CHAPTER VIII

CONCLUSIONS, PROBLEMS AND SUGGESTIONS.

8.1 CONCLUSIONS.

8.2 AGRICULTURAL PROBLEMS OF THE STUDY REGION.

8.3 SUGGESTIONS.
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CONCLUSIONS PROBLEMS AND SUGGESTIONS.

In the previous chapter some aspects of selected village of karmala and Madha viz. irrigation, livestock, agricultural implement, the general landuse, agricultural landuse and problems of selected villages have been discussed. Agricultural regions of the study area also discussed in the previous chapter.

The purpose of this chapter is to sum-up main conclusions of the study (presented in the previous second to seventh chapter) to get comprehensive view on the bases of these conclusions. An attempt is also made to discuss the agricultural problems. Suitable suggestions are also made in this chapter, to change the existing situation and there by to achieve agricultural development in the study region.

1) Physiography of the study region is simple. It is also known as Maharashtra plateau. Except some small hillocks and river basins majority part of the district comes under plateau region. Hilly tracts are not useful for the agricultural activities. They have rugged topography and steep slope. The region under study has a major eastern portion under flat topography. Hence, it supports high concentration of agricultural activities, while the western part of the
district comes under hilly and rugged to topography, it possesses the low concentration of agricultural activities. Agricultural activities are highly concentrated in the river basins of Bhima, Nira, Man, Sina and Bhogavati.

2) Five rivers flow in the Solapur District. These rivers also influence on agricultural structure. Bhima, Sina, Nira, Man and Bhogavati rivers provides water to the agriculture. Ujani project is constructed over Bhima river. This project provides water for irrigation to the crops of Malshiras Madha, Pandharpur, Mohol, Mangalweda etc. Talukas, Various lift irrigational schemes are also practiced on the rivers of Sina, Man, Nira, Bhima, and Bhogavati. These rivers have changed cropping pattern and cultural aspects of the district.

3) Agro-climatically, the entire district except Akkalkot taluka falls in the shadow zone. Entire district except irrigated tract of Malshiras, Pandharpur, Mohal, Mangalweda, Madha comes under drought prone area. Most of the agriculture depends on monsoon rainfall. The south - west Monsoon is the pivot around which almost the entire farm life and economy swings. The western part of Malshiras, Most part of the Sangola, central part of Madha, North Karaul, Eastern part of the Barsi, western and south western part of Pandharpur taluka always gets moderate rainfall and suffers from
water facilities in the month of May. Therefore, agricultural development is very less in above mentioned areas.

4) Soil is an important factor for the development of agriculture. The region under study has black and loamy soil in eastern part and murad soil in the western part. Only river basins have deep black soil which support to the agricultural development. Soils in all talukas of the district are having low percent of Nitrogen and potash. Agriculture is developed in the region of deep and Medium black soils because they are having huge irrational facilities.

5) The total area under forest to the geographical area is only 2.51%. The forests are scattered and thorny. Their role in the rainfall distribution is not important. The forest area should be increased to maintain environmental balance of the study region.

6) Nira right bank canal and Ujani project plays an important role in Solapur district. Nira right bank canal provides water for irrigation to the 41 Villages of Malshiras taluka, 26 villages of Pandharapur and 10 Villages of Sangola taluka. The area irrigated by Nira right bank canal is about 37069 hectares consisting of cash crops like sugarcane, cotton, fruits, groundnut, Jowar, Bajara, wheat etc. As far as the Solapur district is concerned the command area of Ujani project covers eight talukas viz., Madha, Malshiras, Pandharpur, Mohol, Margalwada, Akkalkot, North Solapur and South Solapur. At present
seven talukas are getting benefit of Ujani dam for irrigation except Akkalkot. During 1992-93 133985 hectares off land Ujani Project the yield of every agricultural crop is increased to a greater extent.

7) There are 10 medium irrigation projects in the study region. Six projects are completed and four are in progress. These projects are providing water to 18818 hectares of land of Pandharpur, Mohol, Mangalweda and South Solapur talukas.

8) Table 3.4. indicates that 56 Minor irrigation tanks were completed up to the end of seventh five year plan. These Minor projects have created 21412 hectares irrigational potentials in all talukas except Pandharpur. There was no single Minor project in Pandharpur up to the end of seventh five year plan. These minor schemes are giving benefits of irrigation to the 56 villages of the region. Most of the schemes have changed cropping pattern of concerned villages. Talukas like Barsi, Karmala and Akkalkot have got more advantage of Minor irrigation schemes because nearly 55 % tanks are located in these three talukas.

9) Table 3.5 indicates that these was not a single Kolhapur type bandhara in Barsi, Akkalkot, and Karmala up to the end of seventh five year plan. Government of Maharashtra has constructed 17 bandharas in different talukas of study area and 26 bandharas are in progress. Sixty bandharas are sanctioned for eight five year plan. At
present 24793 hectares irrigational potentials are created by the Kolhapur type bandharas in the region.

10) During 1990-91 there were 91328 irrigational wells in the district. Table 3.8 reveals that out of the total wells nearly 76.33 % wells were found in Akkalkot, Malshiras, Madha, Pandharapur, Mohol, and Barsi, only 23.67 % wells were concentrated in North-Solapur, South-Solapure, Sangola, Mangalweda and Karmala. Most of the wells are dry in the summer season except the wells which comes under the jurisdiction of Ujani dam, Nira right bank canal and Minor irrigation projects.

11) Table 3.9 reveals that Malshiras taluka has the highest percentage of net irrigated area to net area sown i.e. 55.74 % where as the shares held by Pandharapur, Karmala, Barsi, Sangola, Mohol, Karmala, Barsi, Sangola, Mohol, Akkalkot, Madha, Mangalweda, South-Solapure and North-Solapur talukas were 38.37 %, 17.31 %, 16.7 %, 15.28 %, 12.28 %, 7.7 %, 7.37 %, 7.36 %, 7.24 % & 6.02 % respectively during 1990-91.

12) It is clear from the table 3.9 that North Solapur, Akkalkot and Madha talukas have recorded negative change (below 2 %) in percentage of net irrigated area to net sown area between 1960-61 and 1990-91 On the other hand other talukas have recorded positive change in percentages of net irrigated area to net sown area from
1960-61 to 1990-91. The highest positive change (above 27 %) was found in Malshiras while, the lowest positive change (1.64 %) was took place in Sangola from 1960-61 to 1990-91.

13) The irrigated area was increased by 205.5 %, 196.57 %, 183.33 %, 93.88 %, 92.11 %, 119.08 %, 92.5 % and 58.21 % in South Solapur, Pandharpur, Mangalweda, Karmala, Madha, Barsi, Malshiras and Sangola respectively from 1960-61 to 1990-91. It was decreased by 27.2 % in North Solapur and 16.78 % in Akkalkot from 1960-61 to 1990-91.

14) In 1991 the highest agricultural density of population was observed in Malshiras taluka (115) followed by Pandharpur taluka (106). Map 3.8 reveals that agricultural density of population has shown an increasing trend from 1961 to 1991. In 1991 Mangalweda taluka was recorded the lowest agricultural density (52) of population.

15) Table 3.14 reveals that the caloric density of population has increased in every taluka. The caloric density of population has increased more than times in North Solapur Malshiras, Pandharpur, and Barsi from 1961 to 1991. The highest caloric density (364) was recorded in Malshiras while, the lowest caloric density (143) of population was found in Mangalweda in 1991.
16) Female literacy rate is comparatively lower than that of male. Table 3.18 indicates that North Solapur, Barshi, and Madha have higher male and female literacy rates, while remaining eight talukas have comparatively lower literacy rates. The female literacy is low due to (I) general backwardness of female in different spheres of social life and discriminatory treatment given to them in schools, II) traditional jobs or agricultural labours, women are working in their tradional jobs as agricultural labours. III) The low economic conditions of the study region do not permit female education.

17) The proportion of Bovines in the total livestock has decreased from east to west and high (above 54%) in the east comprising the talukas North-Solapur, South Solapur and Akkalkot. It ranges between 41 to 54% in Mohal, Madha, Karmala and Pandharpur. The proportion is low (below 39%) in Sangola, Mangalweda and Malshiras talukas. The proportion of Bovines has increased to about 2% in Pandharpur 30% in Akkalkot. The highest negative change (above 15%) was found in Karmala, while, the lowest negative change (below 3%) was noticed in Sangola from 1961 to 1992.

18) The proportion of the cattle has decreased throughout the region and region as a whole noticed decrease by 13.89%. Above 15 to 20% decrease is recorded in North-Solapur, Mohal, Madha, Karmala,
Barsi and Mangalweda talukas between 10 to 15% in Akkalkot and South Solapur. In talukas like Malshiras, Sanglola and Pandharpur below. 10% decrease was noticed from 1961 to 1992. Due to the Mechanization in agriculture Male population of cattle is decreased in every taluka.

