EPTD DISCUSSION PAPER NO. 33

# GOVERNMENT SPENDING, GROWTH AND POVERTY: AN ANALYSIS OF INTERLINKAGES IN RURAL INDIA

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March 1998
Revised - December 1998

## ABSTRACT

Poverty in rural India has declined substantially in recent decades. The percentage of the rural population living below the poverty line fluctuated between 50 and 65 percent prior to the mid-1960s, but then declined steadily to about one-third of the rural population by the early 1990s. This steady decline in poverty was strongly associated with agricultural growth, particularly the green revolution, which in turn was a response to massive public investments in agriculture and rural infrastructure. Public investmentin rural areas has also benefitted the poor through its impact on the growth of the rural non-farm economy, and government expenditure on rural poverty and employment programs, which has grown rapidly, has directly benefitted the rural poor.

The primary purpose of this study is to investigate the causes of the decline in rural poverty in India, and particularly to disentangle the specific role that government investments have played. We seek to quantify the effectiveness of different types of government expenditures in contributing to poverty alleviation. Such information can assist policy makers in targeting their investments more effectively to reduce poverty. More efficient targeting has become increasingly important in an era of macroeconomic reforms in which the government is under pressure to reduce its total budget.

The study uses state level data for 1970 to 1993 to estimate an econometric model that permits calculation of the number of poor people raised above the poverty line for each additional million rupees spent on different expenditure items. The model is also structured to enable identification of the different channels through which different types of government expenditures impact on the poor. We distinguish between direct and indirect effects. The direct effects arise in the form of benefits the poor receive from employment programs directly targeted to rural poor. The indirect effects arise when government investments in rural infrastructure, agricultural research, health and education of rural people, stimulate agricultural and nonagricultural growth, leading to greater employment and income earning opportunities for the poor, and to cheaper food. Understanding these different effects provides useful policy insights for helping to improve the effectiveness of government expenditures in reducing poverty.

But targeting government expenditures simply to reduce poverty is not sufficient. Government expenditures also need to stimulate economic growth. This is needed to help generate the resources needed for future government expenditures. It is also the only way of providing a permanent solution to the poverty problem, as well as to increase the overall welfare of rural people. The model is therefore formulated so as to measure the growth as well as the poverty impact of different items of government expenditure. This enables us not only to rank different types of investment in terms of their growth and poverty impacts, but also to quantify any tradeoffs or complementarities that may arise between the achievement of these two goals.

The results from our model show that government spending on productivity enhancing investments, such as agricultural R&D and irrigation, rural infrastructure (including roads and electricity), and rural development targeted directly on the rural poor, have all contributed to reductions in rural poverty, and most have also contributed to growth in agricultural productivity. But differences in their poverty and productivity

effects are large.

The model has also been used to estimate the marginal returns to agricultural productivity growth and poverty reduction obtainable from additional government expenditures on different technology, infrastructure and social investments. Additional government expenditure on roads is found to have the largest impact on poverty reduction as well as a significant impact on productivity growth. It is a dominant "win-win" strategy. Additional government spending on agricultural research and extension has the largest impact on agricultural productivity growth, and it also leads to large benefits for the rural poor. It is another dominant "win-win" strategy. Additional government spending on education has the third largest impact on rural poverty reduction, largely as a result of the increases in non-farm employment and rural wages that it induces.

Additional irrigation investment has only a modest impact on growth in agricultural productivity and an even smaller impact on rural poverty reduction, even after trickle down benefits have been allowed for. Additional government spending on rural and community development, including Integrated Rural Development Programs (IRDP), contributes to reductions in rural poverty, but its impact is smaller than expenditures on roads, agricultural R&D, and education. Additional government expenditures on soil and water conservation and health have no impact on productivity growth, and their poverty effects through employment generation and wage increase are also small.

The results of this study have very important policy implications. In order to reduce rural poverty, the Indian government should give priority to increasing its spending on rural roads and agricultural research and extension. These types of investment not only have large poverty impact per rupee spent, but also give the greatest growth in agricultural productivity growth. Additional government spending on irrigation and rural electrification has low productivity effects, and no discernable impact on poverty reduction. While these investments have been essential investments in the past for sustaining agricultural growth, the levels of investment stocks achieved may now be such that it may be more important to maintain those current stocks rather than to increasing them further. On the other hand, additional government spending on rural development is an effective way of helping the poor in the short-term, but since it has little impact on agricultural productivity, then it contributes little to long-term solutions to the poverty problem.

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# GOVERNMENT SPENDING, GROWTH AND POVERTY: AN ANALYSIS OF INTERLINKAGES IN RURAL INDIA

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## 1. INTRODUCTION

Poverty in rural India has declined substantially in recent decades. The percentage of the rural population living below the poverty line fluctuated between 50 and 65 percent prior to the mid-1960s, but then declined steadily to about one-third of the rural population by 1990 (Figure 1). It increased again to about 40 percent of the population at the time of implementation of the policy reforms in the early 1990s, but now seems to be declining again.

The steady decline in poverty from the mid-1960s to the early 1980s was strongly associated with agricultural growth, particularly the green revolution. But the causes seem to have become more complex since then. Non-farm wages and employment now play a much larger role in reducing poverty, and these are less driven by agricultural growth than before. Further, government spending on rural poverty and employment programs has increased substantially in recent years, and this has directly benefitted the rural poor.

The primary purpose of this study is to investigate the causes of the decline in rural poverty in India, and particularly to disentangle the role that government investments

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have played. Government spending can have direct and indirect effects on poverty. The direct effects arise in the form of benefits the poor receive from expenditures on employment and welfare programs. The indirect effects arise when government investments in rural infrastructure, agricultural research, and the health and education of rural people, stimulate agricultural and nonagricultural growth, leading to greater employment and income earning opportunities for the poor, and to cheaper food. We seek to quantify the effectiveness of different types of government expenditures in contributing to poverty alleviation. Such information can assist policy makers in targeting their investments more effectively to reduce poverty. More efficient targeting has become increasingly important in an era of macroeconomic reforms in which the government is under pressure to reduce its total budget. We shall formulate and estimate an econometric model that permits calculation of the number of poor people raised above the poverty line for each additional million rupees spent on different expenditure items.

But targeting government expenditures simply to reduce poverty is not sufficient. Government expenditures also need to stimulate economic growth. This is needed to help generate the resources needed for future government expenditures. It is also the only sure way of providing a permanent solution to the poverty problem, as well as to increase the overall welfare of rural people. Our model is therefore formulated so as to measure the growth as well as the poverty impact of different items of government expenditure. This enables us not only to rank different types of investment in terms of their growth and poverty impacts, but also to quantify any tradeoffs or complementarities that may arise between the achievement of these two goals.

## 2. CONTEXT

There is a large literature on the trends and determinants of rural poverty in India. The wide fluctuations in the incidence of rural poverty that occurred during the 1950s and early 1960s (Figure 1) understandably led to considerable controversy about both the direction of change in rural poverty and the causal factors. Researchers obtained quite different trend results depending on the period they chose for their analysis, and particularly the beginning and end points used for comparison (Bardhan 1973; Vaidyanathan 1974; Ahluwalia 1978; Gaiha 1989; Ghose 1989; Griffin and Ghose 1979; Saith 1981). But once the incidence of rural poverty began its trend decline in the mid-1960s, a greater consensus began to emerge in the literature (Ghose 1989; Ravallion and Datt 1995; Ninan 1994).

Many studies that have tried to analyze the factors responsible for observed trends in the incidence of rural poverty in India have focused primarily on the question of whether or not agricultural growth trickles down to poor through its indirect effects on income and employment opportunities. With few exceptions (Bardhan 1973; Griffin and Ghose 1979), most of these studies have found an inverse relationship between growth in agricultural income and the incidence of rural poverty. Some economists, inspired by the late Dharm Narain, realized that prices of commodities consumed by the rural poor are also a very important factor in explaining changes in rural poverty (Saith 1981; Ahluwalia 1985; Srinivasan 1985; Ghose 1989; Gaiha 1989; Bell and Rich 1994). The role of the labor market in transmitting the benefits of technical change and government employment

programs to the rural poor was only recognized recently (Ravallion and Datt 1994; Sen 1997). Despite the large literature, little attention has previously been paid to the role of government spending in alleviating poverty.

The lack of progress in reducing rural poverty during the 1950s and 1960s is generally attributed to stagnation in the growth of per capita agricultural output (Ahluwalia 1978, 1985). However, this changed dramatically in the late 1960s with the spread of the green revolution, leading to a sharp increase in the rate of agricultural growth. The incidence of rural poverty declined markedly in those regions that most benefitted from the green revolution.

Interestingly, the incidence of rural poverty has also declined in many states that did not benefit so much from the green revolution, particularly in the 1980s (Sen 1997; Tendulkar et al. 1990). It also continued to decline at the national level even after the agricultural growth rate slowed.

The significant feature of this later period, however, is that the agricultural wage rate, which had been stagnant until the mid-1970s, subsequently increased sharply in most parts of India, and appears to have been a major factor (or a significant explanation) in the decline in rural poverty (Tendulkar et al. 1995; Sen 1997; Mukerjee 1996; Ravallion and Datt 1995). While much recent research recognizes this rise in real wages, explanations vary. Some attribute this rise to yield growth in agriculture (Ravallion and Datt 1995). Others argue that the increase in the real wage rate during this period far outstripped any increase in agricultural labor productivity. In fact, after the mid-1970s, real wages went up everywhere, even in states where agricultural labor productivity had been declining for

some time (Bhalla 1997). It has been argued that the increase in the real wage in agriculture arose mainly from an increase in the share of the work force employed in non-agricultural activities (Mukherjee 1996; Sen 1997).

Since there is a weak relationship between agricultural growth and the growth of rural non-farm activity in many parts of the country (it is much more significant in agriculturally advanced regions such as Punjab and Hariyana (Hazell and Haggblade 1991), several researchers have suggested that the reason for the expansion of rural non-farm employment lies in an accompanying expansion in government expenditures (Sen 1997; Visaria and Basant 1994). According to these authors, government expenditure has been crucial not only in generating agricultural growth through the creation of capital assets and rural infrastructure, but has also directly created employment in rural areas by providing government jobs, particularly for the implementation of targeted employment and welfare schemes. In fact, the 1970s was marked by an important shift in state policy towards the poor, and included a burst of poverty-oriented programs that sought to improve their assets, create employment and increase their access to basic needs.

In sum, researchers seeking explanations for the decline in rural poverty after the mid-1960s have emphasized agricultural growth and price changes as the important determinants. But these factors are not sufficient to explain much of the observed changes in poverty across states and over time since the late-1970s. Growth in the rural non-farm economy and government poverty alleviation and employment programs have also become important. Government expenditure has not only contributed to agricultural growth and hence indirectly to poverty alleviation, but it has directly created rural non-

farm jobs and increased wages. The real significance of government development expenditure lies in the fact that it imparts a greater amount of "trickle down" benefits for the poor in the growth process than agricultural growth alone. Unlike agricultural growth, which often reduces poverty only by increasing mean consumption, government expenditure reduces poverty by increasing both mean income and improving the distribution of income (Sen 1997).

Another significant feature in the literature on rural poverty in India is that most of the previous studies have used a single equation approach (Ahluwalia 1978; Saith 1981; Gaiha 1989; Ravallion and Datt 1995; Datt and Ravallion 1997). There are at least two disadvantages with this approach. First, many poverty determinants such as income, production or productivity growth, prices, wages and non-farm employment are generated from the same economic process as rural poverty. In other words, these variables are also endogenous variables, and ignoring this characteristic leads to biased estimates of the poverty effects (van de Walle 1985; Bell and Rich 1994). Second, certain economic variables affect poverty through multiple channels. For example, improved rural infrastructure will not only reduce rural poverty through improved agricultural productivity, but also affect rural poverty through improved wages and non-farm employment. It is very difficult to capture these different effects in a single equation approach.

Building on previous studies of the determinants of rural poverty in India, this study develops a simultaneous equations model to estimate the various direct and indirect effects of government expenditures on productivity and poverty. Such information can be

especially helpful to policy makers who wish to more efficiently target government expenditures to benefit the poor.

## 3. GOVERNMENT EXPENDITURE, AGRICULTURAL GROWTH, AND RURAL POVERTY

### GOVERNMENT EXPENDITURE

Total government expenditure in India is divided into non-development and development spending, and the latter is further sub-divided into spending on social and economic services.[1] Social services include health, labor, and other community services, while economic services include sectors like agriculture, industry, trade, and transportation.

Most public development expenditure on agriculture and rural development is undertaken by the state governments in India. This includes expenditures financed from the states' own revenues, but even the Central Government's expenditure on agriculture and rural development is largely channeled through the state governments. In 1995/96, for example, direct spending by the Central Government on agriculture and rural development was only about 30 percent of the total, and the bulk of this was for fertilizer and other subsidies that are non-productive. Since we are primarily interested in productive investments in this paper, we rely entirely on state level expenditure data. Small omissions arise because part of total agricultural research expenditure remains

[1] India was the largest public spender on agriculture in 1993 among all Asian countries, and its expenditure was 16 percent higher than those of the Chinese government (Fan and Pardey 1997).

within national institutions, and because part of the total investment in transportation and communications does not pass through the state accounts. We try to allow for these omissions in interpreting our results.

Total state government expenditure has grown substantially in recent decades (Table 1); in fact there was a fivefold increase in real terms between the early 1970s and the early 1990s. But the rate of increase is now slowing. It grew at about 8 percent per year during the 1970s and 1980s, but declined to 3.14 percent in the early 1990s. Development expenditure has followed a similar pattern, though the recent drop in the rate of increase is more dramatic; from 13 percent in the 1970s, to 7 percent in the 1980s to only 1 percent in the early 1990s. Within development expenditure, social services expenditure grew the least in the 1990s (only 0.42 percent per annum, compared with about 9 percent in the 1970s and 1980s).

The expenditure items that grew most rapidly over the period 1970-93 were welfare and rural development. The growth in rural development expenditure (consisting of wage employment schemes and integrated rural development programs) has been particularly rapid, and it is the one item that continued to grow at a respectable 5.1 percent per year even during the early 1990s.

In terms of composition of state government spending, development expenditure accounted for 75 percent of total government expenditure in 1993, and the remaining 25 percent went to non-development expenditure. Social and economic services accounted for 47 percent and 53 percent of total development expenditure, respectively (or 35 percent and 40 percent of total government expenditure in rural areas), as shown in Figure 2.

Among social service expenditures, education accounted for 52 percent, health for 16 percent, and welfare of scheduled castes and tribes for 7 percent. Among five major components of economic services, the agricultural sector accounted for 20 percent, the irrigation sector for 22 percent, transportation and communication for 11 percent, the power sector for 17 percent, and rural development programs for 16 percent.

Since 1980, agriculture's share in total expenditure on economic services has declined from 30 percent to 20 percent, and irrigation's share has also declined. In contrast, expenditure on rural development programs has expanded from 6.3 to 16.4 percent of total economic services, causing some concern that resources have been reallocated away from productivity enhancing investments to those that have a much smaller impact on agricultural productivity and growth.

Disaggregating government expenditure into its current and capital accounts reveals that almost all the increase in total expenditure since 1970 has been due to rapid growth in the current account (Figure 3). Capital account expenditure has remained flat since 1970 when measured in 1960/61 prices. The majority of the expenditure on social services has also been under the current account. While expenditures from the current and capital accounts for economic services were equally important between 1970 and 1982, expenditures from the current account more than doubled between 1982 and 1993 while expenditures from the capital account remained flat.

For irrigation expenditure, both the capital and current accounts have kept pace with each other since 1970. But for agriculture, more than 95 percent of expenditure (which includes agricultural R&D, extension, and other productivity increasing

programs), has been from the current account. Similarly, government expenditure for rural and community development was also mainly from the current account. On the other hand, expenditure on power was mainly from the capital account until 1990, but has since shifted to the current account. By 1993, more than one-third of the expenditure on power came from the current account.

The rapid expansion of current expenditure across all expenditure items raises questions about the efficiency of government expenditures. However, whether this disturbing trend is caused by changes in the accounting system or by policy changes towards shorter term spending programs, is not clear.

There exist large regional variations in government expenditure. This can be illustrated by the patterns of expenditure on development activities related to agricultural growth and rural poverty reduction. Among all states, Maharashtra has always had the largest development expenditure, followed by Andhra Pradesh, Uttar Pradesh and Tamil Nadu (Appendix Table 1). Among the 17 states studied here, Himachal Pradesh and Jummr & Kashirmir have had the smallest development expenditure.

In per capita terms, poorer states like Bihar, Assam, Madhya Pradesh, Orissa, Uttar Pradesh, and West Bengal spend much less compared to advanced states like Punjab, Haryana, Maharashtra, Gujarat, and Tamil Nadu (Appendix Table 2). The difference between these two groups is large. For example, on a per capita basis, Maharashtra spent 3.8 times more than Bihar in 1993. Not surprisingly, Bihar is also the state that has the highest incidence of poverty.

## TECHNOLOGY, INFRASTRUCTURE AND GROWTH

The introduction of new technologies, improved infrastructure (roads and electrification) and education have all contributed to agricultural growth in India. This section analyzes these developments, and provides a basis for the analysis in later sections on how these government investments have reduced rural poverty indirectly through improved agricultural productivity.

### *Technologies and Infrastructure*

One of the most significant changes in Indian agriculture in recent decades has been the widespread adoption of high-yielding varieties. During the green revolution of the 1970s, the crop area planted to high-yielding varieties (HYVs) for five major crops (rice, wheat, maize, sorghum, and pearl millet) increased from less than 21 percent to 41 percent (Table 2).[2] Even after the green revolution, the percentage of the crop area planted with HYVs continued to increase. It reached 53 percent by 1990, and 60 percent of the crop area by 1995. This has been one of the major engines of productivity growth in Indian agriculture. However, there have been substantial regional differences. The low poverty states have generally out-performed other states in HYV adoption (Appendix Table 3). In 1970, the adoption rate of HYVs in Punjab was already high at 56 percent, and it increased to 78 percent by 1979, and to more than 90 percent of the crop area by

[2] High-yielding varieties (also referred to as modern varieties) are those released by the Indian national agricultural research system and the international agricultural research centers. The yields of these varieties are usually substantially higher than those of traditional varieties.

the mid-1980s. In Andhra Pradesh, where the adoption rate of HYVs was only 12 percent in 1970, more than 60 percent of the crop areas in the state was planted with HYVs by the mid-1980, and more than 86 percent by 1995. But in high poverty states such as Bihar and Orissa, 60 percent of total crop area was still planted with traditional varieties, even in 1995. Although many factors may contribute to rural poverty, the lower rate of technology adoption in these states is definitely correlated with high rural poverty.

Irrigation, another important factor in Indian agriculture, has also increased dramatically, but with considerable regional variation. For all India, the percentage of the cropped area that is irrigated increased from 23 percent in 1970 to 31 percent in 1985 (Table 2). But the increase has been only marginal in more recent years. In the last 10 years, the percentage area irrigated increased by only 2 percentage points. As with the adoption of HYVs, there seems to be a strong correlation between poverty and extent of irrigation among states. In Punjab, more than 90 percent of the gross cropped area is irrigated (Appendix Table 4). Similarly in Haryana, almost 80 percent of the total cropped area is irrigated. On the other hand, in high poverty states such as Orissa, Assam, and Madhya Pradesh, irrigation has increased very little in recent decades, and they are still the least irrigated states. Since HYVs respond well to irrigation and high rates of fertilizer usage, lack of irrigation facilities in these states has hindered more widespread adoption and effectiveness of HYVs.

One of the greatest achievements in the development of rural India has been the rapid increase of electrification. In 1970, only 34 percent of the villages in rural India had access to electricity. But in 1995, this percentage had increased to almost 90 percent

(Table 2). This rapid increase in electrification not only contributed to agricultural productivity growth through encouraging more irrigation, but also contributed to reductions in rural poverty through the generation of nonagricultural employment opportunities. Among all states, Bihar has the lowest electrification rate (Appendix Table 5). Even in 1995, more than 34 percent of the villages in that state still did not have access to electricity. Similarly, in West Bengal and Uttar Pradesh, more than 20 percent of the villages were still not electrified in 1995. While in Punjab, Haryana, Karnataka, Kerala, and Himachal Pradesh, all the villages in these states have access to electricity.

For the country as a whole, the literacy rate in rural India has increased steadily from 23 percent in 1970 to 40 percent in 1995, but with great regional variation (Table 2). In Bihar and Rajasthan, more than 70 percent of the rural population was still illiterate in 1995, while more than 50 percent of the rural population had the ability to read and write in Kerala, Himachal Pradesh, and West Bengal (Appendix Table 6). Surprisingly, the literacy rate in some well developed states such as Andhra Pradesh and Haryana remains below the national average.

Road density in rural India, measured as the length of roads in kilometers per thousand square kilometers of geographic area, increased from 2,414 in 1970 to 5,196 in 1995; a growth rate of over 3 percent a year (Table 2). Surprisingly, the road density in rural areas is highest in some of the poorer states, such as Tamil Nadu and Orissa (Appendix Table 7).

*Production and Productivity Growth*

As a result of rapid adoption of new technologies and improved rural infrastructure, agricultural production and factor productivity have both grown rapidly in India. Five major crops (rice, wheat, sorghum, pearl millet, and maize), 14 minor crops (barley, cotton, groundnut, other grain, other pulses, potato, rapeseed, mustard, sesame, sugar, tobacco, soybeans, jute, and sunflower), and three major livestock products (milk, meat, and chicken) are included in our measure of total production. Unlike traditional measures of production growth which use constant output prices, we use the more appropriate Tornqvist-Theil index (a discrete approximation to the Divisia index).[3] As Richter (1966) has shown, the Divisia index is desirable because of its invariance property: if nothing real has changed (e.g., the only input quantity changes involve movements along an unchanged isoquant) then the index itself is unchanged (Alston, Pardey, and Norton 1995). The formula for the index of aggregate production is:

$$lnYI_t = \sum_i 1/2 * (S_{i,\ t} + S_{i,\ t\&1}) * \ln(Y_{i,\ t} / Y_{i,\ t\&1}), \qquad (1)$$

where $lnYI_t$ is the log of the production index at time $t$, $S_{i,\ t}$ and $S_{i,\ t-1}$ are output $i$'s share in total production value at time $t$ and $t-1$, respectively; and $Y_{i,t}$ and $Y_{i,\ t-1}$ are quantities of output $i$ at time $t$ and $t-1$, respectively. Farm prices are used to calculate the weights of each crop in the value of total production.

[3] Using the case of China, Fan (1997) has shown the bias is potentially large when constant prices are used in the aggregation of output.

For all India, agricultural production grew at 2.11 percent per annum between 1970 and 1995 (Table 2). In the 1970s, production growth was comparatively low, growing at an average annual rate of only 1.98 percent. In the 1980s, it grew at 3.82 percent per annum, a much higher growth rate than most other countries achieved during the same period. Since 1990, production growth has slowed, growing at only 2.10 percent per annum. Agricultural production grew slowly in the high-poverty states like Bihar and Assam, but much faster in the low-poverty states like Punjab, Andhra Prasesh, and Karnataka (Appendix Table 8).

To gain richer insights into the sources and efficiency of agricultural production growth, a "total" factor productivity index was calculated. Total factor productivity is defined as aggregate output minus aggregated inputs. Again, a Tornqvist-Theil index is used to aggregate both inputs and outputs. Specifically,

$$lnTFP_t = \sum_i 1/2 * (S_{i,\ t} + S_{i,\ t\&1}) * \ln(Y_{i,\ t} / Y_{i,\ t\&1}) - \sum_i 1/2 * (W_{i,\ t} + W_{i,\ t\&1}) * \ln(X_{i,\ t} / X_{i,\ t\&1}) \quad (2)$$

where $lnTFP_t$ is the log of the total factor productivity index; $W_{i,t}$ and $W_{i,t-1}$ are cost shares of input *I* in total cost at time *t* and *t-1,* respectively; and $X_{i,t}$ and $X_{i,t-1}$ are quantities of input *I* at time *t* and *t-1,* respectively. Five inputs (labor, land, fertilizer, tractors and buffalos) are included. Labor input is measured as the total number of male and female workers employed in agriculture at the end of each year; land is measured as gross cropped area; fertilizer input is measured as the total amount of nitrogen, phosphate, and potassium used; tractor input is measured as the number of four-wheel tractors; and bullock input is measured as the number of adult bullocks. The wage rate for agricultural

labor is used as the price of labor; rental rates of tractors and bullocks are used for their respective prices; and the fertilizer price is calculated as a weighted average of the prices of nitrogen, phosphate, and potassium. The land price is measured as the residual of total revenue net of measured costs for labor, fertilizer, tractors, and bullocks.[4]

Total factor productivity for India grew at an average annual rate of0.69 percent between 1970 and 1995 (Table 2). In the 1970s, total factor productivity improved rapidly, growing at 1.44 percent per annum. It grew even faster in the 1980s, at 1.99 percent per annum. But since 1990, total factor productivity growth in Indian agriculture has actually declined, by 0.59 percent per annum. This indicates that the growth in agricultural output achieved since 1990 has been achieved simply by using more inputs, and that the marginal productivity of those inputs is now declining. If this worrying new trend in total factor productivity continues, India will have major difficulties sustaining future agricultural growth, and will become less competitive in world agricultural markets.

For the whole period 1970 to 1994, J&K, West Bengal, Punjab, and Hariyana had the highest growth rates in total factor productivity, while in Gujarat, Assam, and Ranjastan, total factor productivity declined during this period (Appendix Table 9). The correlation between productivity growth and poverty reduction is stronger than that between production growth and poverty reduction, suggesting that productivity growth may be the more important variable to use for explaining poverty.

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[4] This approach implicitly assumes that there is a perfect land rental market. If the residual is negative, the average shares of the zone where the district is located are used for aggregation.

## RURAL EMPLOYMENT AND WAGES

Rural employment in India has undergone several significant changes since the 1970s. Total rural employment grew very little in the 1970s, and even declined in the 1980s (Table 3). But since 1987, total employment in rural India has been growing at almost 2 percent per annum. Nonagricultural employment has grown faster than agricultural employment, and growth in nonagricultural employment has even accelerated in recent years. In the 1990s, it grew at 2.59 percent per annum compared with 1.17 per annum in the 1970s, and 1.79 percent per annum in the 1980s.

As a percentage of total rural employment, nonagricultural employmentincreased from 19 percent in 1970 to 26 percent in 1993 (Table 3). The biggest increase in this share occurred in the 1980s. Government investment in roads, power, and rural development may have contributed to this rapid increase as we will analyze later. Rural development investment is specifically targeted by the government to alleviate rural poverty by generating rural employment.

Rural wages in real terms have increased faster than both agricultural and nonagricultural employment; they grew at an average annual rate of 2.16 percent between 1970 and 1993 (Table 3). As with nonagricultural employment, the most rapid increase was in the 1980s when wages increased by almost 5 percent per year. Again, government investment in rural infrastructure and rural development may have contributed to this rapid growth.

The level and structure of employment and wages seem to have moved together since the early 1970s, but in a peculiar manner. First, there is a clear contrast between the

pre- and post-1987 situation. Agricultural employment actually declined between 1970 and 1987, while non-farm employment grew at an increasing rate. The increase in non-farm employment coincides with a steady increase in rural wages since the early 1970s. Thus we have reason to believe that rural poverty declined during 1972-1987 largely due to increases in rural wages, which in turn were induced by the expansion of rural non-farm employment.

