CHAPTER VII
SUMMARY AND CONCLUSION

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7.1 Introduction:

Agricultural Land use has changed in the last twenty years. Enhanced agricultural technologies have been properly applied in order to achieve self sufficiency in agricultural sector. In order to meet increasing requirement of food grain by increasing population, the research has been carried out in the whole world with India. This investigation is depending on systematic and scientific study of changes in cropping pattern which, carried out at micro as well as macro level.

The cropping pattern of any region is closely influenced by physical as well as cultural factors. Husain (1996) During the last four decades (1970-2010) considerable change has been occurred in cropping pattern in India. Therefore, land use and cropping pattern studies are of particular significance in view of the rapidly rising population and consequent pressure on the existing land. These phenomenal changes are noticed more particularly in the cropping pattern and significance is given to various crops from time to time.

In the research work, an attempt has been made to access, analyze, describe and interpret the agricultural cropping pattern in south east part of Ahmednagar district, with a view of to investigate influence of environmental variables on cropping pattern and to provide corrective measure for better agricultural planning and the development of the study region.

7.2 Findings:

The study area consists of seven tahasils, namely Shevgaon, Pathardi, Nagar, Parner, Shrigonda, Karjat and Jamkhed. The study area shows vast variations in its physical set up. This plateau is also known as Ahmednagar plateau; which is dissected by two main rivers, the Godawari in the northern part and the Bhima in south. This area receives rainfall mainly from south west monsoon. There are three seasons experienced in the study region these are rainy season, winter season and summer season. The study area mostly lies in rain shadow area of the Sahyadries. The average rainfall in the study area is 578.8
millimeters. The eastern part of the study area receives less rainfall while western part receives more rainfall.

There are four types of soil found in the study region namely deep black soil, medium deep black soil, grey soil and red soil. The study area has 7.10 percent of forest cover (2010-11). The study area has well road and railway network i.e. National highway, state highway, district road and village road etc. The population density is 220 persons per square kilometers. The growth rate of population from 1991 to 2011 was 26.98 percent.

The study of general land use of the study area reveals different uses of land in the South East part of Ahmednagar district. Net sown area in the study area is increased by 0.49 percent from 1970-71 to 2010-11. Net sown area of the study region was 70.39 percent in 2010-11. The highest net sown area is observed in Shevgaon tahasil (80.20 percent), while the lowest is found in Karjat tahasil (59.61 percent). The maximum increase in net sown area is recorded in Shevgaon tahasil (19.60 percent).

Land unavailable for cultivation has increased in the South East part of Ahmednagar district from 1970-71 to 2010-11 accounting 6.42 percent during the study period. Land unavailable for cultivation indicates the decreased trend in six tahasils namely Shegaon, Nagar, Parner, Shrigonda, Karjat and Jamkhed. Only Pathardi tahasil shows increased trend in area not available for cultivation.

The area under cultivable waste land has increased by 5.74 percent during the study period. The maximum increase in cultivable waste land is recorded in Karjat tahasil (10.83 percent) followed by Nagar, Shrigonda and Parner tahasil.

The fallow land has increased in study area of Ahmednagar district. It is 10.40 percent in 2010-11. Poor economic situation and occurrence of drought are responsible factor for increasing the fallow land. Maximum increase of fallow land is recorded in Jamkhed tahasil (32.37 percent followed by Parner (14.77 percent), Karjat (9.86 percent) and Shrigonda (5.91 percent). Decreased of fallow land in Shevgaon, Pathardi and Nagar tahasil. This decline under follow land is
mainly due to increasing of irrigation facility, development of roads, markets centers etc. in Shevgaon and Pathardi tahasil. The development of urban area in the Nagar tahasil is the main cause of the decline of fallow land.

The area under forest of the South East part of Ahmednagar district has declined by 2.34 percent during the study period. This decline is due to the increasing demand of increasing population and the meet these demands forest are cleared.