19) Table 3.20 shows that Mohol taluka has recorded zero percent change in draught force from 1961 to 1992. The highest positive change (above 5%) in draught force was recorded in Karmala from 1961 to 1992.

20) Regional distribution of Milch stock is variable and overall intensity of milch stock in the total livestock units is 11.22% it is higher than draught force. The proportion of Milch stock is high (above 17%) in North-Solapur taluka due to the presence of Solapur city. It is between 10 to 14% in Malashiras, Mohol, Barsi, Akkalkot and Pandharpur. Talukas like Karmala, Madha, Sangola, and Mohol have recorded below 10% except Mangalweda the proportion of Milch stock in the total livestock units is increased, where overall intensity of increase is 1.84%. The negative change in milch stock was found in south Solapur and Mangalweda (below 2%). The highest positive change (above 7.7%) was noticed in Barsi, where as the lowest positive change was observed in Karmala from 1961 to 1992.
(21) Table 3.20 reveals that the pressure of livestock has increased on the agricultural land from 1961 to 1992. Pressure is relatively high in the west and less in the east except Akkalkot taluka. Overall pressure is 175 livestock units per 100 hectares of cultivated land. In the western talukas like Malshiras and Pandharpur the Pressure of livestock on cultivated land is very high (above 200) because the livestock units are due to irrigated area and higher proportion of milch stock. It is high (above 150) in North Solapur, Akkalkot, Mohol, Mangalwada, Sangola and Karmala due to the good facilities of fodder. In the remaining talukas the pressure is above 100 livestock per 100 hectares of cultivated area. The pressure of draught force on agricultural land has decreased in the talukas like North Solapur, Barshi, Akkalkot, Mohol, Karmala and Madha. In other talukas presssure of draught force on per 100 hectares of cultivated area increased (Table 2.31).

(22) Sheep have shared for about 16.41% of the total livestock units of the region, however, regional disparities are more as shown in Map 3.23 A. The very high proportion is recorded in Malshiras and Sangola, where it ranges between 30 to 34%. Sheep distribution is highly relevant to rainfall distribution physiographic condition and soil types. Most of the sheep concentration s found on barren and murald soils. The negative change have been occurred in sheep
units in North Solapur (0.72%), Pandharpur (3.89%) and Malshiras (9.28%) from 1961 to 1992. The positive changes were found in sheep units in Karmala (1.47%), Akkalkot (1.53%), South Solapur (1.5%), Barsi (2.75%) Madha (2.86%), Mangalweda (3.53%) and Mohol (4.32%) respectively.

(23) Goat rank first in total livestock units in the study region. The spatial distribution of goats is shown in map 3.24 A which is much uniform than sheep distributional pattern and ranges between 40 to 48%. They are (above 40%) concentrated in North Solapur, Barsi, Mohol, Karmala and Madha taluka. The proportion between 30 to 40% is found in Sangola, Malshiras, Pandharpur, Mangalweda, South Solapur and Akkalkot. The highest positive change (above 13%) in goat number was observed in Malshiras while, the lowest positive change (above 1%) was found in Pandarpur from 1961 to 1992.

(24) In 1994 out of the total poultry birds 49.86% birds were found in Malshiras talukas. The negatives (1 to 7%) were found in all taluka except Malshiras taluka where, positive change (above 39%) in poultry birds was observed from 1961 to 1992. There is more scope development in Sangola, Malshiras, Mohol and Karmala taluka.

(25) With the application of weaver’s method five livestock combinations were found in 1961 and eight combinations in 1992
have emerged as shown in map 3.28 A and B. Out of the eleven talukas seven talukas are involved in the change in livestock combination. Any change is not observed in Barsi, South Solapur, Sangola and Karmala from 1961 to 1992.

(26) The density of wooden ploughs per 1000 hectares in Solapur district was 8.91 and 22.97 during 1961 and 1987 respectively. The highest density of wooden plough per 1000 hectares was observed in South Solapur (82.21), while the lowest density was found in Karmala (4.45). During 1961 the density of Electric water pumps per 1000 hectares was in Akkalkot, South Solapur, Madha, Mohol, Mangalweda, Pandharpur and Sangola. In other talukas the density of Electric water pumps per 1000 hectares was below 1 during 1961. The highest density of Electric water pumps per 1000 hectares (86.94) was recorded in Sangola during 1987; where, as the lowest density of Electric water pumps per 1000 hectares (1.92) was found in Barsi during 1987. The density of tractors per 1000 hectares was nil in South Solapur, Mangalweda, Pandharpur, Sangola and Madha during 1961. During 1987 the highest density of tractors per 1000 hectares (2.63) was observed in Malshiras where, as the lowest density of tractors per 1000 hectares (0.30) was found in South Solapur.
(27) The introduction of important seeds programme in the district has changed the traditional cropping pattern to certain extent and marked the beginning of agricultural development. It is supplement by the expansion of irrigation and use of chemical fertilizers. The programme of improved seeds has greatly succeeded in case of Jowar, Sugarcane, Bajara, Sunflower etc. Now a days 'Sugarcane revolution' is found in Malshiras, Pandharpur, Western part of Mohol and eastern and northern part of Mangalweda. Table 3.25 reveals that out of the district total utilization 14.39% improved seeds were utilized in Malshiras taluka during 1991-92. Barsi taluka stood second in utilization of improved seeds, while, Madha and Karmala utilized 11.83% and 10.71% improved seeds during 1991-92 respectively. Talukawise utilization of high yielding varieties show that there is a remarkable variation from taluka to taluka. Table 3.25 shows us that the use of improved seeds is relatively limited in the taluka of North Solapur, Akkalkot, Mangalweda and Sangola since it depend upon the extent of irrigation and physical socio-economic environment.

(28) Table 3.26 reveals that consumption of chemical fertilizers has increased by 5.41 times from 1970-71 to 1991-92. During 1970-71 the per hectare consumption of chemical fertilizer was 8.43 kilogrammes in Solapur district where, as it was 53.4 kg. in 1991-92. In 1970-71
Malshiras taluka was first in consumption of chemical fertilizers out of the total consumption of chemical fertilizer nearly 26.82% chemical fertilizers were used in Malshiras during 1961 consumption of chemical fertilizer has increased more than four times in every taluka (Table 3.26) Table 3.26 indicates that nearly 56.44% chemical fertilizer was consumed in Malshiras, Pandharpur, Mohol and Mangalweda during 1991-92 use of chemical fertilizer has increased due to the Ujani project's effect on agricultural cropping pattern in the talukas of Pandharpur, Karmala, some parts of Madha, Mohol, Malshiras and Mangalweda.

(29) The co-operative movement has constructed a network of co-operative societies in the region and the agricultural loan is primarily sanctioned by District co-operative Bank and co-operative societies. During 1962 there were 862 agricultural credit societies with membership of 96531. The number of co-operative societies has increased from 862 to 900 from 1962 to 1992 in the study area. co-operative movement has changed agricultural structure to a greater extent in Malshiras, Pandharpur, Mohol, Mangalweda eastern part of Sangola and some parts of Karmala. Cropping pattern changed from foodgrains to cash crops like sugarcane, sunflower, banana and grapes etc.
(30) There are ten regulated markets in the study region. They are
providing marketing facilities to the agricultural commodities of the
study region. The prices of Jowar, Wheat, Bajara, Gram and
Groundnut have increased to a greater extent from 1970-71 to 1991-
92. Table 3.28 indicates that arrivals of Gram and Groundnut have
been decreased in every market in 1991-92 as compared to 1970-71.

(31) Talukas like Pandharpur, Karmala, Malshiras and North Solapur
were having 2.49 to 5.1% of their geographical area under forest
during 1987-92 on the other hand other talukas were having below
2% area under forest. The highest positive change (above 3%) was
observed in Pandharpur during 1960-65 and 1987-92. The rainfall is
moderate in the study region, hence, area under forest is less as
compared to other districts of Maharashtra state.

(32) The proportion of area not available for cultivation varies from
west to east and north to south Malshiras, Sangola and Karmala were
having more per cent (5 to 14%) area under area not available for
cultivation while, other talukas were having 1 to 4% area under this
category during 1987-92.

(33) The study region has significant land under fallow viz. 16.35%
of the total geographical area which is higher than states figure of
6.74%.
The fallow land is increased 6.83 to 16.35% between 1960-65 and 1987-92 in the study region. The proportion of fallow land is very high (above 20%) in Sangola and Mangalweda talukas and high (115 to 20%) in Akkalkot, Pandharpur, Malshiras, North Solapur, South Solapur, Barsi, Mohol have 7 to 14% fallow land.

(34) It is evidence from table 4.1 that South Solapur and Barsi taluka have very high percentage (above 81 to 84%) of net sown area, where as Mangalweda (71.89%), Madha (75.95%), North Solapur (75.7%), Akkalkot (73.88%), Mohol (72.74%) and Pandharpur (69.78%) talukas recorded high proportion during 1987-92. The medium proportion (less than 60%) is combined to the talukas like Karmala, Malshiras and Sangola. The poor soils and rugged topography have prevented the development of cultivated land in the hilly areas of Malshiras, Barsi, Karmala and Sangola.