Agricultural and nonagricultural employment grew at increasing rates in the early 1990s, while the growth in rural wage rates slowed down (Table 3). The increase in rural poverty associated with the introduction of the policy reforms may have induced workers to accept lower productivity jobs.

State-level data reveal that in poor states such as Bihar, Orissa, and Uttar Pradesh, not only is nonagricultural employment less important in total rural employment, but its growth rate is the lowest among all states (Appendix Table 10).

## RURAL POVERTY

Figure 1 shows the changes in rural poverty since 1951 measured as the head-count ratio. The head-count ratio is the percentage of the rural population falling below the poverty line, defined as Rs 49 of income per month at 1973/74 prices. Rural poverty fluctuated between 50 and 65 percent in the 1950s and early 1960s, before beginning a steady decline from the mid-1960s until the late 1980s. It declined from about two-thirds to one-third of the rural population. It increased again to about 40 percent in the early 1990s, at the time of implementation of the policy reforms, but declined again in 1993, the last year for which we have data.

The long downward trend in rural poverty from 1967 to 1989 coincided with several important factors. As already discussed, the rapid adoption of HYVs together with improved irrigation increased agricultural production and productivity growth sharply during this period. This change in technology was a direct result of increased government investment in agricultural research and extension, infrastructure, irrigation, and education during the 1960s, 1970s, and 1980s. The increase in government investment also improved nonagricultural employment opportunities and wages, contributing directly to further reductions in rural poverty. The stagnation in agricultural productivity growth and the increase in rural poverty observed in the early 1990s may have resulted from reduced government investment in rural areas during this period.

State-level data reveal wide variations in the level and change in the incidence of rural poverty (Appendix Table 12). The poverty ratio declined in all states except Assam between 1957 and 1993. The poverty ratios declined at relatively higher rates per annum in Andhra Pradesh, Tamil Nadu, Punjab, Kerala, West Bengal, and Maharashtra, and at lower rates in Bihar, Rajasthan, and Haryana.

All states but Assam and J&K achieved reductions in rural poverty between the mid-1960s and the late 1980s when farmers adopted HYVs. Poverty fell to below 20 percent in Punjab and Haryana, but remained close to 50 percent in Bihar, Karnataka, Madha Pradesh, Maharashta, Orissa, Tamil Nadu and Rajastan. Most states experienced an increase in poverty after 1990. For example, in Orissa, the poverty ratio increased from 27 percent in 1990 to 40 percent in 1993. Even in Punjab, the rural poverty ratio increased from 19 percent to 25 percent. However, West Bengal, one of the states with

the highest incidence of poverty in the early 1970s, had one of the lowest in 1993. West Bengal has also achieved the most rapid growth in total factor productivity in agriculture since 1970.

Given the observed diversity in the rates of poverty alleviation across states, it is important to ask whether there is a relationship between the rates of change and the initial levels of poverty. Does poverty go down faster in those states that had less poverty to begin with, or in those states that had higher initial poverty levels? To answer this question we calculated correlation coefficients across the 14 states between the head count ratios and the annual rates of change in poverty.

The correlations indicate that the relationship between the level of poverty in 1957 and the percentage change in the level of poverty during 1957-60 was negative and significant. This means that the biggest reductions in rural poverty occurred in the poorest states. But in the 1960s, the relationship was reversed. The correlation was positive (0.789) and significant, which shows that the annual rate of decline in poverty tends to be greatest in those states that had the lowest poverty ratio in 1960. In the 1970s, the correlation between the initial level of poverty and the percentage change in poverty was positive, but it was weak and insignificant (0.351). It is interesting to note that this relationship changed again during 1983-1990, and poverty fell fastest in those states that had the highest poverty rates in 1983.

Another important issue is whether the decline in rural poverty was sufficient to reduce the absolute number of persons falling below the poverty line. At the all-India level, the absolute number of poor people increased from 177 million in 1960 to 278 in

1993, a net increase of 101 million persons (equivalent to an annual rate of increase of 1.38). Most of the states experienced a net increase in the size of their poor population (Appendix Table 13). The only exceptions were Andhra Pradesh, Kerala, and Tamial Nadu. In Bihar, the number of poor people under the poverty was 20 million in 1960, but increased to 51.5 million in 1993; a growth of 2.89 percent per annum. Uttar Pradesh also experienced rapid growth in the number of poor people; from 25.6 million in 1960 to 50.1 million in 1993, (equivalent to an annual growth rate of 1.94 percent per annum).

Another related feature of rural poverty in India is its continuing concentration in some regions. Two states, Bihar and Uttar Pradesh, accounted for 26 percent of the total rural poor in 1960, but this share had increased to 36.5 percent in 1993 (Appendix Table 14). Andhra Pradesh and Tamil Nadu have reduced their shares of poor people in the national total.

## 4. CONCEPTUAL FRAMEWORK

Most previous studies on the determinants of rural poverty in India have used a single equation approach, and have tried to explain rural poverty as a function of explanatory variables like agricultural production, wages and the price of food. The conceptual framework we propose for our analysis is a simultaneous equations system in which many economic variables are endogenous, and their direct and indirect interactions are explicitly considered in the model.

A SIMULTANEOUS EQUATIONS SYSTEM

The conceptual framework for the model is portrayed in figure 5, and the formal structure of the system is given in equations 3 to 13.

Equation (3) models the determinants of rural poverty (*P*).[5] They include growth in total factor productivity in agricultural production (*TFP*), changes in the percentage of landless households in total households (*LANDN*), changes in agricultural wages (*WAGES*) and the terms of trade (*TT*), changes in nonagricultural employment (*NAGEMPLY*), growth in rural population (*POP*), changes in annual rainfall and a time trend variable. Total factor productivity rather than agricultural income is used because we want to capture the impact on rural poverty of technology driven shifts in the production function rather than simply increased input use. Some economists, such as Datt and Ravillion (1997), used output per hectare (land productivity) as a proxy for agricultural performance or to represent changes in agricultural technology. But changes in land productivity do not necessarily imply technical change because farmers can simply use more inputs on a per hectare basis to increase land productivity. Wages are the second most important sources of income after agricultural production for rural residents in India. Income from wages can derive from both agricultural and

[5] All variables without subscripts indicate observations in year t at the state level. For presentation reason, we omit the subscript. The variables with subscript "-1,...-j" indicate observations in year *t-1*,...*t-j*.

$$P = f(TFP,\ WAGE,\ NAGEMPLY,\ TT,\ LANDN,\ POP,\ RAIN,\ T) \quad (3)$$

$$TFP = f(RDE,\ RDE_{\&1},\ ...RDE_{\&i},\ IR,\ LITE,\ ROADS,\ RAIN,\ T) \quad (4)$$

$$WAGE = f(TFP,\ ROADS,\ LITE,\ HELE,\ HELE_{\&1},\ ...,\ HELE_{\&l},\ T) \quad (5)$$

$$NAGEMPLY = f(GERDEV,\ ROADS,\ LITE,\ GCSSL,\ PVELE,\ T) \quad (6)$$

$$PUIR = f(IRE,\ IRE_{\&1},\ ...,\ IRE_{\&j},\ PVELE,\ ATT,\ T) \quad (7)$$

$$PRIR = f(PUIR,\ PVELE,\ ATT,\ T) \quad (8)$$

$$ROADS = f(ROADE_{\&1},\ ...,\ ROADE_{\&k},\ T) \quad (9)$$

$$LITE = f(EDE,\ EDE_{\&1},\ ...,\ EDE_{\&m},\ T) \quad (10)$$

$$PUELE = f(PWRE,\ PWRE_{\&1},\ ...,\ EDE_{\&m},\ T) \quad (11)$$

$$LANDN = f(TFP,\ T) \quad (12)$$

$$TT = f(TFP,\ TFPn,\ WAPI,\ T) \quad (13)$$

nonagricultural sources. The terms of trade variable measures the impact of changes in agricultural prices relative to nonagricultural prices on rural poverty.[6] It is hypothesized that in the short run, the poor may suffer from higher agricultural prices because they are usually net buyers of foodgrains. Population growth also affects rural poverty since higher growth in population may increase rural poverty if there is insufficient growth in rural employment. This is particularly important for a country like India where resources are limited, and the population base is large. The percentage of landless households is included in the equation to measure the potential impact of access to land on rural poverty. Rainfall is included to capture the direct effects of variations in agricultural production on the poor, particularly the effects of drought. The time trend variable should capture the effects of other variables that are not included in the equation.

Equation (4) models the determination of total factor productivity growth in agriculture. The TFP growth index is the ratio of an aggregated output index to an aggregated input index (see equation (2)).[7] We included the following variables in the equation: current and lagged government spending on agricultural research and extension

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[6] Instead of using the inflation rate in rural areas (Saith 1981; Ahluwalia 1985; Bell and Rich 1994; Datt and Ravallion 1997), we use the terms of trade (agricultural prices relative to nonagricultural prices). The reason is that increases in agricultural prices may have even greater impact than the general price index on rural poor since they are usually net buyers of agricultural products.

[7] Another advantage of using TFP growth instead of production growth is that the TFP function has significantly fewer independent variables than the production function. The production function includes input variables like labor, land, fertilizer, machinery, and draft animals as independent variables in addition to those variables included in the TFP function. Fewer independent variables in the TFP function will help reduce potential multicollinearity problem in the estimation, and help increase the reliability of the estimated coefficients.

(RDE, $RDE_{-1}$,... $RD_{-1}$), the percentage of irrigated cropped area in total cropped area (*IR*), the literacy rate of the rural population (*LITE*), road density (*ROADS*), annual rainfall (*RAIN*), and a time trend.[8] The first four variables should capture the productivity enhancing effects of technologies, infrastructure, and education, while the last two variables should capture the impact of rainfall and other omitted variables on growth in total factor productivity. In our initial estimation, we attempted to separate out the differential impacts of public and private irrigation in the equation, but these two variables are too highly correlated. Instead, we use the percentage of cropped area under both private and public irrigation in the final specification. Government investments in soil and water conservation (GCSSL) were also included in earlier versions of the equation, but since the estimated coefficient was not statistically significant and its sign was very sensitive to the model specification, we decided to drop the variable in the final model.

Equation (5) is a wage determination function. Agricultural wages are determined by growth in total factor productivity, roads, literacy, health and time trend. The impact of improved roads on wages is often ignored in specifying wage determination equations. Ignoring this effect is likely to lead to underestimation of the impact of government spending on poverty, since wage increases induced by improved rural roads can be

[8] The expenditure in the current year is included because some government expenditure on extension may affect current production growth. This is also true for other expenditures such as those on roads, irrigation, power, and education.

potentially large, benefitting workers in agricultural and nonagricultural activities. Since data on the health condition of the rural population are not available, we use current and past government expenditures on health as independent variables in the wage equation.

Equation (6) determines nonagricultural employment. It is modeled as a function of rural roads, electrification and education, government expenditures on rural development programs and soil and water conservation, and a time trend. Improved roads should help farmers to set up small non-farm businesses and to market their products. Improved roads and education also help farmers to find jobs in towns. Government programs in rural development such as the Integrated Rural Development Programs (IRDP) and Rural Employment Schemes are designed to alleviate rural poverty by the government to generate nonagricultural and wage employment opportunities for rural laborers. Government spending on soil and water conversation is also often used by the government to generate wage employment for farmers, particularly in drought years.

Equation (7) models the relationship between government investment in irrigation and the percentage of the cropped area under canal irrigation. Since nearly all canal irrigation results from government investment, we use the cropped area under canal irrigation as a proxy for public irrigation. Included in the equation are variables that represent current and past government spending on irrigation ($IRE, IRE_{-1},..., IRE_{-j}$), the extent of rural electrification (the percentage of villages that have been electrified), a lagged terms of trade variable ($ATT$),[9] and time trend.

[9] To test whether there is any difference in the impact of between current and capital account expenditure, we included both a capital stock variable (using seven years lag) and a current expenditure variable for irrigation in equation (8). The results revealed

Equation (8) models the determinants of private irrigation. It is hypothesized that canal irrigation supported by government is often a precursor to private irrigation, because it increases the economic returns to investments in wells and pump sets (e.g., by raising the groundwater level). Private irrigation is defined as the percentage of the cropped area under wells, tube wells, and tanks which are mostly the result of farmers' private initiatives. Other determinants of private irrigation investment in equation (8) are rural electrification, the terms of trade, and time trend.

Equations (9), (10) and (11) model the relationships between lagged government expenditures on roads, education and rural electrification and the available stock of these variables. In equation (9), the stock of roads (measured in density form) is specified as a lagged function of government expenditures on roads ($ROADE, ROADE_{-1},...,ROADE_{-k}$) and time trend T. Similarly, the literacy rate at any point in time is a lagged function of past government spending on education ($EDU, EDU_{-1},...EDU_{-m}$) and time T (equation (10)), and the percentage of villages that are electrified depends on past government spending on power ($PWRE, PWRE_{-1}, ..., PWRE_{-n}$) and time (equation (11)).

Equation (12) models the effect of productivity growth on access to land (measured as the incidence of landlessness). It has often been argued that improved productivity due

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that capital expenditure has a significant and positive effect on the percentage of irrigation, but the current expenditure has a small, negative, but statistically insignificant impact on the percentage of irrigation. This seems to indicate that government may have overspent on the current account and underspent on the capital account. But further study is needed to clarify the exact definition of these two accounts. Similar tests could not be done for government expenditure on roads, education, agricultural R&D, rural development, welfare of scheduled castes and tribes and other backward classes, because these government expenditures are mainly from the current account.

to technological change and infrastructure improvements has worsened equity problems in rural areas. Endogenizing access to land in the model should capture these effects.

Equation (13) determines the terms of trade. Growth in total factor productivity in the state and at the national level (TFPn) increases the aggregate supply of agricultural products, and therefore reduces agricultural prices. Lower prices will help the poor if they are net buyers of grains. The inclusion of national TFP growth will help to reduce any upward bias in the estimation of the poverty alleviation effects of government spending within each state, since TFP growth in other states will also contribute to lower food prices through the national market. A world price index of rice, wheat and corn prices is also included in the equation to capture the impact of international markets on domestic agricultural prices. We also included some demand side variables in an earlier version of the equation, such as population and income growth, but they were not significant and have been dropped from the equation. Part of the effects of these omitted variables is captured by the time trend variable.

## MARGINAL EFFECTS OF GOVERNMENT EXPENDITURES ON POVERTY

By differentiating equations (3) to (13), we can derive the marginal impact and elasticities of different types of government expenditures on rural poverty.

The impact of government investment in agricultural research and development in year *t-I* on poverty at year *t* can be derived as:

$$dP/dRDE_{-i} = (MP/MTFP)(MTFP/MRDE_{-i}) + (MP/MWAGES)(MWAGES/MTFP)(MTFP/MRDE_{-i}) + (MP/LANDN)(MLANDN/MTFP)(MTFP/MRDE_{-i}) + (MP/MTT)(MTT/MTFP)(MTFP/MRDE_{-i}). \quad (14)$$

The first term on the right hand side of equation (14) captures the impact on poverty of government investments in R&D through yield enhancing technologies such as improved varieties, and therefore total factor productivity. Increased total factor productivity also affects poverty through changes in wages, access to land, and relative prices, which are captured in the remaining terms of the right hand of the equation. By aggregating the total effects of all past government expenditures over the lag period, the sum of marginal effects is obtained for any particular year.

The impact of government investment in irrigation in year *t-j* on poverty in year *t* is derived as:[10]

$$dP/dIRE_{-j} = (MP/MTFP)(MTFP/MIR)(MPUIR/MIRE_{-j}) + (MP/MWAGES)(MWAGES/MTFP)(MTFP/MIR)(MPUIR/MIRE_{-j}) + (MP/LANDN)(MLANDN/MTFP)(MTFP/MIR)(MPUIR/MIRE_{-j}) + (MP/MTT)(MTT/MTFP)(MTFP)(MTFP/MIR)(MPUIR/MIRE_{-j}) + (MP/MTFP)(MTFP/MIR)(MPRIR/MPUIR)(MPUIR/MIRE_{-j}) + (MP/MWAGES)(MWAGES/MTFP)(MTFP/MIR)(MPRIR/MPUIR)(MPUIR/MIRE_{-j}) + (MP/LANDN)(MLANDN/MTFP)(MTFP/MIR)(MPRIR/MPUIR)(MPUIR/MIRE_{-j}) + (MP/MTT)(MTT/MTFP)(MTFP)(MTFP/MIR)(MPRIR/MPUIR)(MPUIR/MIRE_{-j}). \quad (15)$$

As with government investments in agricultural R&D, the impact of government investments in irrigation is captured through improved productivity, wages, access to

[10] We assume that both private and public irrigation have the same impact on productivity growth which is calculated through equation (4).

land, and relative prices (terms 1-4 of equation (15)). But government irrigation also affects private irrigation, which in turn also affects productivity and poverty. These indirect effects are captured in terms 5-8 of equation (15).

The impact of government investment in rural roads in year *t-k* on poverty in year *t* is derived as:

$$dP/dROADE_{-k} =$$

$$(MP/MTFP)(MTFP/MROADS)(MROADS/MROADE_{-k}) +$$
$$(MP/MWAGES)(MWAGES/MTFP)(MTFP/MROADS)(MROADS/MROADE_{-k}) +$$
$$(MP/MLANDN)(MLANDN/MTFP)(MTFP/MROADS)(MROADS/MROADE_{-k}) +$$
$$(MP/MTT)(MTT/MTFP)(MTFP/MROADS)(MROADS/MROADE_{-k}) +$$
$$(MP/MNAEMPLY)(MNAEMPLY/MROADS)(MROADS/MROADE_{-k}) +$$
$$(MP/MWAGES)(MWAGES/MROADS)(MROADS/MROADE_{-k}). \quad (16)$$

The first term on the right hand side of equation (16) measures the direct effects of improved productivity on poverty attributable to a greater road density. Terms 2, 3, and 4 are the indirect effects of improved productivity through changes in wages, access to land, and prices. Terms 5 captures the effects on poverty of greater nonagricultural employment opportunities. The sixth term of the equation is the impact of improved agricultural wages arising from government investment in roads.

The impact of government investment in education in year *t-m* on poverty in year *t* is derived as:

$$dP/dEDE_{-m} =$$

$$(MP/MTFP)(MTFP/MLITE)(MLITE/MEDE_{-m})$$
$$(MP/MTT)(MTT/MTFP)(MTFP/MLITE)(MLITE/MEDE_{-m}) +$$
$$(MP/MLANDN)(MLANDN/MTFP)(MTFP/MLITE)(MLITE/MEDE_{-m}) +$$
$$MP/MWAGES)(MWAGES/MTFP)(MTFP/MLITE)(MLITE/MEDE_{-m}) +$$
$$(MP/MNAEMPLY)(MNAEMPLY/MLITE)(MLITE/MEDE_{-m}) +$$

$$(MP/MWAGES)(MWAGES/MLITE)(MLITE/MEDE_{-m}). \quad (17)$$

As with government investment in roads, the first four terms of equation (17) capture the impact of government investment in education through improved agricultural productivity. Terms 5 and 6 capture the impact of government investments in education on poverty through improved non-farm employment opportunities and changes in rural wages.

The impact of government investment in electricity in year *t-n* on rural poverty in year *t* is derived as follows:

$$dP/dPWRE_{-n} =$$

$$\begin{aligned}
&(MP/MTFP)(MTFP/MIR)(MPUIR/MPVELE)(MPVELE/MPWRE_{-n})+\\
&(MP/MWAGES)(MWAGES/MTFP)(MTFP/MIR)(MPUIR/MPVELE)(MPVELE/MPWRE_{-n})+\\
&(MP/(LANDN)(MLANDN/MTFP)(MTFP/MIR)(MPUIR/MPVELE)(MPVELE/MPWRE_{-n})+\\
&(MP/MTT)(MTT/MTFP)(MTFP/MIR)(MPUIR/MPVELE)(MPVELE/MPWRE_{-n})+\\
&(MP/MTFP)(MTFP/MIR)(MPRIR/MPUIR)(MPUIR/MPVELE)(MPVELE/MPWRE_{-n})+\\
&(MP/MWAGES)(MWAGES/MTFP)(MTFP/MIR)(MPRIR/MPUIR)\\
&\quad (MPUIR/MPVELE)(MPVELE/MPWRE_{-n})+\\
&(MP/(LANDN)(MLANDN/MTFP)(MTFP/MIR)(MPRIR/MPUIR)\\
&\quad (MPUIR/MPVELE)(MPVELE/MPWRE_{-n})+\\
&(MP/MTT)(MTT/MTFP)(MTFP/MIR)(MPRIR/MPUIR)(MPUIR/MPVELE)(MPVELE/MPWRE_{-n})\\
&(MP/MNAEMPLY)(MNAEMPLY/MPVELE)(MPVELE/MPWRE_{-n}). \quad (18)
\end{aligned}$$

The first 10 terms measure the effect of government investment in power through improved irrigation. The last terms capture the effect of improved electrification on poverty arising from nonagricultural employment opportunities.

The effects of government expenditures on rural and community development expenditures is derived as:

$$dP/dGERDEV = (\partial P/\partial NAEMPLY)(\partial NAEMPLY/\partial GERDEV). \quad (19)$$

This type of expenditure affects rural poverty by improving nonagricultural employment opportunities.

Government investments in health affect poverty through improved agricultural wages:

$$dP/dHEL_{-r} = (\partial P/\partial WAGES)/(\partial WAGES/\partial HEL_{-r}). \quad (20)$$

Government investments in soil and water conservation affect rural poverty through improved non-farm employment:

$$dP/dGCSSL=(\partial P/\partial NAEMPLY)(\partial NAEMPLY/\partial GCSSL) \quad (21)$$

## 5. DATA, MODEL ESTIMATION, AND RESULTS

### DATA SOURCES AND MEASUREMENT

Table 4 presents the definitions of each variable used in the estimation of the model. The head-count ratio, which measures poverty as a percentage of the rural population falling below the poverty line, is used in our analysis. Other measures, such as the poverty-gap index, the squared poverty-gap index, the Sen index, are also used by many scholars to supplement the head-count ratio.[11] But the head-count ratio is the most

[11] For more information on poverty measures, refer to Ravallion 1996, and Foster, Greer, and Thorbecke 1984.

important indicator used by the Indian government in setting its goals to alleviate rural poverty. Time series data on other poverty measures at the state level are also not available. The head-count ratio data used in this analysis were constructed by Gaurav Datt, and are published in a World Bank publication (World Bank 1997). Datt used the poverty line originally defined by the Planning Commission, and more recently endorsed by the Planning Commission, which is based on a nutritional norm of 2,400 calories per person per day. It is defined as the level of average per capita total expenditure at which this norm is typically attained, and is equal to a per capita monthly expenditure of Rs 49 at October 1973-June 1974 all-India rural prices.

Our measure of total factor productivity growth has already been defined. The road density variable is defined as the length of road per unit of geographic area. Education is measured as the literacy rate, defined as the percentage of literate people in the total rural population. Public irrigation is defined as the percentage of the total cropped area under canal irrigation, and private irrigation is defined as the percentage of the total cropped area under well, tube well, and tank irrigation. The electrification variable measures the of all villages that have access to electricity. The rural wage used is the male labor rate in real terms deflated by the consumer price index for agricultural labor. These variables were aggregated from district level data, which were obtained from the Planning Commission through the National Center for Agricultural Policy and Economics Research, New Delhi.

Nonagricultural employment is measured as the percentage of nonagricultural employment in total rural employment.[12] Data on nonagricultural employment are only

[12] Employment is defined as usual status, i.e., if more than half of his time is engaged in a particular employment category.

reported by the NSS for every five years beginning in 1973. The data for other years were estimated by geometric interpolation.

The terms of trade variable is measured as the change in agricultural prices relative to nonagricultural prices. The landless variable is measured as the percentage of rural households classified as landless. Since the data are only available every 10 years beginning in 1953, the data for intermediate years were estimated by geometric interpolation.

Government expenditure data by state were obtained from *Finances of State Governments*, various issues, published by the Reserve Bank of India.[13] All the expenditures are deflated into 1960/61 prices using a national GDP deflator. They include expenditures from both revenue (for maintenance) and capital (investment) account.

Agricultural R&D expenditure includes government expenditure on agricultural research and extension, while government expenditure on irrigation includes irrigation and flood control. Government expenditure on roads, education, power, and health in rural areas are calculated from total state level expenditures scaled down by the proportion of the total population living in rural areas.

Instead of using current and past expenditures, we use stock variables to measure the impact of government spending on rural development, and soil and water conservation. We use a three-year lag structure with weights of 0.4, 0.3 and 0.2, and 0.1

[13] For more details on the definition and classification of government expenditures on agriculture, refer to *Database & Guide on Government Finances in Indian Agriculture*, The new Concept Consulting Services, New Delhi, April 1990.

for the current year, *t-1*, *t-2*, and *t-3, respectively*. These expenditures usually have immediate and short-run impact on rural poverty.

## MODEL ESTIMATION

We used double-log functional forms for all the equations in the system. More flexible functional forms such as the translog or quadratic impose fewer restrictions on the estimated parameters, but when tried we found that many of the estimated coefficients were not statistically significant because of multicollinearity problems.

The model defined by equation system (3) to (13) incorporates inter-dependencies among government investment, technology, infrastructure, productivity growth, rural employment generation, wages, and rural poverty. However, many economists have argued that government investment may itself be an endogenous variable. Binswanger et al. (1989) argued that government may allocate its investment based on agroclimatic conditions, i.e., high potential areas may receive more resources from government. If this is true, we should model government investment behavior in the equations system as well. However, it is difficult to quantify the agroclimatic conditions needed as potential explanatory variables, which may include seasonal rainfall, temperature, soil, topology, etc. But since these conditions are fixed over time, then, in order to reduce any bias from this endogeneity problem, we use the following estimation procedure. Let the following equation represent any equation in the simultaneous system:

$$Y = \$X + (Z + g \qquad (22)$$

where $Y$ is the dependent variable, $X$ is a vector of government investment variables, $Z$ is

a vector of other independent variables, and $\gamma$ is an error term. If government allocates its investment based on agroclimatic conditions, then $X$ is correlated with the error term $\gamma$. By ignoring this endogeneity, the estimates of $\beta$ vector will be biased.

Suppose $\gamma = e_i + e_{it}$, where $e_i$ is a time invariant regional fixed effect representing agroclimatic conditions and $e_{it}$ is a white noise. This fixed effect can, in principle, be predicted by government in determining its investment allocation across regions. Taking the first difference of equation (23),

$$Y_{it} - Y_{i,t-1} = \beta(X_{it} - X_{i,t-1}) + \alpha((Z_{it} - Z_{i,t-1}) + \gamma_{it} - \gamma_{i,t-1}, \text{ or}$$

$$y = \beta x + \alpha z + \varepsilon, \qquad (23)$$

where y and z are the first differences of Y and X, and $\varepsilon = e_{it} - e_{i,t-1}$. Since $e_{it}$ is purely white noise, it is unlikely that x is correlated with $\varepsilon$. Therefore, any bias in the $\beta$ estimates will be reduced.

Based on the above reasoning, all variables in our analysis were first transformed into geometric annual growth rates in logarithm form, i.e., $dx = ln(x_t/x_{t-n})/n$, where $x_t$ and $x_{t-n}$ represent the observations on x at time $t$ and $t$-$n$, respectively, and $n$ is the number of the years between two periods when data are available. If $n$ =1, then $dx$ is simply a first difference in logarithms. This transformation avoids the problem of different time intervals between observations. It also alleviates potential multicollinearity problems among many dependent variables on the right hand side of the equations.

