri	Faizabad/Deoria
1993 - 94	Medium(=>15 and <20)	Agra	Sitapur/Badaun/Bareilly/ Etah/Farrukhabad/Ballia/ Jaunpur/Allahabad/ Kanpur Dehat and Nagar	Ghazipur/Basti/ Barabanki/ Gonda/Hardoi	Rae Bareli/Lucknow/ Sultanpur/Fatehpur/ Azamgarh/Pratapgarh
	Low (<15)			Mirzapur	Jhansi/Banda/Unnao/ Lalitpur/Jalaun/ Behraich/Hamirpur
1999 -00*	High (>20)	Ghaziabad/Bijnore/Etah/ Meerut/Pilibhit/Agra/ Shahjahanpur/Rampur/ Moradabad/Mainpuri/ Bareilly/Badaun/Mathura /Saharanpur/Varanasi/ Pratapgarh/Sultanpur/ Muzaffarnagar/Aligarh	Bulandshahar/Etawah/ Jaunpur/Barabanki/ Kheri/Gorakhpur/Ballia/ Faizabad/Basti/Deoria/ Sitapur/Farrukhabad/ Kanpur Dehat and Nagar/Azamgarh/Hardoi	Ghazipur	
	Medium (= >15 and <20)	Jalaun/Jhansi/Lucknow	Allahabad/Mirzapur/ Behraich/Unnao/Gonda	Fatehpur	Rae Bareily
	Low (<15)	Lalitpur/Hamirpur			Banda
2004 - 05	High (>20)	Ghaziabad/Meerut/ Kheri/Bijnore/Pilibhit/ Saharanpur/Barabanki/ Bulandshahar/Bareilly/ Moradabad/Aligarh/ Hardoi/Agra/Sultanpur/ Farrukhabad/Mainpuri/ Muzaffarnagar/Rampur/ Kanpur Dehat and Nagar	Etah/Etawah/Mathura/ Deoria/Shahjahanpur/ Faizabad	Gorakhpur	
	Medium(=>15 and <20)	Jaunpur/Sitapur/ Azamgarh	Badaun/Unnao/Jalaun/ Fatehpur/Allahabad	Rae Bareli/Basti Gonda/Lucknow/ Behraich	Pratapgarh
	Low (<15)	Jhansi/Mirzapur/ Varanasi	Lalitpur/Hamirpur/Ballia/B anda		Ghazipur

Note: *based on 30 days recall period.