(35) The per capita net sown area was 0.64 in 1961 in Solapur district. In 1991 it was 0.33 hectare in the entire region. The per capita net sown area was decreased to a greater extent in every taluka from 1961 to 1991. The per capita net sown area was decreased more than 50% in every taluka from 1961 to 1991. In fact, the per capita sown area has decreased during the span of decades to a greater extent.
(36) Table 4.3 and Map 4.8 clearly indicates that Karmala, Madha, Pandharapur, Mangalwada, Sangola, Akalkot and North Solapur talukas have shown dynamic change in general landuse. South Solapur and Malshiras have shown semi dynamic change between 1960-65 to 1987-92; while, North Solapur is static because less amount of land is involved in change Sangola taluka showed the maximum change in general landuse, where, as South Solapur has recorded very little change (2.12%) between 1960-65 and 1987-92.

(37) Areas of high landuse efficiency (108 to 114%) was noticed in Pandharapur, Sangola, Malshiras and Karmala, while areas of low landuse efficiency (below 102%) was observed in North Solapur and South Solapur during 1987-92. The highest positive change (7.45%) in landuse efficiency was observed in Pandharapur while, the lowest positive change (1.33%) in landuse efficiency was found in Madha from 1960-65 to 1987-92. The highest negative change (1.5%) in landuse efficiency was noticed in North Solapur where as the lowest negative change (1.38%) in landuse efficiency was observed in South Solapur during the period of investigation.

(38) During the period 1961-62 to 1991-92 the area under rice decreased in seventeen years viz. 1963-64, 1964, 1966-67, 1967-68 etc. The highest decrease in area under rice crop was found in 1972-73 (2876 hectares) followed by 1971-72 (2266 hectares) and the
area under pulses was found in 1981-82. The area under total pulses increased in 16 years out of 31 years. The highest increase in area under total pulses was found in 1973-74 due to the well distribution of rainfall in the study region.

(40) Table 5.1 indicates that the area under total food grains decreased in 18 years out of a time period of 31 years. The highest decrease in foodgrains area was found in 1972-73, while the lowest decrease area was took place in 1980-81. The highest increase in area under foodgrains was observed in 1973-74 where as the lowest increase was took place in 1987-88 (Table 5.1).

(41) The area under sugarcane decreased in 12 years, condiments and spices decreased in 17 years out of a period of 31 years in the region. The area under condiments and spices were decreased by 36.52% during 1960-61 to 1991-92 (table 5.2). The area under fruits and vegetables decrease in 9 years, cotton area in 18 years out of a time period of 31 years. The area under total oil seeds decreased in 17 years and area under total non food crops decreased in 16 years out of 31 years.

(42) Table 5.1 reveals that there are ups and down in area under various crops from 1961-62 to 1991-92. There was a great famine in 1972-73 in the entire region, therefore, the area under foodgrains, pulses, oilseeds, sugarcane, cotton, condiments and spices, drugs and
lowest decrease under rice cultivation area place in 1968-69 (209 hectares). The area under rice increased in 14 years out of 31 years in the study area. The area under decreased in 11 years out of 31 years. The highest decrease under the crop was noticed in 1972-73 (18128 hectares). The lowest decrease in area under wheat was found in 1982-83 (369 hectares). The area under Wheat in 20 years. The highest increase in area under wheat crop took place in 1975-76 (21680 hectares), where as the lowest increase in area under Wheat took place in 1983-84 (213 hectares). The area under Jowar decreased 15 years out of the total investigation period. The highest decrease in area under Jowar took place in 1972-73, while, the lowest decrease in Jowar crop area was found in 1974-75. The highest increase in area under Jowar crop was took place in 1973-74, while, the lowest increase in Jowar area was noticed in 1987-88. The area under total Cereals decreased in 16 years out of a time period of 31 years. The area under total Cereals was decreased in 1972-73 due to a great famine in the entire district. This was dry draught famine year.

(39) The area under Gram decreased in 13 years, Tur in 15 years and other Pulses decreased in 17 year out of the total period of investigation in the area under total Pulses decreased in 15 years out of a time period of 31 years in the region. The highest decrease in area under pulses was found in 1972-73, while the lowest decrease in
narcotics was decreased to a greater extent, while the area under various crops was increased in 1973-74 due to the well distribution of rainfall in the study area.

(43) Table 5.2 indicates that the index numbers of area of crops like rice, Bajara, Jowar, Total cereals, Other pulses, total foodgrains, condiments and spices cotton, other fibres, groundnut, drugs and narcotics were fall to the tremendous extent from 1972-73 to 1991-92. Crops like Wheat, gram, tur, sugarcane, fruits and vegetables shows the increasing trend of indices of area from 1960-61 to 1991-92. Table 5.3 reveals that crops like rice, Jowar, Bajara, other pulses, condiments and spices, cotton, total fibre crops, groundnut total drugs and Narcotics had shown negative change in area from 1960-61 to 1991-92 wheat, other cereals, gram, tur, total pulses, sugarcane, fruits and vegetables and total oil seeds has shown positive change (24.24%) to (299.37%) in area from 1960-61 to 1991-92.

The highest positive change (299.37%) in area under sugarcane was found from 1960-61 to 1992 while the lowest positive change in area (23.36%) under total oil seeds was observed from 1960-61 to 1991-92. The highest negative change (84.86%) in area under other fibre crops was recorded from 1960-61 to 1991-92 while the lowest negative change (16.78%) in area under total foodgrain was found from 1960-61 to 1991-92.
(44) In Solapur district due to the impact of Ujani dam's irrigational facilities and lift irrigation cropping pattern is changes to greater extent in the talukas of Malshiras, Pandharapur, Madha, Mohol, Mangalwada and Karmala (Table 5.5) most of the people are interested in cash crops like sugarcane, grapes, banana's etc. The farmers respond to changes in input costs, output prices and crop yields in their acreage decisions but there are reluctant to make changes in cropping pattern on a large scale. Lack of sufficient credit facilities, ignorance and uncertain future prospects restrain the farmers from undertaking any sufficient changes in their area allocation. The slower rate of adoption of high yielding varieties programme by small farmers in the Solapur district is sufficient proof of this pattern of bahaviour. Most of the rich farmers of the district are attracted towards the fruit gardening like grapes, bananas, ber and pomogranate but the poor farmers do not want to take such crops due to climatic hazards and heavy expenditure for crops. In the long run the changes in cropping pattern do on large scale.

(45) The gross cropped area increased to 1282751 hectares during the quinquennium 1965-66 to 1969-70. The area under rice decreased from 9914 hectares to 8314 hectares registering slightly downward shift in relative area allocation from 0.80% to 0.65%. An upward increase in the area under wheat from 22054 hectares to 24198
hectares was observed during the two quinquenniums 1960-61 to 1964-65 and 1965-66 to 1969-70. The area under jowar increased from 760 thousand hectares to 781 thousand hectares. The relative share of total cereals in gross cropped area increased from 72.94% from 72.26% during 1960-61 to 1964-65 and 1965-66 to 1969-70. The area under total pulses increased from 8.43% to 11.08%. The area under total oilseeds decline from 140 thousand hectares to 131 thousand hectares during the two quinquenniums 1960-61 to 1964-65 and 1965-66 to 1969-70. The area under sugarcane, fruits and vegetables increased slightly during two quinquenniums 1960-61 to 1964-65 and 1965-66 to 1969-70.

(46) The area under total cereals decreased from 936 thousand hectares to 730 thousand hectares thereby registering a decline in the relative in grossed cropped area from 72.94% to 70.47% during 1969-70 to 1974-75 in the study region. The area under total oil seeds, condiments and spices, drugs and narcotics, other fibres, decreased marginally during 1967-70 to 1974-75 in the district. The area under other oilseeds increased from 4.18% to 5.98% in the quinquenniums of 1967-70 to 1974-75. A marginal increase in area under total fibre crops, sugarcane and fodder crops were observed in the quinquennium (1967-70 to 1974-75).
(47) Compared to the quinquennium (1967-70 to 1974-75) the area under total cereals increased by 13.1 thousand hectares, thereby registering an increase of 0.95% in its relative share in the gross cropped area during 1975-76 to 1979-80. The area under total foodgrains increased from 83.69% to 86.77% during 1967-70 to 1974-75 and 1975-76 to 1979-80. The area under groundnut, drugs and narcotics, other fibre crops, condiments spices and fodder crops decreased marginally in the study region during the quinquennium 1975-76 to 1979-80. The area under total oilseeds, cotton, total fibre crops, sugarcane, fruits and vegetable increased marginally during 1975-6-76 to 1979-80. (Table 5.4).