*Lags and Distributions of Public Investments*

Government investments in R&D, roads, education, power, health, and irrigation can have long lead times in affecting agricultural production, as well as long-term effects

once they kick in. One of the thornier problems to resolve when including government investment variables in a production or productivity function concerns the choice of appropriate lag structure. Most past studies use stock variables which are usually weighted averages of current and past government expenditures on certain investments such as R&D. But what weights and how many years lag should be used in the aggregation are currently an issue of some contention in the literature.[14] Since the shape and length of these investments are largely unknown, we first use a free form lag structure in our estimation, i.e., we include current and past government expenditures on certain investment items such as R&D, irrigation, roads, power, and education in the respective productivity, technology, infrastructure, and education equations. Then we use statistical tools to test and determine the appropriate length of lag for each investment expenditure.

Various procedures have been suggested for determining the appropriate lag length. The adjusted $R^2$ and Akaike's Information Criteria (AIC) are often used by many economists (Greene 1993). In this report, we simply use the adjusted $R^2$. Since $R^2$ estimated from the simultaneous system does not provide the correct information on the fitness of the estimation, we use the adjusted $R^2$ estimated from the single equation. The optimal length is determined when the adjusted $R^2$ reaches its maximum. The ACI is similar in spirit to the adjusted $R^2$ in that it rewards goodness of fit, but it penalizes the loss of degrees of freedom. The lags determined by the adjusted $R^2$ approach are 13, 8,

[14] Alston et al. argue that research lag may be much longer than previously thought, or even infinite. But for many developing countries where the national agricultural research systems are much younger than those in developing countries (often 30 to 50 years old), and their research are more applied types. Therefore, it is certain that research lags in developing countries are much shorter than those in developing countries.

11, 7, and 7 years for R&D, irrigation, education, power, and roads, respectively. These are generally very short when compared to much longer lags obtained for the U.S. (Craig and Pardey 1987; Alston et al. 1998).

Another problem related to the estimation of lag distribution is that independent variables (for example, RDE, $RDE_{-1,}$ $RDE_{-2,}$ ... and $RDE_{-I}$ in the TFP function) are often highly correlated, making the estimated coefficients statistically insignificant. To avoid this problem, many ways of tackling this problem have been proposed. The most popular approach is to use what are called *polynomial distributed lags*, or *PDLs.* In a polynomial distributed lag, the coefficients are all required to lie on a polynomial of some degree *d*. In this report, we use *PDLs* with degree 2. In this case, we only need to estimate three instead of $i+1$ parameters for the lag distribution. For more detailed information on this subject, refer to Davidson and MacKinnon (1993). Once the lengths of lags are determined, we estimate the simultaneous equation system with the *PLDs* and appropriate lag length for each investment.[15]

## ESTIMATION RESULTS

The results of the systems equation estimation are presented in Table 5. Most of the coefficients in the estimated system are statistically significant at the 5 percent

[15] The sums of the coefficients from *PLDs* and free forms lag structure are not significantly different for all types of expenditure except R&D. The summed coefficient of R&D expenditure from *PLDs* is substantially large than that from free form lag structure (0.296 vs 0.091). Therefore, the estimated productivity and poverty effects from free forms lag structure are also substantially lower than those from *PLDs* distribution.

confidence level (one-tail test) or better.[16]

The estimated poverty equation (equation (3)) supports the findings of many previous studies. Improvements in agricultural productivity, higher agricultural wages, and increased nonagricultural employment opportunities have all contributed significantly to reducing poverty, whereas improvements in the terms of trade for agriculture have an immediate and negative short term impact on the rural poor (Misra and Hazell 1996).[17] Population growth, the incidence of landlessness and annual rainfall all have insignificant direct effects on poverty.

The estimated total factor productivity equation (equation (4)) shows that, agricultural research and extension, improved roads, irrigation, and education have all contributed significantly to growth in total factor productivity. The coefficient reported here for agricultural research and extension is the sum of the past 13 years coefficients from the *PLDs* distribution. The significance test is the joint *t* test of the three parameters of the *PLD*s.

The estimated wage equation (5) shows that total factor productivity growth, and investments in rural roads, education, and health have all contributed to increases in

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[16] $R^2$ is usually lower when dependent and independent variables are transformed into the difference form. Growth rates we used for both dependent and independent variables are equivalent to different form in logarithm. The model with traditional double-log forms for all equations were also estimated for the comparison purpose. Both t-value and $R^2$ are much better than those we obtained under the difference form in Table 4.1 (almost all coefficients are statistically significant, and $R^2$s range from 0.70 to 0.95).

[17] We also included the variable of expenditure on rural development variable (measured in stock terms with three-year lag) in our road and productivity equations. The coefficients are not statistically significant in either of the equations.

agricultural wages. The estimated nonagricultural employment equation (equation (6)) shows the importance of government expenditures on rural development and soil and water conservation in creating additional rural employment. Additionally, investments in roads and literacy have also been successful in promoting nonagricultural employment.

The estimated public irrigation equation (equation (7)) confirms that the percentage of the cropped area under canal irrigation is primarily a result of government investment, and that this has also been a significant catalytic force in driving private investment in well and tank irrigation (equation (8)). Improvements in the terms of trade seem not to have been a significant factor in encouraging either public or private investment in irrigation.

The estimated results for equations (9), (10), and (11) show that government investments in roads, education, and power have contributed to the development of roads, to increased literacy, and to the percentage of villages that are electrified. Most of the coefficients are statistically significant.

The estimated equation (12) for the incidence of rural landlessness shows that growth in total factor productivity does lead to an increase in landlessness. But the coefficient is small and statistically insignificant. Finally, the estimated terms of trade equation (equation (13)) confirms that increases in total factor productivity at the national and state levels do exert a downward pressure on agricultural prices, worsening the terms of trade for agriculture. It also shows that domestic agricultural prices are highly correlated with world agricultural prices.

The estimated model shows clearly that improvements in agricultural productivity not only reduce rural poverty directly by increasing income (equation (3)), but they also reduce poverty indirectly by improving wages (equation (5)) and lowering agricultural prices (equation (13)). On the other hand, improvements in agricultural productivity contribute to worsening poverty by increasing landlessness (equation (12)), though this effect is relatively small.

## RURAL POVERTY ELASTICITIES AND MARGINAL IMPACT

The total effects of government spending on rural poverty and agricultural productivity are shown in Table 6. Two impact measures are presented. The first measure is the elasticity of each item of government spending, and this gives the percentage change in poverty or productivity corresponding to a 1-percent change in government expenditure on that item. Because we used a double log function, the elasticities are obtained directly from the derivatives in equations (14) through (21). Since all expenditures are measured in rupees, then these elasticities provide a measure of the relative growth and poverty reducing benefits that arise from additional expenditures on different items, where the increases are proportional to existing levels of expenditure. The total elasticities for each expenditure item are decomposed into their various direct and indirect components in Figures 6 to 13.[18]

[18] TRDE, TIRE, TROADE, TEDE, TPWRE, and THELE in Figures 6, 7, 8, 9, 11, and 12 represent the coefficients summed over the lag period that impact the current year production growth and poverty alleviation.

The second measure is the marginal return (measured in poverty and productivity units) for an additional 100 billion rupees of government expenditure. This measure is directly useful for comparing the relative benefits of equal incremental increases in expenditures on different items, and provides crucial information for policymakers in setting future priorities for government expenditure in order to further increase productivity and reduce rural poverty. The marginal returns were calculated by multiplying the elasticities by the ratio of the poverty or productivity variable to the relevant government expenditure item in 1993. Table 6 also shows the number of poor people who would be raised above the poverty line for each one million rupees of additional investment in an expenditure item.

An important feature of the results in Table 6 is that all the productivity enhancing investments considered offer a "win-win" strategy for reducing poverty while at the same time increasing agricultural productivity. There appear to be no tradeoffs between these two goals. However, there are sizable differences in the productivity gains and poverty reductions obtained for incremental increases in each expenditure item.

Government expenditure on roads has by far the largest impact on rural poverty. If the government were to increase its investment in roads by 100 billion rupees (at 1993 constant prices), the incidence of rural poverty would be reduced by 0.87 percent. Moreover, for each one million rupee increase in investment in roads, 165 poor people would be lifted above the poverty line. These poverty impacts are nearly twice as large as the impacts of the next best poverty reducer, viz. government investment in agricultural R&D. Investment in roads also contributes importantly to growth in total factor

productivity. An additional 100 billion rupees invested in roads would increase TFP growth by 3.03 percent. This growth effect is second only to investments in agricultural R&D.

Investment in roads reduces rural poverty through productivity growth, as well as increased nonagricultural employment opportunities and higher wages (Figure 8). The productivity effect accounts for 24 percent of the total impact on poverty, nonagricultural employment for 55 percent, and the remaining 31 percent is accounted for by increases in rural wages. Of the total productivity effect on poverty, 75 percent arises from the direct impact of roads in increasing incomes, while the remaining 25 percent arises from lower agricultural prices (15 percent) and increased wages (10 percent). An increase in the incidence of landlessness arising from the induced productivity growth has no significant impact on rural poverty.

Government investment in agricultural research and extension has the second largest impact on rural poverty, but the largest impact of any investment on growth in total factor productivity. Another 100 billion rupees of investment in R&D would increase TFP growth by 6.98 percent and reduce the incidence of rural poverty by 0.48 percent. Moreover, another million rupees spent on R&D would raise 91.4 poor people above the poverty line (Table 6). R&D has a smaller impact on poverty than roads because it only affects poverty through improved productivity, and it has not been particularly targeted on the poor by the government (Figure 6). If future agricultural research and extension were more deliberately targeted on the poor, it might well achieve a greater poverty impact (Hazell and Fan 1998).

Government spending on education has the third largest impact on rural poverty reduction. An additional million rupees spent on education would raise 31.7 poor people above the poverty line. Most of this effect arises from greater non-farm employment opportunities and increased wages (Figure 9). Education, at least as measured here as a simple literacy ratio, has only a modest impact on growth in agriculture's total factor productivity.

Government expenditures on rural development has the fourth largest impact on poverty reduction. Another million rupees of expenditure would raise 27.8 poor people above the poverty line, a comparable impact to additional investment in education. But unlike other investments with similar or greater poverty impacts, rural development expenditures have no discernable impact on total factor productivity growth in agriculture, and hence do not provide a long-term solution to the poverty problem (Figure 10).

Government expenditure on irrigation has the fifth largest impact on rural poverty reduction. Another million rupees of expenditure would raise 7.4 poor people above the poverty line. However, it should be noted that statistically this impact is not significantly different from zero. Public irrigation investments also have the third largest impact on TFP growth; an additional billion rupees would add 0.56 percent to the TFP growth rate. Public irrigation impacts on poverty through its productivity effect, and this impact is enhanced by its catalytic role in stimulating additional private investment in irrigation (Figure 7).

Government expenditure on power has positive but small and statistically insignificant impacts on both rural poverty and productivity growth. This may be because the government has already invested heavily in rural electrification and the marginal returns from additional investments are now low. Not only is the size of power expenditure relatively large in the government's budget (50 percent greater than road expenditure in 1993), but current expenditure has also increased enormously since 1990 and about 90 percent of all rural villages are already electrified (Table 2). More than 90 percent of the total power effects are derived from non-farm employment, while the remaining effect arises from productivity increases obtained through improved irrigation (Figure 11).

Additional government expenditures on soil and water conservation and health have small impacts on rural poverty, and the impact is statistically insignificant in the case of health. They also have no discernable impacts on agricultural productivity growth.

## 6. CONCLUSIONS

Using state-level data for 1970 to 1993, this study has developed a simultaneous equations model to estimate the direct and indirect effects of different types of government expenditure on rural poverty and productivity growth in India. The results show that government spending on productivity enhancing investments (especially agricultural research and extension), rural infrastructure (especially roads and education),

and rural development targeted directly on the rural poor, have all contributed to reductions in rural poverty, and most have also contributed to growth in agricultural productivity.[19] But differences in their poverty and productivity effects are large.

The model has also been used to estimate the marginal returns to agricultural productivity growth and poverty reduction obtainable from additional government expenditures on different technology, infrastructure and social investments. Additional government expenditure on roads is found to have the largest impact on poverty reduction as well as a significant impact on productivity growth. It is a dominant "win-win" strategy. Additional government spending on agricultural research and extension has the largest impact on agricultural productivity growth, and it also leads to large benefits for the rural poor. It is another dominant "win-win" strategy. Additional government spending on education has the third largest impact on rural poverty reduction, largely as a result of the increases in non-farm employment and rural wages that it induces.

Additional irrigation investment has only a modest impact on growth in agricultural productivity and an even smaller impact on rural poverty reduction, even after trickle down benefits have been allowed for. Additional government spending on rural and community development, including Integrated Rural Development Programs (IRDP), contributes to reductions in rural poverty, but its impact is smaller than expenditures on

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[19] The results we obtained from this study differ sharply from Datt and Ravillion (1997) who used the state aggregate development expenditures and found insignificant correlation with rural poverty reduction. In another study, Sen (1997) found that while the aggregate state expenditures have a positive and significant impact on rural poverty, he failed to obtain the similar results using the individual items of government expenditures. This may be due to the different specifications of the models.

roads, agricultural R&D, and education. Additional government expenditures on soil and water conservation and health have no impact on productivity growth, and their poverty effects through employment generation and wage increase are also small.

The results of this study have very important policy implications. In order to reduce rural poverty, the Indian government should give priority to increasing its spending on rural roads and agricultural research and extension. These types of investment not only have large poverty impact per rupee spent, but also give the greatest growth in agricultural productivity growth. Additional government spending on irrigation and rural electrification has low productivity effects, and no discernable impact on poverty reduction. While these investments have been essential investments in the past for sustaining agricultural growth, the levels of investment stocks achieved may now be such that it may be more important to maintain those current stocks rather than to increasing them further. On the other hand, additional government spending on rural development is an effective way of helping the poor in the short-term, but since it has little impact on agricultural productivity, then it contributes little to long-term solutions to the poverty problem.

**Table 1 Government expenditure in India, million rupees in 1960/61 prices**

| | Total | Development | Social Service | Education et al. | Health | Welfare | Economic Service | Agriculture | Irrigation | Transportation | Power | Rural Development |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | (million rupees) | | | | | | |
| 1970 | 19,660 | 12,387 | 6,364 | 4,002 | 1,731 | 268 | 6,023 | 1,889 | 2,582 | 636 | 1,209 | 411 |
| 1971 | 22,112 | 15,471 | 8,132 | 3,578 | 1,685 | 380 | 7,339 | 1,623 | 3,065 | 907 | 1,025 | 526 |
| 1972 | 22,899 | 16,786 | 9,029 | 3,759 | 1,813 | 630 | 7,703 | 2,923 | 3,119 | 1,358 | 1,166 | 708 |
| 1973 | 23,054 | 16,643 | 8,902 | 3,906 | 1,848 | 636 | 7,978 | 3,014 | 3,185 | 1,206 | 1,159 | 658 |
| 1974 | 18,793 | 16,089 | 7,156 | 3,688 | 1,673 | 501 | 8,933 | 2,716 | 2,738 | 1,129 | 1,345 | 517 |
| 1975 | 25,158 | 21,933 | 9,477 | 5,068 | 2,225 | 657 | 12,496 | 3,925 | 4,586 | 1,395 | 2,083 | 653 |
| 1976 | 30,608 | 27,105 | 11,563 | 6,018 | 2,693 | 818 | 15,571 | 4,412 | 4,768 | 1,724 | 2,811 | 711 |
| 1977 | 32,043 | 28,213 | 12,065 | 6,280 | 2,858 | 878 | 16,496 | 4,364 | 6,310 | 1,851 | 3,024 | 681 |
| 1978 | 38,435 | 35,209 | 14,126 | 7,198 | 3,450 | 1,002 | 21,084 | 5,782 | 7,595 | 2,387 | 3,800 | 1,024 |
| 1979 | 39,516 | 36,192 | 14,864 | 7,160 | 3,624 | 1,062 | 21,415 | 6,239 | 7,505 | 2,423 | 3,663 | 1,183 |
| 1980 | 42,110 | 38,215 | 15,846 | 7,589 | 3,810 | 1,123 | 22,369 | 6,665 | 7,263 | 2,691 | 3,675 | 1,418 |
| 1981 | 48,759 | 43,289 | 18,843 | 8,973 | 4,639 | 1,334 | 24,444 | 7,444 | 8,102 | 3,009 | 3,889 | 1,765 |
| 1982 | 56,527 | 49,952 | 22,498 | 10,600 | 5,520 | 1,593 | 27,451 | 8,591 | 8,892 | 3,178 | 4,472 | 2,196 |
| 1983 | 52,329 | 45,821 | 20,626 | 9,678 | 5,378 | 1,541 | 25,200 | 8,395 | 7,917 | 2,804 | 3,461 | 2,104 |
| 1984 | 60,754 | 52,075 | 23,263 | 11,035 | 5,894 | 1,717 | 28,790 | 13,048 | 8,473 | 3,082 | 4,230 | 3,146 |
| 1985 | 65,048 | 55,521 | 25,671 | 12,152 | 5,220 | 1,904 | 29,850 | 6,577 | 7,599 | 3,038 | 3,948 | 3,888 |
| 1986 | 72,450 | 61,681 | 28,148 | 13,157 | 4,427 | 2,191 | 33,533 | 5,859 | 9,366 | 3,708 | 4,904 | 5,146 |
| 1987 | 74,646 | 62,914 | 28,876 | 13,621 | 4,812 | 1,927 | 34,038 | 5,962 | 9,045 | 3,516 | 5,381 | 5,132 |
| 1988 | 77,435 | 63,484 | 29,886 | 14,784 | 4,941 | 1,950 | 33,598 | 6,162 | 8,725 | 3,458 | 4,930 | 5,216 |
| 1989 | 85,130 | 67,879 | 32,957 | 17,748 | 5,299 | 2,057 | 34,922 | 6,739 | 8,740 | 3,688 | 5,622 | 3,991 |
| 1990 | 91,285 | 72,728 | 34,690 | 18,273 | 5,541 | 2,313 | 38,442 | 7,821 | 8,754 | 4,018 | 6,225 | 5,640 |
| 1991 | 89,891 | 71,322 | 32,267 | 16,622 | 5,089 | 2,184 | 38,839 | 6,744 | 7,519 | 3,757 | 10,079 | 5,543 |
| 1992 | 93,817 | 72,837 | 33,789 | 17,741 | 5,349 | 2,293 | 39,047 | 8,209 | 7,963 | 4,087 | 7,099 | 6,177 |
| 1993 | 100,161 | 75,072 | 35,127 | 18,392 | 5,761 | 2,411 | 39,947 | 8,072 | 8,785 | 4,330 | 6,873 | 6,546 |
| *Annual Growth Rate* | | | | | | | | | | | | |
| 1970-79 | 8.07 | 12.65 | 9.88 | 6.68 | 8.56 | 16.55 | 15.14 | 14.20 | 12.59 | 16.02 | 13.11 | 12.46 |
| 1980-89 | 8.14 | 6.59 | 8.48 | 9.90 | 3.73 | 6.95 | 5.07 | 0.12 | 2.08 | 3.56 | 4.84 | 12.18 |
| 1990-93 | 3.14 | 1.06 | 0.42 | 0.22 | 1.31 | 1.38 | 1.29 | 1.05 | 0.12 | 2.52 | 3.36 | 5.09 |
| 1970-93 | 7.34 | 8.15 | 7.71 | 6.86 | 5.37 | 10.03 | 8.57 | 6.52 | 5.47 | 8.69 | 7.85 | 12.79 |

Notes: 1. All figures in this table include both revenue and capital expenditure, and are aggregated from 17 major states.
2. Expenditure on education et al. include those on education, culture and sport.
3. Expenditure on transportation include those on transportation and communication.
4. Rural development expenditure is included in agriculture expenditure for some years. Therefore, the sum of the expenditure for agriculture, irrigation, transportation, power, and rural development is not necessarrily equal to total economic service expenditure.

**Table 2 Technology, infrastructure, production and productivity in Indian agriculture**

| | HYVs | Irrigation | Village electrified | Literacy rate | Road density | Production growth | Productivity growth |
|---|---|---|---|---|---|---|---|
| | % | % | % | % | km/1000 sq. km | % | % |
| 1970 | 21 | 23 | 34 | 23 | 2414 | 100 | 100.00 |
| 1971 | 24 | 23 | 36 | 24 | 2523 | 100 | 99.11 |
| 1972 | 23 | 23 | 37 | 25 | 2641 | 93 | 91.61 |
| 1973 | 25 | 24 | 39 | 25 | 2768 | 97 | 97.73 |
| 1974 | 26 | 24 | 41 | 26 | 2858 | 101 | 99.64 |
| 1975 | 29 | 25 | 44 | 27 | 2955 | 114 | 113.18 |
| 1976 | 31 | 25 | 46 | 27 | 3042 | 105 | 103.15 |
| 1977 | 34 | 26 | 48 | 28 | 3309 | 115 | 111.70 |
| 1978 | 36 | 27 | 51 | 28 | 3492 | 119 | 113.78 |
| 1979 | 37 | 27 | 54 | 29 | 3587 | 119 | 113.00 |
| 1980 | 41 | 28 | 57 | 30 | 3670 | 120 | 112.05 |
| 1981 | 40 | 29 | 60 | 31 | 3791 | 127 | 116.23 |
| 1982 | 43 | 29 | 63 | 31 | 3915 | 125 | 110.05 |
| 1983 | 41 | 29 | 67 | 31 | 4011 | 135 | 117.88 |
| 1984 | 45 | 29 | 70 | 32 | 4127 | 131 | 113.53 |
| 1985 | 44 | 30 | 73 | 32 | 4261 | 141 | 120.13 |
| 1986 | 46 | 31 | 75 | 33 | 4400 | 133 | 113.86 |
| 1987 | 48 | 32 | 78 | 33 | 4513 | 136 | 113.68 |
| 1988 | 47 | 34 | 81 | 34 | 4651 | 152 | 129.50 |
| 1989 | 53 | 33 | 83 | 34 | 4809 | 168 | 133.75 |
| 1990 | 53 | 33 | 85 | 35 | 4861 | 152 | 120.69 |
| 1991 | 57 | 33 | 86 | 36 | 4935 | 152 | 118.52 |
| 1992 | 56 | 32 | 87 | 37 | 5035 | 153 | 117.56 |
| 1993 | 57 | 32 | 87 | 37 | 5105 | 156 | 118.05 |
| 1994 | 64 | 33 | 89 | 39 | 5221 | 165 | 117.86 |
| 1995 | 59 | 31 | 89 | 40 | 5196 | n.a. | n.a. |
| *Annual Growth Rate (%)* | | | | | | | |
| 1970-79 | 6.25 | 1.84 | 5.37 | 2.47 | 4.50 | 1.95 | 1.37 |
| 1980-89 | 3.10 | 1.69 | 4.38 | 1.61 | 3.05 | 3.82 | 1.99 |
| 1990-95 | 2.10 | -0.88 | 0.96 | 2.68 | 1.34 | 2.09 | -0.59 |
| 1970-95 | 4.19 | 1.20 | 3.96 | 2.17 | 3.11 | 2.11 | 0.69 |

**Table 3 Rural wages and employment in India**

| | Total rural employment | Agricultural employment | Non -agricultural employment | Rural | Non-agricultural employment |
|---|---|---|---|---|---|
| | Thousand | Thousand | Thousand | Index | % |
| 1970 | 220,755 | 178,812 | 41,943 | 100.00 | 19.00 |
| 1971 | 220,910 | 178,937 | 41,973 | 97.48 | 19.00 |
| 1972 | 221,064 | 178,399 | 42,665 | 91.97 | 19.30 |
| 1973 | 221,289 | 178,492 | 42,797 | 86.46 | 19.34 |
| 1974 | 221,444 | 178,529 | 42,915 | 74.23 | 19.38 |
| 1975 | 221,599 | 178,565 | 43,034 | 90.88 | 19.42 |
| 1976 | 221,755 | 178,601 | 43,153 | 105.35 | 19.46 |
| 1977 | 221,910 | 178,637 | 43,272 | 104.81 | 19.50 |
| 1978 | 223,684 | 178,839 | 44,845 | 110.25 | 20.05 |
| 1979 | 225,920 | 179,354 | 46,567 | 105.52 | 20.61 |
| 1980 | 228,180 | 179,825 | 48,355 | 101.11 | 21.19 |
| 1981 | 230,461 | 180,250 | 50,212 | 103.66 | 21.79 |
| 1982 | 232,766 | 180,626 | 52,140 | 106.20 | 22.40 |
| 1983 | 235,094 | 182,433 | 52,661 | 112.84 | 22.40 |
| 1984 | 230,016 | 176,790 | 53,226 | 122.41 | 23.14 |
| 1985 | 225,094 | 171,293 | 53,801 | 135.09 | 23.90 |
| 1986 | 220,277 | 165,895 | 54,381 | 143.00 | 24.69 |
| 1987 | 215,563 | 160,594 | 54,968 | 136.38 | 25.50 |
| 1988 | 219,883 | 164,584 | 55,299 | 147.18 | 25.15 |
| 1989 | 224,259 | 167,526 | 56,732 | 154.71 | 25.30 |
| 1990 | 228,721 | 170,519 | 58,203 | 158.35 | 25.45 |
| 1991 | 233,273 | 173,562 | 59,711 | 148.06 | 25.60 |
| 1992 | 237,915 | 176,656 | 61,259 | 158.31 | 25.75 |
| 1993 | 242,649 | 179,803 | 62,846 | 163.59 | 25.90 |
| *Annual Growth Rate* | | | | | |
| 1970-79 | 0.26 | 0.03 | 1.17 | 0.60 | 0.91 |
| 1980-89 | -0.19 | -0.78 | 1.79 | 4.84 | 1.99 |
| 1990-93 | 1.99 | 1.78 | 2.59 | 1.09 | 0.59 |
| 1970-93 | 0.41 | 0.02 | 1.77 | 2.16 | 1.36 |

Notes: Employment figures are available for 1972, 1977, 1983, 1987, and 1993 from the Government of India. The figures for the rest of the years are interpolated using the time trend.

