Chapter VI

Conclusions, Problems and Suggestions

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Conclusions, Problems and Suggestions

6.1 Introduction:

This chapter is mainly devoted to sum up the important conclusions of the study region on the basis of second to fifth chapter. Conclusions present the clear picture of agricultural development in the region. Some important agricultural problems of the study region are presented here for the consideration of planners and administrators.

Suggestions regarding the agricultural problems of Buldhana district are also given to overcome the situation in order to achieve the agricultural development.

6.2 Conclusions:

1. Buldhana is a district in the Amravati division of Maharashtra state in western India at the westernmost border of Vidarbha region. The Buldhana district lies between 19°51’ to 21°17’ North Latitude and 75°57’ to 76°49’ East Longitude.

2. The landscape in the district is rich and varied, with gently sloping fertile riverine plains studded with agriculturally prosperous villages standing in sharp contrast to the flat undulation plateau country with patches of cultivation, broad open river valleys and a monotonous scrub cover. The part of the Satpudas that lie in the district consists of high level buttes and mesas and the south facing scarp.

3. Buldhana forms the westernmost district of Vidarbha with an average annual rainfall of 70 to 85 centimeters. The mean annual rainfall in the region varies from 538.70 to 844.96 for the period ranging from 1995 to 2015. The rivers in the district are
Purna, Penganga, Khadakpurna, Dhamna, Koradi, Banganga, Mun, Gyanganga, Nalganga, Vishwaganga. The district has 1) Coarse shallow soil, 2) Medium black soil and 3) Deep black soil.

4. Khadakpurna is the only river which has good deal of water capacity for major part of the year. At present there are 2 major and 12 medium irrigation projects in the district. Khadakpurna Project is located in Deulgaonraja tahsil on the river of Purna near Deulgaonraja city. The total length of the canal is 48 kilometers. 

Wan Project is located on the Wan river. Total length of canal is 14.13 km and storage capacity of this project is 83.465 million cubic meter. Area facilitated from the project is 15100 hectares. There are 11 medium irrigation projects in Buldhana district.

5. In 1995-96, there were 36311 irrigation wells in Buldhana district. Out of the total wells about 78.68% wells were in use on the other hand 21.32% well were not in use. Numbers of wells in use were increased up to 87.38% in 2014-15 as compared to 1995-96 and numbers of wells not in use were decreased up to 12.62%.

6. The percentage of net irrigated area to net sown area is increased from 5.87% to 8.79% in Buldhana district during the period of investigation.

7. Below 200 crude density per sq. km was found in Shegaon, Sangrampur, Motala, Deulgaonraja, Sindkhedraja and Lonar tahsil. About 200 to 250 crude density was found in Jalgaon-Jamod, Khamgaon and Mehkar tahsils. Above 250 crude density per sq. km was observed in Nandura, Malkapur, Chikhli and Buldhana tahsils in 2011.

8. Below 300 physiological density per square kilometer was found in Motala, Deulgaonraja, Sindkhedraja and Lonar tahsils in 2011. About 300 to 400 physiological density per square kilometer was
observed in Jalgaon-Jamod, Shegaon and Mehkar tahsils. Above 400 physiological density per square kilometer was recorded in Sangrampur, Nandura, Malkapur, Khamgaon, Chikhli and Buldhana.

9. Agricultural density per square kilometer was 96 in 2001 and it was increased up to 124 in 2011. Below 110 agricultural density per square kilometer was found in Shegaon, Deulgaonraja, Sindkhedraja and Lonar tahsils in 2011. About 110 to 140 agricultural density per square kilometer was observed in Jalgaon-Jamod, Malkapur, Motala, Khamgaon and Mehkar tahsils. Above 140 agricultural density per square kilometer was found in Sangrampur, Nandura, Chikhli and Buldhana tahsil in 2011.