(48) The area under foodgrains, drugs and narcotics cotton, groundnut and other fibres increased marginally during 1980-81 to 1984-85. The area under total oilseeds, sugarcane condiments and spices, fruits, vegetables and fodder crops increased marginally during 1979-80 to 1984-85. A major share of increase in area under cereals was claimed by Bajara and its area increased from 4.67% to 7.07% in the study region during 1985-86 to 1991-92. The area under sugarcane increased from 1.94% to 3.23% during the last (1985-86 to 1991-92) quinquennium (Table 5.4). The area under total fibres, drugs and narcotics, fruits vegetables and fodder crops
decreased marginally during the quinquennium of 1985-86 to 1991-92.

(49) Out of the total cropped area 59.96% area was under Jowar cultivation during 1987-92 in the study region. The region is no draught a foodgrains oriented region as they have occupied about 871277 hectares or 76.88% of the total cropped area during 1987-92 and the share of food crop was even large. The spatial distribution of cereals of cereals is shown in Map 5.1 A and B. It shows that in most of the central part, the proportion is high (above 69%). Elsewhere except Akkalkot, it ranges between 61 to 68 and in Akkalkot below 58%. The highest positive change (2.4%) in area under cereals was found in Madha taluka while, the lowest positive change (0.64%) was observed in South Solapur from 1960-65 to 1987-92. The highest negative change (13.10%) in area under cereals was found in Pandharpur where as the lowest negative change (0.67) in area under cereals was noticed in Barsi. The high negative change (9 to 13%) in area under cereals was observed in Mangalweda Karmala and Phandharpur. Irrigational facilities are increased in Sangola, Malshiras, Phandharpur, Mohol Mangalweda and Karmala talukas due to the Ujani project and lift irrigation schemes, hence, people have changed their views. They have attracted towards the cash crops like Sunflower, Sugarcane, Ber, Grapes etc. Sangola, Malshiras
and Akkalkot taluka have shown moderate negative change (4 to 9%) in area under cereals during 1960-65 and 1987-92.

The area under rice has decreased below 1% in all talukas except North Solapur and South Solapur from 1960-65 to 1987-92. Out of the total gross cropped area about 3 to 6% area was found under Wheat in Mohol, Karmala, Pandharpur and Malshiras during 1987-92. The area under Wheat has decreased from 0.22% to 0.96% in North Solapur, Akkalkot and South Solapur. The highest positive change (4.05%) in area under Wheat was found in Malshiras taluka. The area under Wheat was increased from 0.09% to 4.05% in Madha, Sangola, Mangalweda, Barsi, Karmala, Pandharpur, Mohol and Malshiras during 1960-65 and 1987-92.

(50) The distribution of Bajara is shown in Map 5.4 A. This map shows us that Bajara occupies 12% to 14% of the total cropped area in Mangalweda and Sangola taluka during 1987-92. The area under Bajara has decreased by 3.48% during the last thirty two years. The highest negative change (above 16%) was found in Sangola taluka 3 to 8% negative change in area under Bajara was found in the talukas like North Solapur, Mangalweda, Pandharpur and Malshiras during the period of investigation. Spatial distribution of Jowar (Map 5.5 A) indicates that crop is widely grown and its proportion ranges between 55 to 71% except Malshiras and Akkalkot. The greater
concentration of Jowar area was observed in Madha taluka (above 71%) and in South Solapur and Mohol (above 64%) during 1987-92.

changes in Jowar area are depicted in map 5.5 B. As it is the principal crop of the region significant increases are observed in Barsi (0.07%), Sangola (11.41%) and Madha (4.79%) during 1960-65 and 1987-92. Negative change in area under Jowar was found in eight talukas like North Solapur, Akkalkot, South Solapur, Mohol, Mangalweda, Pandharpur, Malshiras and Karmala during the period of investigation.

(51) About 1.4340 hectares or 9.21% of the total cropped area is under all pulses, which is higher than states average figure of 7.61%. The principal pulses growing areas are confined to North eastern northern and eastern parts of the region. During 1987-92 talukas like Barsi and Akkalkot were having more area (above 14%) under pulses, while other talukas like North Solapur, South Solapur, Mohol, Mangalweda and Karmala were having 7 to 11% area under pulses during the same period. Significant changes have occurred in pulses area during the period of investigation as shown in map 5.7 B. The area under pulses was decreased by 0.20 to 4.19% in North Solapur, South Solapur, Pandharpur, Madha and Sangola. The highest positive change (6.22%) in area under pulses was
noticed in Akkalkot, while the positive change (0.75%) in area under pulses was observed in Malshiras during 1960-65 and 1987-92. In other talukas like Karmala, Mohol, Mangalweda and Barsi it was increased between 0.75 to 2.85% during the period of investigation.

(52) Sugarcane is grown in all talukas of the study region Map 5.8 B reveals that only positive changes in area under sugarcane was observed in all talukas from 1960-65 to 1987-92. As it is the principal cash crop of the region significant increases are observed in Pandharpur (8.32%), Malshiras (6.25%), Mangaleeda (5.83%), Sangola (2.31%), Karmala (2.12%) and Akkalkot (2.06%) during the period of investigation. In other talukas like South Solapur, North Solapur, Madha, Mohol and Barsi between below 1 to 2% change is occurred.

(53) Spatial distribution of area under oilseeds as shown Map 5.9 A is variable and ranges between 2% to 20% during 1987-92. The proportion was high (above 15 to 20%) in the taluka Akkalkot and South Solapur during 1987-92. 10 to 20% area under oilseeds were found in North Solapur, Barsi, Karmala and Madha talukas. In Mohol, Mangalweda and Pandharpur talukas area under oilseeds was between 5 to 9%. Table 5.5 indicates that positive and negative changes have been occurred in area under oilseeds in the study region during period of thirty two years. The positive change (0.37 to
0.59%) was found in North Solapur and Karmala between 1960-65 and 1987-92. The negative change (0.81 to 4.07%) was noticed in the talukas like Barsi, Akkalkot, Mohol, Mangalweda, Pandharapur, Sangola, Malshiras and Madha during 1960-65 and 1987-92.

(54) Map 5.10 B reveals that negative in area under condiments and spices was occurred in North Solapur, Barsi, Akkalkot, Mohol, Pandharapur, Sangola, Malshiras and Madha taluka (0.02 to 0.91%). The positive change in area under condiments and spices was found in south Solapur and Madha (0.07 to 0.73%).

(53) Table 5.5 indicates that Pandharapur was the leading taluka where above 2% of the cropped area was occupied by the fruits and vegetables during 1987-92. Talukas like North Solapur, South Solapur, Karmala and Madha werre having below 2% area under fruits and vegetables. In other talukas area under fruits and vegetables were below 1% only positive in area under fruits and vegetables was found in all talukas from 1960-65 to 1987-92.

(56) All talukas were recorded negative change (0.10 to 2%) in area under total fibres during 1960-65 and 1987-92. Table 5.5 reveals that there was negative change (below 1%) in area under drugs and narcotics in all talukas during 1960-65 and 1987-92. The highest land under fodder crops was found in Barsi (4%) during 1987-92. Map 5.14 B indicates that the positive change between 0.05 to 1.17% in
5.14 B indicates that the positive change between 0.05 to 1.17% in area under fodder crops was found in Barshi, North Solapur, Mohol, Mangalwada and Madha. Elsewhere it was below 1%.

(57) according to the weaver's the method the highest 13 crop combination were found in North Solapur, while the lowest 2 crop combinations were observation in Barshi during 1960-65. The changes were occurred in every taluka from 1960-65 to 1987-92. It was from thirteen to five in North Solapur, two to nine in Barshi, eleven to eight in Akkalkot, eleven to seven in South Solapur, nine to eight in Mangalwada, ten to nine in Pandharpur, eight to six in Sangola, twelve to seven in Malshiras, seven to eleven in Karmala and nine to seven in Madha.

(58) Changes in the crop combination regions resultant from Rafiullah's method during the period under study do not show any significant change as shown in Table 5.7 changes has occurred in Akkalkot, South Solapur, Mohol, Sangola, Malshiras and Madha. It reveals that lesser number of crops are in the combinations than weaver's method with application's Doi's method three crop combination regions have emerged. The striking feature of these combination is Jowar, Tur, Moong, other oil seeds, groundnut and Bajara. Monoculture of Jowar was found in North Solapur, Karmala, Sangola, and Madha during 1987-92.
(59) After the lapses of 32 years during 1987-92 indicated a shift in degree of concentration in area under rice upward shift was observed in Akkalkot, Barsi and Pandharpur while downward shift in area under rice was found in North Solapur, South Solapur, Mangalweda, Sangola and Madha from 1960-65 to 1987-92.

(60) Table 5.7 indicates that Pandharpur, Mohol and Malshiras had shown upward shift in degree of concentration in area under wheat while South Solapur, Akkalkot, and Madha had registered downward shift in degree of concentration in area under wheat from 1960-65 to 1987-92. (Map 5.19 A and B) North Solapur, South Solapur, and Madha have recorded upward shift in degree of concentration in area under Jowar while downward shift was found in Akkalkot, Pandharpur, Malshiras and Karmala from 1960-65 to 1987-92.