**Table 4 Definition of exogenous and endogenous variables**

| | |
|---|---|
| *Exogenous Variables* | |
| *POP*: | Rural population growth. |
| *WAPI*: | World agricultural price index (average export price for rice, wheat and corn). |
| *IRE*: | Government expenditure on irrigation, both from revenue and capital accounts. |
| *RDE*: | Government spending (both revenue and capital) on agricultural R&D. |
| *ROADE*: | Government investment and spending in rural roads. |
| *EDE*: | Government spending on rural education. |
| *PWRE*: | Government revenue and capital spending on rural power. |
| *GCSSL*: | Government capital stock accumulated in soil and water conservation investment. It is the weighted average of the past government expenditure on soil and water conservation, i.e., $GCSSL_t = \sum_m w_m ESL_{t-m}$, where $ESL_{t-m}$ is government expenditure on soil and water conservation at time $t-m$. The weights are 0.4, 0.3, 0.2, and 0.1, respectively with three years lag. |
| *HELE*: | Government spending on medical and public health and family welfare measured in stock terms using the three years lag similar to soil and water conservation. |
| *GERDEV*: | Government expenditure on rural and community development measured in stock terms using three years lag similar to expenditures on soil and water conservation. |
| *RAIN*: | Annual rainfall. |
| *T*: | Time trend. |
| *ATT*: | Moving 5-year average of the terms of trade (predetermined endogenous variable). |

Table 4 (continued)

| | |
|---|---|
| *Exogenous Variables* | |
| *P*: | Percentage of rural population falling below poverty line. |
| *LITE*: | Literacy rate of rural population. |
| *ROADS*: | Road density in rural areas. |
| *IR*: | Percentage of total cropped areas that is irrigated (sum of both public and private irrigation). |
| *PUIR:* | Percentage of total cropped areas under public irrigation (canal irrigation). |
| *PRIR:* | Percentage of total cropped areas under private irrigation (wells, tube wells, and tanks). |
| *PVELE*: | Percentage of rural villages that are electrified. |
| *WAGE*: | Wage rate of agricultural labor. |
| *NAEMPLY*: | Percentage of nonagricultural employment in total rural employment. |
| *TFP*: | Total factor productivity growth (Tornqvist-Theil index). It is defined as aggregate output minus aggregated inputs. |
| TFPn | Total factor productivity growth at the national level. |
| *LANDN*: | Percentage of rural households that are landless. |
| *TT*: | Terms of trade, measured as agricultural prices divided by a relevant non agricultural GNP deflator. |

**Table 5 Determinants of rural poverty in India: Simultaneous equation system**

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (3) | P | = | -0.073* | - | 0.164 TFP* | - | 0.205 WAGES* | + | 0.189 TT* | - | 0.458 NAEMAPL* | + | 0.000 LANDN | - | 0.847 POP | + | 0.380 RAIN | **$R^2$=0.117** |
| (4) | TFP | = | -0.034 | + | 0.296 TRDE* | + | 0.145 IR* | + | 0.231 ROADS* | + | 0.532 LITE* | + | 0.356 RAIN* | | | | | **$R^2$=0.296** |
| (5) | WAGES | = | 0.089* | + | 0.111 TFP* | + | 0.316 ROADS* | + | 1.457 LITE* | + | 0.005 GCSHEL | | | | | | | **0.133** |
| (6) | NAEMPLY | = | -0.027 | + | 0.046 GERDEV* | + | 0.208 ROADS* | + | 0.503 LITE* | + | 0.025 GCSSL* | | | | | | | **$R^2$=0.022** |
| (7) | PUIR | = | -0.035 | + | 0.120 TIRE* | + | 0.06 PVELE | + | 0.07 ATT | | | | | | | | | **$R^2$=0.127** |
| (8) | PRIR | = | -0.007 | + | 0.926 PUIR* | - | 0.127 ATT | + | 0.013 PVELE | | | | | | | | | **$R^2$=0.697** |
| (9) | ROADS | = | 0.007* | + | 0.315 TROADE* | + | -0.004 T* | | | | | | | | | | | **$R^2$=0.113** |
| (10) | LITE | = | 0.032* | + | 0.084 TEDE* | + | -0.001 T* | | | | | | | | | | | **$R^2$=0.270** |
| (11) | PVELE | = | 0.232 | + | 0.072 TPWRE* | + | -0.009 T* | | | | | | | | | | | **$R^2$=0.167** |
| (12) | LANDN | = | 0.031 | + | 0.026 TFP | + | -0.001 T | | | | | | | | | | | **$R^2$=0.022** |
| (13) | TT | = | -0.025<br>(0.19) | - | 0.176 TFP*<br>(-3.44) | - | 0.563 TFPn*<br>(-0.20) | + | 0.279 WAPI * | | | | | | | | | **$R^2$=0.379** |

NOTES: Coefficients for expenditures on R&D (TRDE), irrigation (TIRE), roads (TROADE), education (TEDE), power (TPWRE) are sums of coefficients of current and lagged expenditures. Coefficients for time-trend variables are not reported. "*" indicates significance at the 5% level.

**Table 6 Poverty and productivity effects of additional government expenditures**

| Expenditure variable | Elasticities | | Marginal impact | | |
|---|---|---|---|---|---|
| | Poverty | TFP | Poverty (% point) | TFP (% point) | No. of poor reduced |
| | | | (per 100 billion rupees at 1993 prices) | | (per million rupees) |
| R&D | -0.065* (2) | 0.296* (1) | -0.48* (2) | 6.98* (1) | 91.4* (2) |
| Irrigation | -0.007 (5) | 0.034* (4) | -0.04 (6) | 0.56* (3) | 7.4 (5) |
| Road | -0.066* (1) | 0.072* (2) | -0.87* (1) | 3.03* (2) | 165.0* (1) |
| Education | -0.054* (3) | 0.045* (3) | -0.17* (3) | 0.43* (4) | 31.7* (3) |
| Power | -0.002 (6) | 0.0007 (5) | -0.015 (8) | 0.02 (5) | 2.9 (7) |
| Soil and Water | -0.0004 (7) | 0 (6) | -0.035* (7) | 0 (6) | 6.7* (6) |
| Rural Development | -0.019* (4) | n.a. | -0.15* (5) | n.a. | 27.8* (4) |
| Health | -0.0007 (8) | n.a. | -0.02 (4) | n.a. | 4.0 (8) |

Note: Numbers in parentheses are ranks. "*" indicates significance at the 5% level.

**Appendix Table 1 Development expenditures by state**

| | Andhra Pradesh | Assam | Bihar | Gujarat | Haryana | HP | J&K | Karnataka | Kerala | MP | Maharashta | Orissa | Punjab | Rajasthan | Tamil Nadu | UP | West Bengal | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | (million 1960/61 rupees) | | | | | | | | | |
| 1970 | 1,083 | 462 | 795 | 877 | 344 | 70 | 276 | 753 | 612 | 770 | 1,504 | 443 | 449 | 709 | 1,155 | 1,252 | 842 | 12,398 |
| 1971 | 1,350 | 478 | 926 | 1,114 | 506 | 235 | 385 | 858 | 743 | 1,003 | 1,433 | 564 | 588 | 913 | 1,450 | 1,821 | 1,146 | 15,513 |
| 1972 | 1,347 | 439 | 963 | 1,226 | 420 | 269 | 410 | 1,190 | 720 | 983 | 1,810 | 610 | 664 | 935 | 1,528 | 1,956 | 1,331 | 16,803 |
| 1973 | 1,339 | 403 | 856 | 1,180 | 503 | 236 | 414 | 1,042 | 729 | 956 | 2,360 | 623 | 742 | 866 | 1,467 | 1,885 | 1,040 | 16,639 |
| 1974 | 1,325 | 426 | 911 | 1,269 | 528 | 234 | 418 | 1,023 | 691 | 975 | 1,946 | 521 | 726 | 763 | 1,105 | 2,057 | 1,157 | 16,076 |
| 1975 | 1,949 | 505 | 1,470 | 1,315 | 683 | 225 | 549 | 1,452 | 886 | 1,366 | 2,541 | 665 | 976 | 1,185 | 1,541 | 2,991 | 1,602 | 21,900 |
| 1976 | 2,353 | 593 | 1,662 | 1,821 | 829 | 267 | 542 | 1,600 | 1,090 | 1,866 | 3,242 | 869 | 1,315 | 1,438 | 1,953 | 3,884 | 1,770 | 27,094 |
| 1977 | 2,870 | 796 | 1,471 | 1,980 | 789 | 358 | 667 | 1,796 | 1,251 | 1,883 | 3,558 | 987 | 1,026 | 1,420 | 2,245 | 3,447 | 1,744 | 28,287 |
| 1978 | 3,347 | 892 | 2,020 | 2,245 | 1,051 | 500 | 930 | 2,247 | 1,414 | 2,252 | 4,522 | 1,235 | 1,216 | 1,834 | 2,591 | 4,382 | 2,716 | 35,392 |
| 1979 | 3,406 | 854 | 2,077 | 2,657 | 1,100 | 518 | 754 | 2,326 | 1,554 | 2,475 | 4,622 | 1,104 | 1,515 | 1,890 | 2,662 | 4,396 | 2,415 | 36,325 |
| 1980 | 3,386 | 975 | 2,402 | 2,901 | 1,100 | 534 | 818 | 2,242 | 1,742 | 2,842 | 4,649 | 1,414 | 1,360 | 1,793 | 3,239 | 4,292 | 2,647 | 38,336 |
| 1981 | 3,517 | 1,073 | 2,682 | 3,237 | 1,214 | 617 | 862 | 2,645 | 1,841 | 3,099 | 5,335 | 1,588 | 1,617 | 2,224 | 3,728 | 4,998 | 3,145 | 43,421 |
| 1982 | 4,152 | 1,268 | 3,266 | 4,044 | 1,485 | 683 | 874 | 3,180 | 1,924 | 3,441 | 6,305 | 1,860 | 1,856 | 2,402 | 4,260 | 5,493 | 3,598 | 50,091 |
| 1983 | 4,493 | 1,309 | 2,494 | 3,682 | 1,356 | 565 | 824 | 2,599 | 1,619 | 3,376 | 5,878 | 1,262 | 1,838 | 2,379 | 3,715 | 5,585 | 2,818 | 45,792 |
| 1984 | 5,057 | 1,566 | 3,159 | 4,081 | 1,486 | 669 | 967 | 3,096 | 1,727 | 3,644 | 6,575 | 1,555 | 1,868 | 2,252 | 4,244 | 6,748 | 3,451 | 52,145 |
| 1985 | 5,549 | 1,711 | 3,852 | 3,699 | 1,605 | 811 | 1,163 | 3,481 | 2,169 | 3,713 | 7,262 | 1,716 | 2,275 | 2,437 | 4,427 | 6,265 | 3,562 | 55,697 |
| 1986 | 6,332 | 1,793 | 4,009 | 4,759 | 1,700 | 894 | 1,273 | 3,994 | 2,120 | 4,104 | 7,997 | 1,978 | 2,073 | 3,112 | 4,542 | 7,392 | 3,770 | 61,843 |
| 1987 | 5,887 | 1,925 | 3,909 | 5,262 | 1,726 | 994 | 1,463 | 3,939 | 2,008 | 4,372 | 7,887 | 1,940 | 2,888 | 3,713 | 4,878 | 6,534 | 3,825 | 63,148 |
| 1988 | 6,238 | 1,928 | 4,208 | 5,183 | 1,691 | 998 | 1,288 | 3,613 | 2,039 | 4,375 | 8,342 | 2,090 | 2,487 | 3,162 | 4,735 | 7,182 | 4,077 | 63,634 |
| 1989 | 6,756 | 2,053 | 4,353 | 5,337 | 1,769 | 951 | 1,410 | 4,000 | 2,159 | 4,313 | 9,488 | 2,164 | 2,455 | 2,955 | 5,672 | 7,819 | 4,417 | 68,070 |
| 1990 | 7,282 | 2,068 | 4,864 | 5,482 | 1,795 | 994 | 1,661 | 4,007 | 2,330 | 4,860 | 9,654 | 2,524 | 2,542 | 3,466 | 6,043 | 8,656 | 4,852 | 73,080 |
| 1991 | 6,592 | 2,176 | 4,238 | 5,574 | 1,774 | 861 | 1,420 | 4,461 | 2,324 | 4,568 | 7,873 | 2,387 | 3,716 | 4,021 | 7,896 | 7,490 | 4,028 | 71,397 |
| 1992 | 6,693 | 1,960 | 4,381 | 6,029 | 1,861 | 851 | 1,327 | 4,386 | 2,300 | 4,978 | 8,842 | 2,516 | 2,307 | 4,188 | 6,945 | 9,123 | 4,095 | 72,782 |
| 1993 | 8,003 | 2,033 | 4,341 | 5,749 | 1,781 | 1,044 | 1,474 | 5,253 | 2,407 | 5,327 | 10,580 | 2,540 | 2,201 | 4,146 | 6,689 | 7,351 | 4,539 | 75,457 |
| *Annual Growth Rate (%)* | | | | | | | | | | | | | | | | | | |
| 1970-79 | 13.57 | 7.05 | 11.26 | 13.11 | 13.78 | 24.97 | 11.81 | 13.35 | 10.91 | 13.85 | 13.28 | 10.68 | 14.46 | 11.50 | 9.72 | 14.98 | 12.42 | 12.69 |
| 1980-89 | 7.98 | 8.63 | 6.83 | 7.01 | 5.42 | 6.62 | 6.24 | 6.65 | 2.41 | 4.74 | 8.25 | 4.84 | 6.78 | 5.71 | 6.42 | 6.89 | 5.85 | 6.59 |
| 1990-93 | 3.19 | -0.57 | -3.72 | 1.60 | -0.26 | 1.64 | -3.91 | 9.44 | 1.09 | 3.11 | 3.10 | 0.22 | -4.70 | 6.15 | 3.44 | -5.30 | -2.20 | 1.07 |
| 1970-93 | 9.08 | 6.65 | 7.66 | 8.52 | 7.41 | 12.49 | 7.55 | 8.81 | 6.14 | 8.77 | 8.85 | 7.89 | 7.15 | 7.98 | 7.94 | 8.00 | 7.60 | 8.17 |

Notes: Assam's expenditures are deflated using West Begal's consumer price index for agricultural labor, and Himachal Pradesh and Jammu & Kashmir's expenditures are deflated by Punjab's consumer price index for labor.

**Appendix Table 2 Per capita development expenditures by state**

| | Andhra Pradesh | Assam | Bihar | Gujarat | Haryana | HP | J&K | Karnataka | Kerala | MP | Maharashta | Orissa | Punjab | Rajasthan | Tamil Nadu | UP | West Bengal |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | (1960/61 rupees/person) | | | | | | | | | |
| 1970 | 31 | 34 | 16 | 46 | 42 | 21 | 72 | 34 | 34 | 22 | 43 | 22 | 43 | 33 | 40 | 16 | 25 |
| 1971 | 38 | 34 | 18 | 57 | 60 | 69 | 98 | 38 | 41 | 28 | 41 | 28 | 56 | 42 | 50 | 24 | 34 |
| 1972 | 37 | 31 | 18 | 61 | 49 | 78 | 102 | 52 | 39 | 27 | 50 | 29 | 62 | 42 | 52 | 25 | 38 |
| 1973 | 36 | 28 | 16 | 58 | 57 | 67 | 101 | 45 | 39 | 26 | 65 | 30 | 68 | 38 | 49 | 23 | 29 |
| 1974 | 35 | 29 | 17 | 60 | 58 | 65 | 100 | 44 | 36 | 26 | 52 | 24 | 65 | 32 | 36 | 25 | 32 |
| 1975 | 51 | 34 | 26 | 61 | 74 | 62 | 128 | 61 | 46 | 35 | 67 | 30 | 86 | 49 | 50 | 36 | 43 |
| 1976 | 60 | 39 | 29 | 83 | 88 | 72 | 124 | 64 | 55 | 47 | 84 | 39 | 114 | 57 | 63 | 45 | 47 |
| 1977 | 72 | 51 | 25 | 88 | 81 | 95 | 149 | 70 | 62 | 47 | 90 | 44 | 87 | 55 | 71 | 39 | 45 |
| 1978 | 83 | 56 | 34 | 99 | 107 | 130 | 203 | 86 | 70 | 55 | 113 | 54 | 102 | 70 | 81 | 49 | 69 |
| 1979 | 83 | 53 | 34 | 115 | 110 | 133 | 161 | 88 | 77 | 60 | 114 | 48 | 126 | 71 | 82 | 49 | 60 |
| 1980 | 82 | 59 | 39 | 123 | 108 | 134 | 171 | 84 | 85 | 67 | 113 | 60 | 111 | 66 | 99 | 47 | 65 |
| 1981 | 84 | 64 | 43 | 136 | 117 | 152 | 176 | 98 | 89 | 72 | 128 | 67 | 130 | 80 | 113 | 53 | 76 |
| 1982 | 97 | 74 | 51 | 167 | 140 | 166 | 175 | 116 | 92 | 79 | 149 | 77 | 147 | 84 | 127 | 58 | 85 |
| 1983 | 103 | 76 | 38 | 149 | 125 | 135 | 161 | 93 | 77 | 76 | 136 | 51 | 143 | 81 | 110 | 57 | 65 |
| 1984 | 114 | 89 | 47 | 163 | 134 | 156 | 184 | 109 | 82 | 80 | 149 | 62 | 143 | 75 | 123 | 68 | 78 |
| 1985 | 123 | 94 | 56 | 145 | 141 | 186 | 215 | 120 | 103 | 80 | 161 | 67 | 171 | 79 | 127 | 61 | 79 |
| 1986 | 137 | 96 | 57 | 184 | 146 | 200 | 229 | 135 | 100 | 86 | 174 | 76 | 153 | 99 | 128 | 71 | 82 |
| 1987 | 126 | 101 | 54 | 200 | 145 | 218 | 257 | 131 | 94 | 90 | 169 | 73 | 209 | 115 | 136 | 61 | 81 |
| 1988 | 131 | 99 | 57 | 195 | 140 | 215 | 221 | 118 | 96 | 88 | 176 | 78 | 177 | 96 | 131 | 66 | 85 |
| 1989 | 139 | 103 | 58 | 198 | 143 | 201 | 236 | 129 | 101 | 85 | 197 | 79 | 172 | 87 | 155 | 70 | 90 |
| 1990 | 148 | 102 | 64 | 200 | 142 | 206 | 272 | 127 | 108 | 94 | 197 | 91 | 176 | 100 | 163 | 76 | 97 |
| 1991 | 131 | 105 | 54 | 201 | 138 | 175 | 227 | 139 | 108 | 87 | 158 | 84 | 252 | 114 | 210 | 65 | 79 |
| 1992 | 131 | 93 | 55 | 214 | 141 | 169 | 207 | 135 | 106 | 92 | 174 | 88 | 154 | 116 | 182 | 77 | 78 |
| 1993 | 154 | 94 | 54 | 201 | 133 | 204 | 225 | 159 | 111 | 97 | 205 | 87 | 145 | 112 | 173 | 61 | 85 |
| *Annual Growth Rate (%)* | | | | | | | | | | | | | | | | | |
| 1970-79 | 11.67 | 5.10 | 9.03 | 10.79 | 11.37 | 22.77 | 9.40 | 11.13 | 9.37 | 11.67 | 11.34 | 8.89 | 12.51 | 8.68 | 8.30 | 12.76 | 10.19 |
| 1980-89 | 6.12 | 6.39 | 4.61 | 5.37 | 3.20 | 4.57 | 3.66 | 4.89 | 1.91 | 2.61 | 6.36 | 3.09 | 5.00 | 3.23 | 5.06 | 4.69 | 3.63 |
| 1990-93 | 1.47 | -2.53 | -5.65 | 0.17 | -2.28 | -0.35 | -6.11 | 7.68 | 0.74 | 1.07 | 1.37 | -1.41 | -6.23 | 3.79 | 2.16 | -7.20 | -4.19 |
| 1970-93 | 7.25 | 4.58 | 5.48 | 6.66 | 5.17 | 10.39 | 5.09 | 6.94 | 5.25 | 6.64 | 6.98 | 6.13 | 5.37 | 5.40 | 6.56 | 5.85 | 5.42 |

Notes: Rural population is used to calculate per capita expenditure.

**Appendix Table 3 Percentage of cropped areas with high-yielding varieties**

| | Andhra Pradesh | Haryana | MP | Maharasht | Karnataka | Punjab | Tamil Nadu | UP | Bihar | Gujarat | Assam | HP | Rajasthan | Orissa | J&K | West Bengal | Kerala | All India |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1970 | 11.91 | 23.98 | 4.80 | 15.38 | 10.39 | 55.81 | 37.31 | 37.91 | 13.53 | 14.90 | 6.16 | 6.09 | 4.89 | 4.10 | n.a. | 12.42 | 17.50 | 21.20 |
| 1971 | 15.29 | 34.94 | 8.00 | 11.40 | 10.84 | 54.67 | 47.83 | 38.05 | 18.12 | 15.33 | 9.65 | 5.89 | 6.11 | 6.38 | n.a. | 13.53 | 27.97 | 24.16 |
| 1972 | 24.88 | 39.94 | 11.00 | 15.15 | 17.47 | 58.10 | 53.01 | 38.29 | 27.74 | 12.93 | 12.36 | 6.62 | 7.58 | 8.66 | n.a. | 17.38 | 15.38 | 22.87 |
| 1973 | 31.77 | 51.39 | 16.50 | 21.08 | 18.34 | 63.85 | 51.39 | 38.03 | 34.61 | 15.09 | 13.04 | 6.50 | 7.63 | 7.27 | n.a. | 16.68 | 18.45 | 25.23 |
| 1974 | 40.22 | 51.64 | 19.45 | 19.48 | 21.96 | 71.78 | 48.56 | 40.48 | 21.20 | 14.08 | 14.94 | 6.48 | 10.12 | 6.79 | n.a. | 18.52 | 11.15 | 26.09 |
| 1975 | 40.26 | 52.70 | 21.85 | 27.55 | 36.01 | 71.55 | 40.45 | 41.04 | 26.42 | 15.72 | 14.08 | 6.14 | 12.62 | 9.87 | n.a. | 21.12 | 17.39 | 28.75 |
| 1976 | 37.66 | 52.05 | 25.35 | 34.22 | 25.14 | 70.98 | 50.17 | 41.73 | 31.52 | 17.78 | 18.26 | 5.93 | 13.62 | 12.14 | n.a. | 26.30 | 18.05 | 31.41 |
| 1977 | 42.61 | 59.87 | 26.52 | 39.48 | 32.40 | 78.48 | 51.23 | 42.13 | 34.18 | 18.56 | 23.68 | 6.09 | 12.75 | 13.93 | n.a. | 30.94 | 20.50 | 34.41 |
| 1978 | 43.45 | 62.44 | 27.07 | 37.54 | 34.64 | 73.47 | 50.42 | 52.05 | 29.80 | 19.40 | 24.81 | 6.00 | 12.99 | 18.47 | n.a. | 36.06 | 20.14 | 36.12 |
| 1979 | 42.40 | 62.23 | 19.95 | 38.78 | 33.93 | 78.71 | 49.24 | 54.36 | 33.78 | 23.92 | 16.93 | 5.93 | 12.83 | 22.53 | n.a. | 36.83 | 22.15 | 36.59 |
| 1980 | 53.70 | 65.29 | 33.90 | 49.95 | 42.61 | 84.22 | 59.53 | 47.00 | 31.54 | 23.46 | 19.09 | 5.71 | 17.34 | 24.23 | n.a. | 30.71 | 28.71 | 40.56 |
| 1981 | 49.23 | 68.15 | 28.14 | 38.69 | 38.56 | 87.79 | 61.33 | 54.71 | 32.07 | 24.06 | 23.45 | 5.89 | 11.50 | 27.31 | n.a. | 32.80 | 22.59 | 40.12 |
| 1982 | 54.30 | 71.05 | 28.70 | 42.05 | 35.81 | 87.00 | 70.06 | 59.17 | 35.06 | 22.67 | 27.10 | 5.87 | 12.18 | 30.06 | n.a. | 35.35 | 28.04 | 42.61 |
| 1983 | 52.23 | 70.43 | 33.39 | 42.10 | 37.65 | 88.74 | 56.54 | 47.09 | 33.51 | 28.19 | 26.02 | 5.86 | 14.06 | 30.34 | n.a. | 35.46 | 28.65 | 40.50 |
| 1984 | 59.28 | 74.87 | 35.75 | 51.42 | 39.82 | 91.08 | 58.79 | 47.80 | 34.15 | 27.58 | 29.18 | 5.62 | 18.15 | 33.02 | n.a. | 39.86 | 28.19 | 44.56 |
| 1985 | 63.23 | 69.77 | 37.46 | 50.87 | 40.41 | 94.56 | 56.92 | 45.25 | 34.35 | 23.03 | 34.02 | 5.78 | 16.96 | 30.64 | n.a. | 39.75 | 28.73 | 44.31 |
| 1986 | 64.12 | 65.47 | 44.04 | 54.83 | 35.51 | 92.43 | 55.27 | 52.42 | 35.07 | 21.20 | 36.93 | 5.79 | 15.60 | 35.58 | n.a. | 38.60 | 23.26 | 45.62 |
| 1987 | 68.40 | 77.19 | 42.63 | 56.72 | 36.19 | 96.99 | 53.15 | 52.45 | 36.22 | 26.56 | 36.34 | 5.91 | 17.95 | 42.61 | n.a. | 42.82 | 24.43 | 48.46 |
| 1988 | 65.63 | 74.41 | 44.79 | 56.55 | 39.42 | 90.79 | 58.45 | 50.52 | 36.07 | 31.96 | 36.68 | 5.91 | 13.25 | 39.68 | n.a. | 45.34 | 19.88 | 46.82 |
| 1989 | 74.82 | 79.63 | 49.36 | 61.52 | 78.16 | 93.55 | 50.88 | 68.42 | 40.68 | 28.92 | 38.43 | 6.08 | 11.85 | 42.57 | n.a. | 45.01 | 22.82 | 53.39 |
| 1990 | 75.70 | 80.12 | 47.65 | 64.39 | 87.04 | 96.91 | 67.44 | 51.84 | 38.17 | 35.05 | 46.14 | 5.99 | 13.47 | 50.66 | n.a. | 38.79 | 25.61 | 53.36 |
| 1991 | 80.17 | 89.26 | 56.51 | 67.38 | 89.11 | 97.31 | 64.04 | 48.29 | 39.60 | 31.27 | 52.47 | 6.42 | 15.54 | 51.85 | n.a. | 51.06 | 28.70 | 57.29 |
| 1992 | 82.47 | 65.34 | 59.79 | 67.49 | 47.20 | 96.89 | 52.84 | 49.37 | 38.69 | 35.16 | 38.74 | 6.47 | 16.77 | 50.78 | n.a. | 46.86 | 26.22 | 55.83 |
| 1993 | 86.41 | 68.90 | 62.66 | 67.77 | 46.55 | 95.76 | 59.32 | 50.31 | 46.66 | 33.86 | 38.29 | 6.84 | 20.48 | 47.01 | n.a. | 48.02 | 35.10 | 57.48 |
| 1994 | 86.47 | 75.73 | 65.68 | 69.77 | 45.40 | 95.91 | 57.53 | 51.16 | 40.58 | 39.53 | 41.59 | 7.79 | 20.59 | 43.92 | n.a. | 54.91 | 34.21 | 64.49 |
| 1995 | 86.21 | 78.41 | 65.74 | 71.17 | 43.40 | 95.90 | 54.07 | 51.97 | 41.47 | 40.00 | 41.59 | 8.02 | 16.63 | 44.99 | n.a. | 56.94 | 33.35 | 59.20 |