The south east part of Ahmednagar district experiences Kharif and Rabbi seasons. Kharif season belongs of rainy season from June to September. Rabbi season starts in autumn from October to the end of February or March. Bajara, Tur, Groundnut Cotton and Soyabean are the major Kharif crops, while Jowar, Wheat, Gram, Maize are Rabbi crops cultivated in the study area. Sugarcane, fruits and vegetables are grown both in Kharif and Rabbi season.

Jowar is the major crop of the study area. It is cultivated in 73.30 percent of cultivated area in 1970-71. Jowar crop is decline decade wise in the study period i.e. 59.48 percent in 1980, 53.46 percent in 1990, 45.52 percent in 2000 and 50.85 percent in 2010.

The study region is an agricultural region of Ahmednagar district. Wheat, Jowar, Bajara, Other Cereal, Pulses, Sugarcane, Fruits, Vegetable and Spices, Oil Seed, Fiber and Fodder crop are the main crops grown in this region. Wheat, Bajara, Other Cereal, Pulses, Sugarcane, Fruits, Vegetables, Spices and Fiber are having found increased. Whereas Jowar, Oil Seeds and Fodder are found decreasing in the study area. Area under Wheat cultivation has increased by 5.31 percent in the study period. Wheat is grown all over the study region. The spatial distribution has also shows the variation in wheat cultivation. Jowar is cultivated on 73.48 percent area in 1970-71 and it has decreased by 22.63 percent during the study period and it has found 50.85 percent area in 2010-11. In all tahasil in study area shows high decrease in area under Jowar cultivation in study period. Bajara has cultivated in 7.6 percent area in 1970-71 and it has increased 5.16 percent found 12.76 percent of area. The area under crop of other
cereals is increased 2.54 percent. Pulses like gram, tur, mug, wal, chawali, math, peas etc are grown in Khariff as well as rabbi season and the area under these crops is increased by 8.24 percent. The pulses are grown after Bajra cultivation with limited irrigation particularly in gram and peas.

Sugarcane is cash crop of the study area observed in cultivation only 0.6 percent in 1970-71. It is lightly increased by 0.62 percent in the last forty year. Sugarcane required a more water supply throughout the year. The spatial distribution of Sugarcane cultivation has observed in study region. Four Tahasils are shown increasing trend (Shevgaon, Shrigonda, Pathardi and Parner), while three tahasils shows the decreasing trend during the study period. Horticulture is not developed in the region yet. The area under fruits, vegetables and spices observed increasing by 1.60 percent in the period of forty years. Banana, grapes, mustard apple, pomegranate are the main fruit crops, Lady Fingers, Brinjal, Onion, Chilly, Cabbage, Bitter gourd, Cluster beans, Drumstick, Peas and other Vegetables grown in the study region. Groundnut, soya bean, sunflower are the important oil seeds cultivate in the region. The area under oil seed cultivation shows decline by 7.20 percent. This is remarkable negative change throughout the study region. Fiber mostly cotton is cash crop in the study area. It is increased by 10.63 percent during forty years. The spatial distribution of this crop is observed the variation Tahasil to Tahasil. Shevgaon, Pathardi Jamkhed and Karjat tahasils shows the remarkable positive change, while Nagar, Shrigonda and Parner shown the negative change in fiber cultivation. It is mostly grown on plain region having black soil belt of the Godavari River bank area. Fodder crop include kadwal green grass and maize covers 4.5 percent area in 1970-71. It is decreased by 4.38 percent and observed only 0.12 percent of the area under crop.

