CHAPTER - VII
CONCLUSIONS AND SUGGESTIONS

The present research work is attempted to study the grain farming to fruit farming a geographical study of Dry zone area of Sangli District. The study is aimed at proving some guidelines and base for planning of agriculture development of dry zone area of Sangli District. Therefore, the objectives of the study include the identification of dry zone area and to analyse the agriculture transformation from grain farming to fruit farming in dry zone area of Sangli District. Examination of association of grain farming to fruit farming with physical and socioeconomic condition, the study of physical and socioeconomic status of region are understood in this study. In order to understand the land utilization, the five categories of landuse are studied. The agriculture landuse and their change in area has been analysed. The index number, annual variation and spatiotemporal variation of grain crops and fruit crops has been attempted which clear the grain farming to fruit farming transformation. The agriculture planning for assessment of agriculture development, policy of agriculture, problem of dry zone farmers, trend of transformation, a micro level study in respect of selected villages has also been carried out. The following finding from the study of DZSD have emerged.

Findings

1. Sangli district is one of the southern most districts of Maharashtra state where droughts occur frequently. For the study of dry zone area of Sangli District it is essential to identify the area that is dry zone. There are many definition of drought, therefore the methods of study of the drought are also many. The selection of method is depend on rainfall and irrigation based method. For the purpose of the study these factors are analysed during the study period. Sangli District roughly 80 percent rainfall is received from the south west monsoon. Rainfall starts sometime in the last week of June and lasts till end of September because Sangli District is located in rain shadow area of Western Ghats. This scanty and uneven rainfall drastically affecting agriculture of the region. But Shirala tahsil records heavy amount of rainfall with average of 1005 mm. This perhaps, is due to close vicinity of this tahsil with Western ghats. The rage of 450
to 620 mm are observed in Palus, Khanapur, Atpadi, Tasgao, Miraj, Kadegao, Jath and K. Mahakal tahasils of Sangli district. Secondly irrigation is selected to identify dry zone area. The intensity of irrigation is the proportion of net irrigated area to net shown area of the aerial unit. The average irrigation intensity district is 24.76. The low and moderate irrigation intensity is observed in six tahsil of Sangli district. On the observation of rainfall and irrigation base the Jat, Atpadi, Khanapur, K.Mahankal and Tasgaon are consisted in dry zone area.

2. The physical and socio-economic conditions of the area have a great bearing on the agriculture landuse and agriculture transformation. DZSD is a part of the larger Deccan Peninsula of India. The average height of the area is about 600 meters. There are not prominent hilly ranges but little Central and north-western part of the study region is covered by Mahadev ranges respectively. Central part of the district comes under the Man river basin. The Krishna, Agrani, Yerala rivers flows in study area. Soils vary from deep black in river valley to shallow gray in dry area of DZSD.

3. The agro climatic conditions of the region are uneven. December is coldest month and average minimum temperature is about 12.8°C. In April and May maximum temperature goes up to about 38.5°C. Rain fall is the dominant single weather parameter, and climatic hazards which affects plant growth. The variability of rainfall is high in the western part than the eastern part of study region. The average rain fall is ranging from 500 to 600 mm. The variation in the annual rainfall from year to year is large.

4. The population of DZSD is 688521 persons according to 2001 census. The highest population is observed in Miraj (35.3%) and followed by Tasgaon tahsil (24.9%). The lowest population is located in Atpadi tahsil (5.8%). During the investigation period it is increased 47.4 percent. The density of population in the region is 325 persons per km. The agriculture density of study region 58 persons per square km. That is high Miraj and Tasgaon and low in Atpadi and Jath tahsil. The relative co-efficient of over population is 1.15 in the study region. The high over population is observed in Khanapur and Jath tahsil.

5. The study area acute need of irrigation. Wells, canals and rivers are used for irrigation and drip irrigation system plays a very vital role as a source of irrigation for fruit farming. There is one major project (Tembu) in the study region and other sources of irrigation played a vital role in transforming the cropping
pattern of the area. So far as the land holding size is concerned the district is an area of small and medium sized farmers. The farm implements include ploughs, carts and tractors.

6. The study of general landuse pattern reveals that out of the total geographical area 75.22 area percent area belong to the cultivated area. There is positive change (3.61 percent) observed over a period of twenty five years in cultivated area. The land under fallow is 3.66 percent to geographical area. It is highly (7.76 %) decreased due to the development of irrigation facility, growing population and farmers economic condition. The land under potential category is 7.59 percent to geographical area in DZSD. There is slight increase (2.99%) in potential land during the investigation period. Area under non agriculture is more (9.55 %) compare to the other part of the district. There is a little positive change (1.10%) over a period of twenty five years of investigation.