**Appendix Table 4 Percentage of cropped areas with irrigation**

| | Andhra Pradesh | Haryana | MP | Maharasht | Karnataka | Punjab | Tamil Nadu | UP | Bihar | Gujarat | Assam | HP | Rajasthan | Orissa | J&K | West Bengal | Kerala | All India |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1970 | 30.69 | 41.10 | 8.13 | 8.46 | 13.24 | 74.72 | 46.24 | 38.75 | 25.54 | 14.24 | 9.50 | 15.25 | 14.66 | 16.58 | 39.42 | 20.33 | 18.63 | 23.32 |
| 1971 | 31.15 | 41.48 | 8.32 | 8.46 | 13.21 | 74.72 | 46.25 | 38.30 | 25.65 | 14.24 | 9.99 | 14.52 | 14.66 | 16.58 | 39.64 | 21.14 | 18.64 | 23.35 |
| 1972 | 29.56 | 42.20 | 9.06 | 9.05 | 15.43 | 76.47 | 46.38 | 39.33 | 26.48 | 14.61 | 10.15 | 14.93 | 14.55 | 10.41 | 40.12 | 19.04 | 18.89 | 23.08 |
| 1973 | 28.69 | 46.56 | 9.20 | 8.75 | 13.56 | 76.70 | 47.70 | 40.03 | 26.44 | 14.83 | 10.34 | 16.87 | 16.66 | 16.86 | 40.95 | 21.04 | 20.02 | 24.34 |
| 1974 | 31.16 | 49.92 | 9.16 | 9.16 | 12.70 | 76.77 | 48.03 | 40.28 | 26.94 | 15.17 | 10.71 | 17.25 | 14.98 | 17.76 | 42.06 | 22.56 | 19.09 | 24.29 |
| 1975 | 32.34 | 50.47 | 9.04 | 9.87 | 14.45 | 76.77 | 47.91 | 40.79 | 27.97 | 16.02 | 10.94 | 17.30 | 14.98 | 18.23 | 42.45 | 23.10 | 18.82 | 24.89 |
| 1976 | 33.56 | 53.96 | 9.04 | 10.58 | 16.09 | 76.77 | 47.30 | 41.32 | 29.03 | 16.89 | 11.22 | 17.28 | 14.98 | 18.69 | 42.83 | 23.64 | 18.85 | 25.49 |
| 1977 | 34.03 | 54.57 | 9.04 | 11.28 | 16.22 | 76.77 | 47.17 | 41.99 | 30.07 | 17.75 | 11.51 | 17.27 | 14.98 | 19.15 | 43.21 | 24.18 | 18.82 | 25.95 |
| 1978 | 34.41 | 53.04 | 9.92 | 11.89 | 16.37 | 81.29 | 46.53 | 42.67 | 32.83 | 18.62 | 11.77 | 17.27 | 18.71 | 18.72 | 43.57 | 24.72 | 13.47 | 26.91 |
| 1979 | 35.96 | 52.77 | 10.62 | 12.07 | 16.31 | 83.05 | 45.98 | 43.55 | 32.89 | 19.30 | 12.13 | 17.37 | 19.75 | 19.09 | 43.68 | 25.13 | 13.68 | 27.47 |
| 1980 | 34.94 | 60.10 | 10.14 | 12.18 | 15.98 | 87.21 | 46.02 | 43.75 | 33.39 | 20.84 | 12.49 | 17.33 | 24.95 | 19.89 | 41.90 | 25.54 | 13.92 | 28.40 |
| 1981 | 35.39 | 61.05 | 10.99 | 12.29 | 16.47 | 85.48 | 49.59 | 44.67 | 32.76 | 21.83 | 12.67 | 17.38 | 21.61 | 19.25 | 41.43 | 25.94 | 14.38 | 28.55 |
| 1982 | 35.80 | 58.81 | 11.02 | 12.99 | 16.98 | 86.09 | 44.35 | 44.20 | 34.14 | 23.14 | 12.76 | 17.43 | 20.01 | 19.81 | 41.66 | 26.33 | 14.99 | 28.55 |
| 1983 | 36.15 | 66.35 | 11.02 | 11.64 | 17.01 | 86.09 | 44.85 | 45.47 | 34.20 | 23.79 | 12.85 | 17.42 | 22.95 | 21.42 | 41.98 | 26.73 | 14.99 | 28.84 |
| 1984 | 38.45 | 59.85 | 11.02 | 11.55 | 17.89 | 85.49 | 44.05 | 47.00 | 35.14 | 25.64 | 12.94 | 17.42 | 22.11 | 23.08 | 42.12 | 27.11 | 14.99 | 29.32 |
| 1985 | 37.77 | 63.58 | 11.02 | 11.54 | 19.19 | 90.50 | 42.62 | 48.99 | 36.33 | 23.78 | 13.02 | 17.41 | 22.11 | 25.14 | 41.84 | 27.50 | 14.99 | 29.89 |
| 1986 | 36.66 | 66.40 | 13.21 | 11.77 | 18.97 | 91.01 | 47.50 | 50.64 | 38.81 | 22.92 | 13.03 | 17.41 | 21.30 | 26.67 | 42.16 | 27.88 | 17.86 | 30.84 |
| 1987 | 38.41 | 62.27 | 14.94 | 12.35 | 20.13 | 91.31 | 43.81 | 53.32 | 39.29 | 23.50 | 13.05 | 17.42 | 24.66 | 27.52 | 40.35 | 28.26 | 14.83 | 31.96 |
| 1988 | 38.25 | 81.12 | 15.78 | 11.79 | 19.86 | 91.74 | 41.98 | 57.30 | 41.21 | 25.18 | 13.06 | 17.75 | 30.02 | 28.02 | 40.47 | 28.63 | 18.27 | 33.52 |
| 1989 | 40.28 | 63.16 | 16.40 | 13.76 | 23.06 | 92.42 | 43.74 | 55.63 | 41.10 | 26.09 | 13.06 | 17.64 | 21.67 | 29.99 | 43.88 | 28.98 | 17.62 | 33.02 |
| 1990 | 40.41 | 70.17 | 16.32 | 14.24 | 22.20 | 92.40 | 45.19 | 54.04 | 41.10 | 23.18 | 13.43 | 18.12 | 23.71 | 30.26 | 43.15 | 29.06 | 12.61 | 32.82 |
| 1991 | 40.70 | 75.20 | 19.39 | 12.30 | 22.97 | 94.99 | 44.49 | 55.47 | 40.62 | 20.23 | 13.04 | 18.51 | 24.39 | 23.50 | 42.29 | 31.24 | 12.23 | 32.61 |
| 1992 | 42.39 | 79.03 | 19.39 | 11.35 | 24.11 | 94.11 | 46.45 | 55.43 | 40.62 | 17.86 | 13.23 | 18.60 | 25.92 | 21.56 | 41.76 | 31.41 | 12.23 | 32.42 |
| 1993 | 41.78 | 77.20 | 19.39 | 11.02 | 23.95 | 94.44 | 46.54 | 56.03 | 40.62 | 17.62 | 13.10 | 18.68 | 27.20 | 19.23 | 41.27 | 33.38 | 12.50 | 32.01 |
| 1994 | 45.81 | 78.47 | 19.41 | 10.99 | 25.04 | 94.78 | 46.57 | 56.46 | 40.62 | 16.05 | 13.03 | 17.58 | 28.82 | 17.53 | 40.79 | 32.90 | 12.50 | 32.98 |
| 1995 | 43.51 | 78.63 | 19.39 | 10.90 | 25.04 | 94.96 | 46.60 | 57.18 | 40.62 | 14.67 | 12.73 | 18.99 | 30.25 | 16.24 | 39.41 | 32.45 | 12.50 | 31.39 |

**Appendix Table 5 Percentage of electrified villages**

| | Andhra Pradesh | Haryana | MP | Maharasht | Karnataka | Punjab | Tamil Nadu | UP | Bihar | Gujarat | Assam | HP | Rajasthan | Orissa | J&K | West Bengal | Kerala | All India |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1970 | 34.40 | 68.75 | 11.81 | 29.79 | 59.03 | 50.53 | 53.58 | 25.95 | 13.36 | 22.89 | 63.69 | 24.90 | 63.56 | 7.91 | 8.54 | 8.83 | 100.00 | 33.62 |
| 1971 | 34.61 | 91.26 | 11.99 | 33.05 | 59.03 | 56.04 | 57.79 | 26.67 | 13.73 | 25.44 | 64.51 | 25.38 | 63.82 | 11.19 | 9.15 | 9.80 | 100.00 | 35.51 |
| 1972 | 39.75 | 91.09 | 14.57 | 36.28 | 58.92 | 57.83 | 62.58 | 27.59 | 14.21 | 29.81 | 65.56 | 28.48 | 63.96 | 16.09 | 9.76 | 10.76 | 100.00 | 37.25 |
| 1973 | 42.09 | 92.23 | 16.23 | 39.62 | 59.53 | 61.70 | 66.79 | 28.28 | 14.96 | 30.44 | 66.70 | 31.80 | 63.71 | 16.56 | 11.30 | 16.30 | 100.00 | 38.97 |
| 1974 | 44.68 | 92.43 | 16.86 | 42.99 | 58.67 | 70.52 | 70.78 | 28.77 | 15.09 | 32.09 | 67.56 | 35.53 | 63.99 | 21.01 | 14.69 | 24.48 | 100.00 | 41.08 |
| 1975 | 45.39 | 92.69 | 18.66 | 46.22 | 62.98 | 79.07 | 74.95 | 29.83 | 22.70 | 34.86 | 68.58 | 38.83 | 64.26 | 26.10 | 18.43 | 26.54 | 100.00 | 43.72 |
| 1976 | 49.15 | 92.97 | 20.20 | 49.43 | 65.38 | 87.63 | 79.15 | 31.00 | 24.16 | 35.82 | 69.43 | 40.12 | 64.53 | 29.65 | 22.11 | 27.47 | 100.00 | 45.62 |
| 1977 | 57.87 | 93.25 | 21.13 | 52.63 | 65.17 | 98.55 | 83.36 | 32.25 | 26.18 | 40.55 | 70.27 | 43.00 | 64.80 | 33.44 | 35.47 | 30.51 | 100.00 | 48.49 |
| 1978 | 62.42 | 93.79 | 24.77 | 55.62 | 69.84 | 98.61 | 87.61 | 33.59 | 28.18 | 46.58 | 71.19 | 48.40 | 64.27 | 37.05 | 44.31 | 32.48 | 100.00 | 51.17 |
| 1979 | 65.36 | 93.89 | 29.29 | 58.60 | 72.45 | 99.20 | 91.96 | 34.92 | 29.59 | 54.78 | 72.17 | 53.80 | 64.34 | 40.30 | 49.80 | 34.52 | 100.00 | 53.83 |
| 1980 | 68.76 | 94.23 | 33.92 | 63.91 | 75.30 | 99.50 | 95.76 | 36.89 | 28.90 | 63.60 | 73.29 | 58.74 | 65.45 | 43.14 | 54.66 | 36.03 | 100.00 | 56.50 |
| 1981 | 73.79 | 100.00 | 38.52 | 70.56 | 80.86 | 99.50 | 97.31 | 40.90 | 33.60 | 72.80 | 74.30 | 63.19 | 64.82 | 45.81 | 58.87 | 40.83 | 100.00 | 60.32 |
| 1982 | 79.19 | 100.00 | 44.17 | 72.86 | 86.03 | 99.52 | 97.39 | 43.17 | 37.95 | 77.11 | 75.50 | 70.10 | 64.93 | 45.98 | 64.18 | 47.35 | 100.00 | 63.45 |
| 1983 | 82.88 | 100.00 | 49.66 | 75.34 | 90.35 | 99.59 | 98.04 | 47.08 | 43.65 | 79.42 | 76.74 | 75.53 | 65.44 | 48.04 | 73.80 | 51.71 | 100.00 | 67.07 |
| 1984 | 86.67 | 100.00 | 55.12 | 78.96 | 93.42 | 99.75 | 98.19 | 50.78 | 48.68 | 83.80 | 78.04 | 80.99 | 64.71 | 50.41 | 76.25 | 53.84 | 100.00 | 70.09 |
| 1985 | 89.02 | 100.00 | 60.23 | 80.60 | 97.03 | 99.85 | 98.19 | 55.11 | 49.58 | 89.59 | 79.40 | 86.47 | 65.72 | 51.77 | 81.53 | 56.62 | 100.00 | 72.79 |
| 1986 | 90.91 | 100.00 | 64.44 | 81.56 | 99.81 | 99.94 | 98.31 | 58.10 | 52.39 | 93.20 | 80.91 | 91.80 | 66.30 | 54.13 | 86.32 | 59.99 | 100.00 | 75.11 |
| 1987 | 92.22 | 100.00 | 69.26 | 88.69 | 100.00 | 100.00 | 98.42 | 62.05 | 56.39 | 94.44 | 82.46 | 96.87 | 66.67 | 57.61 | 88.62 | 63.71 | 100.00 | 78.18 |
| 1988 | 94.33 | 100.00 | 74.30 | 90.42 | 100.00 | 100.00 | 98.52 | 65.03 | 58.62 | 96.44 | 84.05 | 100.00 | 68.14 | 60.97 | 90.14 | 67.70 | 100.00 | 80.51 |
| 1989 | 95.56 | 100.00 | 80.74 | 92.24 | 100.00 | 100.00 | 99.71 | 68.05 | 62.26 | 96.44 | 85.02 | 100.00 | 70.32 | 63.79 | 90.63 | 72.32 | 100.00 | 83.09 |
| 1990 | 95.50 | 100.00 | 84.02 | 92.43 | 100.00 | 100.00 | 99.71 | 68.30 | 65.08 | 96.40 | 85.73 | 100.00 | 76.23 | 65.92 | 91.85 | 76.24 | 100.00 | 84.55 |
| 1991 | 95.82 | 100.00 | 87.36 | 92.48 | 100.00 | 100.00 | 99.71 | 71.05 | 65.70 | 96.39 | 86.46 | 100.00 | 78.45 | 70.26 | 92.90 | 77.25 | 100.00 | 85.78 |
| 1992 | 95.78 | 100.00 | 89.55 | 92.66 | 100.00 | 100.00 | 99.69 | 72.50 | 66.02 | 96.43 | 86.60 | 100.00 | 79.50 | 74.40 | 93.13 | 78.13 | 100.00 | 86.61 |
| 1993 | 95.87 | 100.00 | 91.71 | 92.79 | 100.00 | 100.00 | 99.92 | 73.88 | 66.22 | 96.52 | 86.60 | 100.00 | 81.35 | 78.10 | 93.37 | 78.64 | 100.00 | 87.46 |
| 1994 | 95.93 | 100.00 | 94.34 | 92.85 | 100.00 | 100.00 | 99.92 | 75.54 | 66.43 | 96.46 | 86.79 | 100.00 | 82.56 | 80.19 | 93.59 | 79.02 | 100.00 | 88.66 |
| 1995 | 95.95 | 100.00 | 94.23 | 92.86 | 100.00 | 100.00 | 99.92 | 76.80 | 66.50 | 96.42 | 86.87 | 100.00 | 83.36 | 86.04 | 94.52 | 78.93 | 100.00 | 88.67 |

**Appendix Table 6 Literacy rate of rural population**

| | Andhra Pradesh | Haryana | MP | Maharasht | Karnataka | Punjab | Tamil Nadu | UP | Bihar | Gujarat | Assam | HP | Rajasthan | Orissa | J&K | West Bengal | Kerala | All India |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1970 | 19.07 | 25.50 | 19.97 | 29.39 | 23.61 | 25.12 | 33.01 | 16.01 | 17.53 | 26.10 | 27.49 | 32.57 | 12.68 | 23.84 | 14.23 | 26.10 | 54.25 | 23.40 |
| 1971 | 19.46 | 25.53 | 20.29 | 30.33 | 24.06 | 25.74 | 33.43 | 15.97 | 17.78 | 26.79 | 28.06 | 34.46 | 13.02 | 24.25 | 14.71 | 26.09 | 55.18 | 24.18 |
| 1972 | 19.96 | 25.51 | 20.66 | 31.44 | 24.53 | 26.50 | 33.98 | 16.36 | 18.02 | 27.63 | 28.61 | 35.06 | 13.30 | 25.67 | 15.09 | 26.18 | 56.18 | 24.76 |
| 1973 | 20.25 | 25.78 | 21.13 | 32.59 | 24.80 | 27.22 | 34.34 | 16.64 | 18.28 | 28.26 | 29.24 | 35.27 | 13.66 | 23.51 | 15.52 | 26.35 | 56.90 | 25.33 |
| 1974 | 20.59 | 25.92 | 21.48 | 33.57 | 25.26 | 27.95 | 34.71 | 16.85 | 18.71 | 29.00 | 30.00 | 34.42 | 14.00 | 25.55 | 16.19 | 26.60 | 57.95 | 25.92 |
| 1975 | 21.04 | 26.14 | 21.94 | 34.75 | 25.95 | 28.64 | 35.14 | 17.08 | 18.89 | 29.78 | 30.82 | 35.05 | 14.37 | 26.08 | 16.75 | 26.91 | 58.97 | 26.53 |
| 1976 | 21.51 | 26.40 | 22.39 | 36.00 | 26.48 | 29.35 | 35.59 | 17.34 | 19.10 | 30.57 | 31.68 | 35.68 | 14.76 | 26.64 | 17.34 | 27.27 | 60.03 | 27.15 |
| 1977 | 22.00 | 26.70 | 22.86 | 37.32 | 26.90 | 30.08 | 36.81 | 17.63 | 19.34 | 31.39 | 32.58 | 36.33 | 15.15 | 27.22 | 17.96 | 27.68 | 61.12 | 27.87 |
| 1978 | 22.29 | 26.95 | 23.24 | 38.70 | 27.50 | 30.67 | 36.57 | 17.94 | 19.61 | 32.24 | 33.57 | 37.02 | 15.54 | 27.77 | 18.60 | 28.13 | 62.29 | 28.40 |
| 1979 | 23.03 | 27.18 | 23.73 | 40.16 | 28.02 | 31.49 | 37.17 | 18.28 | 19.97 | 33.07 | 34.64 | 37.67 | 16.00 | 28.28 | 19.27 | 28.69 | 63.38 | 29.14 |
| 1980 | 23.52 | 27.35 | 23.85 | 41.79 | 28.68 | 32.32 | 37.75 | 18.65 | 20.14 | 33.97 | 35.72 | 38.43 | 16.44 | 28.89 | 19.96 | 29.28 | 64.58 | 29.86 |
| 1981 | 24.12 | 27.54 | 24.71 | 43.45 | 29.40 | 32.92 | 38.75 | 18.71 | 20.60 | 34.93 | 36.88 | 39.08 | 16.78 | 29.31 | 20.69 | 29.91 | 65.74 | 30.57 |
| 1982 | 24.37 | 27.42 | 25.34 | 42.64 | 29.75 | 33.65 | 39.42 | 19.62 | 21.05 | 35.70 | 37.28 | 40.21 | 17.36 | 29.57 | 21.33 | 30.83 | 66.29 | 30.97 |
| 1983 | 24.86 | 27.56 | 26.06 | 42.92 | 30.29 | 34.47 | 39.96 | 20.35 | 21.41 | 37.83 | 37.78 | 41.35 | 17.93 | 29.86 | 22.08 | 31.80 | 67.18 | 31.20 |
| 1984 | 25.34 | 27.89 | 26.81 | 42.36 | 30.72 | 35.22 | 40.51 | 21.13 | 21.77 | 38.61 | 38.38 | 42.52 | 18.67 | 30.18 | 22.83 | 32.80 | 68.08 | 31.64 |
| 1985 | 25.90 | 28.20 | 27.59 | 42.04 | 31.20 | 36.21 | 41.10 | 21.97 | 22.12 | 38.86 | 39.07 | 43.72 | 19.17 | 30.17 | 23.53 | 33.86 | 68.99 | 32.11 |
| 1986 | 26.53 | 29.03 | 28.43 | 41.70 | 31.94 | 37.04 | 41.62 | 23.12 | 22.52 | 39.16 | 39.91 | 44.96 | 19.83 | 30.73 | 24.38 | 34.98 | 69.78 | 32.61 |
| 1987 | 27.29 | 29.44 | 29.07 | 40.97 | 32.33 | 37.92 | 42.50 | 23.89 | 23.01 | 40.20 | 40.81 | 46.26 | 20.35 | 31.51 | 25.02 | 36.15 | 70.70 | 33.16 |
| 1988 | 27.66 | 29.76 | 31.68 | 40.27 | 32.89 | 39.07 | 43.29 | 24.83 | 23.44 | 41.35 | 41.78 | 47.52 | 21.66 | 31.86 | 25.82 | 37.40 | 71.58 | 33.71 |
| 1989 | 28.81 | 30.69 | 30.63 | 39.88 | 33.54 | 39.70 | 43.88 | 25.96 | 23.90 | 42.04 | 42.85 | 48.81 | 21.78 | 32.09 | 26.68 | 38.59 | 71.70 | 34.49 |
| 1990 | 28.93 | 30.58 | 31.74 | 39.55 | 34.11 | 40.72 | 44.64 | 26.71 | 24.34 | 42.84 | 43.99 | 49.99 | 22.16 | 32.59 | 27.49 | 40.03 | 72.49 | 35.02 |
| 1991 | 29.69 | 32.02 | 32.69 | 39.31 | 34.73 | 41.62 | 45.28 | 27.25 | 24.80 | 43.76 | 45.21 | 51.40 | 23.24 | 36.64 | 28.33 | 41.57 | 73.50 | 35.69 |
| 1992 | 30.51 | 32.77 | 33.67 | 39.04 | 35.29 | 42.63 | 45.98 | 29.00 | 25.27 | 44.76 | 46.50 | 52.86 | 23.94 | 39.52 | 29.19 | 43.18 | 74.53 | 36.52 |
| 1993 | 31.45 | 33.51 | 34.68 | 39.03 | 35.94 | 43.83 | 46.71 | 30.44 | 25.75 | 45.85 | 47.87 | 54.37 | 24.62 | 41.73 | 30.08 | 44.94 | 76.23 | 37.29 |
| 1994 | 33.90 | 35.17 | 36.46 | 38.75 | 37.24 | 46.15 | 48.31 | 33.92 | 26.74 | 48.22 | 50.87 | 57.29 | 26.40 | 44.37 | 32.07 | 48.97 | 78.35 | 39.14 |
| 1995 | 34.42 | 36.06 | 37.92 | 38.65 | 37.89 | 47.47 | 49.11 | 35.96 | 27.26 | 49.47 | 52.47 | 59.04 | 27.37 | 46.04 | 32.73 | 51.43 | 79.44 | 39.98 |

**Appendix Table 7 Road density in rural India**

| | Andhra Pradesh | Haryana | MP | Maharasht | Karnataka | Punjab | Tamil Nadu | UP | Bihar | Gujarat | Assam | HP | Rajasthan | Orissa | J&K | West Bengal | Kerala | All India |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | (km/000 sq. km) | | | | | | | | | |
| 1970 | 4,603 | 4,313 | 848 | 2,038 | 3,436 | 2,870 | 4,951 | 935 | 5,974 | 1,721 | 1,950 | 2,263 | 927 | 2,641 | 1,480 | 4,578 | 3,434 | 2,414 |
| 1971 | 4,658 | 4,654 | 959 | 2,017 | 3,761 | 2,870 | 5,363 | 938 | 5,974 | 1,779 | 2,033 | 2,471 | 932 | 2,641 | 1,506 | 5,053 | 3,527 | 2,523 |
| 1972 | 4,713 | 5,117 | 1,003 | 2,370 | 4,085 | 3,241 | 5,801 | 952 | 5,974 | 1,874 | 2,116 | 2,587 | 950 | 2,650 | 1,532 | 5,081 | 3,621 | 2,641 |
| 1973 | 4,857 | 5,129 | 1,048 | 2,724 | 4,214 | 3,611 | 6,252 | 1,037 | 5,974 | 1,937 | 2,198 | 2,944 | 994 | 2,666 | 1,575 | 5,108 | 3,715 | 2,768 |
| 1974 | 5,037 | 5,140 | 1,119 | 2,719 | 4,205 | 3,981 | 6,591 | 1,112 | 5,974 | 1,987 | 2,273 | 3,009 | 1,005 | 2,688 | 1,617 | 5,135 | 3,808 | 2,858 |
| 1975 | 5,216 | 5,152 | 1,163 | 2,784 | 4,567 | 4,351 | 7,105 | 1,182 | 5,974 | 2,016 | 2,348 | 3,049 | 1,050 | 2,697 | 1,660 | 5,214 | 3,902 | 2,955 |
| 1976 | 5,353 | 5,731 | 1,207 | 2,775 | 4,821 | 4,643 | 7,601 | 1,220 | 5,974 | 2,035 | 2,349 | 3,089 | 1,094 | 2,735 | 1,702 | 5,261 | 3,996 | 3,042 |
| 1977 | 5,418 | 6,058 | 1,253 | 4,109 | 4,861 | 4,858 | 7,834 | 1,257 | 5,974 | 2,081 | 2,416 | 3,128 | 1,138 | 4,190 | 1,739 | 5,291 | 4,089 | 3,309 |
| 1978 | 5,725 | 6,383 | 1,298 | 4,219 | 4,991 | 5,149 | 8,080 | 1,380 | 5,974 | 2,161 | 2,484 | 3,168 | 1,146 | 5,754 | 1,775 | 5,325 | 4,183 | 3,492 |
| 1979 | 5,656 | 6,383 | 1,344 | 4,333 | 5,108 | 5,356 | 8,440 | 1,482 | 5,974 | 2,207 | 2,520 | 3,208 | 1,166 | 6,240 | 2,082 | 5,360 | 4,277 | 3,587 |
| 1980 | 5,825 | 6,599 | 1,392 | 4,425 | 5,173 | 5,563 | 8,799 | 1,565 | 5,974 | 2,304 | 2,537 | 3,248 | 1,186 | 6,275 | 2,146 | 5,414 | 4,370 | 3,670 |
| 1981 | 5,993 | 6,820 | 1,436 | 4,681 | 5,290 | 5,770 | 9,173 | 1,665 | 5,974 | 2,420 | 2,629 | 3,288 | 1,205 | 6,631 | 1,994 | 5,463 | 4,508 | 3,791 |
| 1982 | 6,161 | 6,955 | 1,490 | 4,646 | 5,389 | 5,977 | 10,013 | 1,747 | 5,974 | 2,544 | 2,720 | 3,328 | 1,282 | 6,987 | 2,067 | 5,495 | 4,594 | 3,915 |
| 1983 | 6,262 | 7,043 | 1,619 | 4,678 | 5,488 | 6,184 | 10,375 | 1,818 | 5,974 | 2,712 | 2,820 | 3,368 | 1,358 | 7,343 | 2,135 | 5,549 | 4,680 | 4,011 |
| 1984 | 6,364 | 7,149 | 1,665 | 4,817 | 5,529 | 6,391 | 11,000 | 1,863 | 5,974 | 2,834 | 2,921 | 3,408 | 1,396 | 7,699 | 2,208 | 5,613 | 4,767 | 4,127 |
| 1985 | 6,444 | 7,171 | 1,721 | 4,875 | 5,778 | 6,598 | 11,900 | 1,971 | 5,974 | 2,953 | 3,022 | 3,447 | 1,428 | 8,055 | 2,282 | 5,721 | 4,853 | 4,261 |
| 1986 | 6,452 | 7,162 | 1,782 | 5,163 | 6,027 | 6,805 | 12,624 | 2,054 | 5,974 | 3,087 | 3,122 | 3,487 | 1,475 | 8,410 | 2,355 | 5,850 | 4,940 | 4,400 |
| 1987 | 6,564 | 7,118 | 1,850 | 5,096 | 6,081 | 7,012 | 13,624 | 2,133 | 5,974 | 3,325 | 3,219 | 3,527 | 1,512 | 8,766 | 2,428 | 5,905 | 5,066 | 4,513 |
| 1988 | 6,576 | 7,204 | 1,918 | 5,363 | 6,180 | 7,220 | 13,814 | 2,213 | 5,989 | 3,360 | 3,360 | 3,567 | 1,566 | 9,122 | 2,653 | 6,027 | 5,097 | 4,651 |
| 1989 | 6,715 | 7,166 | 1,976 | 5,595 | 6,261 | 7,427 | 14,311 | 2,281 | 5,974 | 3,415 | 3,477 | 3,607 | 1,632 | 9,478 | 2,574 | 6,073 | 5,099 | 4,809 |
| 1990 | 6,743 | 7,233 | 2,035 | 5,506 | 6,875 | 7,634 | 14,581 | 2,362 | 5,974 | 3,451 | 3,652 | 3,647 | 1,666 | 9,817 | 2,647 | 6,133 | 5,103 | 4,861 |
| 1991 | 6,802 | 7,325 | 2,098 | 5,442 | 7,044 | 7,841 | 14,942 | 2,437 | 5,974 | 3,490 | 3,662 | 3,687 | 1,707 | 10,156 | 2,846 | 6,155 | 5,217 | 4,935 |
| 1992 | 6,912 | 7,420 | 2,147 | 5,474 | 7,179 | 8,048 | 15,310 | 2,515 | 5,974 | 3,567 | 3,761 | 3,727 | 1,775 | 10,475 | 2,910 | 6,317 | 5,253 | 5,035 |
| 1993 | 6,968 | 7,456 | 2,194 | 5,507 | 7,213 | 8,268 | 15,678 | 2,593 | 5,974 | 3,584 | 3,804 | 3,766 | 1,775 | 10,814 | 2,974 | 6,324 | 5,328 | 5,105 |
| 1994 | 7,155 | 7,592 | 2,241 | 5,521 | 7,227 | 8,489 | 16,045 | 2,671 | 5,974 | 3,601 | 3,832 | 4,048 | 1,816 | 11,153 | 3,038 | 6,369 | 5,383 | 5,221 |
| 1995 | 7,072 | 7,533 | 2,213 | 5,535 | 7,236 | 8,569 | 16,272 | 2,662 | 5,974 | 3,618 | 3,832 | 3,844 | 1,816 | 11,153 | 3,102 | 6,369 | 5,437 | 5,196 |