10. Below 300 caloric density per square kilometer was experienced in Deulgaonraja and Lonar tahsils in 2011. About 300 to 400 caloric density per square kilometer was recorded in Shegaon, Khamgaon and Sindkhedraja tahsils. Above 400 caloric density per square kilometer was found in Jalgaon-Jamod, Sangrampur, Nandura, Malkapur, Motala, Mehkar, Chikhli, and Buldhana tahsils in the same period.

11. In cattle population, below 5% negative change in Jalgaon-Jamod (3.41%), Shegaon (2.41%), Nandura (2.67%), Deulgaonraja (1.27%), Sindkhedraja (1.98%) and Lonar (2.38%) from 1992 to 2013. About 5% to 10% negative change was recorded in Sangrampur (8.34%), Khamgaon (6.39%), Chikhli (6.94%), and Buldhana (7.23%) tahsils. Above 10% negative change was experienced in cattle population in Motala (14.92%) and Mehkar (16.17%) tahsils. Below 5% positive change was experienced in cattle population in Malkapur tahsils.

12. Below 0.5% population of buffaloes was observed in
Sangrampur, Shegaon, Nandura, Malkapur, Motala, Khamgaon, Mehkar, Chikhli and Sindkhedraja tahsils on the other hand about 0.5% to 1% buffaloes were observed in Deulgaonraja and Lonar tahsils. About 1% to 2% buffaloes were found in Jalgaon-Jamod tahsil. Above 2% buffaloes were found in Buldhana tahsil in 2013.

13. Sheep shared about 9.63% of the total livestock units of the region. Below 2% negative change in sheep population was took place in Shegaon (1.19%), Buldhana (0.41%), Sindkhedraja (0.47%) and Lonar (1.38%) on the other hand above 2% negative change in sheep population was found in Malkapur tahsil (2.19%) in 1992 to 2013. Below 2% positive change in sheep population was experienced in Jalgaon- Jamod (1.19%), Nandura (1.80%) and Chikhli (1.70%) on the other hand about 2% to 10% positive change in sheep population was found in Khamgaon (2.25%) and Deulgaonraja tahsils.

14. Goats rank second in total livestock in Buldhana district in 2013. Out of the total livestock below 30% was occupied by the goats in Sangrampur and Mehkar tahsils. About 30% to 40% goats population was found in Jalgaon-Jamod, Shegaon, Nandura, Malkapur, Motala, Khamgaon, Chikhli, Buldhana, Deulgaonraja and Sindkhedraja tahsils whereas above 40%, goats population was observed from Lonar tahsil during 2013.

15. The wooden ploughs are increased from 1992 to 2013. In 1992, the highest wooden ploughs were observed from Motala (15.36%) whereas the lowest wooden ploughs were observed from Chikhli (2.21%). The highest density of wooden ploughs per 100 hectare was found in Nandura (3.83) whereas the lowest density 0.04 per 100 hectare was found in Chikhli tahsil in 2013.
16. The total iron ploughs below 5% iron ploughs were found in Jalgaon-Jamod (1.69%), Nandura (3.64%), Malkapur (3.71%), Khamgaon (3.07%) and Deulgaonraja (4.35%) in 2013. About 5% to 10% iron ploughs were recorded in Sangrampur (7.56%), Shegaon (7.19%), Motala (7.19%), Mehkar (7.54%), Buldhana (9.43%), Sindkhedraja (9.25%) and Lonar tahsils (8.14%) whereas above 10% iron ploughs were found in Chikhli tahsil (27.18%) in the same year.

17. Bullock carts increased from 51773 to 55159 between 1992 and 2013. During 2013, the highest density of bullock carts per 100 hectare was found in Malkapur (14.60) while the lowest density per 100 hectare was observed in Motala (0.86).

18. Sugarcane crushers were decreased by 259 to 62 during the period of investigation. Out of the total sugarcane crushers nearly 95.11% crushers were observed in Jalgaon-Jamod (16.12%), Malkapur (22.58%), Khamgaon (29%), Mehkar (14.51%) and Buldhana (12.90%) tahsils while only 4.89% crushers were recorded in other all tahsils during 2013. In 2013 the highest density of sugarcane crusher was found in Jalgaon- Jamod (0.02) and Khamgaon (0.02).

