Land is a factor of production and is a gift of the nature whose supply is fixed or limited. By nature, the supply of this factor of production is mostly inelastic and is beyond the control of farmers. So from the point of view of economic development optimum use of this scarce resource (i.e. land) is essential. In the free market economy, allocation of factors of production to different productive uses depends on the price level of the products. The farmers are most sensitive to change in prices of the agricultural products, which they produce, by adjusting their acreage under various crops. The agricultural prices play an important role in the allocation of land among the different crops. Though there are different and numerous factors which affect the area under different crops e.g., weather, rainfall, yield rate, yield of the competing crops, price of the crop, prices of competing crops, gross income from the crop, change
in pattern of consumption from coarse to superior, availability of the improved seeds, pesticides and manures, market facilities, credit supply, knowledge of developed agricultural technology, cost of cultivation, etc. Among these factors the prices of agricultural products is a very significant factor which affects the acreage under the crops.

Several attempts have been made by different researchers to study the responsiveness of farmers to change in prices by making adjustments in allocation of limited land to different crops. There are different opinions about which prices affect the decision of farmers regarding distribution of land among different crops. These views are: whether the farmers respond to absolute prices or to relative prices; harvest prices or to average wholesale prices. Some studies conducted on acreage response to price change have considered absolute prices while other studies considered relative prices. So there is not any specific answer to the question that which prices should be considered for the analysis of farmer’s response. Further, there should be a proper economic justification for such a price selection.
Several econometric models have been developed and used in studying the acreage response of farmers to price changes. But the most commonly used price expectation model is "current year price model" in which one year lagged prices are used. This model is proved to be very efficient for price prediction and therefore has been adopted in several earlier studies. There are different methods which have been adopted in different studies for taking into account the lagged prices e.g., annual average price of preceding year, three-month average of pre-sowing prices, average of prices prevailed in three preceding years, three-month average of post-harvest prices, three-year average of post-harvest prices, etc.

In this chapter an attempt is made to gauge the impact of change in prices of some selected agricultural products on the pattern of land distribution among the different crops. The price movements of wheat, jowar, paddy, gram, tur, groundnut and gur (sugarcane) and their effects on area under these crops are studied in this present chapter. The crop
chillies is not considered in this chapter as there is no adequate data available on area under this crop in Nanded district.

In the present study "the current year price model" is adopted to analyse the data and the 12-month average wholesale prices of the preceding year are taken into account. It means the arreages under different selected crops in a year stand against the corresponding average prices of these crops for the preceding year. The effect of the change in prices on area is examined from two angles: (1) the prices of selected commodities and their influence on the acreage under the respective crops, and (2) effects of the change in prices of competitive crops on the area under a particular crop.

The data on yearly prices of and acreage under selected crops are considered at taluka level. The data on area under different selected crops is given in tables 1 to 7 (Appendix II). One year lagged prices are considered against the current year acreages. It means the prices of selected crops for the years from 1967-68 through 1986-87 are taken against the acreages of the respective crops for the years from 1968-69 to 1987-88.
The yearly price data of different crops relate to the marketing year which begins in October and ends in September. Whereas the data on area under different selected crops relate to the agricultural year i.e; June to May.

Effect of Absolute Prices on Area Under Crops:

From the observation of data on prices and areas it is clear that there have been year-to-year variations in the price and area of all selected crops in the region under study. This is studied by calculating co-efficients of variation for both area and price. These co-efficients of variation are presented in Table 1. This table reveals that the variations in acreage under wheat and groundnut crops are higher than the variations in prices in all the taluka of Nanded district with the exception of groundnut crop in Mukhed taluka. Further, the variations in area under wheat and groundnut are also higher than the variations in area under other selected crops. On the other hand, the variations in area under the crops jowar and tur are lower than the variations in their own prices. Moreover,
Table 1
Table showing co-efficients of variation in lagged yearly prices and current areas of selected agricultural commodities in different talukas of Nanded District.