7. Analysis of the cropping pattern indicates that area under food crop is 75.22 percent to total agriculture area. This area tremendously (7.81 %) decreased over a period of investigation. Among the food crops, share of food grain is more (75.98%), however it is also slightly decreased. Non-food grain crops capture 7.63 percent area. This area also decreased in amount of 4.86 percent. It is important to note that area under non food crops is 16.57 percent and it is 7.58 percent increased with a fast rate during the period of investigation.

8. Annual area variation of food grain and fruit crops area ups and downs during the period of investigation. During the investigation period of 20 years, the food grain area is increase in 16 years and decreased in 8 years which period is 1990 to 1995. The highest increase (72708Hect.) is observed in 1986-87 and lowest increase (3987 Hect.) is in 2004-05. The rate of growth continuously decreasing after 1997-98. It strongly present that it is replaced by other cash crops or fruit crops.

9. The total area under fruit crop is low compared to foodgrain because of the climatic conditions. Area under fruit crop has continuously increasing during the investigation period. The growth rate was below 1300 hect. in first decade (1989-90 to 1999-2000) compare with base year of 1989-90. During the second decade (1999 to 2009) the growth rate was between 3000 to 11000 hect. After the 2004-05, the fruit crop area has increasing tremendously because of the development of irrigation type and mode, new variety of fruit crops, traditional way of fruit cultivation and increasing demand of fruit crops in over all world.
10. The total food grain crops indices are remaining over 100 % during the period of 1991 to 1995 and 2001 to 2009. Remaining period of study, it is decreased and reached below 100 %. Moog is highest in the year 2004-05 and it is 760.41 %. Followed by Maize is second leading crop in index number 389.79 % in 1995-96 in all food grain crops in DZSD. The indices of Bajara and Tur crop shows us ups and downs through out the period of under study. A wheat crop index is always remaining below 100 during the investigation period in study area. In the table no 6.14 also observed that all food grains crops are remaining below 100 % in during between 1996-97 to 1999-2000.

11. The index of area under total fruit crops are continuously increased and growth rate are also increased during the study region. The highest indices are observed in grape fruit crop in 2009-10 and it is 743.54 %. Followed by pomegranate, Sapota fruit crops are also high indices. Grape fruit crop indices are continuously extent. But pomegranate indices are becoming low after 2005-06. Ber fruit crops index remaining below 100 % in only two years out of 20 years. However the rage of increasing of ber fruit crop area is below 130 %.

12. Among the food grain, Jawar is most importance as a staple crop in the DZSD. During the period of study under consideration, the area has increased by 3.39 percent. It has become 43.58 percent in reference year 2009-10. Bajara is the second rank crop in the district accounting for a major proportion (16.67 percent in 1989-90 and 7.86 percent in 2009-10) to the net sown area. Maize covered 0.74 percent of the net sown area in 1989-90 and 2.45 percent in 2009-10, it increased by 1.71 percent of the net sown area.

13. Among the pulses gram, tur, Moog etc. are the major pulses in study area. Gram was 2.70 percent in 1989-90, which has been increased 1.63 percent and reach 4.33 percent in 2009-10. The area under tur crop has been decreased by 0.54 percent in DZSD during the period under study. The area under gram was 821 hектors (0.16 %) in 1989-90, which increased in 2009-10 i.e. 0.92 percent of the net sown area.

14. Fruits comprise a large range of crops which differ in their perishability, seasonality value and also their soil and climatic requirements. The percentage fruit crop has increased by 2.31 percent during the period of 20 years. Grape is cultivated only 1123 hect. in the reference year 1989-90, but it is tremendously growing during the investigation period. It is capture 8350 hect.in 2009-10.
Pomegranate is cultivated only 709 hect. On DZSD in the reference year 1989-90, however it is increasing 3446 hect. in the reference year 2009-10. Ber is cultivated on 482 hect. (14.20% to FCA) in the reference year 1989-90 which is increased 90 hect. in during the study period. The mango, crusted apple, banana, guava, sapota fruit crops are cultivated on small scale in study region.

15. The agriculture transformation in DZSD during the period 1989-90 to 2009-10 studied. During the investigation period, the food grain crops are decreased to 2.97 percent to net sown area and food grain crops are increased 2.33 percent to net sown area in study area. Among the foodgrain crops, the area under four crops is increased and these crops are Jawar, Maize, Gram, Tur and Moog crop. However, the highest positive change is lie in Jawarcrop(4.21% to NSA) and lowest lie in Moog crop (0.75 % to NSA). However, the negative change in area under food grain crop is recorded in Bajara, Wheat and Tur crop. The maximum negative is observed in Bajara crop (8.81 % to NSA) and lowest in Tur crop (0.54 % to NSA).