19. In 1992 there were 3876 oil engines in the study region and number of oil engine decreased to 2713 in 2013. About 30% negative change was found in oil engine in the study region. Out of the total oil engine, the highest oil engines 20.09% were concentrated in Sindkhedraja tahsil while only 1.00% oil engines were observed in Shegaon tahsil.

20. Electric pumps increased by 2.56% in the study region from 1992 to 2013. Density of electric pump per 100 hectare was increased in all tahsils during the period of investigation.
Number of tractors increased by 3.59 times from 1992 to 2013.

21. In 1995-96, the highest share of consumption of chemical fertilizers was found in Chikhli tahsil (15.76%), whereas the lowest share of consumption of chemical fertilizers was found in Sangrampur tahsil (2.69%). Use of chemical fertilizers increased by 2.31 times during the study period.

22. During 1995-96 about 2673 liters liquid formation pesticides were used whereas about 8691 liters liquid pesticides were used in the study region in 2014-15. In 1995-96 about 39.58 metric tonne other pesticides were used on the other hand 65.84 M.T. other pesticides were used in 2014-15.

23. Total 574 agricultural credit societies to cater the financial needs of the farmer. Highest number of agricultural societies is observed in Motala tahsils i.e. 67 (11.67%) on the contrary lowest number of societies is found in Sangrampur i.e. 28 (4.88%). Highest loan recovery was found in Chikhli tahsil (81.01%) on the other hand lowest loan recovery was found in Deulgaonraja tahsil (16.05%).

24. In 2014-15, out of total consumption of electricity about 39.11% electricity was consumed by agriculture sector whereas the shares of domestic, road lighting, commercial, industrial and other consumption were 21.39%, 3.59%, 1.40%, 18.72% and 15.76% respectively.

25. Total length of the district was only 3636 kilometers in 1996. Total length of the district was increased by 1.32 times from 1995 to 2015. Out of the total road length highest share was found under major district road and it was 25.28%. Total length of railway route was 105.84 kilometers.

26. About 115800 hectares or 11.97% of the geographical area of
the study region was under forest during 1995-2000. It decreased from 115800 hectares to 68500 hectares from 1995-2000 to 2010-15.

27. About 82100 hectares of land was not available for cultivation in the study region during 1995-2000. Area not available for cultivation decreased from 82100 hectares to 76200 hectares (-0.61%) between 1995-2000 and 2010-15 in entire study region. In this group major negative change was observed in Sindkhedraja tahsil.

28. During 1995-2000 about 52900 hectares land was uncultivable land. This land increased from 52900 hectares to 68200 hectares in study region from 1995-2000 to 2010-15. It means that about 1.58% positive change was observed in this group between 1995-2000 and 2010-15.

29. The study area has large amount of land under fallow land viz. 7.69% of the total geographical area during 2010-15. Both positive and negative change in fallow land was observed in the study region. Negative change was found in only Chikhli tahsils (1.26%) in the study region. Net sown area decreased from 702100 hectares to 679800 hectares between 1995-2000 and 2010-15. It means that about 2.31% net sown area was decreased in the entire study region during the period of investigation.

30. During 2001 the highest per capita net sown area was recorded in Lonar tahsil (0.52 hectares) whereas the lowest per capita net sown area was recorded in Buldhana tahsil (0.25 hectares). In 2011 the highest per capita net sown area was recorded in Lonar tahsil (0.41 hectares) while the lowest per capita was experienced in Buldhana (0.22 hectares).

31. Jalgaon-Jamod, Shegaon, Khamgaon, Mehkar, Chikhli,
Buldhana, Deulgaonraja, Sindkhedraja and Lonar tahsils have shown dynamic (above 10%) change while semi-dynamic (5% to 10%) change in general landuse was found in Sangrampur, Malkapur and Motala tahsils. Nandura tahsil has shown static change (below 5%) in general landuse from 1995-2000 to 2010-15.