<table>
<thead>
<tr>
<th>Markets</th>
<th>Wheat</th>
<th>Jowar</th>
<th>Paddy</th>
<th>Gram</th>
<th>Tur</th>
<th>Groundnut</th>
<th>Sugarcane</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P</td>
<td>A</td>
<td>P</td>
<td>A</td>
<td>P</td>
<td>A</td>
<td>P</td>
</tr>
<tr>
<td>Nanded</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>30.32</td>
<td>47.52</td>
<td>16.64</td>
<td>10.96</td>
<td>19.22</td>
<td>25.88</td>
<td>49.21</td>
</tr>
<tr>
<td>Kandhar</td>
<td>29.99</td>
<td>66.78</td>
<td>10.22</td>
<td>4.81</td>
<td>22.62</td>
<td>23.9</td>
<td>46.68</td>
</tr>
<tr>
<td>Biloli</td>
<td>30.18</td>
<td>46.25</td>
<td>23.16</td>
<td>27.3</td>
<td>25.74</td>
<td>26.93</td>
<td>50.19</td>
</tr>
<tr>
<td>Degloor</td>
<td>29.95</td>
<td>41.21</td>
<td>19.26</td>
<td>11.96</td>
<td>24.64</td>
<td>17.47</td>
<td>51.43</td>
</tr>
<tr>
<td>Bhokar</td>
<td>31.56</td>
<td>60.81</td>
<td>24.62</td>
<td>19.27</td>
<td>31.16</td>
<td>15.99</td>
<td>50.35</td>
</tr>
<tr>
<td>Mukhed</td>
<td>30.73</td>
<td>59.65</td>
<td>23.53</td>
<td>6.07</td>
<td>24.52</td>
<td>24.38</td>
<td>50.03</td>
</tr>
<tr>
<td>Nanded</td>
<td>30.63</td>
<td>45.48</td>
<td>18.69</td>
<td>7.7</td>
<td>26.01</td>
<td>19.96</td>
<td>50.02</td>
</tr>
<tr>
<td>District</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: A = Arrival, P = Price, a = Maximum, b = Minimum.
variations in area under jowar and tur are lower than the variations in area under all other selected crops with the exception of jowar in Biloli taluka. The cultivated area under jowar is found to be larger and next to this under tur crop than area under all other individual selected crops. But the lowest variations in area are found for jowar and next this for tur, which reveals perverse relation between size of cultivated area and variation in its price. It means farmers' behaviour to adjust area under these crops is mostly rigid because these crops are the main food articles of the people in the district. Therefore, the variations in area under these crops viz., jowar and tur, are the lowest. In the case of paddy, gram and sugarcane, variations in area under these crops are higher than the variations in their prices in some talukas and are lower than their price variation in other talukas. But the general picture at the aggregate level is that the variations in area under these crops are lower than the variations in their prices.

To gauge the response of farmers to change in prices one way is to work-out the co-efficients of
correlation between one year lagged price and acreage under the crop. These co-efficients of correlation are calculated for selected crops and presented in table 2. In the case of gram, tur and groundnut, it is found that the correlation co-efficients are negative, which indicate inverse relation between lagged price and current area under these crops. This result is found for all the talukas of the Nanded district. It means that the farmers respond negatively to change in prices by rearranging the area under these crops. There is exception of tur crop in Nanded taluka where the correlation co-efficient has a positive value (i.e. 0.068), however, it is not significant. Positive co-efficients of correlation with poor values are found for wheat in Bholi, Bhokar and Mulhed talukas and for paddy in Negloor, Bhokar and Mulhed talukas. However, the picture at the distirict level was opposite, that is, the correlation co-efficients for these crops have negative values. It indicates the absence of farmers’ response to change in prices of these crops.
Table 2

Table showing co-efficients of correlation between lagged prices and current areas of selected agricultural commodities in different talukas of Nanded district.

