3.1 Introduction

We know that the current level of agricultural income is the function of current agricultural price and current agricultural output. We saw, in the last chapter, that these two variables influence agricultural income in an independent manner and a negative relationship between the current agricultural price and current agricultural quantity is not found to hold in the Indian context. These results are contrary to those in the literature where a negative relationship between agricultural output supply and price is generally perceived.

Underlying the conclusions of the last chapter is the fact that the farm population in India is not a homogenous group. In the Indian context, rural population is usually divided into two broad groups:

   a) net buyers of foodgrains, (first group); and
   b) net sellers of foodgrains, (second group).

The two groups are likely to be affected differently by independently moving agricultural output and price level. In this context, it becomes important to analyze the net effect of changing agricultural price and output level on the two groups of rural population to ascertain their impact on the marketable surplus as well as its
implications for the industrial sector. For instance, a higher agricultural price consumes a larger part of income (wage and non wage) as the food bill of net buyers of foodgrains in the rural population, converting it into income of the surplus-producing farmers, and leaving a smaller share of net buyers' earnings to provide demand for non-agricultural products (Sanyal, 1996, p 622). This is also substantiated by the Graph 3.1 which shows that food grain price paid by the first group of net buyers\(^1\) (i.e., the CPI\(_{AL}\)) and agricultural prices are observed to move closely overtime in India.

This chapter is divided into four sections: Section 3.2 looks at the issues relating to the distributional aspects of agricultural sector of rural resources in India. It also tries to see whether the technological change has played any significant role in altering this distribution structure. Section 3.3 examines the empirical issues concerning price and quantity changes and their implications for the incomes of the two groups of the agrarian population. Conclusions emerging from the chapter are summarized in Section 3.4 at the end.

### 3.2 Distribution of rural resources

In Section 2.2, it was observed that the share of agriculture in domestic product has been falling continuously. The share of farm sector in the work force has also fallen

\(^1\)It is proxied by the consumer price index (food) for agricultural labourers (or CPI\(_{AL}\)).
GRAPH 3.1: Annual Rates of Growth of Agricultural Price and Consumer Price Index (food) for Agricultural Labourers
but at a much slower rate. As a result the *average labour productivity* in this sector has been falling and it stood at about 40 percent of the national average productivity in 1991. This suggests that the output generated year after year in agricultural sector is growing at a pace slower than in other sectors of the economy. In addition, this output is shared by more than two-thirds of the Indian population located in the rural sector. Quite expectedly, therefore, the majority of the Indian poor are located in the low productivity rural sector of the economy.

### 3.2.1 The rural asset distribution

Now, we examine the available evidence, for the purpose of further analysis, to investigate whether the usual grouping of rural population in terms of rural asset distribution for India is verified. The decennial *All India Debt and Investment Survey* published by the Reserve Bank of India is the main source of estimates for assets and liabilities, capital formation, etc., of households (urban as well as rural) at state and all India level. In the survey rural population is divided into two broad categories. First is the 'cultivator' category defined to include all rural households operating some land (defined as 0.005 acre or more). The second category is that of 'non-cultivators' consisting of households operating no land or land less than 0.005 acre. The latter group is further classified into: a) agricultural labourers; b) artisans; and c) others, according to the principal household occupation.

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2Which fetched them maximum earnings in a reference year.
The survey results of 1981-82 show that an overwhelming proportion of rural households, a little over three-fourths, are cultivators and only 24 percent are non-cultivators.

The average value of all items of assets owned by rural households was found to be Rs.36,090. However, there is enormous disparity between the two categories of households with the cultivators owning about 5 times more assets (at Rs. 44,524) compared to non-cultivators households with average asset value at Rs. 8,974. For the rural cultivators households land was found to be the most important asset. For the non-cultivators, on the other hand, land accounted for only about 31 percent of their total assets. Buildings which accounted for a slightly greater share of 39 percent, was the most significant asset for the latter group. As would be expected, the non-cultivators households, in the absence of adequate land for cultivation, pursued other economic activities.