32. The highest gross cropped area was recorded in Mehkar tahsil during 1995-2000 and Chikhli tahsil in 2010-15, on the other hand the lowest gross cropped area was recorded in Jalgaon-Jamod tahsil during 1995-2000 and Deulgaonraja Tahsil in 2010-15.

33. Low efficiency region (Below 106%) was recorded in Sangrampur, Shegaon, Deulgaonraja and Sindkhedraja tahsils. Moderate efficiency region (106% to 115%) was observed in Jalgaon-Jamod, Malkapur, Motala, Khamgaon and Lonar tahsil where infrastructural facilities for agriculture are not so much developed. High landuse efficiency (Above 115%) was recorded in Nandura, Mehkar, Chikhli and Buldhana tahsil during the period of investigation.

34. The correlation between area under forest and area not available for cultivation was above 0.50 in Jalgaon Jamod, Sangrampur tahsils, it means there was slight positive correlation whereas 0.30 positive correlation was found in Buldhana, Deulgaonraja and Sindkhedraja tahsils. Below 0.30 positive correlation was found between forest area and area not available for agriculture in Nandura and Malkapur tahsils.

35. Above 0.50 negative correlation between forest land and area not available for agriculture was found in Shegaon, Motala, Chikhli and Lonar tahsils while 0.30 to 0.50 negative correlation was found in Mehkar tahsils. Below 0.30 negative correlation between forest land and area not available for agriculture was found in
Correlation between forest land and fallow land was positive in Jalgaon Jamod, Sangrampur, Nandura, Malkapur, Buldhana, Deulgaonraja and Sindkhedraja tahsils while Motala, Khamgaon, Mehkar, Chikhli and Lonar tahsils showed negative correlation and it varies from -0.10 to -0.66.

Very slight positive correlation was experienced in area not available for cultivation and culturable waste land in Jalgaon Jamod, Nandura, Malkapur, Motala, Khamgaon, Mehkar, Chikhli, Buldhana, Deulgaonraja, Sindkhedraja and Lonar tahsils and slightly negative correlation between these categories was recorded in Sangrampur tahsil. Shegaon tahsil showed zero correlation between the same category.

Medium positive correlation between culturable waste and fallow land was noticed in Deulgaonraja and Sindkhedraja tahsil and remaining all tahsils showed slight positive correlation. Negative correlation was found between area not available for agriculture and net sown area in all tahsils. High to very high negative correlation between fallow land and net sown area found in all tahsils during 1995-2000 to 2010-15.

The area under Rice decreased in 13 years during the study period. The lowest decrease in Rice area was recorded in 1997-98 (2 hectares), whereas the highest decrease occurred in 2003-04 (1515 hectares). Wheat area showed nine time decrease during the period of investigation. The highest decrease in Wheat area was noticed in 2001-02 (18000 hectares), on the other hand the lowest negative change in Wheat area took place in 2013-14.

Jowar area decreased in 12 years during the period under study. The highest negative change in Jowar area was found in
1998-99 whereas the lowest negative change was experienced in 2007-08. The lowest index number of Jowar area was observed in 2014-15, whereas the highest index number was observed in 1997-98. Bajara area decreased in 12 years during the period of investigation. The highest positive change in Bajara area (11211 hectares) was experienced in 1998-99 while the lowest positive change was recorded in 2004-05. The highest index number in Bajara was recorded in 1998-99 (317.58%) while the lowest index number was recorded 2014-15 (73.26%).

41. Maize area was decreased for 5 years. The highest decrease in Maize area was observed in 2009-10 by 14584 hectares while the lowest decrease was found in the year of 1997-98 by 109 hectares. The highest positive change in Maize area was noticed in 2010-11 and the lowest positive change was observed in 1999-2000. The highest Maize indices were found in 2014-15.

42. Other cereals showed 11 time negative change in which the highest negative change was found in 2009-10 whereas the lowest negative change was found in 2004-05 and it was only 7 hectares. The highest indices of other cereals was found in 2013-14 and lowest indices of other cereals was observed in 2012-13.