<table>
<thead>
<tr>
<th>Markets</th>
<th>Wheat</th>
<th>Jowar</th>
<th>Paddy</th>
<th>Gram</th>
<th>Tur</th>
<th>Groundnut</th>
<th>Sugar</th>
<th>cane</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nanded</td>
<td>-0.057</td>
<td>-0.074</td>
<td>-0.831</td>
<td>-0.818</td>
<td>0.068</td>
<td>-0.490</td>
<td>0.017</td>
<td></td>
</tr>
<tr>
<td>Kandhar</td>
<td>-0.149</td>
<td>0.035</td>
<td>-0.523</td>
<td>-0.723</td>
<td>-0.452</td>
<td>-0.706</td>
<td>-0.450</td>
<td></td>
</tr>
<tr>
<td>Biloli</td>
<td>-0.004</td>
<td>0.401</td>
<td>-0.038</td>
<td>-0.774</td>
<td>-0.327</td>
<td>-0.781</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>Degloor</td>
<td>-0.222</td>
<td>0.544</td>
<td>0.308</td>
<td>-0.664</td>
<td>-0.567</td>
<td>-0.774</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>Bhokar</td>
<td>0.280</td>
<td>0.246</td>
<td>0.296</td>
<td>-0.259</td>
<td>-0.598</td>
<td>-0.717</td>
<td>0.354</td>
<td></td>
</tr>
<tr>
<td>Mukhed</td>
<td>0.188</td>
<td>0.004</td>
<td>0.540</td>
<td>-0.641</td>
<td>-0.209</td>
<td>-0.799</td>
<td>0.289</td>
<td></td>
</tr>
<tr>
<td>Nanded</td>
<td>-0.205</td>
<td>0.116</td>
<td>-0.256</td>
<td>-0.835</td>
<td>-0.74</td>
<td>-0.874</td>
<td>0.16</td>
<td></td>
</tr>
</tbody>
</table>

| District |        |       |       |      |     |          |       |      |
|          |        |       |       |      |     |          |       |      |


In case of jowar and sugarcane, there has been a positive relation between their lagged prices and current area under them in Nanded district with the exception of jowar in Nanded taluka and sugarcane in Chandrapur taluka. At the district level, the co-efficient of correlation for jowar is found to be 0.116 and for sugarcane it is 0.160. These co-efficients are not significant. These positive correlation co-efficients, no doubt, reveal that there is positive co-variation of area with the price but it is so weak that we cannot say that the area under these crops has increased only due to increase in prices. Because there are some other dominant factors which affect the area under these crops. Since jowar is a main cereal food of the people in this district, the demand for it has been increasing over the period of time due to increasing pressure of population. To meet this increased demand for jowar farmers have brought more and more area under jowar cultivation in this district. Sugarcane is an irrigated crop with one years duration. Its cultivation mainly depends on the availability of irrigation facilities. The area under sugarcane in the district has increased
with the increase in price of gur. But it is more true that the area under sugarcane mostly depends on availability of irrigation rather than the price of gur.

The farmers’ response through readjusting area to change in price of selected crops is most rigid in Kandhar taluka, followed by Nanded, Bulbuli and Degloor talukas. In Kandhar taluka, excluding only jowar crop, all other crops have negative correlation co-efficient. In case of Nanded (except tur and sugarcane crops) Bulbuli (except wheat and jowar crops) and Degloor (except jowar and paddy crops) talukas, area under all selected crops is negatively related to their own prices. It reveals that area under a crop in these talukas has not increased when their prices tended to increase. But in case of Bhokar and Mulhed talukas area under four crops out of seven crops have positive relation with their own prices. It means cultivators of these talukas are most sensitive to change in prices of crops.
Further, to precise the relation between change in price and change in area under the crop, the straight-line trend is fitted which would indicate a long-term tendency of prices and area. The trend values of selected crops for different talukas are presented in Table 3. The price and area of individual selected crops have shown different trends in different talukas of Nanded district. However, at the district level it is found that in case of wheat, paddy, gram, tur and groundnut, prices have shown an increasing trend whereas areas have shown the decreasing trend. It means that increased prices of these crops could not brought increase in area under them. There has been an inverse relation between the areas under these crops and their own prices. In case of jowar and qur (sugarcane), both prices and areas have increased over the study period, indicating a positive relation between them. These results are supported by the same results which we have obtained from co-efficients of correlation between areas and prices presented in Table 7.
Table 3

Table showing the trends in prices and areas of selected agricultural commodities in different talukas of Nanded.
(1968 to 1987)