Downward shift in degree of concentration in under Bajara was found in all talukas except Malshiras and Mangalweda from 1960-65 to 1987-92. Upward shift in degree of construction in area under sugarcane was found in all talukas except North Solapur, Barsi and Madha from 1960-65 and 1987-92.

(61) In Malshiras, Akkalkot, South Solapur and Mangalweda the diversification of crop was high during 1987-92. Moderate crop diversification was observed in North Solapur and Mohol where as
low crop diversification was found in Barsi, Sangola, Karmala and Madha during 1987-92. Very low diversification was observed in Pandharapur during 1987-92. Map 5.6 A and B indicates that the most of the changes crop diversification have been occurred in Malshiras, South Solapur, Mangalweda, Barsi, Mohol, Pandharapur, Sangola, Karmala and Madha. In Malshiras the change was found from high to low in Mohol and North Solapur from moderate to very low, in Barsi from low to moderate and in Sangola, Karmala and Madha from low to very low.

(62) The production of rice crop in 1990-91 (the mid year of the ending triennium) showed an decrease of 48.03 percent over that in 1961-62 (the mid year of the first ending triennium). It means an average annual decrease of 1.66 percent in the district production of rice. The output of wheat, Bajara, Maize, gram, Sugarcane and groundnut showed percentage increase of 193.66%, 66.35%, 445.65%, 109.09%, 266.55% and 12.5%, respectively (Table 6.1).

It means an average annual percentage increase of 6.68%, 2.29%, 15.37%, 3.76%, 9.19%, and 0.43% respectively for the crops of wheat, bajara, maize gram, sugarcane and groundnut.

(63) During the period mentioned in table 6.1 the output of jowar, tur, cotton, chillies showed a decrease of 4.21%, 46.86%, 79.27% and
34.76% which means an average annual decrease of 0.15%, 1.62%, 2.73%, and 1.19% respectively. The broad conclusion of the table 6.1 is that output of five crops viz. rice, jowar, tur, cotton and chillies showed a decrease and the output of other six crops viz. wheat, bajara, maize, gram, sugarcane and groundnut showed an increase during the entire period of investigation. (64) In 1972-72 there was a great dry famine through the region, therefore, the highest negative annual growth rates of output of rice, wheat jowar, bajara, maize gram were achieved in the region (53 to 92%). The highest positive annual growth rates of output of rice (1400%) wheat (130.71%), jowar (734.36%), bajara (2542.86%), maize (1038.36%), gram (5.7.14%) tur (2362.5%) and groundnut (756.52%) were achieved in 1973-74 (Table 6.2).

(65) Crops like rice, jowar, tur, cotton and chillies were achieved the negative annual growth rates more than 15 times during the period of investigation (Table 6.2). The index number of rice (48.39%), jowar (52.97%), tur (43.51%), cotton (21.82%), groundnut (34.39%) and chillies (56.25%) were reduced to a greater extent in 1991-92 over to 1960-61 in the region (base year 1960-61).

(66) From column of table 6.4 it is seen that the highest variability (161.34%) was present in the production of tobacco and the lowest variability (34.93%) was observed in the production of jowar from
1960-61 to 1991-92. The variability in the production of other cereals, maize, cotton, rice, bajara, tur, groundnut, sugarcane, other pulses, wheat and gram was 131.68%, 63.9%, 60.32%, 57.57%, 54.97%, 54.36%, 54.36%, 53.73%, 53.13%, 52.21% and 50.58% respectively.

On examination of average annual compound growth rates presented in table 6.4 it is quite evident that the production of six out of thirteen selected crops increased during the entire period of investigation. While the average annual compound growth rates of production of rice, bajara, other cereals, tur, other pulses, cotton and tobacco were negative. The highest positive average annual compound growth rate was observed in maize (6.24%), while, the lowest positive average annual compound growth rate (0.07%) was noticed in jowar during the period of investigation.

(67) Substantial changes have occurred in the production of rice in the study region during the period under study. The higher positive change about 14.21% was found in Akkalkot, while the lowest positive change (1.68%) of rice production was found in Pandharpur between 1960-65 and 1987-92. North Solapur, South Solapur, and Mangalwada recorded moderate negative change (2 to 4%) from 1960-65 to 1987-92 (table 6.4). In case of wheat production the positive change (5 to 13%) was noticed in Mohol, Pandharpur, and
Malshiras, while, the negative change (5 to 10%) was noticed in Akkalkot, South Solapur and Karmala between 1960-61 and 1987-92. The positive change (below 2%) of jowar production was observed in Mangalweda, South Solapur, Sangola, Mohol and Malshiras taluka during 1960-65 and 1987-92. The jowar production of Malshiras, Madha and Mohol has decreased during 1960-65 and 1987-92 but their shares in the district percentage were increased slightly. The farmers of Malshiras, Mangalweda, and Mohol have attracted towards the sugarcane cultivation in the recent years.

(69) The production of bajara has increased more than twelve times viz. from 8003 metric tonne’s to 96710 metric tonne’s between 1960-65 and 1987-92 in the region. During 1987-92 about 77.55% production of bajara was received from Malshiras, Sangola and Mangalweda. The positive change above 10 per cent was found in Malshiras taluka. Where as, 3 to 6% change of bajara production was noticed in Karmala and Mangalweda during the period of investigation. The production of bajara was reduced by 13.95% in Sangola while in other talukas it reduced by below 2% during 1960-65 and 1987-92.

(70) In the case of tur production the positive change (1 to 3%) was observed in Barsi, Mohol, Akkalkot and Karmala during the period of investigation. Actually tur production of Barsi, Mohol, Akkalkot
and Karmala has decreased but due to their increase in the share percentage of total region's production they have shown positive change. The groundnut production of Akkalkot, Mohol, Mangalwerda, Pandharpur, Malshiras and Karmala was increased between 1960-65 and 1987-92. During 1960-65 about 65.82 production of sugarcane was obtained from Malshiras but during 1987-92 only 32.21% production was received from the Malshiras. The area under sugarcane was increased to a greater extent in Pandharpur, Mangalweda, Mohol, Karmala and Akkalkot during the recent years, therefore, the percentage share of sugarcane production of Malshiras taluka in the district has decreased.

(71) The smothered series of three yearly moving averages of yield and index numbers of wheat, bajara, maize, groundnut and chillies indicates an increasing trend during the period of investigation. Three yearly moving averages of fields of rice, wheat, jowar, bajara, maize, gram, tur, groundnut and chillies shows ups and downs during the entire period of investigation (Table 6.5).

(72) The index numbers of average yield of rice (16.18%), jowar (19.70%), gram (32.75%) and tur (26.63%), were reduced in 1972-73 in the region, while, the index numbers of average yield of rice, bajara and maize have increased more than two times during 1975-76
(Table 6.6). The numbers of average yield of rice, jowar, gram, tur and cotton show a mixed trend during the period of investigation.

(73) The highest variability (53.21%) was found in the yield of groundnut and the lowest variability (24.11%) was observed in the yield of sugarcane in the region during the period of investigation (Table 6.7). The variability in the yields of bajara, tur, rice, gram, cotton, maize, jowar, wheat and chillies was 52.06%, 49.06%, 40.74%, 35.78%, 35.32%, 34.86%, 28.7%, 27.92%, and 14.6% respectively during the period of investigation. The variability present in the yields of these crops ranged 14 to 53 percent.

(74) On the examination of average annual compound growth rates presented in Table 6.8 it is quite evident that the yield of ten crops out of eleven selected crops increased during the period of investigation. Tur has decline or negative trend in the yield from 1960-61 to 1991-92. The average annual compound growth rate yield of tur is 2.21%. The highest average annual compound growth rate was observed in the yields of bajara (4.66%) where as the lowest positive average annual compound growth rate was noticed in jowar (0.004%) during the entire period of investigation.

(75) The average yield of rice and tur was reduced in every taluka during 1987-92 as compound to 1960-65. The average yields of other
crops have shown upward shift in every taluka. Particularly the yield of every crop is better in the irrigated area dry tract.

(76) The production of food crops is very low in every taluka of the region as compound it with Punjab and Haryana. As far as the region is concerned the productivity of food crops is high in the irrigated area of Malshiras, Pandharpur, Mohol and Mangalweda, Karmala and Madha. The overall productivity is very low in the western part of Malshiras, Pandharpur, Sangola, Mangalweda, Madha, eastern part of Karmala and Mohol, drier part of Akalkot, South Solapur, North Solapur due to the infertile soils, less irrigational facilities and low distribution of rainfall.

(77) Shelgaon, Kugaon, Chikhalthan, Dahigaon and Wangi selected villages of Karmala were having 10 to 47% net sown area under irrigation while the villages viz. Lahve, Shetphal, Varkatne, Pophalaj and Kumbhej were having below 5% net sown area under cultivation during 1994-95. Backwater schemes of Ujani dam have changed agricultural cropping pattern from cereals to cash crops like sugarcane, ber, grapes, in the selected irrigated villages of Karmala. But selected dry villages of Karmala like Lahve, Shetphal etc. area facing problem of drinking water in summer season.