Crop ranking method is applied to understand relative strength of crop percentage at Tahasil level. To compute crop ranking ten major dominant crop namely, wheat, Jowar, Bajra, other cereal, pulses, sugarcane, fruits vegetable and spices, oil seed, fiber and fodder were taken into the consideration. Among these crops Jowar is identified as the first ranking crop in all over the study region in
1970-71. Fiber is stood as the first in rank in two Tahasils namely Shevgaon and Pathrdi occupying 8.46 percent area of the total area under crop in 2010-11. Two crops namely bajara and oil seed are observed as second ranking crops. Bajara ranks the second in three tahasils, while oil seed crops in four tahasils in 1970-71. Four crops namely wheat, jowar, bajara and pulses are observed in the second ranking crops. Among them, pulses are observed in three tahasils in 2010-11. Oil seed and fodder crops are observed as the third ranking crop in three tahasils in 1970-71 while five crops namely wheat, jowar, bajara pulses and fiber are observed as the third ranking crops in 2010-11. Bajara and fodder crop are identified in the forth ranking while wheat, pulses, other cereals and bajara are observed in the forth ranking crops in 2010-11. In the fifth ranking crops, wheat, pulses, fodder crops are observed in 1970-71, while six crops namely wheat, other cereal, pulses, sugarcane, fruits vegetable and spices and oil seeds are observed as the fifth ranking crops in 2010-11. Wheat, pulses sugarcane are observed as the six ranking crops in 1970-71, whereas six crops namely wheat, other cereal, sugarcane, fruits, vegetable, spices and oil seeds are observed as the sixth ranking crop in 2010-11. Other cereal, sugarcane, fruits, vegetable and spice and fiber are the crops identified as the seventh ranking crop in 1970-71, whereas other cereal, fruits vegetable and spices, oil seeds and fiber are observed as the seventh ranking crop in 2010-11. Four crops namely, bajara, sugarcane, fruits vegetable and spices and fiber stood rank the eighth in 1970-71, whereas sugarcane, fruits, vegetables, spices and oil seeds are observed in the eighth ranking crop in 2010-71. Other cereal, sugarcane, fruits, vegetable, spices and fiber are observed as the ninth ranking crop in 1970-71, while sugarcane, fiber and fodder are observed as the nineth ranking crop in 2010-11. Three crops namely other cereal, sugarcane and fiber are observed as the tenth ranking crops in 1970-71, whereas fiber and fodder as the tenth ranking crop in 2010-11.

There are ten crops, which have considered computing crop combination in the study region by applying maximum positive deviation method introduced by Rafiullah’s. Two crop combinations have been identified. Jowar
crop is observed as a monoculture in three tahasils namely Nagar, Shrigonda and Karjat, while two crop combinations are observed in four tahasils namely Shevgaon, Pathardi Parner and Jamkhed in 1970-71. These crop combinations are Jowar and Bajra in the first three Tahasil and Jowar and oil seed in Jamkhed Tahasil. In 2010-11 two crop combinations are observed in six Tahasil. These combinations are fiber and Jowar in Shevgaon, Jowar and pulses in Nagar, Parner and Jamkhed, Jowar and wheat in Shrigonda, Jowar and Bajra in Karjat Tahasil. There is observed monoculture in Pathardi i. e. fiber crop.

Jasbir Singh’s formula used for identification of crop diversification regions. The study region divided into three classes of area of high diversification, area of moderate diversification and area of low diversification. Low to high diversification is found in Pathardi and Nagar tahasil. Moderate to high change were observed in Shevgaon and low to moderate change observed in Jamkhed and Shrigonda tahasil. No change in crop diversification observed in Parner tahasil in the study period.