**Appendix Table 8 Production growth in Indian agriculture**

| | Andhra Pradesh | Haryana | MP | Maharasht | Karnataka | Punjab | Tamil Nadu | UP | Bihar | Gujarat | Assam | HP | Rajasthan | Orissa | J&K | West Bengal | Kerala | All India |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1970 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| 1971 | 98.34 | 95.43 | 102.38 | 97.22 | 101.83 | 107.91 | 98.68 | 91.68 | 95.69 | 92.82 | 105.07 | 145.11 | 83.46 | 96.31 | 100.59 | 127.16 | 104.44 | 99.58 |
| 1972 | 92.18 | 73.55 | 92.42 | 66.97 | 86.02 | 106.07 | 104.12 | 85.39 | 99.10 | 53.47 | 106.78 | 112.56 | 70.71 | 93.21 | 101.84 | 109.71 | 105.97 | 92.54 |
| 1973 | 111.93 | 70.99 | 90.12 | 108.88 | 102.70 | 114.80 | 107.60 | 85.99 | 75.94 | 78.62 | 104.83 | 107.93 | 79.73 | 101.83 | 100.56 | 104.69 | 105.09 | 97.49 |
| 1974 | 120.05 | 88.34 | 100.90 | 124.72 | 113.05 | 143.02 | 88.82 | 94.32 | 76.66 | 71.93 | 98.07 | 112.50 | 114.35 | 87.84 | 102.71 | 116.42 | 104.14 | 101.26 |
| 1975 | 113.59 | 104.66 | 108.19 | 145.06 | 111.28 | 142.72 | 117.48 | 102.58 | 86.09 | 107.43 | 105.22 | 129.10 | 148.96 | 112.56 | 116.24 | 133.14 | 106.37 | 113.72 |
| 1976 | 94.59 | 99.17 | 88.41 | 154.20 | 85.11 | 141.54 | 105.87 | 101.07 | 83.48 | 105.87 | 101.28 | 130.94 | 117.92 | 90.72 | 117.86 | 127.60 | 99.16 | 104.80 |
| 1977 | 104.99 | 108.01 | 108.51 | 163.55 | 108.82 | 160.63 | 118.26 | 109.85 | 87.71 | 107.35 | 99.13 | 127.54 | 118.81 | 108.50 | 132.50 | 138.52 | 101.33 | 114.66 |
| 1978 | 118.29 | 119.90 | 105.81 | 160.60 | 124.01 | 163.19 | 134.07 | 111.52 | 90.86 | 109.60 | 111.66 | 125.88 | 118.67 | 113.19 | 173.64 | 144.85 | 100.52 | 119.26 |
| 1979 | 107.69 | 84.55 | 72.06 | 160.32 | 118.22 | 176.92 | 130.45 | 80.73 | 76.61 | 103.59 | 108.99 | 111.30 | 106.04 | 92.39 | 155.01 | 139.18 | 102.76 | 104.90 |
| 1980 | 107.03 | 114.01 | 108.19 | 162.92 | 110.74 | 180.28 | 109.42 | 118.43 | 92.69 | 112.54 | 124.96 | 150.80 | 114.88 | 123.44 | 180.66 | 154.36 | 100.11 | 119.63 |
| 1981 | 131.73 | 109.60 | 110.62 | 174.95 | 120.50 | 209.37 | 137.13 | 116.93 | 89.06 | 126.40 | 123.63 | 129.46 | 130.01 | 126.26 | 190.76 | 148.26 | 97.93 | 126.56 |
| 1982 | 121.53 | 112.09 | 109.89 | 169.10 | 116.44 | 213.69 | 106.08 | 128.27 | 92.06 | 125.09 | 130.70 | 121.45 | 131.27 | 120.02 | 188.66 | 144.81 | 98.63 | 125.16 |
| 1983 | 132.75 | 110.77 | 127.30 | 181.41 | 126.81 | 215.08 | 108.26 | 135.95 | 107.55 | 141.10 | 129.84 | 123.76 | 130.78 | 149.27 | 181.47 | 177.27 | 94.28 | 135.28 |
| 1984 | 114.07 | 112.73 | 113.34 | 172.87 | 123.80 | 228.32 | 124.29 | 128.31 | 109.01 | 123.82 | 131.92 | 116.76 | 119.37 | 161.90 | 193.33 | 183.16 | 93.73 | 131.48 |
| 1985 | 120.58 | 142.67 | 125.86 | 157.64 | 118.41 | 238.98 | 150.37 | 139.68 | 122.94 | 92.17 | 143.79 | 149.00 | 134.54 | 156.23 | 220.63 | 220.79 | 89.25 | 140.51 |
| 1986 | 114.41 | 136.70 | 115.17 | 141.72 | 129.47 | 228.13 | 117.51 | 149.29 | 114.03 | 99.19 | 127.60 | 142.26 | 113.98 | 150.08 | 220.54 | 203.49 | 86.56 | 133.47 |
| 1987 | 137.63 | 112.63 | 128.68 | 178.54 | 127.31 | 239.93 | 133.31 | 147.58 | 108.44 | 68.29 | 130.84 | 119.34 | 105.51 | 135.48 | 201.66 | 199.46 | 82.37 | 135.51 |
| 1988 | 169.03 | 159.53 | 133.22 | 188.31 | 141.23 | 242.32 | 131.40 | 159.20 | 121.89 | 156.55 | 118.39 | 155.88 | 128.37 | 155.69 | 223.99 | 222.96 | 82.55 | 151.69 |
| 1989 | 196.91 | 110.69 | 128.05 | 241.82 | 136.16 | 263.09 | 161.23 | 154.60 | 119.19 | 156.60 | 123.22 | 191.54 | 129.37 | 153.48 | 241.68 | 409.13 | 87.37 | 167.70 |
| 1990 | 155.93 | 129.14 | 143.47 | 188.22 | 138.22 | 262.17 | 136.44 | 151.99 | 123.96 | 163.81 | 124.47 | 183.18 | 137.32 | 144.46 | 264.11 | 234.08 | 84.54 | 151.85 |
| 1991 | 159.94 | 140.50 | 132.88 | 183.97 | 149.75 | 262.25 | 134.86 | 154.53 | 117.38 | 154.26 | 104.62 | 172.56 | 135.82 | 148.21 | 259.36 | 247.72 | 96.77 | 151.92 |
| 1992 | 158.43 | 165.57 | 136.59 | 195.60 | 171.74 | 246.15 | 140.33 | 153.60 | 101.08 | 146.80 | 88.95 | 165.67 | 141.24 | 169.14 | 269.59 | 248.13 | 103.15 | 153.01 |
| 1993 | 168.83 | 162.74 | 146.71 | 196.32 | 185.71 | 262.80 | 141.06 | 154.49 | 117.93 | 122.81 | 69.52 | 152.16 | 124.95 | 181.98 | 306.39 | 261.28 | 110.08 | 156.26 |
| 1994 | 187.86 | 176.70 | 147.07 | 187.16 | 188.46 | 289.00 | 145.42 | 158.36 | 141.85 | 162.09 | 90.41 | 144.42 | 129.91 | 183.90 | 329.10 | 278.70 | 118.70 | 164.93 |
| *Annual Growth Rate (%)* | | | | | | | | | | | | | | | | | | |
| 1970-79 | 1.88 | 2.04 | 0.63 | 5.41 | 2.42 | 5.59 | 3.31 | 1.22 | -1.06 | 1.02 | 1.23 | 2.59 | 1.92 | 1.39 | 6.32 | 4.20 | 0.06 | 1.98 |
| 1980-89 | 7.01 | -0.33 | 1.89 | 4.49 | 2.32 | 4.29 | 4.40 | 3.01 | 2.83 | 3.74 | -0.16 | 2.69 | 1.33 | 2.45 | 3.29 | 11.44 | -1.50 | 3.82 |
| 1990-94 | 4.77 | 8.15 | 0.62 | -0.14 | 8.06 | 2.47 | 1.61 | 1.03 | 3.43 | -0.26 | -7.68 | -5.77 | -1.38 | 6.22 | 5.65 | 4.46 | 8.85 | 2.09 |
| 1970-94 | 2.66 | 2.40 | 1.62 | 2.65 | 2.68 | 4.52 | 1.57 | 1.93 | 1.47 | 2.03 | -0.42 | 1.54 | 1.10 | 2.57 | 5.09 | 4.36 | 0.72 | 2.11 |

**Appendix Table 9 Total factor productivity growth in Indian agriculture**

| | Andhra Pradesh | Haryana | MP | Maharasht | Karnataka | Punjab | Tamil Nadu | UP | Bihar | Gujarat | Assam | HP | Rajasthan | Orissa | J&K | West Bengal | Kerala | All India |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1970 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| 1971 | 97.96 | 97.82 | 102.98 | 95.25 | 96.58 | 105.74 | 96.37 | 93.53 | 97.37 | 90.10 | 105.32 | 136.29 | 82.93 | 95.80 | 100.47 | 112.94 | 104.44 | 99.11 |
| 1972 | 91.90 | 77.54 | 91.67 | 64.78 | 81.44 | 100.98 | 98.70 | 86.79 | 103.02 | 47.81 | 104.04 | 106.23 | 69.53 | 91.44 | 101.29 | 97.11 | 105.97 | 91.61 |
| 1973 | 111.76 | 80.66 | 88.95 | 108.25 | 97.04 | 105.81 | 105.71 | 87.00 | 80.86 | 73.83 | 99.87 | 105.63 | 79.14 | 100.36 | 98.57 | 91.95 | 105.09 | 97.73 |
| 1974 | 117.62 | 102.41 | 103.51 | 112.16 | 92.93 | 129.66 | 86.34 | 96.11 | 93.05 | 65.26 | 91.91 | 119.29 | 107.09 | 82.58 | 99.90 | 101.76 | 104.14 | 99.64 |
| 1975 | 115.16 | 126.97 | 110.71 | 129.51 | 100.09 | 132.07 | 115.58 | 104.78 | 104.28 | 100.24 | 96.06 | 139.58 | 139.59 | 106.12 | 112.09 | 115.42 | 106.37 | 113.18 |
| 1976 | 90.99 | 122.62 | 89.00 | 136.50 | 75.96 | 127.60 | 102.18 | 102.15 | 100.89 | 97.47 | 89.79 | 141.19 | 109.81 | 84.93 | 112.10 | 109.99 | 99.16 | 103.15 |
| 1977 | 98.91 | 134.77 | 107.35 | 142.24 | 99.30 | 140.97 | 112.84 | 108.12 | 105.26 | 96.34 | 85.12 | 137.24 | 109.49 | 100.47 | 124.48 | 118.41 | 101.33 | 111.70 |
| 1978 | 104.46 | 151.11 | 102.02 | 138.02 | 106.17 | 139.73 | 123.93 | 108.51 | 107.98 | 94.60 | 94.38 | 134.23 | 113.13 | 104.18 | 160.77 | 122.13 | 100.52 | 113.78 |
| 1979 | 93.19 | 105.83 | 68.68 | 136.29 | 96.70 | 146.81 | 118.56 | 76.78 | 90.62 | 86.65 | 91.28 | 117.98 | 99.43 | 84.06 | 148.55 | 115.30 | 102.76 | 98.40 |
| 1980 | 93.03 | 143.20 | 103.98 | 136.84 | 87.70 | 146.99 | 98.50 | 111.80 | 112.71 | 90.20 | 104.16 | 157.56 | 108.18 | 113.35 | 170.23 | 127.71 | 100.11 | 112.05 |
| 1981 | 109.75 | 128.55 | 103.32 | 147.55 | 95.67 | 167.62 | 132.44 | 108.32 | 103.33 | 99.44 | 101.50 | 134.35 | 120.67 | 113.62 | 169.18 | 118.38 | 97.93 | 116.23 |
| 1982 | 93.48 | 120.29 | 99.40 | 139.07 | 88.62 | 167.84 | 94.21 | 113.72 | 94.46 | 91.84 | 106.95 | 123.90 | 118.62 | 106.38 | 165.69 | 114.75 | 98.63 | 110.05 |
| 1983 | 100.13 | 115.84 | 113.62 | 145.34 | 94.36 | 166.17 | 111.59 | 117.07 | 115.75 | 99.68 | 106.08 | 124.45 | 116.07 | 130.95 | 158.02 | 140.28 | 94.28 | 117.88 |
| 1984 | 82.22 | 117.57 | 99.44 | 137.05 | 89.84 | 174.69 | 122.98 | 109.59 | 122.30 | 88.36 | 106.98 | 115.75 | 105.04 | 140.87 | 167.23 | 143.73 | 93.73 | 113.53 |
| 1985 | 85.45 | 146.16 | 107.52 | 122.38 | 82.30 | 180.94 | 144.28 | 117.90 | 145.00 | 65.24 | 116.66 | 145.27 | 117.64 | 133.46 | 188.78 | 172.75 | 89.25 | 120.13 |
| 1986 | 81.14 | 132.56 | 94.94 | 111.16 | 89.42 | 170.62 | 111.55 | 123.66 | 139.53 | 70.68 | 102.86 | 136.36 | 97.21 | 126.26 | 186.40 | 159.35 | 86.56 | 113.86 |
| 1987 | 96.18 | 107.31 | 100.21 | 138.80 | 85.49 | 177.92 | 128.26 | 121.70 | 131.24 | 46.06 | 104.65 | 113.07 | 88.62 | 113.36 | 170.29 | 155.08 | 82.37 | 113.68 |
| 1988 | 113.41 | 159.39 | 105.89 | 141.37 | 93.13 | 179.91 | 123.91 | 130.45 | 144.55 | 92.13 | 93.55 | 147.40 | 131.11 | 134.24 | 195.15 | 173.10 | 82.55 | 129.50 |
| 1989 | 116.40 | 102.38 | 96.63 | 177.65 | 85.34 | 194.22 | 136.69 | 123.34 | 141.80 | 80.52 | 95.92 | 177.55 | 101.29 | 126.32 | 206.53 | 314.91 | 87.37 | 133.75 |
| 1990 | 96.87 | 118.25 | 108.15 | 132.32 | 84.53 | 192.02 | 126.01 | 120.22 | 147.04 | 76.99 | 96.00 | 168.26 | 108.88 | 120.62 | 218.95 | 179.18 | 84.54 | 120.69 |
| 1991 | 96.22 | 118.57 | 96.02 | 128.86 | 89.28 | 188.85 | 120.86 | 120.40 | 138.83 | 67.26 | 79.39 | 155.88 | 102.59 | 140.52 | 222.81 | 187.92 | 96.77 | 118.52 |
| 1992 | 94.51 | 139.54 | 97.04 | 136.99 | 100.78 | 175.62 | 123.32 | 118.50 | 119.16 | 59.41 | 66.75 | 148.62 | 103.10 | 160.10 | 228.51 | 187.47 | 103.15 | 117.56 |
| 1993 | 99.32 | 137.14 | 103.30 | 135.68 | 106.09 | 192.76 | 122.14 | 117.80 | 138.81 | 47.27 | 51.78 | 135.21 | 88.02 | 171.79 | 257.03 | 196.86 | 110.08 | 118.05 |
| 1994 | 102.38 | 73.21 | 98.73 | 128.66 | 105.93 | 215.39 | 122.82 | 118.23 | 165.95 | 59.39 | 66.19 | 112.07 | 92.34 | 159.27 | 273.36 | 208.03 | 118.70 | 117.86 |
| *Annual Growth Rate (%)* | | | | | | | | | | | | | | | | | | |
| 1970-79 | 0.49 | 4.69 | 0.22 | 3.65 | 0.67 | 3.79 | 2.41 | 0.91 | 0.86 | -0.62 | -0.64 | 3.33 | 1.38 | 0.46 | 5.42 | 2.25 | 0.06 | 1.44 |
| 1980-89 | 2.52 | -3.66 | -0.81 | 2.94 | -0.30 | 3.14 | 3.71 | 1.10 | 2.58 | -1.25 | -0.91 | 1.34 | -0.73 | 1.21 | 2.17 | 10.55 | -1.50 | 1.99 |
| 1990-94 | 1.39 | -11.30 | -2.25 | -0.70 | 5.80 | 2.91 | -0.64 | -0.42 | 3.07 | -6.28 | -8.88 | -9.66 | -4.04 | 7.20 | 5.71 | 3.80 | 8.85 | -0.59 |
| 1970-94 | 0.10 | -1.29 | -0.05 | 1.06 | 0.24 | 3.25 | 0.86 | 0.70 | 2.13 | -2.15 | -1.70 | 0.48 | -0.33 | 1.96 | 4.28 | 3.10 | 0.72 | 0.69 |

**Appendix Table 10 Rural employment by state**

| States | 1972-73 | 1977-78 | 1983 | 1987-88 | 1993-94 | Annual growth rate |
|---|---|---|---|---|---|---|
| | | | (absolute number, thousand) | | | % |
| *Total Employment* | | | | | | |
| Andhra Pradesh | 22,686 | 23,292 | 24,992 | 22,685 | 27,594 | 0.94 |
| Bihar | 22,170 | 23,668 | 24,675 | 21,662 | 25,990 | 0.76 |
| Gujarat | 10,648 | 10,626 | 12,020 | 10,633 | 11,692 | 0.45 |
| Haryana | 4,090 | 3,671 | 3,776 | 3,368 | 3,460 | -0.79 |
| Karnataka | 13,569 | 14,559 | 14,095 | 12,792 | 14,836 | 0.43 |
| Kerala | 7,681 | 8,809 | 7,202 | 6,724 | 7,052 | -0.41 |
| Madhya Pradesh | 21,724 | 20,361 | 23,716 | 21,029 | 23,411 | 0.36 |
| Maharashtra | 21,191 | 21,778 | 23,738 | 21,328 | 23,926 | 0.58 |
| Orissa | 10,683 | 10,266 | 10,938 | 9,908 | 10,977 | 0.13 |
| Punjab | 5,148 | 4,499 | 4,488 | 4,349 | 4,549 | -0.59 |
| Rajasthan | 14,728 | 13,206 | 14,600 | 13,911 | 15,128 | 0.13 |
| Tamil Nadu | 17,811 | 17,426 | 18,132 | 17,117 | 18,864 | 0.27 |
| Uttar Pradesh | 35,689 | 35,045 | 37,364 | 35,645 | 38,628 | 0.38 |
| West Bengal | 13,246 | 14,704 | 15,357 | 14,410 | 16,544 | 1.06 |
| All India | 221,064 | 221,910 | 235,094 | 215,563 | 242,649 | 0.44 |
| *Agricultural Employment* | | | | | | |
| Andhra Pradesh | 17,831 | 18,704 | 18,594 | 16,810 | 20,861 | 0.75 |
| Bihar | 18,224 | 19,668 | 20,061 | 17,330 | 21,311 | 0.75 |
| Gujarat | 8,933 | 8,969 | 9,483 | 7,294 | 8,313 | -0.34 |
| Haryana | 3,276 | 2,845 | 2,726 | 2,388 | 2,107 | -2.08 |
| Karnataka | 11,561 | 12,113 | 11,501 | 10,183 | 11,691 | 0.05 |
| Kerala | 4,278 | 5,215 | 4,163 | 3,645 | 3,752 | -0.62 |
| Madhya Pradesh | 19,638 | 18,162 | 20,680 | 17,937 | 20,415 | 0.18 |
| Maharashtra | 17,461 | 17,509 | 18,896 | 16,167 | 18,016 | 0.15 |
| Orissa | 8,717 | 8,715 | 8,553 | 7,421 | 8,639 | -0.04 |
| Punjab | 4,087 | 3,500 | 3,479 | 2,992 | 3,098 | -1.31 |
| Rajasthan | 12,431 | 10,895 | 11,826 | 9,070 | 10,529 | -0.79 |
| Tamil Nadu | 13,430 | 12,878 | 12,493 | 11,160 | 12,073 | -0.51 |
| Uttar Pradesh | 29,229 | 28,106 | 29,405 | 28,124 | 29,473 | 0.04 |
| West Bengal | 10,319 | 11,425 | 11,226 | 10,404 | 10,704 | 0.17 |
| All India | 179,417 | 178,704 | 183,087 | 160,925 | 180,981 | 0.04 |
| *Non Agricultural Employment* | | | | | | |
| Andhra Pradesh | 4,855 | 4,589 | 6,398 | 5,875 | 6,733 | 1.57 |
| Bihar | 3,946 | 4,000 | 4,614 | 4,332 | 4,678 | 0.81 |
| Gujarat | 1,714 | 1,658 | 2,536 | 3,339 | 3,379 | 3.28 |
| Haryana | 814 | 826 | 1,050 | 980 | 1,353 | 2.45 |
| Karnataka | 2,008 | 2,446 | 2,593 | 2,610 | 3,145 | 2.16 |
| Kerala | 3,403 | 3,594 | 3,039 | 3,080 | 3,300 | -0.15 |
| Madhya Pradesh | 2,085 | 2,199 | 3,036 | 3,091 | 2,997 | 1.74 |
| Maharashtra | 3,730 | 4,268 | 4,843 | 5,161 | 5,910 | 2.22 |
| Orissa | 1,966 | 1,550 | 2,384 | 2,487 | 2,338 | 0.83 |
| Punjab | 1,060 | 999 | 1,010 | 1,357 | 1,451 | 1.50 |
| Rajasthan | 2,298 | 2,311 | 2,774 | 4,841 | 4,599 | 3.36 |
| Tamil Nadu | 4,382 | 4,548 | 5,639 | 5,957 | 6,791 | 2.11 |
| Uttar Pradesh | 6,460 | 6,939 | 7,959 | 7,521 | 9,155 | 1.67 |
| West Bengal | 2,927 | 3,279 | 4,131 | 4,006 | 5,840 | 3.34 |
| All India | 41,648 | 43,206 | 52,006 | 54,638 | 61,669 | 1.89 |

**Appendix Table 11 Changes in rural wages by state**

| | Andhra Pradesh | Bihar | Gujarat | Haryana | Karnataka | Kerala | MP | Maharashta | Orissa | Punjab | Rajasthan | Tamil Natu | UP | West Bengal |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Rupees/day, 1960/61 prices | | | | | | | |
| 1970 | 1.74 | 1.21 | 1.77 | 3.42 | 1.24 | 2.05 | 1.05 | 1.45 | 1.00 | 3.55 | 2.13 | 1.47 | 1.38 | 1.45 |
| 1971 | 1.49 | 1.18 | 2.00 | 3.32 | 1.28 | 2.33 | 1.08 | 1.00 | 1.01 | 3.34 | 2.21 | 1.53 | 1.36 | 1.57 |
| 1972 | 1.39 | 1.08 | 1.66 | 2.97 | 1.22 | 2.22 | 1.01 | 1.07 | 0.97 | 3.00 | 2.00 | 1.43 | 1.29 | 1.68 |
| 1973 | 1.31 | 1.16 | 1.41 | 2.71 | 1.19 | 2.14 | 0.95 | 1.14 | 0.93 | 2.74 | 1.87 | 1.35 | 1.25 | 1.77 |
| 1974 | 1.16 | 1.05 | 1.17 | 2.55 | 0.99 | 1.78 | 0.81 | 0.95 | 0.76 | 2.60 | 1.52 | 1.08 | 1.11 | 1.56 |
| 1975 | 1.38 | 1.46 | 1.62 | 2.79 | 1.23 | 2.03 | 1.09 | 0.98 | 0.91 | 2.97 | 1.93 | 1.35 | 1.78 | 1.93 |
| 1976 | 1.53 | 1.78 | 2.20 | 2.87 | 1.51 | 2.33 | 1.26 | 1.10 | 1.26 | 3.28 | 2.52 | 1.33 | 1.88 | 2.00 |
| 1977 | 1.51 | 1.53 | 2.02 | 3.14 | 1.67 | 2.40 | 1.19 | 1.15 | 1.20 | 3.13 | 2.43 | 1.31 | 1.49 | 2.17 |
| 1978 | 1.78 | 1.53 | 2.14 | 3.32 | 1.70 | 2.45 | 1.25 | 1.30 | 1.24 | 3.19 | 2.39 | 1.47 | 1.63 | 2.20 |
| 1979 | 1.76 | 1.43 | 1.99 | 3.18 | 1.59 | 2.58 | 1.13 | 1.27 | 1.12 | 3.05 | 2.27 | 1.56 | 1.54 | 2.11 |
| 1980 | 1.71 | 1.37 | 1.90 | 2.84 | 1.42 | 2.83 | 1.08 | 1.16 | 1.09 | 2.80 | 2.24 | 1.52 | 1.36 | 2.02 |
| 1981 | 1.99 | 1.61 | 2.16 | 3.27 | 1.52 | 3.26 | 1.30 | 1.34 | 1.23 | 2.96 | 2.46 | 1.63 | 1.54 | 2.14 |
| 1982 | 2.27 | 1.85 | 2.43 | 3.69 | 1.61 | 3.69 | 1.53 | 1.53 | 1.37 | 3.12 | 2.68 | 1.74 | 1.72 | 2.25 |
| 1983 | 1.15 | 0.90 | 1.36 | 2.17 | 0.95 | 1.36 | 0.80 | 0.81 | 0.72 | 2.09 | 1.61 | 0.83 | 1.02 | 1.38 |
| 1984 | 2.29 | 1.87 | 2.69 | 3.42 | 1.35 | 2.83 | 1.57 | 1.82 | 1.45 | 3.21 | 2.41 | 1.72 | 1.96 | 2.04 |
| 1985 | 2.51 | 2.02 | 2.89 | 3.38 | 1.47 | 3.11 | 1.61 | 2.45 | 1.47 | 3.35 | 2.86 | 1.91 | 1.97 | 2.79 |
| 1986 | 2.79 | 2.07 | 2.78 | 3.66 | 1.62 | 3.05 | 1.84 | 2.59 | 1.43 | 3.65 | 3.47 | 1.86 | 2.18 | 2.91 |
| 1987 | 2.60 | 2.02 | 2.39 | 3.48 | 1.80 | 3.28 | 1.77 | 2.64 | 1.35 | 2.99 | 3.27 | 1.75 | 1.96 | 2.98 |
| 1988 | 2.52 | 2.05 | 2.56 | 3.35 | 2.05 | 3.74 | 1.74 | 2.51 | 1.57 | 3.76 | 3.77 | 1.90 | 1.96 | 3.22 |
| 1989 | 3.00 | 2.08 | 2.48 | 3.76 | 2.27 | 3.87 | 1.84 | 2.43 | 1.80 | 3.83 | 3.52 | 1.98 | 2.41 | 3.23 |
| 1990 | 2.89 | 2.21 | 2.29 | 4.00 | 2.36 | 3.75 | 2.00 | 2.53 | 1.82 | 3.94 | 3.52 | 2.23 | 2.45 | 3.16 |
| 1991 | 2.45 | 1.96 | 2.10 | 4.17 | 1.72 | 3.82 | 1.88 | 2.07 | 1.78 | 4.02 | 3.42 | 2.39 | 2.32 | 3.01 |
| 1992 | 2.50 | 1.90 | 2.31 | 4.34 | 1.53 | 4.27 | 2.11 | 2.32 | 1.97 | 4.38 | 3.31 | 2.64 | 2.65 | 3.40 |
| 1993 | 2.56 | 2.07 | 2.21 | 4.16 | 1.92 | 4.18 | 3.10 | 2.66 | 2.04 | 4.22 | 2.73 | 2.83 | 2.35 | 3.24 |
| *Annual Growth Rate (%)* | | | | | | | | | | | | | | |
| 1970-79 | 0.17 | 1.83 | 1.30 | -0.82 | 2.81 | 2.58 | 0.79 | -1.42 | 1.29 | -1.67 | 0.69 | 0.63 | 1.28 | 4.26 |
| 1980-89 | 6.45 | 4.73 | 3.01 | 3.16 | 5.34 | 3.54 | 6.15 | 8.63 | 5.76 | 3.55 | 5.14 | 2.97 | 6.57 | 5.34 |
| 1990-93 | -4.01 | -2.13 | -1.20 | 1.35 | -6.68 | 3.68 | 15.78 | 1.68 | 3.88 | 2.30 | -8.10 | 8.26 | -1.27 | 0.77 |
| 1970-93 | 1.70 | 2.35 | 0.97 | 0.86 | 1.92 | 3.14 | 4.82 | 2.67 | 3.15 | 0.75 | 1.09 | 2.89 | 2.36 | 3.56 |