(78) In 1994-95 out of the total geographical area of Wangi (Karmala) about 18.95% area was under forest during 1994-95. Table
7.4 reveals that selected villages like Shelgaon, Kugaon and Chikhalthan (Karmala) were having 0.71 to 3.38% area under forest other selected villages of Karmala taluka were having 0.70% area under forest. There was slight change in area under forest 1990-91 to 1994-95 in the selected villages of Karmala.

(79) Selected villages of Karmala were having 56.39% to 91.38% net sown area in 1994-95. The proportion of net sown area varies from place to place. Jowar, bajara, wheat, maize, safflower, tur and moong are the important crops of selected dry villages, while jowar, sugarcane, wheat, bajara safflower etc. are the important crops of selected irrigated villages Karmala. The economic condition of irrigated villages is quite better than selected dry villages.

(80) Selected villages of Madha particularly Ranzani and Ujani were having above 64% net sown area under irrigation during 1994-95. Villages like Rui, GarAkole and irrigation. Other selected dry villages of Madha were having below 4% net area under irrigation. Ujani irrigation canal has changed the agricultural structure of Rui, GarAkole, Takali, Ranzani and Ujani villages.

(81) The economic status of the selected irrigated villages of Madha and Karmala has changes due to the impact of Ujani project selected by dry villages of Madha and Karmala are facing problems like drinking water in summer, lack of irrigation, credit facilities low
productivity low standard of living problem of shallow soils, problem of draught, poor techniques of production, etc. The majority people of the selected irrigated villages of Madha and Karmala are using motor cycles, jeeps, cars and scooters. It shows that due to the development of agriculture the living standard of people living in irrigated area has increased.

(82) Four talukas viz. Malshiras, Pandharapur, Mohol and Mangalweda have recorded high level of agricultural development, where as medium level of agricultural development was found in South Solapur, Akkalkot and Sangola taluka during the period of investigation (Table 7.8).

Low level development was observed in North Solapur, Madha and Karmala while very low level development of agriculture was noticed in Barsi taluka during 1987-92.

(83) Ujani dam, Nira right bank canal, irrigational wells, percolation tanks and Kolhapur type bandhare have changed agricultural cropping pattern from foodgrains to cash crops in Malshiras, Pandharapur, Mohol and Mangalweda and irrigated villages of Karmala, Madha, Sangola, Akkalkot and South Solapur.
8.2. AGRICULTURAL PROBLEMS OF THE STUDY REGION

In this part we consider a number of problems of agricultural development most of which are linked to the question of agricultural research and training problems associated with the agriculture are to numbers to describe all of them in detail. Nevertheless the most important problems of study region’s agriculture may be mentioned in order to highlight their nature.

1. UNTIMELY AND UNEQUAL DISTRIBUTION OF RAINFALL:

A timely and adequate supply of water is absolutely essential for the maximum output from the land. In Solapur district nearly 82.75% net cultivated area is dependent on rainfall which is seldom adequate and timely throughout the various parts of the region. Annual failure of crops in different parts of Solapur district is, therefore, a common feature of region’s agriculture. Entire district except irrigated tracts of Malshiras, Pandharpur, Sangola, Mangalweda, Mohol and Madha comes under drought prone area. The South-west monsoon is the pivot around which almost the entire farm life and economy swings. The western part of Malshiras, most part of South Solapur, Sangola, Karmala, Madha western and South western part of Pandharpur, eastern part of Mohol always gets moderate rainfall and suffers from water facilities in summer season.
(2) **SOIL EROSION** :-

The problem of soil erosion is a complicated problem. For soil erosion varies from place to place according to the character of the soil, according to the slopes of the ground, according to the vegetation cover, according to the use to which the soil is being put and according to the nature and the amount of rainfall.

The very shallow and shallow soils are have poor water retention capacity, poor fertility and they soils do not support to the rabi crops at all. Such soils are found in Sangola, Western part of Malshiras, Pandharpur, Mangalweda, eastern part of Mohol. Madha, Karmala, Barsi, South Solapur and Akkalkot. Due to the soil erosion the crop productivity is very less in the above mentioned area.

(3) **PROBLEM OF SALINE AND ALKALINE SOILS** :-

Saline and alkaline soils are found in the irrigated area of Malshiras, Pandharpur, Mohol, Mangalweda, Sangola, Madha and Karmala taluka. The canal irrigation water is not available as per the need of the crops. Moreover, the farmers use excess of water which result in the development of saline and sodic soils. The farmers are not following appropriate irrigation methods, fertilizer schedules and the crop management practices. Some of the area which found on the both sides of Ujani canal and Nira right bank canal becomes saline
and alkaline. That soil is not suitable for agriculture due to the more calcium containt.

**4) PROBLEM OF HIGH POPULATION PRESSURE ON LAND :**

In 1961 the physical density in Solapur district was 159 persons per sq.km. and it was persons per sq.km in 1991. It means physiological density of population in the district was increased to a greater extent. In the highest physiological density was found in North Solapur taluka 1599, in Malshiras 378 per sq.km. It shows that heavy population burden on soil (Table 3.14). In 1991 the highest agricultural density was observed in Malshiras taluka 115 followed by Pandharpur taluka 106 map 3.8 reveals that agricultural density has shown an increasing trend from 1961 to 1991 in almost all talukas of the study region. Nutritional and caloric densities also shown an increasing trend in all talukas of the study region from 1961 to 1991.

In 1991 the relative co-efficient of over population was greater than in Pandharpur, North Solapur and Malshiras taluka, hence, these talukas are called over populated talukas (Table 3.15). Table 3.16 reveals that per capita cultivated area has decreased continuously from 1960-61 to 1990-91 in almost all talukas of the district all above points shows us that there is problem of high population pressure on
land in the study region. Due to the increase in population pressure on agriculture is increased in the entire region. There is also a problem of small agricultural holdings in Malshiras, Pandharpur, Mohol, Mangalweda and North Solapur.

(5) DISCOURAGING RURAL ATMOSPHERE :-

The farmers of dry villages are poor, illiterate, ignorant, superstitions, conservative and found by out model customs and institutions such as the caste system and joint family superstition and belief in fate are the cause which keeps the farmers fully satisfied with their primitive system of cultivation. Besides they are so poor that they did not have the means to improve their economic conditions. Most of the farmers of Sangola, Karmala, Madha, Akkalkot, Barsi, North Solapur and South Solapur are facing various economic problems. Their standard of living is very less as compared to the people of Malshiras, Pandharpur, Mohol and Mangalweda.

(6) LACK OF IRRIGATION FACILITIES :-

The Solapur district has got advantage of two major irrigation projects such as Ujani Project and Nira right bank canal. There were 91328 irrigated wells in the district during 1990-91. Most of the wells becomes dry during summer season, except the wells which comes under the jurisdiction of Ujani dam and Nira right bank canal.
There are 56 minor irrigation projects in the district which provides water to the 56 villages. Table 3.9 reveals that Malshiras, taluka has the highest percentage of net irrigated area to net area sown i.e. 55.74%, where as the shares held by Pandharpur, Karmala, Barsi, Sangola, Mohol, Akkalkot, Madha, Mangalweda, South Solapur and North Solapur talukas were 38.37%, 17.31%, 16.7%, 15.28%, 12.28%, 7.7%, 7.37%, 7.36%, 7.24%, and 6.02%, respectively.

Western part of Pandharpur, Sangola, Mangalweda, Malshiras, eastern part of Mohol, Barsi, Karmala, Akkalkot, North and South Solapur are having less irrigation facilities. In the absence of irrigation facility farming in these regions depends on rains and therefore is risky. Lack of irrigation facilities is one of the most serve contains on the use of fertilizers, high yielding crop varieties and expansion of area under vegetation.

(7) **AGRICULTURAL IMPLEMENTS AND MACHINERY** :-

Most of the region’s farmers continue to use out model agricultural implements. Wooden plough and bullocks are still used by a majority of farmers use of iron ploughs, tractors is also limited. The farmer by using the old type of wooden plough and light applications works on the fields. The plough that looks like a half-open pen knife and just scratches the soil, and hand sickle made for a child than a man, the old fashioned winnowing try that woos the wind to shift the
grains from the chaff and rude chopper with its waste of fodder are undisplaced from their primitive but unmemorial functions. Particularly most of the dry area farmers are using old and traditional agricultural implements. They are not using tractors for their agricultural activities.

(8) PROBLEM OF PLANT PROTECTION :-

No systematic quantities studies have been conducted so far to determine the losses caused by insect pests and plant diseases except irrigated tract of the study region. The pests and diseases which occur during the various stages of growth of a plant are well know most of the farmers of dry area are poor so they are unable to use pesticides to protect their crops from diseases.