The assets within the rural sector were found to be distributed as follows:
**TABLE 3.1: Percentage Distribution of Assets Owned by Rural Households**

<table>
<thead>
<tr>
<th></th>
<th>LOWEST</th>
<th></th>
<th></th>
<th>TOP</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10%</td>
<td>25%</td>
<td>50%</td>
<td>25%</td>
<td>10%</td>
<td>CR</td>
</tr>
<tr>
<td>ALL INDIA RURAL</td>
<td>.......</td>
<td>.......</td>
<td>.......</td>
<td>.......</td>
<td>.......</td>
<td>.......</td>
</tr>
<tr>
<td>1981</td>
<td>0.4</td>
<td>1.7</td>
<td>9.1</td>
<td>72.3</td>
<td>49.5</td>
<td>0.64</td>
</tr>
<tr>
<td>1971</td>
<td>0.0</td>
<td>1.3</td>
<td>-</td>
<td>74.8</td>
<td>50.7</td>
<td>0.66</td>
</tr>
<tr>
<td>CULTIVATOR</td>
<td>.......</td>
<td>.......</td>
<td>.......</td>
<td>.......</td>
<td>.......</td>
<td>.......</td>
</tr>
<tr>
<td>1981</td>
<td>0.6</td>
<td>2.8</td>
<td>12.0</td>
<td>70.0</td>
<td>46.7</td>
<td>0.5848</td>
</tr>
<tr>
<td>1971</td>
<td>0.6</td>
<td>2.9</td>
<td>12.0</td>
<td>68.4</td>
<td>45.3</td>
<td>0.5847</td>
</tr>
</tbody>
</table>

*Source: RBI (1987), 'All India Debt and Investment Survey - 1981-82', p 6-7.*

**NOTE:** CR, concentration ratio, is based on Gini coefficient which summarizes overall distribution pattern.

The above table shows wide disparities of assets among rural households. The top 10 percent of the rural households own almost half of the assets with the share of top 25 percent at staggering 72 percent plus. In contrast to this, the bottom 25 percent owned a meagre 1.7 percent and bottom 10 percent a paltry 0.4 percent. The survey results for rural cultivator households is only marginally better but not much different. Also, we can notice that there has not been any perceptible shift in the distribution pattern for the rural cultivator households over the period 1971 to 1981.

Thus, we do find supportive evidence for our contention developed above that the farm population in India is not a homogenous group and can be usefully divided into two broad groups. Not only that, this scene has continued without any noticeable
change over the years.

3.2.2 Distribution of gains from Green Revolution

In this sub-section, we examine the impact of new technology on asset distribution and its likely impact in altering the distribution pattern of the rural economy. In this context, first we look at the existing literature in some detail.

The experience of green revolution technology shows that in the early Green Revolution phase (1967/8 to 1981/2) the benefits of gains were confined to regions with assured irrigation. These included Punjab, Haryana, western Uttar Pradesh and parts of Gujarat and Maharashtra. In the opinion of Rao (1994, p 106),

"The main beneficiary of the green revolution technology being the big farmers in developed regions which meant that large parts of the country where small farmers and share-croppers predominate and where wages are low, and where a large part of rural population lives below poverty line, the gains from new technology remained limited until the eighties".

However, since the early eighties (the late green revolution phase), other regions of the country have also benefited from the new technology and experienced faster growth in output.

The agricultural scientists who actively took part in the development of high yielding varieties (HYVs) of seeds were generally of the opinion that the 'seed-fertilizer' based
green revolution technology was basically size-neutral in nature. But the high working capital requirement per unit of output was not taken into account by this line of argument, especially for the small and marginal farmers. Without adequate assets as collateral, the small asset holders were clearly at a disadvantage. The gross inequalities of the credit delivery system meant that the better-off farmers could make relatively more profitable use of new package of measures (Chakravarty, 1987, p 26-7). The government machinery also worked in their favour so far as the identification of 'progressive farmers' was concerned as more often than not this implied selecting farmers who were resourceful in terms of ownership of land and in their command on capital resources (Rao, 1994, p 106).

Thus, we find that although green revolution technology significantly expanded agricultural output, it distributed more than proportionate benefits to the better-off farmers in infrastructurally better endowed regions (Chakravarty, 1987, p 27). The observation by Rao (1975, p 177) in an earlier work also were that the technological change in farm sector was contributing to widening of disparities between different regions, between small and large farms, and between landowners, on the one hand, and landless labourers and tenants on the other.