<table>
<thead>
<tr>
<th>Markets</th>
<th>Wheat</th>
<th>Jowar</th>
<th>Paddy</th>
<th>Gram</th>
<th>Tur</th>
<th>Groundnut</th>
<th>Sur</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P</td>
<td>A</td>
<td>P</td>
<td>A</td>
<td>P</td>
<td>A</td>
<td>P</td>
</tr>
<tr>
<td>Nanded</td>
<td>7.71</td>
<td>3.51</td>
<td>1.24</td>
<td>-75.41</td>
<td>9.95</td>
<td>-56.00</td>
<td>19.55</td>
</tr>
<tr>
<td>Bilehi</td>
<td>6.92</td>
<td>-38.65</td>
<td>3.70</td>
<td>1321.87</td>
<td>9.37</td>
<td>221.53</td>
<td>16.56</td>
</tr>
<tr>
<td>Degloor</td>
<td>7.27</td>
<td>-33.32</td>
<td>3.85</td>
<td>113.00</td>
<td>7.86</td>
<td>45.45</td>
<td>17.47</td>
</tr>
<tr>
<td>Bhokar</td>
<td>7.80</td>
<td>44.01</td>
<td>3.29</td>
<td>673.24</td>
<td>9.06</td>
<td>74.01</td>
<td>17.09</td>
</tr>
<tr>
<td>Mukhed</td>
<td>7.49</td>
<td>108.98</td>
<td>5.03</td>
<td>168.83</td>
<td>7.52</td>
<td>67.73</td>
<td>19.95</td>
</tr>
</tbody>
</table>

Note: P = Price, A = Area.
Effect of Relative Prices on Area Under Crops:

The present part of this chapter is devoted to study the farmers' response to changes in prices of competitive crops, that is, response to change in relative prices. Area under a particular crop is not affected only by its own price but it is also influenced by the prices of competing crops. So the impact of change in prices on area can not be judged only by the price of that particular crop alone. It should be studied in the relative terms also as to how far the area under a crop responds to prices of its competitive crops. Among the selected commodities in the present study, jowar, paddy, tur and groundnut are the kharif crops. Paddy crop requires higher rainfall which is not necessary to any other selected kharif crop. So there is no close substitute crop for paddy amongst the selected crops. And area under paddy mainly depends on rainfall. Jowar and tur are competitive crops because they can be cultivated on the same quality lands and in the same season. Further, they are the main foodgrain crops in the district and have covered a larger part of the area.
under the foodgrain crops. Tur and groundnut crops may also be substitutes to each other in the sense that they are produced in the kharif season and require normal rainfall. As well as these crops help the farmers to earn income to meet their financial requirements. So here an attempt has been made to study the area response to the change in relative prices. The prices of jowar have been deflated by the prices of tur, and area under jowar has been deflated by area under tur. Similarly the relative prices and relative areas are obtained for tur and groundnut also. Then the data on prices and acreages are converted into index numbers. By using these data the relation between relative prices and relative areas has been examined by fitting straight-line trend which is shown in table 4. In case of jowar (for which tur has been considered as the competing crop) it is found that the relative prices have a declining trend for all the taluksas, whereas the relative areas have an increasing trend (with the exception of Nanded taluka). The average picture at the district level is that the relative prices have declined by Rs. 3.75 per year and relative area has increased by 3.32 hectares per year over the study period. This clearly indicates that the
Table 4