(9) PROBLEM OF USE SEEDS :-

Agriculture in the study region moreover, suffers from the application of inadequate and bad seeds. Usually seeds are laid added and kept unprotected for the next sowing season. Thus the seed is badly affected by the worked and when sown the resulting plants also turn unhealthy. Sometimes, the farmers have to open their seed-sector for consumption and for sowing purpose borrow it from the local grain merchants or Baniya which is bad and unhealthy. Therefore, the yield of agricultural crops is low in dry area of the Solapur district.
(10) LESS OF USE CHEMICAL FERTILIZERS :-

During 1970-71 the per hectare consumption of chemical fertilizer was 8.43 kilograms in Solapur district, where it was 53.4 kg. in 1991-92. Malshiras taluka is leading in use of chemical fertilizers. chemical fertilizers are largely used in irrigation tracts of the region. Elsewhere, use of chemical fertilizer is very less. It has been estimated by the agricultural scientists that use of chemical fertilizers in ample quantity can push up the productivity manifold. Most of the dry area farmers are poor, hence they are unable to use chemical fertilizers on large scale.

(11) PROBLEM OF CREDIT FACILITIES AND INDEBTEDNESS :-

Capital puts definite limitations on agricultural practices. All agricultural inputs require capital. All the farmers make their decisions on the basis of capital available to them. There were 900 credit co-operative societies in Solapur district during 1991-92. There are 1134 villages in the study region. At present there are 213 different banks in the study area, but only 161 villages are having bank offices.

The farmer borrows loan year after year but he is not in a position to clear off the loans, either because the loans are larger or because his agricultural output is not large enough to pay off his debt. Therefore,
the debt of the farmer goes on increasing this is what is known as rural indebtedness. The dry land farmer is born in debt, lives is debt and dies in debt. The main cause of the indebtedness of the farmers is his poverty. Secondly, the farmers have a tremendous passion for and desire to make implements on land. Thirdly, the farmers are to incur certain types of expenditures which automatically lead them to borrowing and indebtedness. Fourthly, much of the debt may be inherited. Finally, the money leaders themselves are responsible to a large extent for rural indebtedness.

Table 3.17 indicates that Malshiras, Pandharpur, Mohol and Sangola talukas have more than 62% recovery of loans because most of the farmers are having good agricultural returns but the recovery of other talukas is below 52% except Mangalweda (58%).

The money lenders encourages the farmers to borrow from them, get their lands mortgaged to them, change very high rates of interested, keep false accounts and finally, when the farmers debt has accumulated to a sufficient amount, they take away the land of the borrows like a big in the cobweb, which can rarely escape, so also the farmer once caught b the money lender can rarely come out of his clutches. Loan from the money-lender support the farmer as the hangmen’s rope supports the hanged.
(12) **Lack of Marketing System**: -

There are 10 main agricultural markets and 27 sub-marketing centers in the study region. Majority of the small farmers sale their produce in the villages. Due to lack of proper transport and communication, high transport cost, and very low marketable surplus in scarcity area, the farmers sale their agricultural produce to the village Bania. The big size holder who have comparatively large surplus, sale the produce in markets most of the farmers in the scarcity area has to sale the produce to meet their day to day requirement which is a forest sale. Even, though the minimum prices of agricultural commodities are fixed, transport facilities etc. are developed, the farmers has to face many difficulties in marketing of agricultural produce at the reasonable rates. Following are the some of the general constraints observed in region market.

(i) Forced sale  (ii) lack of organization. (iii) Inadequate storage capacity  (iv) The rats damage 10 limits the quantity of material they eat  (v) superficial middlemen and malpractice's. (vi) lack of market intelligence. (vii) Absence of grading and standardization of agricultural produce. (viii) Unauthorized deduction and multiplicity of changes.(ix) Lack of information regarding prices.
(13) PROBLEM OF BUMPER SUGARCANE PRODUCTION :

Sugarcane is grown in all talukas of the study region. The proportion of sugarcane cropped area ranges between 1% to 12.74%. The proportion is high (above 12%) in Malshiras. Out of the total net cultivated area the area under sugarcane is between 6 to 9% in Mangalweda, Pandharpur and Mohol. Due to the Ujani dam, Nira right bank canal and lift irrigation facilities area under sugarcane is increased in Malshiras, Pandharpur, Sangola, Mohol and Mangalweda talukas. There is bumper sugarcane production in Malshiras, Pandharpur, Mohol and Mangalweda. There are 10 sugar factories in study region. The sugarcane production is increasing day by day. During 1960-65 the region’s total sugarcane production was 8,54624 metric tonne’s.

Sugarcane production was increased from 854624 metric tonne’s to 2909531 metric tonne’s from 1960-65 to 1987-92. As far as the capacity of the ten sugar factories is concerned it is more production. Particularly Malshiras, Pandharpur, Mohol and Mangalweda talukas are facing problem of bumper sugarcane production. In these talukas sugar factories are working from October to June but they are unable to crush the entire sugarcane production some of the farmers send their sugarcane to the factories of Satara and Sangli district. Now a days sugar factories are
exploiting the farmers. These factories are giving Rs. 730/- per metric tonne's to the farmers. This amount is not sufficient.

(14) **LACK OF TRAINING CENTERS** :-

The region farmers, generally speaking are poor, illiterate, ignorant, superstitions, conservative and found by outmoded custom and institutions such as the caste system and the joint family superstition and belief in fate are the causes which keep the farmers satisfied with their primitive system of cultivation. Except for a small group of enlightened farmers from ‘Sugarcane belt’ of Malshiras, Pandharpur, Mohol, Mangalweda etc. who have adopted quickly modern techniques of production, vast majority of farmers are not motivated by consideration of economic progress. Two agricultural research centers are located at Solapur and Mohol. They organized training programs for the farmers, but these programs are not sufficient to the entire region. Due to lack of agricultural training the farmers are unable to take more production from their farmers. They are also aware from new agricultural techniques.

(15) **LOW AGRICULTURAL PRODUCTIVITY** :-

In general agricultural productivity in the area is very low because of traditional practices, lack of irrigation, lack of motivation, poor resources base, lack of training centers, less use of chemical
fertilizers pressures population on land and inadequate knowledge. Further the variations in productivity are very large in different types of farming system prevent in the area. Table 6.9 gives idea about trends of yield of selected agricultural crops. The average yield of rice, bajara, tur is very low as compared to other districts of Maharashtra. Particularly average yield of every crop is low in scarcity area of the district. The productivity of food crops is very low in every taluka of the study region as compared to Punjab and Haryana. As far as the region is concerned the productivity of food crops is high in the irrigated area of Malshiras, Pandharpur, Mohol and Mangalweda. The overall productivity is very low in the western part of Malshiras, Pandharpur, Sangola, Mangalweda, Madha, eastern part of Karmala, Mohol and dry part of Akkalkot, North Solapur and South Solapur due to the infertile soils less irrigated facilities and low distribution of rainfall.

8.3 MAJOR SUGGESTION TO SOLVE THE PROBLEMS :-

(1) UNTIMELY AND UNEQUAL DISTRIBUTION OF RAINFALL :-

To solve problem microlevel planning should be done for crop system on the basis of ecology consideration. It is necessary to identify the best cropping system for any local area under the prevailing rainfall and temperature pattern.
Many of the crops have insufficient water resources during the summer and early monsoon hence efficient utilization of water is needed, minimum irrigation for field crops need to be adopted. Similarly drip irrigation system for horticultral crop for optimizing water resources need to be followed. various percolation tanks and Kohlapur type bandhares should be started in dry area of the district. The area under forest should be increased In the various dry patches of the study area.

(2) **SOIL EROSION** :-

The very shallow soils and the shallow soils having less depth have poor water retention capacity, poor fertility and they are vulnerable to run-off and soil erosion. As such these soils need to be diverted to grasses, agro-forestry, dry land horticultral crops. The following methods should be adopted to control the soil erosion of the study region.

(i) Terraces control run-off and reduce erosion

(ii) Contour cultivation should be given more preference.

(iii) Increased use of manure.

(iv) Soil should cover with crops or vegetation.

(v) Crop rotation should be followed to reduce soil erosion.
3. **PROBLEM OF SALINE AND ALKALINE SOILS** :-

Saline and alkaline soils lie scattered in the irrigated tract of the region and are on the increase unless immediate attention is given to reclaim them through well known techniques, they will ultimately turn into waste. An area approach is required in this regard also. This work should be initiated jointly by research and extension as an operational research project. Initially studies on physico-chemical characteristics of the soil, drainage characteristics etc. would be involved in this work. The farmers should follow appropriate irrigation methods, use adequate manure for the crops. They should not fallow over irrigation system for their crops.

4. **PROBLEM OF HIGH POPULATION PRESSURE IN LAND** :-

To solve this problem the following measures should be adopted.

(i) A huge frontal attack on population growth is the first and foremost necessity. When we are having so many compulsions in our economy life why not limit the family to one or two children by law using the various well-known techniques ?.