16. During the study period the fruit crop area is increased 12637 hect. The highest area (1.33 % to NSA) under fruit crop is increased in Grape fruit crop and followed by Pomegranate (0.50 % to NSA). The lowest growth is recorded in Banana crop (0.01 % to NSA) which needs more water.

17. Among the agriculture transformation, it is reveals that the bajara, wheat and tur crop area is replaced by grape and pomegranate fruit crop. It is also observed that western part of study area attracted to grape cultivation while the eastern part trend is to pomegranate cultivation. This is depend on environment situation.

18. The area under forest and fallow land are replaced by fruit crops in study region and the area under sugarcane and cotton crop are also replaced by fruit crops in small scale in DZSD.

19. This micro level study the 45 villages are selected on random sampling. The four farmers are selected in each village. In this way the 180 farmers are selected for micro level study. The education, land holding size, age group, working family member, irrigation, soil, etc. elements are analysed in this study.

20. The total sample farmers have captured 1528 acres area. The area under jawar crop is highest (23.83 %) in sample farmers total captured land. Followed by grape (17.47 %), pomegranate (12.76 %) and Maize (9.29 %) are also largely cultivated crops by sample farmers in DPSD. The area under bajara and sugarcane
are range between 4 to 7 percent in investigated land. Among the remaining crops wheat, soyabin, turmeric, mango are captured in range between 1 to 2 percent by sample farmers total land. However, the crops like ber, c. apple, coconut, banana and rose are cultivated on very small scale (below 1%). It is also observed that the other crops like mataki, hulaga, tur, udid etc. are also cultivated in DPSD which acquire 5.36 percent land of total sample farmers land.

21. Among 180 farmers, 158 farmers (88%) are transform their cropping pattern from food grain to fruit crop. Remaining 26 farmers are agreeing to transformation landuse pattern. But they face many problems, that why they can’t be transform their landuse pattern. The last five years, 81 farmers (45% to total farmers) transformed food grain to fruit crops in study area. Followed by 67 farmers (37%) are transformed their crops in the period between 5 to 10 years of from present year. It is also noticed on the table that the last 10 to 15 years, the 23 farmers out of 180 (13%) are transformed towards the fruit crops but above 15 years, only 9 farmers (05%) trends towards the transformation.

22. The sample farmers of the study region face many problem of agriculture. Among them scarcity of water, lack of irrigation facilities, traditional cultivator, poor techniques of production, high population pressure on agriculture land, supply of capital on low interest rate, less knowledge of agriculture etc. are major problem of farmers in dry zone area of Sangli District.

**Major suggestion to solve the problem**

1. Sangli District is located in drought prone area. Water scarcity is a serious problem in agriculture. The farmers should use the mulching techniques for maximum use of available water. Drip irrigation system is most useful in getting good yield during the water scarcity period.

2. Many of the wells have insufficient water facilities during late summer and early monsoon, hence efficient utilization of water is needed minimal irrigation for field crops need to be adopted.

3. There is a need to establish training and research center at every tahsil. The farmers should be given training about water conservation, water management, crop production, modern implements, new production technology, etc.
4. For the development of agriculture in DZSD to select the best cropping pattern system on the ecological consideration, it is necessary to identify the best cropping pattern for DZSD under the prevailing rainfall and temperature pattern.

5. Farmers of the region face the problem of capital. To solve this problem, it is suggested that Credit Societies, N.H.B., DCC Banks and Agriculture Departments can release more capital on subsidy basis for increasing fruit cultivation area in the study area.

6. The problem of daily shortage of electricity is very serious. Therefore, it is suggested that to overcome this difficulty the use of fuel engines, solar plant etc. may be made as an alternative to the electricity.

7. The co-operative marketing channel is quite safe to avoid the cheating by the middlemen. Hence, the Farmer should come together and form a Federation of Co-operative Societies by taking financial assistance from the Government Organizations viz, the National Board of Agriculture Research & Development (NABARD) and National Horticulture Board (NHB).

8. It is noticed from the field study that there are technological differences among the farmers regarding the application of chemical fertilizer, application of irrigation, plant protection from diseases and pests, knowledge of improved varieties and application of compost. Hence, it is suggested that special extension efforts are essential in terms of organization of demonstration, meetings, discussion, film shows on farmer’s field and campus training programmes should be organized.