From the above assessment of rural assets distribution and gains from green revolution technology it is quite legitimate to argue that the two groups are likely to be affected differently by changes in the level of output and price level of the farm sector. The
next section provides some empirical evidence in this respect.

3.3 The empirical evidence and its implications

We saw in Section 2.5 earlier that the price level of the farm sector \( P_{agr} \) moves with the output \( Q_{agr} \) in the long run. The agricultural output and income were also found to be positively associated. The implication of this for the second group (or the surplus-producing cultivators) would be positive in general in so far as their income is concerned (as the current price and current output move together). So, the income effect of output change is positive for this better-off segment of rural population (or the net sellers of food grains). However, the impact for the first group of net buyers of foodgrains is not that straight forward. Because the impact of rising prices and quantities of food grains would affect them in a contradictory manner. The effect of increase in farm prices (especially food prices) is likely to be negative whereas that of rising level of farm output would be positive as the following analysis seems to indicate:

i) The price effect

Note that the price-quantity relationship for the agricultural sector was found to be weak throwing doubts on the usually assumed negative relationship between current output and current price in the Indian context. Here we examine what influences the consumer price index (food) for agricultural
labour (CPI\textsubscript{AL}). Analysis of Gaiha (1989) provides us with some information on this count. He found that CPI\textsubscript{AL} depends on foodgrains output (current and lagged). The lagged variables turn out to be much more important in explaining annual rate of growth in CPI\textsubscript{AL} in his analysis.

We also find from our regression results that annual rate of growth in food prices paid by rural net buyers (CPI\textsubscript{AL}) is influenced significantly by annual rate of growth of foodgrains output level (current as well as lagged):

\[ \Delta \log(\text{CPI\textsubscript{AL}}) = 0.12 - 0.324 \Delta \log(Q_{\text{food}}) - 0.886 \Delta \log(Q_{\text{food}}(-1)) - 0.486 \Delta \log(Q_{\text{food}}(-2)) \]

(t-values): (6.8) (-1.84) (-5.1) (-3.0)

R\textsuperscript{2} = 0.509, adj-R\textsuperscript{2} = 0.453, DW = 1.84

*indicates significance at 10 percent level, @ indicates significance at 1 percent level.

NOTE: \(\Delta\) refers to the first difference.

Quite clearly we find that net change in annual rate of growth of the foodgrains price is dependent on annual rate of growth in not just the current foodgrains output but also of first and second lagged foodgrain output as well. And the impact of first and

---

3 Which is the appropriate variable for the first group’s real income that has relevance for the industrial sector.

4 In brief, CPI\textsubscript{AL} = \( x\{Q_{\text{food}}, Q_{\text{food}}(-1), Q_{\text{food}}(-2)\} \) with all the three negatively influencing the current CPI\textsubscript{AL}.

5 Computed as the log-difference between current and lagged level, a stationary transformation.

6 Data for the CPI for agr labour for FOOD is available only for this period.
second lag are found to be much stronger than the current period effect. A given shortfall in the previous two years' production produces a sharper rise in CPI_{AL} than a current shortfall. Gaiha (1989) attributed this result to the stocks held by private producers and traders and the dependence of these stocks on previous years' production. Buffer stock operations of the government could also be another contributory factor in it as depicted in Graph 2.5 (point already discussed in Section 2.5 earlier).

ii) The output effect

Next, we examine the impact of output on the first (or the net-buyers) group.

a) a higher level of output tends to raise the real wages in the agricultural sector (see Graph 3.2A and 3.2B). Papanek (1988) also found indications of co-movement of rural real wages growth and output growth. The reason of output growth, as we saw in the Section 2.4, has been mainly the productivity growth in the post-1966 period. The real wages (as also the wage rates) are generally found to be positively related to agricultural productivity (Rao, 1994, p 108). The evidence for faster growing regions (e.g., Punjab and Haryana) clearly shows this where the wages are found to be the highest (Papanek, 1988, p 128).
GRAPH 3.2A: Annual Rates of Growth of Agricultural Output and Real Rural Wages