This formula should followed in the study region.

(ii) The population of the rural sector must come down to 50 to 40% very soon. And big farms of the modern type should start immediately with atleast 40 hectares to begin with. This should be
immediately with at least 40 hectares to begin with. This should be done in the irrigated area of the study region. Quick industrialization will help the process of reduction of labour in villages in the study area.

(iii) Fallow land should be brought under cultivation.

(iv) Table 4.1 reveals that 80 to 90% area is agricultural land except Malshiras and Karmala but at present only 62 to 80% area is under cultivation. Therefore, potential agricultural land should be brought under cultivation to feed the over population.

(5) DISCOURAGING RURAL ATMOSPHERE :-

The region farmers generally speaking are poor illiterate, ignorant therefore they are adopting method of cultivation. Unless this atmosphere which supports backwardness and stagnation is changed, there is no possibility of agricultural development. We should change these conditions through television programs, radio programs and government efforts. The farmers should have motivated about application of new improved seeds, fertilizers and use of pesticides etc. The percentage of literacy should be increased in the study area.

(6) LACK OF IRRIGATION FACILITIES :-

At present there are two major irrigation projects in the region. There are 56 minor irrigation projects in region. It is necessary to give more importance to the irrigation in the region. Addition minor irrigation
projects should be started in the dry area of the districts. Government should have started various Kolhapur type of bandhara in the dry area. These works should be done in time proper management is essential for the completion of the schemes.

Regions farmers, by and large lack the necessary knowledge to optimise irrigation use. They do not know appropriate practices including suitable various of short maturity crops, appropriate crop rotation etc. In this connection, it is necessary to provide better extension services, suitably linked with research organisation of scientists and adopted to multi-cropping farming practices. Land leveling land shaping land consolidation should be done in the region.

(7) AGRICULTURAL IMPLEMENTS AND MACHINERY :-
Most of the dry land farmers are using old type of wooden ploughs and inefficient method and techniques for the production of various crops since they are tradition found and also poor they have not adopted advanced techniques. The farmers should have motivated to use steel ploughs, sugarcane crushers, small pump sets, hoes, seed drills and fodder cutters. Increase in production is possible if proper machinery's are used. The rural banks co-operative banks should have given more loans and subsides to the poor farmer. Improved equipment for seed bed preparation and moisture conservation,
seed-cum fertilizer drills, peg harrow to break soil crust etc. are needed to ensure timely sowing and adequate plant population. Several new bullock drawn implements must be developed for efficient farm operations. There is need to find out the socio-economic reasons why farmers in the dryland areas are inhabited from using some of the useful equipment already available.

(8) PROBLEM OF PLANT PROTECTION :-

Pests and diseases are invariably limiting factors in crop production. Leaf minor and leaf spot diseases in groundnut, mosaic in horsegram, shemborer and shoot fly in cotton are among the more serious plant protection problems encountered. Research should concentrate on developing resistant/tolerant varieties and on an integrated approach in tracking many of these problems. Appropriate irrigation scheduled and follow up is also needed. The farmers should have given knowledge of plant diseases and proper pesticides through orientation programs, radio programs and television programs.

(9) PROBLEM OF USE SEEDS :-

Agriculture in the study region moreover suffers from application of inadequate bad seeds. Usually seeds are laid added and kept unprotected for the sowing season a number of high yielding varieties of rice and wheat, hybrid of maize, jowar and bajara have
been introduced. It is necessary to give knowledge of high yielding variety seeds to the farmers. The government should have distribute improved seeds to the poor farmer with charging any fees. The improved seeds must be distributed through credit societies or gram panchayat to the farmers.

(10) LESS USE OF CHEMICAL FERTILIZERS :-

The fertility of regions soil is deteriorating steadily an account of manure. Due to the poor economic condition farmers are using less chemical fertilizer to the agricultural crops. It is necessary to distribute chemical fertilizers by the state government to the farmers by charging half amount. Poor farmer must have given adequate loan so that he can use fertilizer to his field.

(11) PROBLEM OF CREDIT FACILITIES AND INDEBTEDNESS :-

The poor farmers of the region should have given more loans so that they can improve their agriculture. The Problem of rural indebtedness has two aspects and therefore, the solution is also two-fold. In the first instance, measures may be devised for canceling old debts. Secondly, measures should be devised to see that fresh borrowing is limited to the minimum necessary and to the productive type. At the same time it is necessary to control the lender and regulate his activities.
(12) **Lack of Marketing System** :-

In order to have best advantage in marketing of his agricultural produce the farmer should enjoy certain basic facilities

(i) He should have proper facilities for storing his goods.

(ii) He should have holding capacity in the sense, that he should be able to wait for when he could get better prices for his produce and not dispose of his stocks immediately after the harvest when the prices are very low.

(iii) He should have adequate and cheap transport facilities which would enable him to take his surplus to the mandi rather than dispose it off in the village itself to the village money lender cum merchant at low prices.

(iv) He should have clean information regarding the market conditions as well as about the ruling prices, otherwise he may be cheated. There should be organised and regulated markets where the farmer will not be cheated by dafals and arhatiyas.

(v) The number of intermediaries should be as small as possible so that the middlemen’s profits are reduced this increase returns to the farmers.
(13) **PROBLEM OF BUMPER SUGARCANE PRODUCTION** :

There is bumper sugarcane production in Malshiras, Pandharpur, Mohol and Mangalweda taluka. To solve the problem of bumper sugarcane production it is necessary to start new sugar factories in Pandharpur, Malshiras, Mohol and Mangalweda taluka. Other solution is that the farmer should have diverted from sugarcane production to the other cash crops like banana, ber, pomegranate, groundnut, sunflower etc.

(14) **LACK OF TRAINING CENTRES** :-

There is not a single training center in the study area. The following workshops should be organised in the study area.

(i) Pre season workshop : These workshops must be organised for two days twice a year before the commencement of kharif and rabbi season in every block of the study region.

(ii) Monthly workshops should organised in every taluka for adequate knowledge to the farmers. Farmers should have given detailed knowledge of various crops, pesticides and improved seeds.

(iii) Krishi vigyan kendra should be started in every taluka. These kendras will give training to the farmers.

(iv) The following training should be given to the farmers.

(A) Improvement of saline sodic soils.
(B) Training on water management
(C) Training on oilseeds production.
(D) Training on pulses production.
(E) Training on production technology.
(F) Dry land technology.
(G) Fruit preservation.

(15) **PROBLEM OF LOW PRODUCTIVITY** :-

In general the crop productivity in the drier part of the district is very low. To solve the problem of low productivity the measures should be adopted.

(i) There is small size of holding in the study region. The Govt. of Maharashtra should have adopted land consolidation act effectively. Those farmers who have extremely small holdings may be induced to give up their lands and shift to other occupations in rural areas. The pressure on land may be reduced by the starting of industries in rural areas to provide employment to the landless labourers and marginal peasants. If we increase the size of the farm we can use tractors and other modern agricultural implements to increase the crop productivity.

(ii) Improved seeds can play an important role in increasing productivity. This has been amply proved by the experience of many
countries and by the demonstration of high yielding varieties of wheat in Punjab, Haryana and Uttar Pradesh in our country. Therefore, more and more farmers in more and more areas should encouraged to use improved seeds. After examining the soil conditions and availability of irrigation facilities in different taluks of the study region, farmers should be advised about what seeds are best in their areas. They should also be educated in the method of sowing manuring and irrigating the new high yielding varieties of seeds.

(iii) Fertilizers used in the drier area is very less as compared to irrigated area. Therefore the farmer should have motivated to use fertilizers on large scale to their farms. Use of fertilizers in ample quantity (especially Nitrogen, phosphorous and potash) can push up the productivity manifold.

(iv) Use of improved seeds and fertilizers requires proper irrigation facilities. Irrigation can also make multiple cropping possible in a number of areas and hence, enhance productivity. Therefore, it is necessary to increase irrigational facilities in the region.

(v) Agricultural productivity can be increased by applying new farm technology and advanced agricultural implements.

(iv) The economic condition of the farmers is very poor, hence their agricultural productivity is less. The commercial banks should be
encouraged to lend more to small farmers. Regional rural banks should have gave more loan to the poor farmers. The marketing structure also needs a reorientation to serve the small and marginal farmers in a better way co-operative marketing societies should be promoted to ensure better prices to small farmers.

(vii) Just as industry needs skilled management for increased productivity; agriculture also require better management for raising the level of productivity. For this purpose farmers have to be educated in more efficient use of their resources particularly land, irrigation facilities and agricultural implements.

(viii) The farmers should have given incentives in the following forms.

(A) Implementing land reforms rigorously and vigorously.

(B) Providing timely availability of agricultural inputs.

(C) Implementing crop-ensurance scheme to cover the risk of damage to crops and other risk in agriculture.

(D) Quaranteening remunerative prices of produce to the farmers and

(E) Social recognition and conferment of awards/merit certificates etc.