43. Gram area was decreased in 7 years during the study period. The highest decrease in Gram area was noticed in 2009-10 (30326 hectares) while the lowest decrease in Gram area was observed in 2005-06 (384 hectares). The highest positive change in Gram area was observed in 1998-99 and it was increased by 19237 hectares whereas lowest positive change in Gram area was recorded in 2000-01. The highest index number of Gram area was observed in 2008-09.
44. Tur area decreased in 7 years during the period of investigation whereas it was increased in 12 years from 1995-96 to 2014-15. Indices of Tur area was above 100% in 17 years during the investigation period. The highest index number of Tur area was found in 1999-2000 and lowest indices of tur area was experienced in 2009-10.

45. Mung area decreased in 7 years from 1995-96 to 2014-15. The highest negative change in Mung area (12506 hectares) was noticed in 2007-08 and the lowest negative change in Mung area was found in 2000-01. The highest index number of Mung area was observed in 2013-14 and it was 238.63% whereas the lowest index number was observed in 1997-98.

46. Sugarcane area showed 12 times decrease during the period under study. The highest positive change in Sugarcane area (2690 hectares) was noticed in 2006-07, on the other hand the lowest positive change was observed in 2000-01 (6 hectares). The highest negative change was found in 2007-08 and the lowest negative change in Sugarcane area was observed in 2011-12. The highest index number of Sugarcane area was found in 2006-07. The indices of Sugarcane area were decreased by 86.12% from 1995-96 to 2014-15.

47. Cotton area showed 8 times negative change from 1995-96 to 2014-15. The highest negative change was found in 2010-11 and the lowest negative change was found in 2009-10. The highest positive change in cotton area was found in 2004-05 (33443 hectares) whereas the lowest positive change in cotton area was observed in 2011-12 (354 hectares).

48. Negative change in Groundnut area was observed for 13 years. The highest negative change in Groundnut area was found in 2006-
07, whereas the lowest negative change was recorded in 2007-08. The highest positive change in Groundnut area was recorded in 1997-98 and it was by 3483 hectares and the lowest positive change in Groundnut area was experienced in 1999-2000 and it was 14 hectares.

49. The highest negative change in Safflower area was recorded in 2001-02 (29255 hectares) and the lowest negative change in Safflower area in 2013-14. The lowest positive change in Safflower area was experienced in 2014-15 (112 hectares) and the highest positive change in Safflower area was found in 2002-03 and that is 60123 hectares.

50. The lowest negative change in Sunflower area (66 hectares) was found in 2002-03 and the highest negative change was observed in 2006-07 (11277 hectares). The highest positive change in Sunflower area was recorded in 1997-98 (14203 hectares) whereas the lowest positive change in Sunflower area was recorded in 1996-97 and it was 183 hectares.

51. The highest negative change in Soyabean area was recorded in 2006-07 (2486 hectares) and the lowest negative change in Soyabean area was noticed in 2000-01. The lowest positive change in Soyabean area was experienced in 1998-99 (18 hectares) and the highest positive change in Soyabean area was found in 2014-15 and that is 53307 hectares.

52. The variability in the area of various crops ranged from 12.61% to 115.41% during the period of study. Below 40% variability was found in Wheat, Jowar, Tur, Mung and cotton. About 40% to 80% variability was observed in Bajara, Maize, Gram, Groundnut, Sunflower, Safflower and Sugarcane crops whereas above 80% variability was found in Rice, Jawas and

53. In the period of 1995-96 to 1999-2000, the total gross cropped area was 795717 hectares. Tur was the dominant crop among the pulses whereas gram crop occupied the lowest area. Total gross cropped area increased by 45147 hectares during the second quinquennium (2000-01 to 2004-05).

54. Gross cropped area decreased from 840774 hectares 833992 hectares between 2001-05 to 2005-10. Gross cropped area was increased 843992 hectares to 842974 hectares during 2010-11 to 2014-15. It means gross cropped area was increased with 8982 hectares.