**Appendix Table 12 Poverty changes by state, head-count ratio**

| | Andhra Pradesh | Assam | Bihar | Gujarat | Haryana | HP | J&K | Karnataka | Kerala | MP | Maharashta | Orissa | Punjab | Rajasthan | Tamil Nadu | UP | West Bengal | All India |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | (million 1960/61 rupees) | | | | | | | | | |
| 1951 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | 47 |
| 1952 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | 46 |
| 1953 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | 58 |
| 1954 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | 64 |
| 1955 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | 50 |
| 1956 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | 59 |
| 1957 | 64 | 37 | 65 | n.a. | 33 | n.a. | n.a. | 49 | 67 | 63 | n.a. | 65 | 33 | 51 | 73 | 55 | 53 | 59 |
| 1958 | 67 | 39 | 66 | 65 | 28 | n.a. | n.a. | 54 | 69 | 56 | 71 | 56 | 28 | 49 | 66 | 51 | 48 | 53 |
| 1959 | 64 | 43 | 62 | 56 | 33 | n.a. | n.a. | 58 | 71 | 52 | 58 | 62 | 33 | 40 | 71 | 38 | 50 | 51 |
| 1960 | 64 | 32 | 47 | 50 | 32 | n.a. | 37 | 47 | 69 | 51 | 60 | 62 | 32 | 57 | 65 | 41 | 32 | 45 |
| 1961 | 59 | 43 | 57 | 57 | 31 | n.a. | 40 | 45 | 59 | 48 | 58 | 47 | 31 | 56 | 57 | 34 | 50 | 47 |
| 1962 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | 48 |
| 1963 | 60 | 36 | 55 | 60 | 34 | n.a. | 35 | 58 | 63 | 45 | 58 | 58 | 34 | 50 | 54 | 49 | 56 | 49 |
| 1964 | 55 | 35 | 60 | 69 | 36 | n.a. | 37 | 63 | 69 | 50 | 72 | 61 | 36 | 56 | 65 | 57 | 57 | 54 |
| 1965 | 62 | 45 | 68 | 68 | 38 | n.a. | 33 | 73 | 80 | 57 | 71 | 60 | 38 | 55 | 67 | 51 | 64 | 58 |
| 1966 | 63 | 62 | 80 | 69 | 39 | n.a. | 42 | 68 | 77 | 68 | 76 | 63 | 39 | 63 | 71 | 59 | 68 | 64 |
| 1967 | 63 | 55 | 77 | 65 | 44 | n.a. | 30 | 67 | 74 | 71 | 72 | 63 | 44 | 60 | 66 | 65 | 76 | 64 |
| 1968 | 61 | 63 | 68 | 58 | 32 | n.a. | 24 | 60 | 74 | 66 | 69 | 70 | 32 | 67 | 68 | 50 | 70 | 59 |
| 1969 | 57 | 49 | 66 | 66 | 36 | n.a. | 27 | 46 | 78 | 64 | 69 | 66 | 36 | 69 | 70 | 54 | 60 | 59 |
| 1970 | 57 | 51 | 67 | 61 | 31 | n.a. | 21 | 59 | 73 | 62 | 62 | 65 | 32 | 65 | 63 | 45 | 63 | 55 |
| 1971 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | 55 |
| 1972 | 64 | 58 | 69 | 61 | 26 | n.a. | 34 | 57 | 67 | 65 | 81 | 67 | 25 | 63 | 59 | 56 | 61 | 55 |
| 1973 | 56 | 56 | 70 | 58 | 34 | 27 | 52 | 61 | 62 | 66 | 65 | 59 | 35 | 59 | 59 | 56 | 63 | 56 |
| 1974 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1975 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1976 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1977 | 48 | 64 | 66 | 55 | 28 | 33 | 43 | 54 | 53 | 65 | 79 | 63 | 25 | 54 | 58 | 45 | 56 | 51 |
| 1978 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1979 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1980 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1981 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1982 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1983 | 38 | 46 | 70 | 39 | 21 | 17 | 28 | 45 | 44 | 53 | 55 | 57 | 22 | 49 | 55 | 45 | 49 | 45 |
| 1984 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1985 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1986 | 34 | 44 | 56 | 43 | 25 | n.a. | 31 | 46 | 40 | 54 | 54 | 45 | 23 | 46 | 45 | 36 | 34 | 39 |
| 1987 | 34 | 43 | 59 | 43 | 16 | 16 | 31 | 43 | 35 | 48 | 52 | 48 | 20 | 50 | 48 | 41 | 35 | 39 |
| 1988 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | 39 |
| 1989 | 32 | 42 | 59 | 37 | 16 | n.a. | 21 | 54 | 39 | 45 | 46 | 39 | 14 | 40 | 42 | 31 | 26 | 34 |
| 1990 | 37 | 42 | 58 | 43 | 21 | n.a. | 43 | 43 | 34 | 48 | 43 | 27 | 19 | 39 | 42 | 37 | 39 | 36 |

Appendix Table 12 (continued)

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1991 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | 37 |
| 1992 | 42 | 57 | 67 | 47 | 20 | n.a. | n.a. | 57 | 34 | 56 | 61 | 37 | 18 | 51 | 47 | 47 | 28 | 43 |
| 1993 | 29 | 49 | 64 | 47 | 28 | 30 | 30 | 41 | 31 | 45 | 48 | 40 | 25 | 48 | 37 | 42 | 27 | 37 |
| *Annual Growth Rate (%)* | | | | | | | | | | | | | | | | | | |
| 1957-93 | -2.18 | 0.76 | -0.08 | -0.96 | -0.49 | 0.51 | -10.45 | -0.48 | -2.11 | -0.90 | -1.11 | -1.32 | -0.78 | -0.18 | -1.88 | -0.77 | -1.82 | -1.30 |

Notes: Growth rates for Gujarat, HP, J&K, and Maharashta are calculated between the first year when the data are available and 1993.

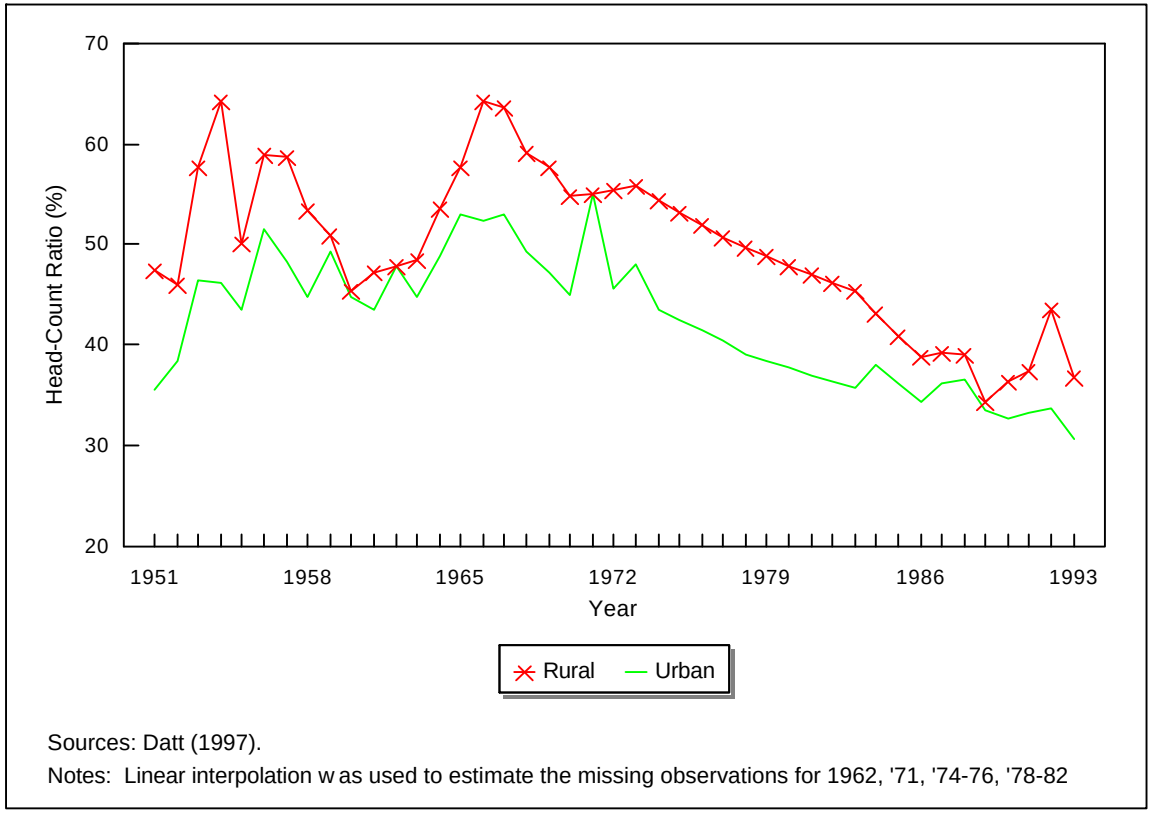
**Appendix Table 13 Population under poverty line by state**

| | Andhra Pradesh | Assam | Bihar | Gujarat | Haryana | HP | J&K | Karnataka | Kerala | MP | Maharashta | Orissa | Punjab | Rajasthan | Tamil Nadu | UP | West Bengal | All India |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1960 | 18,921 | 3,660 | 20,135 | 7,649 | 2,011 | n.a. | 1,160 | 8,687 | 9,851 | 14,126 | 17,031 | 10,147 | 2,742 | 9,698 | 16,082 | 26,586 | 8,539 | 177,022 |
| 1961 | 17,696 | 4,958 | 24,613 | 8,948 | 2,025 | n.a. | 1,279 | 8,324 | 8,684 | 13,660 | 16,901 | 7,861 | 2,738 | 9,650 | 14,342 | 22,811 | 13,560 | 178,050 |
| 1962 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1963 | 18,668 | 4,375 | 24,495 | 9,823 | 2,314 | n.a. | 1,155 | 11,199 | 9,694 | 13,482 | 17,401 | 10,119 | 3,074 | 9,027 | 13,911 | 33,726 | 15,761 | 198,224 |
| 1964 | 17,511 | 4,291 | 27,285 | 11,538 | 2,532 | n.a. | 1,235 | 12,432 | 10,875 | 15,248 | 22,107 | 10,910 | 3,336 | 10,319 | 16,973 | 39,353 | 16,383 | 222,327 |
| 1965 | 20,070 | 5,582 | 31,355 | 11,596 | 2,769 | n.a. | 1,141 | 14,619 | 12,776 | 17,782 | 22,169 | 10,875 | 3,616 | 10,433 | 17,762 | 35,708 | 19,097 | 237,350 |
| 1966 | 20,713 | 7,897 | 37,863 | 12,149 | 2,862 | n.a. | 1,478 | 13,883 | 12,669 | 21,510 | 24,194 | 11,623 | 3,705 | 12,224 | 19,163 | 42,318 | 20,602 | 264,853 |
| 1967 | 21,192 | 7,131 | 37,083 | 11,649 | 3,366 | n.a. | 1,078 | 13,989 | 12,408 | 23,069 | 23,679 | 11,955 | 4,320 | 11,892 | 17,990 | 46,941 | 23,574 | 271,314 |
| 1968 | 20,856 | 8,286 | 33,065 | 10,688 | 2,533 | n.a. | 867 | 12,741 | 12,621 | 21,798 | 23,093 | 13,516 | 3,223 | 13,631 | 18,855 | 37,040 | 22,156 | 254,968 |
| 1969 | 19,829 | 6,615 | 32,900 | 12,355 | 2,860 | n.a. | 1,011 | 10,061 | 13,669 | 21,701 | 23,337 | 12,982 | 3,608 | 14,285 | 19,734 | 40,171 | 19,593 | 254,713 |
| 1970 | 20,065 | 6,937 | 34,128 | 11,785 | 2,559 | n.a. | 819 | 13,022 | 12,990 | 21,718 | 21,499 | 12,953 | 3,279 | 13,855 | 18,205 | 34,300 | 20,864 | 248,977 |
| 1971 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1972 | 23,385 | 8,280 | 36,493 | 12,274 | 2,249 | n.a. | 1,377 | 13,010 | 12,310 | 23,509 | 29,117 | 13,889 | 2,722 | 14,157 | 17,469 | 43,775 | 20,971 | 274,988 |
| 1973 | 20,868 | 8,106 | 37,504 | 11,909 | 3,020 | n.a. | 2,146 | 14,023 | 11,638 | 24,413 | 23,638 | 12,369 | 3,822 | 13,622 | 17,729 | 44,788 | 22,405 | 272,001 |
| 1974 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1975 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1976 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1977 | 19,044 | 10,004 | 39,040 | 12,473 | 2,691 | n.a. | 1,921 | 13,821 | 10,582 | 25,991 | 31,123 | 14,128 | 2,994 | 13,799 | 18,398 | 39,577 | 21,762 | 277,347 |
| 1978 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1979 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1980 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1981 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1982 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1983 | 16,538 | 7,934 | 45,924 | 9,676 | 2,229 | n.a. | 1,444 | 12,510 | 9,148 | 23,647 | 23,611 | 13,976 | 2,764 | 14,334 | 18,627 | 43,647 | 21,217 | 267,226 |
| 1984 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1985 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1986 | 15,651 | 8,276 | 39,704 | 11,028 | 2,929 | n.a. | 1,705 | 13,619 | 8,401 | 25,930 | 24,720 | 11,701 | 3,079 | 14,419 | 15,831 | 37,865 | 15,766 | 250,626 |
| 1987 | 15,946 | 8,205 | 42,043 | 11,267 | 1,925 | n.a. | 1,752 | 13,047 | 7,370 | 23,268 | 24,400 | 12,665 | 2,759 | 16,269 | 17,308 | 44,129 | 16,460 | 258,812 |
| 1988 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1989 | 15,442 | 8,321 | 43,791 | 9,974 | 1,945 | n.a. | 1,255 | 16,873 | 8,320 | 22,671 | 21,972 | 10,798 | 2,018 | 13,690 | 15,412 | 34,605 | 12,886 | 239,973 |
| 1990 | 18,196 | 8,591 | 44,479 | 11,811 | 2,601 | n.a. | 2,617 | 13,460 | 7,260 | 24,780 | 21,133 | 7,546 | 2,687 | 13,475 | 15,617 | 41,827 | 19,645 | 255,725 |
| 1991 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1992 | 21,320 | 11,941 | 53,473 | 13,180 | 2,650 | n.a. | 2,500 | 18,525 | 7,387 | 30,187 | 30,799 | 10,508 | 2,714 | 18,422 | 17,778 | 55,131 | 14,738 | 311,252 |
| 1993 | 15,003 | 10,539 | 51,551 | 13,365 | 3,762 | n.a. | 2,002 | 13,548 | 6,744 | 24,898 | 24,729 | 11,764 | 3,836 | 17,584 | 14,175 | 50,132 | 14,570 | 278,203 |
| *Annual Growth Rate (%)* | | | | | | | | | | | | | | | | | | |
| 1960-93 | -0.70 | 3.26 | 2.89 | 1.71 | 1.92 | n.a. | 1.67 | 1.36 | -1.14 | 1.73 | 1.14 | 0.45 | 1.02 | 1.82 | -0.38 | 1.94 | 1.63 | 1.38 |

**Appendix Table 14 Poor population concentration by state**

| | Andhra Pradesh | Assam | Bihar | Gujarat | Haryana | HP | J&K | Karnataka | Kerala | MP | Maharashta | Orissa | Punjab | Rajasthan | Tamil Nadu | UP | West Bengal | All India |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1960 | 10.7 | 2.1 | 11.4 | 4.3 | 1.1 | 0.0 | 0.7 | 4.9 | 5.6 | 8.0 | 9.6 | 5.7 | 1.5 | 5.5 | 9.1 | 15.0 | 4.8 | 100 |
| 1961 | 9.9 | 2.8 | 13.8 | 5.0 | 1.1 | 0.0 | 0.7 | 4.7 | 4.9 | 7.7 | 9.5 | 4.4 | 1.5 | 5.4 | 8.1 | 12.8 | 7.6 | 100 |
| 1962 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1963 | 9.4 | 2.2 | 12.4 | 5.0 | 1.2 | 0.0 | 0.6 | 5.6 | 4.9 | 6.8 | 8.8 | 5.1 | 1.6 | 4.6 | 7.0 | 17.0 | 8.0 | 100 |
| 1964 | 7.9 | 1.9 | 12.3 | 5.2 | 1.1 | 0.0 | 0.6 | 5.6 | 4.9 | 6.9 | 9.9 | 4.9 | 1.5 | 4.6 | 7.6 | 17.7 | 7.4 | 100 |
| 1965 | 8.5 | 2.4 | 13.2 | 4.9 | 1.2 | 0.0 | 0.5 | 6.2 | 5.4 | 7.5 | 9.3 | 4.6 | 1.5 | 4.4 | 7.5 | 15.0 | 8.0 | 100 |
| 1966 | 7.8 | 3.0 | 14.3 | 4.6 | 1.1 | 0.0 | 0.6 | 5.2 | 4.8 | 8.1 | 9.1 | 4.4 | 1.4 | 4.6 | 7.2 | 16.0 | 7.8 | 100 |
| 1967 | 7.8 | 2.6 | 13.7 | 4.3 | 1.2 | 0.0 | 0.4 | 5.2 | 4.6 | 8.5 | 8.7 | 4.4 | 1.6 | 4.4 | 6.6 | 17.3 | 8.7 | 100 |
| 1968 | 8.2 | 3.2 | 13.0 | 4.2 | 1.0 | 0.0 | 0.3 | 5.0 | 4.9 | 8.5 | 9.1 | 5.3 | 1.3 | 5.3 | 7.4 | 14.5 | 8.7 | 100 |
| 1969 | 7.8 | 2.6 | 12.9 | 4.9 | 1.1 | 0.0 | 0.4 | 4.0 | 5.4 | 8.5 | 9.2 | 5.1 | 1.4 | 5.6 | 7.7 | 15.8 | 7.7 | 100 |
| 1970 | 8.1 | 2.8 | 13.7 | 4.7 | 1.0 | 0.0 | 0.3 | 5.2 | 5.2 | 8.7 | 8.6 | 5.2 | 1.3 | 5.6 | 7.3 | 13.8 | 8.4 | 100 |
| 1971 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1972 | 8.5 | 3.0 | 13.3 | 4.5 | 0.8 | 0.0 | 0.5 | 4.7 | 4.5 | 8.5 | 10.6 | 5.1 | 1.0 | 5.1 | 6.4 | 15.9 | 7.6 | 100 |
| 1973 | 7.7 | 3.0 | 13.8 | 4.4 | 1.1 | 0.0 | 0.8 | 5.2 | 4.3 | 9.0 | 8.7 | 4.5 | 1.4 | 5.0 | 6.5 | 16.5 | 8.2 | 100 |
| 1974 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1975 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1976 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1977 | 6.9 | 3.6 | 14.1 | 4.5 | 1.0 | 0.0 | 0.7 | 5.0 | 3.8 | 9.4 | 11.2 | 5.1 | 1.1 | 5.0 | 6.6 | 14.3 | 7.8 | 100 |
| 1978 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1979 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1980 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1981 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1982 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1983 | 6.2 | 3.0 | 17.2 | 3.6 | 0.8 | 0.0 | 0.5 | 4.7 | 3.4 | 8.8 | 8.8 | 5.2 | 1.0 | 5.4 | 7.0 | 16.3 | 7.9 | 100 |
| 1984 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1985 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1986 | 6.2 | 3.3 | 15.8 | 4.4 | 1.2 | 0.0 | 0.7 | 5.4 | 3.4 | 10.3 | 9.9 | 4.7 | 1.2 | 5.8 | 6.3 | 15.1 | 6.3 | 100 |
| 1987 | 6.2 | 3.2 | 16.2 | 4.4 | 0.7 | 0.0 | 0.7 | 5.0 | 2.8 | 9.0 | 9.4 | 4.9 | 1.1 | 6.3 | 6.7 | 17.1 | 6.4 | 100 |
| 1988 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1989 | 6.4 | 3.5 | 18.2 | 4.2 | 0.8 | 0.0 | 0.5 | 7.0 | 3.5 | 9.4 | 9.2 | 4.5 | 0.8 | 5.7 | 6.4 | 14.4 | 5.4 | 100 |
| 1990 | 7.1 | 3.4 | 17.4 | 4.6 | 1.0 | 0.0 | 1.0 | 5.3 | 2.8 | 9.7 | 8.3 | 3.0 | 1.1 | 5.3 | 6.1 | 16.4 | 7.7 | 100 |
| 1991 | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| 1992 | 6.8 | 3.8 | 17.2 | 4.2 | 0.9 | 0.0 | 0.8 | 6.0 | 2.4 | 9.7 | 9.9 | 3.4 | 0.9 | 5.9 | 5.7 | 17.7 | 4.7 | 100 |
| 1993 | 5.4 | 3.8 | 18.5 | 4.8 | 1.4 | 0.0 | 0.7 | 4.9 | 2.4 | 8.9 | 8.9 | 4.2 | 1.4 | 6.3 | 5.1 | 18.0 | 5.2 | 100 |
| *Annual Growth Rate (%)* | | | | | | | | | | | | | | | | | | |
| 1960-93 | -2.05 | 1.85 | 1.49 | 0.32 | 0.53 | n.a. | 0.29 | -0.02 | -2.49 | 0.35 | -0.24 | -0.92 | -0.35 | 0.43 | -1.74 | 0.55 | 0.25 | 0.00 |

**Figure 1 Changes of poverty in India**




Sources: Datt (1997).