Table showing trend and co-efficients of correlation between relative prices and relative areas of competing crops in different talukas of Nanded district.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nanded</td>
<td>-4.57 -0.28 0.13</td>
<td>0.38 22.85 -0.18</td>
<td>-2.54 11.16 -0.51</td>
</tr>
<tr>
<td>Kandhar</td>
<td>-5.03 6.24 -0.75</td>
<td>1.51 48.45 0.21</td>
<td>-2.74 33.85 -0.47</td>
</tr>
<tr>
<td>Buloli</td>
<td>-3.47 2.40 -0.07</td>
<td>-0.05 22.72 -0.22</td>
<td>-2.66 8.06 -0.08</td>
</tr>
<tr>
<td>Degloor</td>
<td>-4.61 3.10 -0.24</td>
<td>-0.08 38.36 0.03</td>
<td>-2.93 3.03 -0.08</td>
</tr>
<tr>
<td>Bhokar</td>
<td>-4.51 3.84 -0.26</td>
<td>-0.21 2.60 -0.14</td>
<td>-2.53 1.74 -0.25</td>
</tr>
<tr>
<td>Mukhed</td>
<td>-4.45 1.47 -0.48</td>
<td>0.80 132.75 -0.10</td>
<td>-2.79 34.27 -0.50</td>
</tr>
<tr>
<td>Nanded District</td>
<td>-3.75 3.32 -0.48</td>
<td>0.07 38.08 -0.07</td>
<td>-2.74 7.08 -0.46</td>
</tr>
</tbody>
</table>
relative area of jowar is negatively related to its relative price. To precise the relation between relative area and relative price we have also calculated the coefficients of correlation between relative area and relative price of jowar (table 4). These correlation coefficients have negative values with the exception of Nanded taluka. These coefficients of correlation have also supported the same result that the relative area of jowar is inversely related to its relative price.

Relative price and relative area of tur (taking groundnut as its competing crop) have shown different trends in different talukas over the study period (table 4). In Nanded, Pandhar and Mukhed talukas, relative price and relative area have shown an increasing trend. In Biloli, Degloor and Bhokar talukas, relative prices have shown a decreasing trend but relative area has shown an increasing trend over the period under consideration. At the district level, both relative price and relative area have shown increasing trend. Co-efficients of correlation between relative area of tur and its relative price are found to have
positive values in Kandhar and Degloor talukas, and negative values in Nanded, Buloli, Bhokar and Mukhed talukas. But all these correlation co-efficients are not significant. It reveals that there is a poor effect of relative prices on relative area under tur crop.

There is a high degree of substitution between wheat and gram, because both are rabi crops often cultivated on the same quality of land and in the same region having moderate rainfall and mild cold weather. Therefore, they are considered as the competing crops to each other for studying the degree of responsiveness of area under these crops to the changes in their relative prices. The data on relative price and relative areas are also obtained by the same way, that is, the price and area of wheat is deflated by price and area of gram respectively. Further, these relative price and relative area data are converted into the index numbers. The straight-line trend fitted for these data which is presented in Table 4 shows that relative prices have declined whereas relative area of these crops has increased over the period in all talukas of Nanded district. It reveals that the area under wheat (when
gram is considered as its competing crop) is not affected by its relative price. The co-efficients of correlation have also indicated the negative response of relative area under these crops to their relative prices.

In short, there is a negative response of farmers to the absolute prices of the selected crops as well as to their relative prices. This finding is obtained for the selected food crops as they are the main subsistence food crops required to farmers for home consumption. In this district, cultivation is performed mainly to produce for home consumption. When the nature of agriculture is subsistence oriented, the impact of price factor on area is not significant. The farmers are induced to increase production of these subsistence crops as they are essential for self-consumption. They will shift the area under such food crops for whom weather and rainfall are favourable. In the advanced countries, where the agriculture is market oriented, the prices of agricultural products become a dominant factor in determining the area under different
crops. But in subsistence agriculture, it is not so. The climate, rainfall and weather conditions are the stronger determinants of area under the foodgrain crops than the price factor.

The farmers' response to change in prices is different in case of cash crops and for food crops. Dharam Narain has pointed that in case of foodgrain crops rainfall assumes that status which prices does in case of cash crops. It means that area under the foodgrain crops is not affected by the changes in their prices as the area under cash crops. The study held by the NCAER supported the results drawn by Dharam Narain that the degree of responsiveness of area under foodgrain crops to change in prices is low and in most of the cases insignificant.

In brief, firstly it is found that the variations in the area under the crops jowar and tur, which are the main cereal crops, are lower than the variations in their prices and the variations in area under the other selected crops. Secondly, among the selected crops, area under food crops is not affected by
their prices over the study period. Similarly, response of relative area to relative price is negative. This clearly indicates that the area under food crops is not influenced by their absolute prices as well as relative prices.