An in depth study of twenty three sample villages has shown differential characteristics. The village Bhaygaon is situated on the west side of the tahasil has spreads on 592 hectares area with 2056 population. Net sown area accounts 68.75 percent of the total geographical area. It is observed decreased by 23.48 percent during the study period. Fiber is the most important crop fallowed by sugarcane covers 45.25 and 32.66 percent respectively. Dahigaon Ne village located in Erandgaon circle covers 2189 hectares area with 6520 population. Net sown area observed 64.68 percent of the total geographical area. It is decreased by 3.43 percent. Fiber, sugarcane and fodder crop are the important crops covers 38.40, 23.76 and 11.88 percent area respectively. Malegaon Ne village situated in Shevgaon circle covers 770 hectares area. Net sown area accounts 85.45 percent of the village. Fiber is the important crop fallowed by sugarcane covers 41.08 and 16.50 percent respectively. Hatgaon village is located in western side of the tahasil spreads on 2887 hectares with 4950 population. Net sown area accounts 89.60 percent area of the village. Fiber, jowar and sugarcane are the most important crops covers 48.16, 14.46 and 13.24 percent respectively. Shiral
village is situated in the west side of the Pathardi tahasil. It covers 2665 hectares area in which 65.89 percent area is under cultivation. Jowar is the main crop covers 43.52 percent. Along with the bajara, fiber, Fruits vegetable and spices and fodder crops are grown more than five percent land of the cropped area. Kasar Pimpalgaon village is situated in the central part of the tahasil. It covers 1497 hectares area which is 82.68 percent of area under cultivation. Fiber is the main crop covers 46.86 percent area under crop. Sugarcane and wheat are grown more than ten percent land of the cropped area. Jambhali village is situated in eastern side of the tahasil. It covers 1060 hectares area in which 80.85 percent area is under cultivation. Fiber is the important cash crop of this village covers 23 percent area of the village. Bajara, wheat and pulses are the other food grain crops are grown in this village. Fruits, vegetable and spices are the other cash crop covers 14.18 percent area of the village.

In Nagar tahasil, Shingawe village net sown area has increased by 1.58 percent and occupied 76.53 percent of total geographical area. Fodder crop is cultivated more than 15 percent area out of total cultivated area. 59.16 percent area under net sown in Jeur village. Jowar and wheat are the most important crops in this village. Nepti village is situated near Ahmednagar city covers 1664 hectares area. Net sown area is 92.10 percent of the total geographical area. Jowar and Fruits, vegetable and spices are the predominant crops in this village. Net sown area has observed decreased by 1.42 percent of village Pargaon Maula. Jowar, bajara and fodder crops are the important crops Pargaon Maula.

In Parner tahasil, Wadgaon Savatal village net sown area has observed increased by 4.49 percent and covered 63.94 percent area of the village. Pulses, Wheat and Jowar are the most important crops cultivated in this village. Goregaon village is located in eastern side of Parner tahasil occupied 86.92 percent net sown area of the village. Food grain crops like Pulses, Jowar, and Bajara are the important crop in kharif season. Wadzire is situated in western side of the tahasil occupied 2103 hectare area. Net sown area has observed declining by 0.67 percent. Fruits, vegetable and spices are the most important crops covered 26 percent area of the village. Supa is situated in eastern side of the
tahasil occupied 2002 hectares area of the village. The net sown area has observed by 27.27 percent covered 76.92 percent land of the village. Food grains like jowar, bajara, pulses are the major crops of this village. Ukkadgaon is located in west side of Shrigonda tahasil occupied 72.71 percent area under net sown area. It is observed increased by 4.28 percent area of the village. Fruits, vegetable and spices as well as sugarcane are the most important crops of this village. Pisore Khand village situated in eastern side of the tahasil occupied 1348 hectares geographical area. Net sown area accounts 56.98 percent of the village. It is observed increased by 3.64 percent. Fruits, vegetables and spices and sugarcane are the important crops of this village. Jangalewadi village situated in the southern part of the tahasil covers 823 hectares geographical area.net sown area accounts 89.91 percent of the village. Sugarcane, fruits vegetable and spices and fodder crops are the major crops covers 20.18, 15.79 and 10.96 percent respectively in this village.