Notes: Linear interpolation w as used to estimate the missing observations for 1962, '71, '74-76, '78-82

**Figure 2 Composition of government expenditure in India**

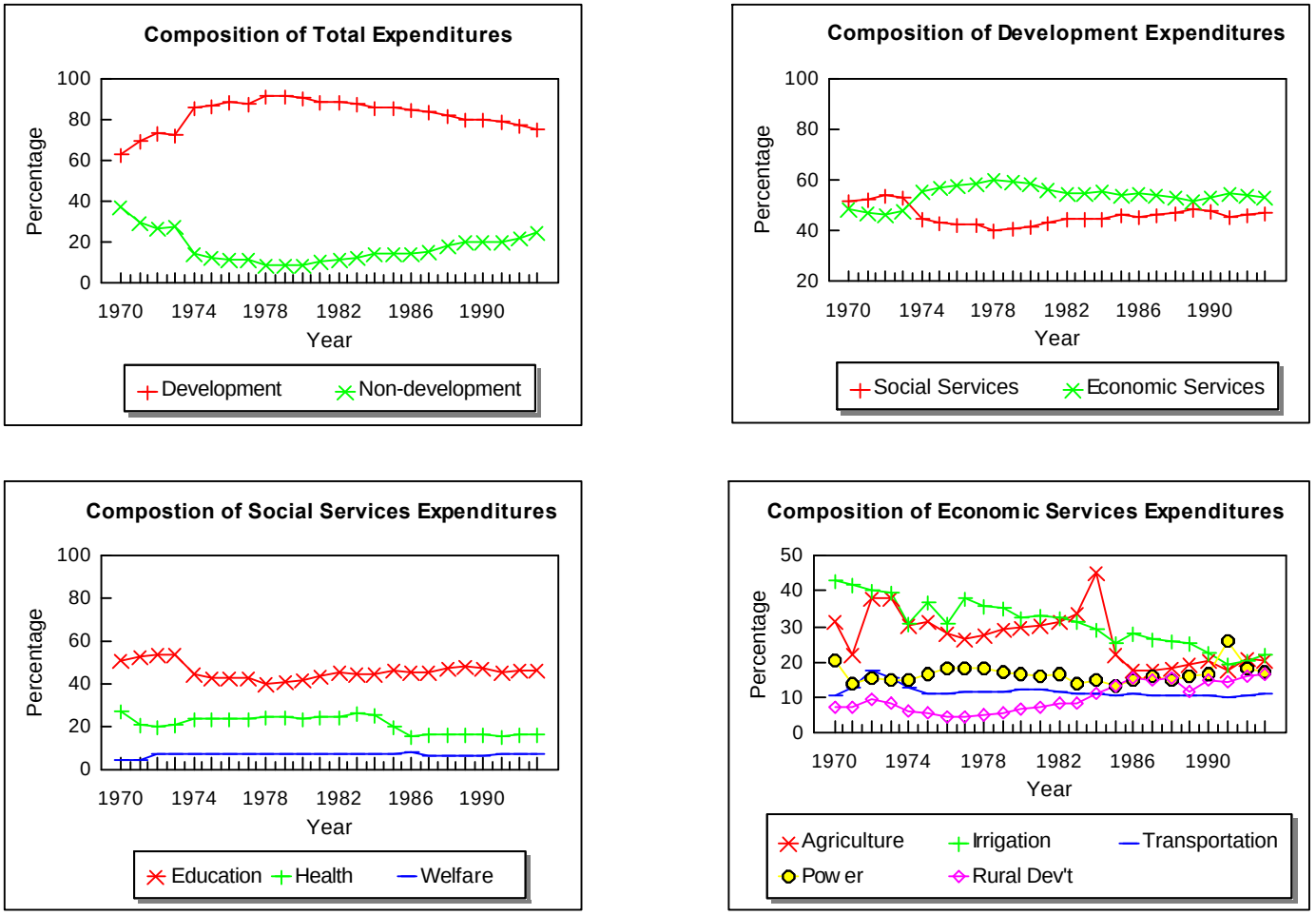


**Figure 3 Current vs. capital expenditure (1960/61 constant million rupees)**

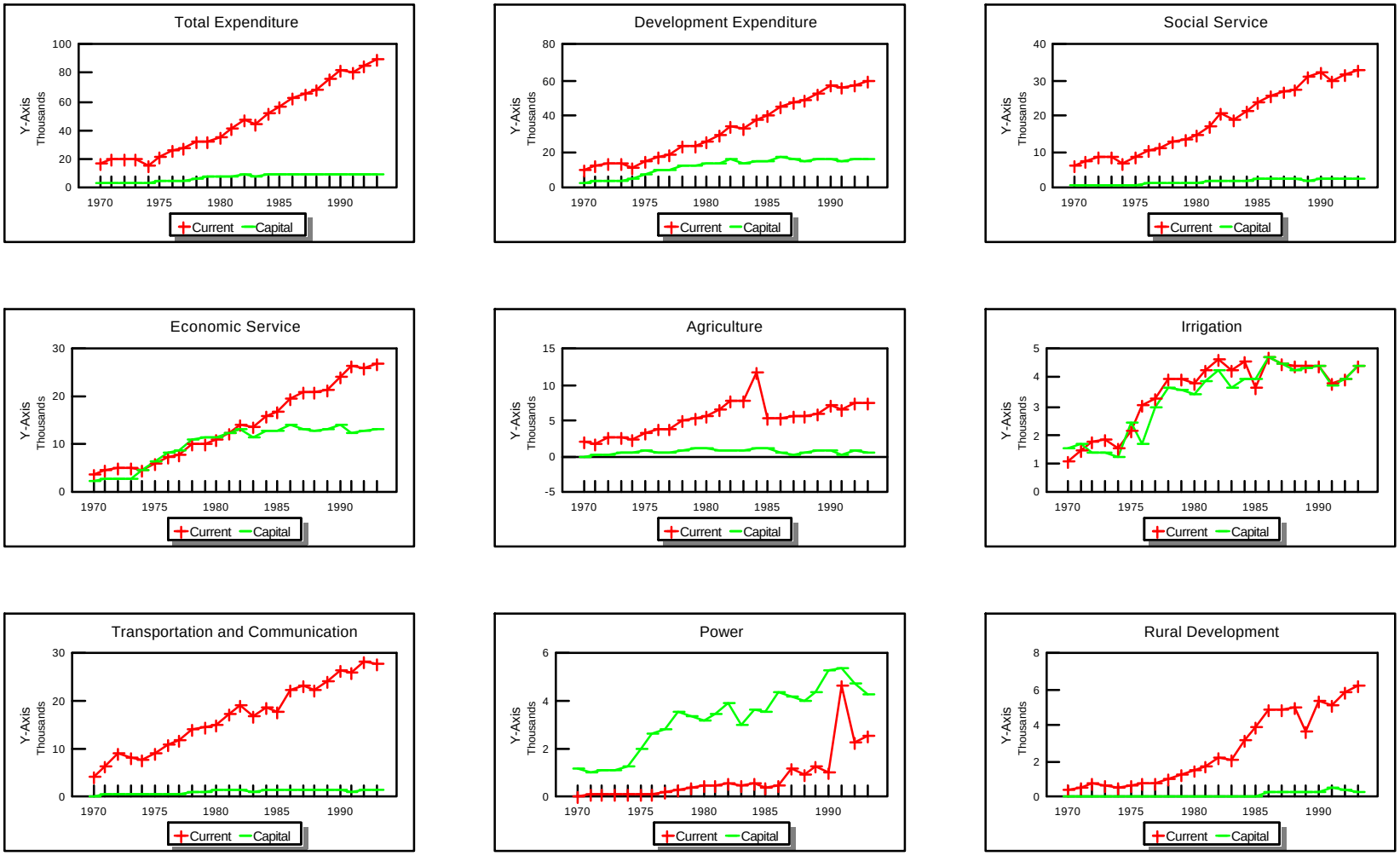


**Figure 4 Technology, infrastructure, production and productivity**

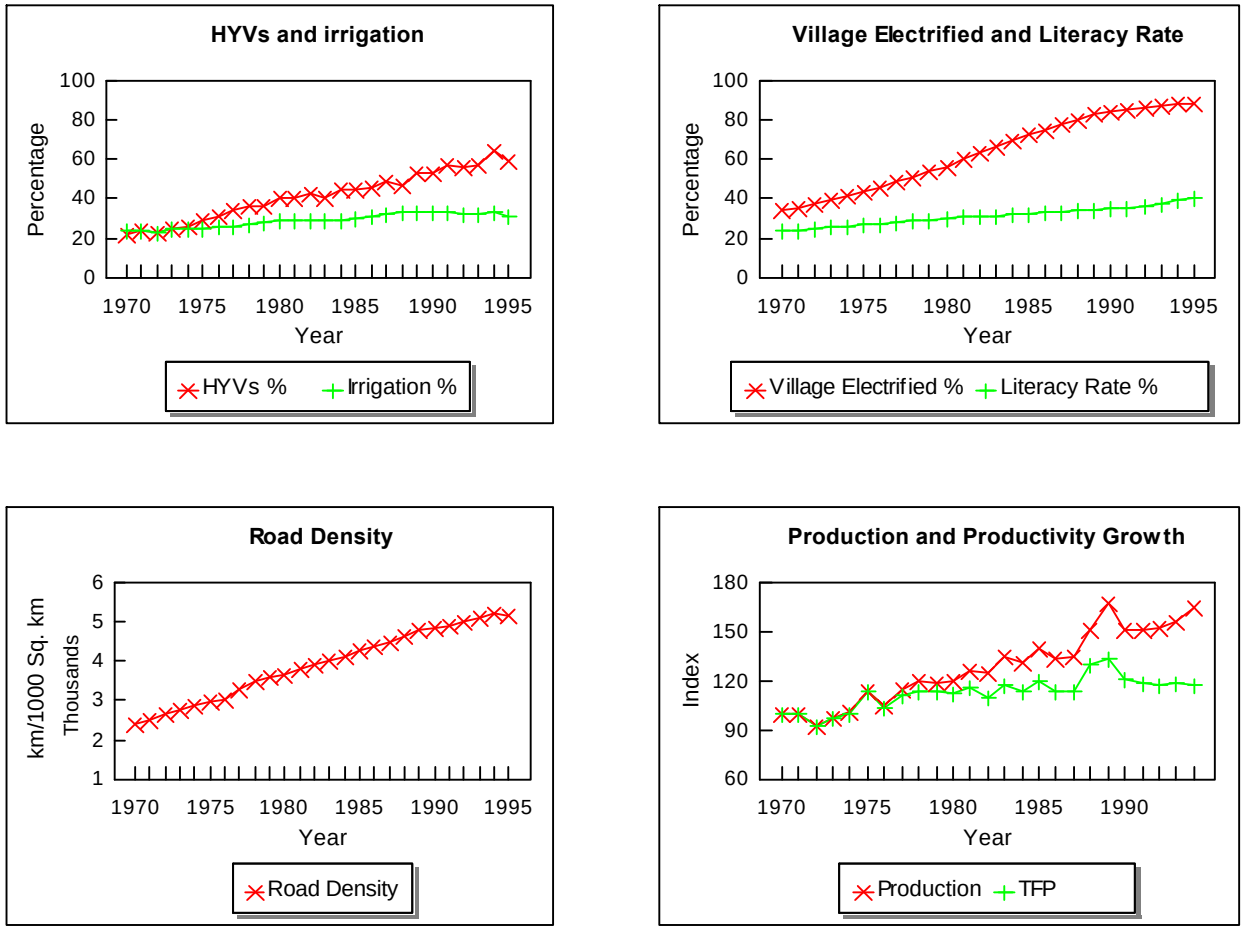
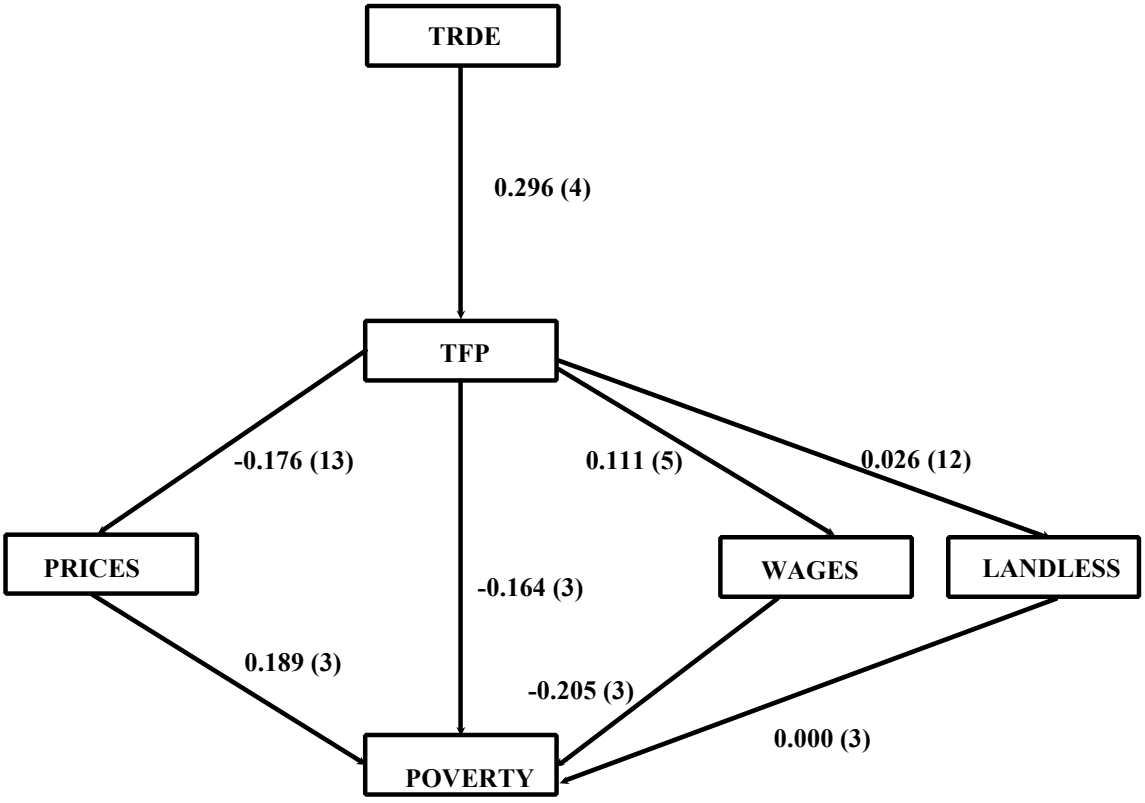


**Figure 6 Poverty effects of governmental expenditures in agricultural R&D**

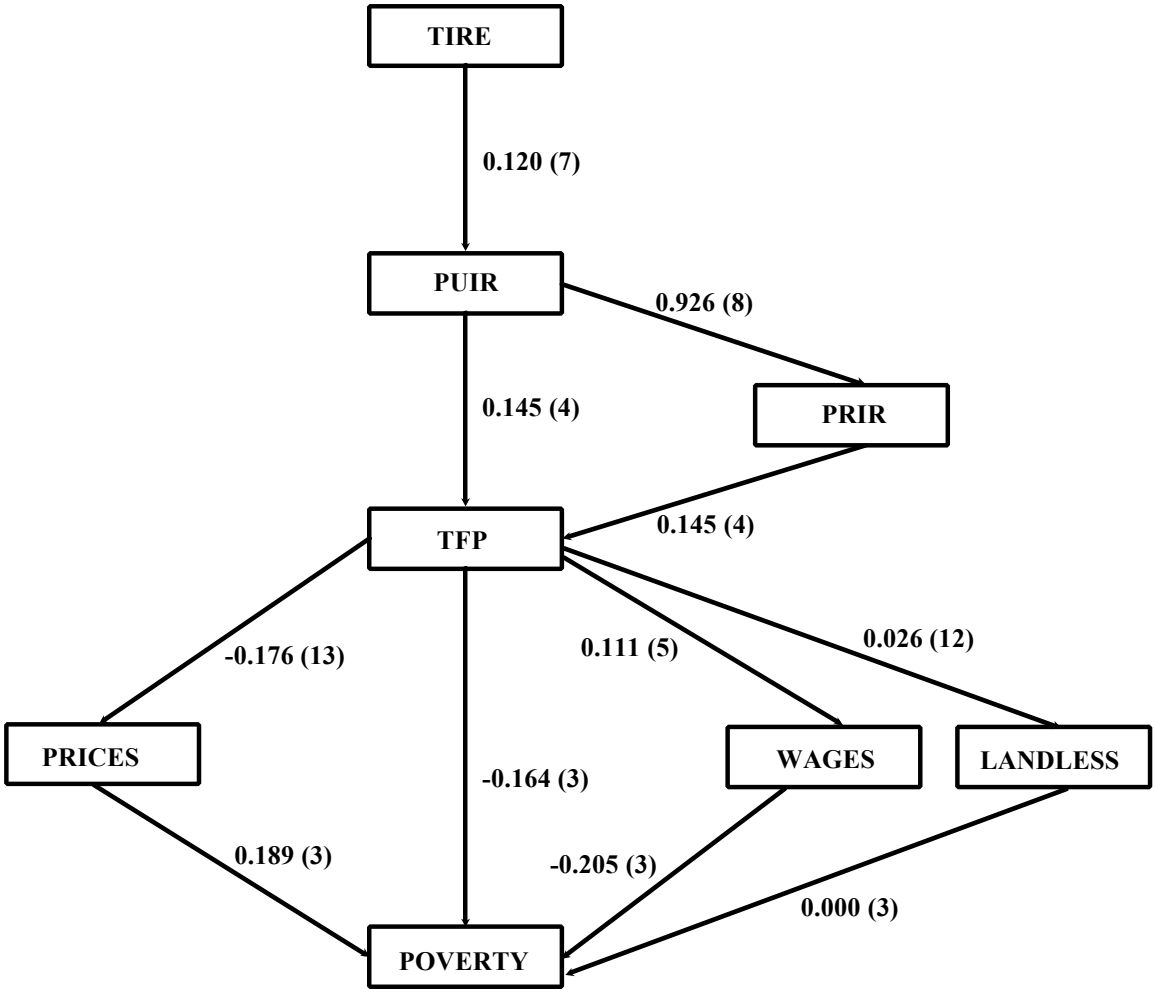



$$\text{Total poverty effects } \frac{dP}{dTRDE} = -0.065$$

**Effects on poverty (%) per billion rupees = -0.48**

**Note: Numbers in parentheses correspond to equation numbers in table 5.**

**Figure 7 Poverty effects of governmental expenditures in irrigation**

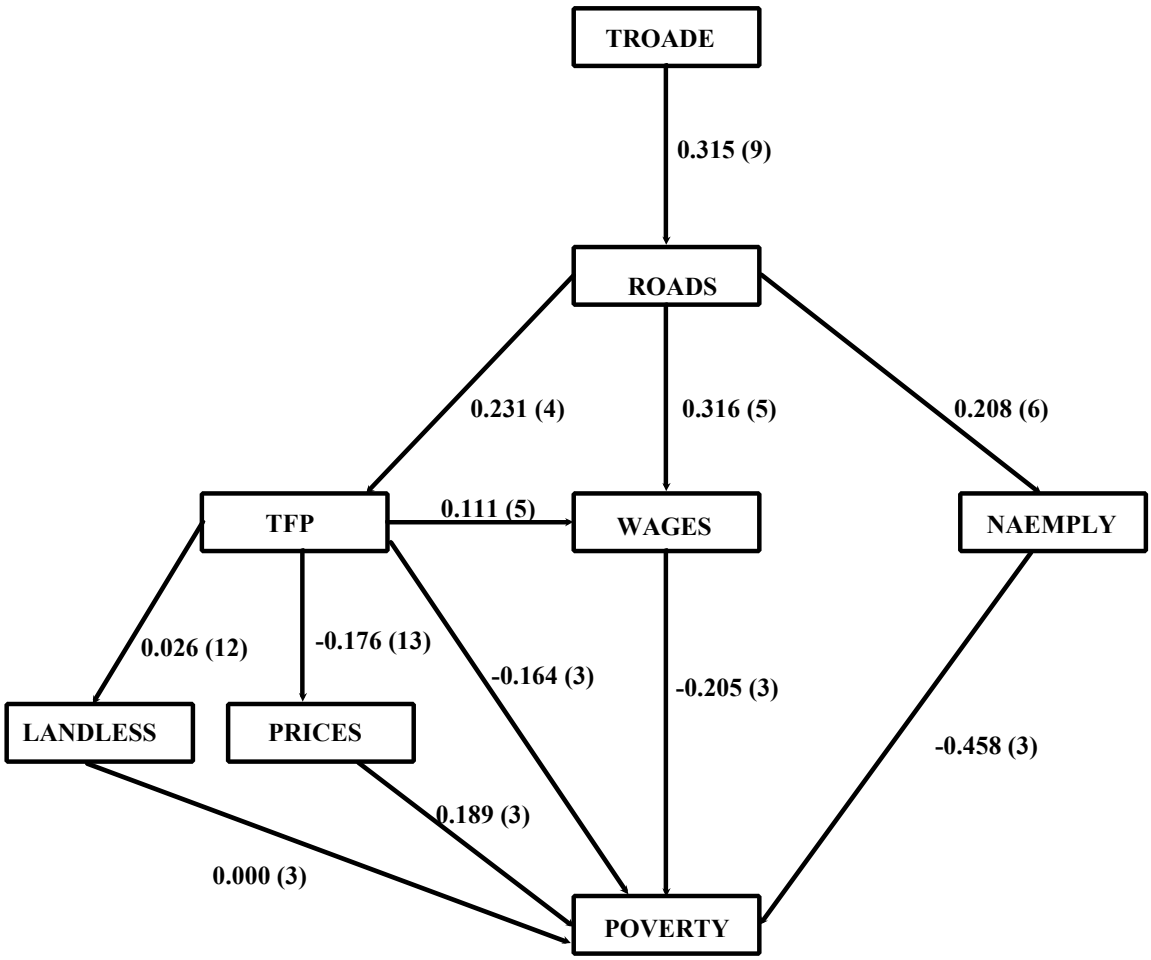



$$\text{Total poverty effects } \frac{dP}{dTIRE} = -0.007$$

**Effects on poverty (%) per billion rupees = -0.04**

**Note: Numbers in parentheses correspond to equation numbers in table 5.**

**Figure 8 Poverty effects of governmental expenditures in roads**

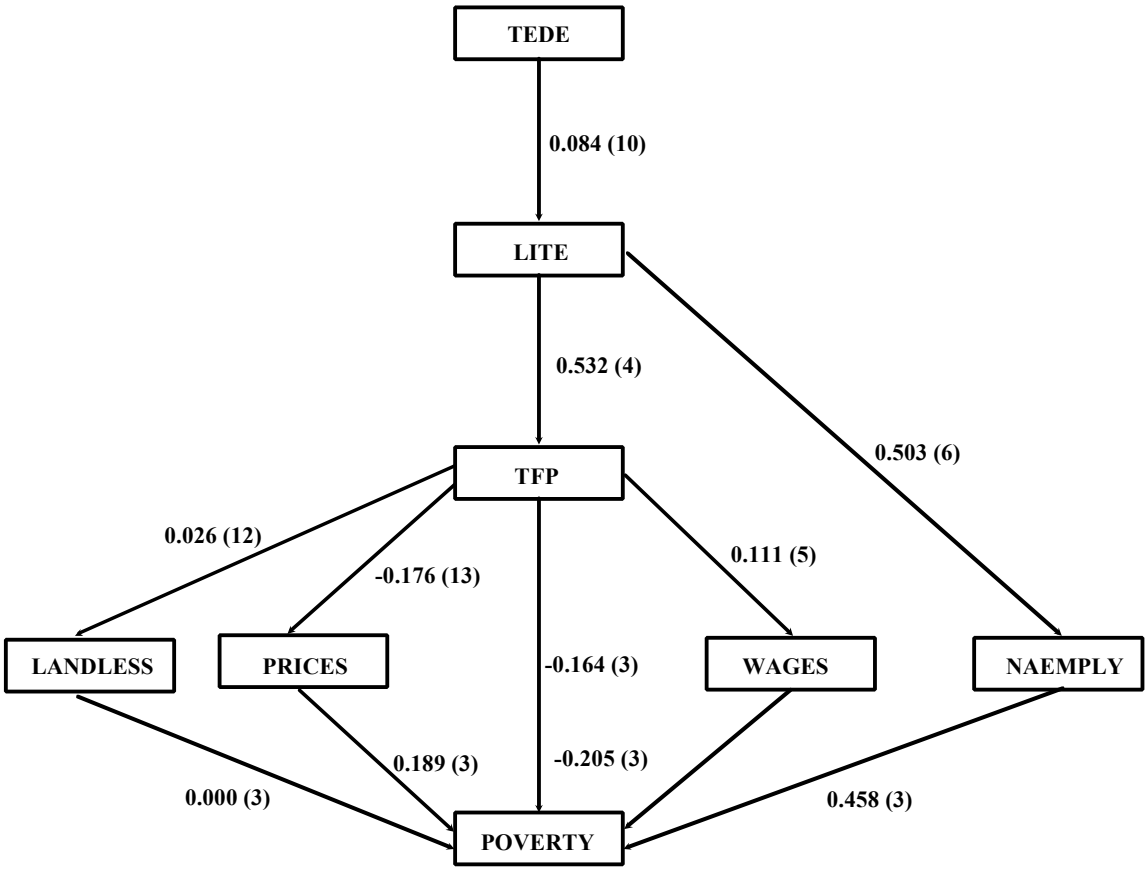



**Total poverty effects** $\frac{dP}{dTROADE}$ **= -0.066**

**Effects on poverty (%) per billion rupees = -0.87**

**Note: Numbers in parentheses correspond to equation numbers in table 5.**

**Figure 9 Poverty effects of governmental expenditures in education**

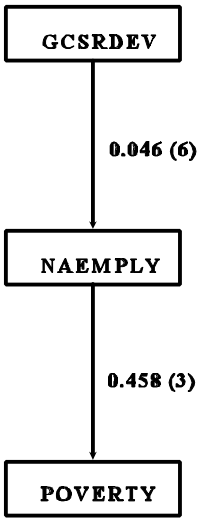



**Total poverty effects** $\frac{dP}{dTEDE}$ **= -0.054**

**Effects on poverty (%) per billion rupees = -0.17**

**Note: Numbers in parentheses correspond to equation numbers in table 5.**

**Figure 10 Poverty effects of governmental expenditures in rural and community development**

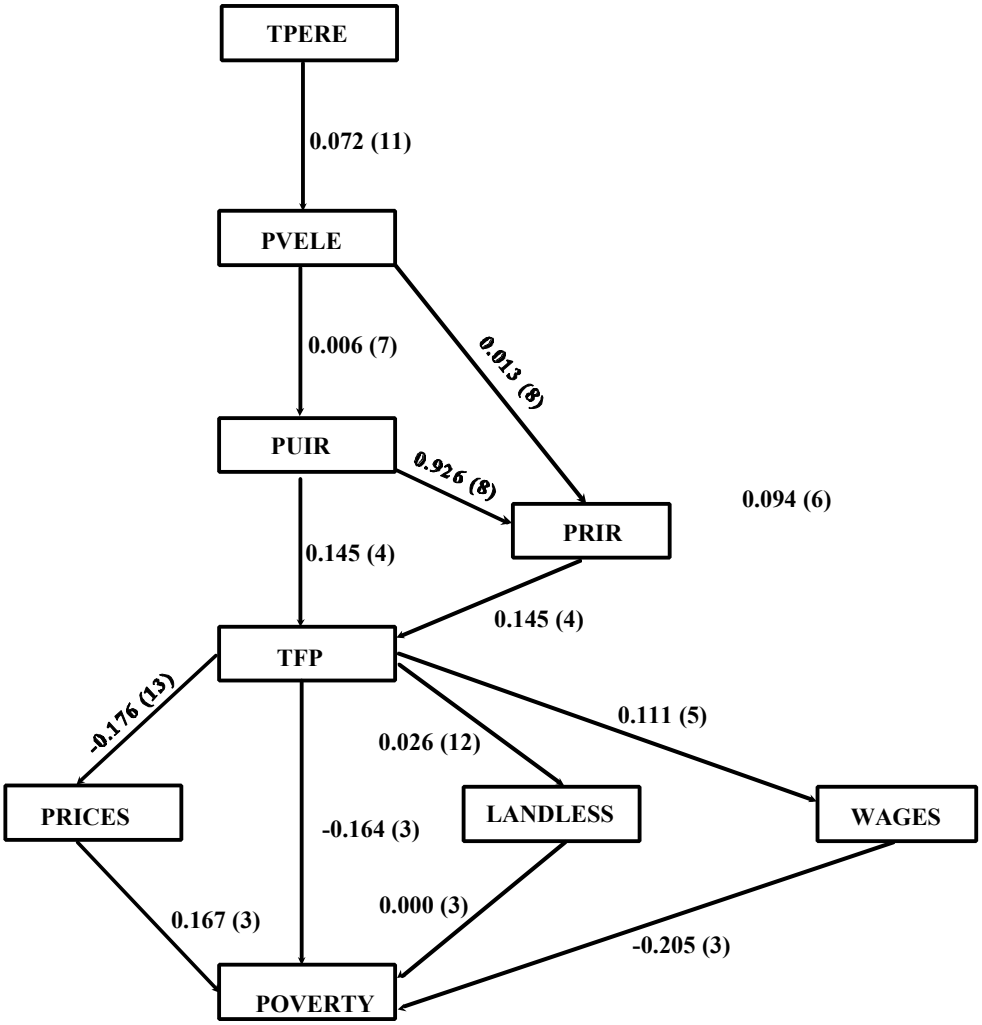



$$\text{Total poverty effects } \frac{dP}{dGCSRDEV} = -0.021$$

**Effects on poverty (%) per billion rupees = -0.15**

**Note: Numbers in parentheses corresponding to equation numbers in table 5.**

**Figure 11 Poverty effects of governmental expenditures in power**

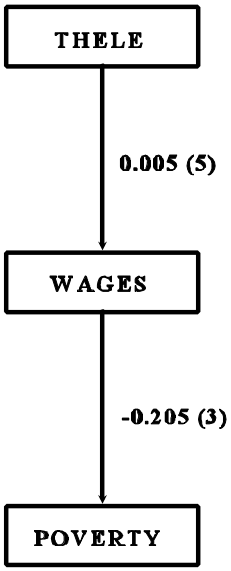



**Total poverty effects** $\frac{dP}{dTPERE}$ **= -0.002**

**Effects on poverty (%) per billion rupees = -0.15**

**Note: Numbers in parentheses correspond to equation numbers in table 5.**

**Figure 12 Poverty effects of governmental expenditures in health**

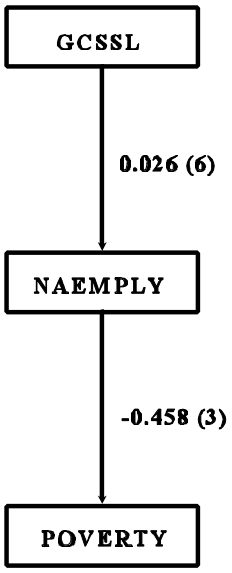



$$\text{Total poverty effects} \frac{dP}{dTHELE} = -0.001$$

**Effects on poverty (%) per billion rupees = -0.02**

**Note: Numbers in parentheses correspond to equation numbers in table 5.**

**Figure 13 Poverty effects of governmental expenditures in soil and water conservation**




$$\text{Total poverty effects} \frac{dP}{dGCSSL} = -0.004$$

**Effects on poverty (%) per billion rupees = -0.035**

**Note: Numbers in parentheses correspond to equation numbers in table 5.**

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