55. Out of the total gross cropped area below 0.02% area was observed under Rice in Jalgaon-Jamod, Sangrampur, Shegaon, Nandura, Malkapur, Motala, Khamgaon, Chikhli and Deulgaonraja whereas 0.02% to 0.04% area was observed under rice in Mehkar and Sindkhedraja tahsils. Above 0.06% area was experienced under rice in Buldhana and Lonar tahsil in 2010-15.

56. Out of the total gross cropped area below 3% area was found under Wheat in Sangrampur, Shegaon, Nandura, Malkapur, Khamgaon, Chikhli, Deulgaonraja, and Lonar tahsils on the other hand 3% to 6% area was noticed under wheat in Jalgaon-Jamod, Motala, Mehkar, and Buldhana tahsils during 2010-15. Above 6% area under wheat was found in Sindkhedraja tahsil.

57. Below 15% area was found under Jowar in Jalgaon-Jamod, Sangrampur, Mehkar, Chikhli, and Lonar tahsils whereas 15% to 20% area was recorded in Shegaon, Motala, Khamgaon, Buldhana and Sindkhedraja tahsils. Above 20% area was observed under Jowar in Nandura, Malkapur and Deulgaonraja during 2010-15.
58. Out of the total gross cropped area below 0.50% area was found under Bajara in Jalgaon-Jamod, Shegaon, Motala, Mehkar, Chikhli, Buldhana and Lonar tahsils whereas 0.50% to 1% area was observed under Bajara cultivation in Sangrampur, Malkapur and Sindkhedraja tahsil during 2010-15. Above 1% area was noticed under Bajara in Nandura, Khamgaon, and Deulgaonraja tahsils.

59. Out of the total gross cropped area below 2% area was found under Maize in Shegaon, Khamgaon, Mehkar, Sindkhedraja and Lonar tahsils whereas 2% to 4% area was experienced in Nandura, Motala, Buldhana and Deulgaonraja tahsils in 2010-15. Above 4% area under Maize was recorded in Jalgaon-Jamod, Sangrampur, Malkapur and Chikhli tahsil.

60. About 0.73% area was found under other cereals in entire study region during 2010-15. Below 0.50% area under other cereals was found in Chikhli, Buldhana and Lonar tahsils and 0.50% to 1% area under other cereals was observed in Jalgaon-Jamod, Sangrampur, Shegaon, Nandura, Malkapur, Khamgaon, Mehkar, and Sindkhedraja tahsils in 2010-15. Above 1% area under other cereals was found in Motala and Deulgaonraja tahsil.

61. Out of the total gross cropped area below 1% area was found under Gram in Shegaon, Malkapur, Motala, and Sindkhedraja and 1% to 2% area was found in Jalgaon Jamod, Sangrampur, Nandura, Khamgaon, Buldhana and Lonar tahsil. Above 2% area was found in Mehkar, Chikhli, and Deulgaonraja, tahsil whereas Chikhli shows highest gram area 13.66% under Gram during the 2010-15.

62. Below 5% area under Tur was found in Shegaon, Malkapur, Chikhli, Buldhana and Sindkhedraja tahsils and 5% to 10%
area was recorded under Tur in Jalgaon-Jamod, Sangrampur, Nandura, Mehkar, Motala, Khamgaon, and Deulgaonraja tahsils during 2010-15. In Lonar tahsil area under Tur was found 26.23% which is highest in all tahsils.

63. Below 7% gross cropped area was recorded under Mung in Malkapur, Motala, and Buldhana tahsil and 7% to 14% area was recorded under Mung in Jalgaon-Jamod, Sangrampur, Shegaon, Nandura, Khamgaon, Chikhli, and Deulgaonraja and Lonar tahsils during 2010-15. Above 14% area under Mung crop experienced in Mehkar and Sindkhedraja tahsils during 2010-15.