Mirajgaon situated on the northern side of the tahasil on nagar -karmala road covers 3443 hectares geographical area.Net sown area accounts 91.49 percent of the village. Jowar and fiber are the most important crops covers 25.20 and 24.47 percent area under crop of the village. Kumbhelfal village located in the Karjat circle covers 438 hectares area. Net sown area accounts 57.54 percent of the village. It is observed increased by 6.17 percent area of the village. Fiber, jowar and fruits, vegetable and spices are the major crops cover 22.65, 19.33 and 11.60 percent respectively of the village area. Dhalwadi is situated in south-west part of the tahasil covers 1159 hectares geographical area. Net sown area accounts 81.96 percent of the village. Jowar 16.80 percent, pulses 15.16 percent, fiber 12.70 percent and fodder crop 10.65 percent are the main crops of this village. Kusadgaon situated in western side of the tahasil occupied 1168 hectares geographical area Net sown area accounts 91.18 percent of the village. Jowar and fiber are the main crops covers 33.40 and 29.55 percent area respectively of the village. Dhangaon village is situated in the west side of the tahasil occupied 1472 hectares geographical area.Net sown area accounts 59.10 percent of the village.

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Jowar, fiber and pulses are the most important crops covers 33.19 percent, 31.90 percent and 10.34 percent respectively.

### 7.3 Suggestions:

1. Uncultivated land can be brought under cultivation by creating irrigation facilities.
2. More area should be brought under net sown area.
3. There has been marked decreased in area under jowar, oilseeds and fodder crop. If the irrigation facility is provided through small and medium project, the area under these crops can be remarkably be increased.
4. Government should provide incentives to the farmers for improving the agricultural suitability and quality of land.
5. The best achievement award should be given at village level for encouraging farmers to make the best utilization of their land and other resources for adopting the better cropping pattern.
6. Instead of food grain, the farmers should adopt a pattern of cash crop such as fruits, vegetable, floriculture etc. It will be helpful for changing their income and create new employment.
7. The farmer must plan well in advance about the cropping pattern for the agricultural year.
8. The cropping pattern system has a great value to achieve sustainable agricultural production. Several forms of agricultural system such as horticulture, floriculture can be practiced as major alternative cropping system.
9. Farmer must be aware to use of improved variety of onion, vegetables and fodder crops. If possible, the crop should be replaced with less water consumer cash crop.
10. Workshop should be organized on regional level for exchanging ideas and discuss further strategies in agriculture.
11. It is must to increase the awareness about modern agricultural technology among farmers.
12. There is increase in production of fruits and vegetables, but the farmers were not aware about international markets. So there is a necessary of market information systems.

13. In Shrigonda tahasil Lemon production is more. If lemon processing industry is established there, it will be a permanent market for the lemon producers.

14. There is a need of warehouse, go down facility for farmers. Government provides these facilities then the quality of agriculture production will increase.

15. There is a wide scope of dairy farming, but there is a need to provide a financial support for these occupations.

16. There is a need of strong transportation network in the rural area.

17. The study area has a wide scope of milk production thus the cultivation of fodder crop needs to be increased.

18. There is a great scope for horticulture in the study region. e.g. cultivation of banana, grapes, lemon etc will help converting the waste and barren land into a cultivable land.

19. Farmers should be encouraged for horticulture. Their economical status should be increased. Employment and self employment facilities should be provided in the rural area.

7.4 Conclusion:

The South-East part of Ahmednagar district comes under drought prone region. The average annual rainfall is 578.8 millimeters. The distribution of rainfall is very uneven and irregular. The study region has a varied topography and climate. Soil in river basins are fertile, which resulted to cultivate sugarcane and fruits and vegetables besides Jowar and Bajra. In the recent years, irrigation has played an important role in the development of agriculture in the study area. Agriculture department and farmers in the South-East part of Ahmednagar district are making efforts to improve agricultural practice to cultivate maximum area under crop. New planning strategies are applied to enhance the knowledge.
of farmers and to increase the production through changing the cropping pattern. River basin areas in study region are rich in terms of the agriculture but it is very essential to supplement this activity by fruits and dairy farming. Such typical characteristics of this region create a background for immense development of agriculture sector. Such study has much potential to attract experts from various fields like planning, agriculturists, economists, and administrators for further study and to preparing a plan for overall development of agriculture for the study area of Ahmednagar district. The various developmental programmes require implementing for the agriculture in general and farmer’s awareness in particular in study area.