GRAPH 3.2B: Annual Rates of Growth of Foodgrains Output and Real Rural Wages
b) in the years of good harvest, and, therefore, a higher level of agricultural output, there is generally an *expansion in employment opportunities* (Tendulkar, *et al.*, 1996, p 14). As a result an extra demand for labour is generated. The faster growth of agricultural production in the north-western states has also attracted migrant labour on a large scale from the poorest regions of the country in the east and has contributed to the income of the landless poor. This is also likely to have pushed up wages somewhat in the regions of their origin (Rao, 1994, p 108)\(^7\);

The following regression result relating to the *annual rate of growth of real wage* and *annual rate of growth in food grain output* also tends to reinforce the positive association between the two.

*Sample 1954-1983*\(^8\)

\[
\Delta \log(W_{\text{real}}) = -0.006 + 0.384 \Delta \log(Q_{\text{food}}) + 0.238 \Delta \log(Q_{\text{food}(-1)})
\]

(t-values): \((-0.41)\) \((2.6)\) \((1.6)\)

\[R^2 = 0.20, \ \text{adj-}R^2 = 0.145, \ \text{DW} = 2.41\]

Where \(W_{\text{real}} = \text{Rural wages (real)}, Q_{\text{food}} = \text{Food grains output};\)

\(^7\)significant at 15 percent level, \(^8\)significant at 5 percent level.

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\(^7\)However, the literature also suggests that the elasticity of labour with respect to output has been declining. Acharya (1992) shows that it has declined from 0.77 in the 1970s to 0.37 in the 80s. Bhalla (1993) also says that the labour absorptive capacity of Indian agriculture as a whole has declined (Dev and Ranade, 1993, p 17).

\(^8\)All India composite index available only from 1954 to 1983 for real rural wages (Papanek, 1988).

\(^9\)See the Appendix A for details about these data variables.
In this growth form equation we find that although $R^2$ is not very high, the growth in food output is found to be significant with expected positive sign$^{10}$.

c) a higher agricultural growth can lead to higher employment in rural non-farm activities. This happened significantly in the seventies and eighties in the green-revolution phase (Dev and Ranade, 1993, p 17).

Thus, the rise in wages of the net buyers is likely to more than compensate the rise in price of foodgrains for this group and as a result, the net effect of a good harvest is likely to be positive for their incomes$^{11}$.

3.4 Summary of findings

It can be safely concluded from the above analysis that the income of both the population groups is positively influenced by the level of agricultural output. Though, we find that the impact of price is positive for the second group of surplus producing cultivators but negative for the first group consisting of food deficit rural poor$^{12}$.

However, on the whole, the positive effect on real wages along with expanding employment opportunities in farm and non-farm activities in the wake of good harvest

$^{10}$The results with agricultural output growth are also found to be similar.

$^{11}$The above evidence corroborates the weakening of the negative link between farm output growth and rural poverty which operates through price. But in so far as the price ($P_{agr}$ or $P_{fgl}$) has been moving independently of current output level, this is possibly the overall consequence, for the poorer agrarian section of the population, of encouraging food (or farm) production at rising prices.

$^{12}$Consisting of agricultural labourers, small and marginal farmers.
year is likely to outweigh the negative price effect on the purchasing power of the first (net buyers) group.\(^{13}\)

Thus, on the output side, the impact of distribution of agricultural income among the two groups would be positive for the industrial sector. However, so far as the price level is concerned the net impact is likely to depend on a host of factors as we observed in the last section. It is likely to be positive so far as the second group is concerned as their income would rise and, besides, their propensity to consume industrial products is also generally much higher. In contrast, the impact is likely to be negative on the first group as their purchasing power tends to fall with the rising farm prices. However, rise in the real rural wages, as we saw, on average compensates the increasing agricultural prices. So, on the whole, we would expect a positive influence of farm income on industrial sector output. However, the agricultural price and output need to be used independently in explaining their relationship with industrial sector. This is attempted in the next chapter of the present study.

\(^{13}\text{We saw that the rising level of productivity has been the main reason for rising output growth in the post-green revolution period in Section 2.3 and we also observed that real wages respond positively to rising productivity.}\)