64. Out of total gross cropped area, below 10% area was recorded under other pulses in Sangrampur, Shegaon, Nandura, Malkapur, Motala, and Buldhana tahsils and 10% to 15% area was recorded under other pulses observed in Jalgaon-Jamod, Sindkhedraja, Khamgaon, Chikhli, and Deulgaonraja tahsils during 2010-15. Above 15% area under other pulses was experienced in Lonar and Mehkar tahsils.

65. Out of the total gross cropped are below 0.50% area was found under Groundnut in Shegaon, Malkapur, Motala, Khamgaon, Chikhli, Deulgaonraja, Sindkhedraja and Lonar tahsils. About 0.50% to 1% area under groundnut was experienced in Sangrampur, Nandura and Mehkar tahsils. Above 1% area found in Jalgaon-Jamod and Buldhana tahsils during 2010-15.

66. Below 0.50% area was found under Safflower in Jalgaon-Jamod, Sangrampur, Shegaon, Nandura, Malkapur, Motala and Khamgaon tahsils whereas 0.5% to 1% area was found under Safflower in Chikhli, Buldhana, Deulgaonraja and Sindkhedraja tahsils. Above 1% area was found under Safflower in Mehkar and
Lonar tahsils during 2010-15.

67. Area under Sugarcane is decreasing in the study area. Below 0.10% area was observed under Sugarcane in Jalgaon-Jamod, Sangrampur, Shegaon, Nandura, Motala, Khamgaon, Chikhli and Lonar tahsils whereas 0.10% to 0.20% area was found in Malkapur and Mehkar tahsil. Above 0.20% area was found under Sugarcane in Buldhana, Deulgaonraja and Sindkhedraja tahsils during 2010-15.

68. Below 20% area was observed under cotton in Mehkar, Chikhli, Buldhana and Lonar tahsils while 20% to 40% area was found under cotton in Jalgaon-Jamod, Nandura, Khamgaon, Deulgaonraja and Sindkhedraja tahsils. Above 40% area was found under cotton in Sangrampur, Shegaon, Malkapur and Motala tahsil during 2010-15.

69. According to Weaver’s method 2 to 8 crop combinations were noticed in the study region. Particularly Rice, Wheat, Jowar, Bajara, Maize, other cereals, Gram, Tur, Mung, other pulses, Groundnut, Safflower, other oil seeds, Condiments and Spices, Fruits and Vegetables, fodder crops, cotton and other fibers these crops were considered to calculate the crop combination.

70. Eight crop combinations were found in Nandura, Motala and Khamgaon tahsils where seven crop combination was observed in Chikhli and Buldhana tahsils. Six crop combination was occurred in Mehkar, Sindkhedraja and Lonar tahsils where five crop combination was found in Sangrampur and Deulgaonraja tahsils. Three crop combination was noticed in Sangrampur tahsil during 1995-2000. Lower two crop combination was found in Shegaon and Malkapur during the same period.

71. No change was occurred in crop combination in Nandura,
Khamgaon, Chikhli and Lonar tahsils while changes were recorded in crop combination increased from 3 to 8, 5 to 8, 2 to 3, 2 to 8 and 5 to 6 were found in Jalgaon-Jamod, Sangrampur, Shegaon, Malkapur and Deulgaonraja during 1995-2000 to 2010-15. Crop combination decreased from 8 to 4, 7 to 6 and 6 to 5 were observed in Motala, Buldhana and Sindkhedraja tahsils during the same period.

72. High degree (1% to 2%) of Jowar concentration was found in Shegaon, Nandura, Malkapur, Motala, Khamgaon, Chikhli, Deulgaonraja and Sindkhedraja tahsils while moderate degree (0.75% to 1%) of Jowar concentration was found in Jalgaon-Jamod, Sangrampur, Buldhana and Lonar tahsils during 1995-2000. Low crop concentration was found in Mehkar tahsil in the same period.

73. Very high degree (above 2%) crop concentration under Gram was found in Sindkhedraja tahsil while high degree crop concentration was found in Jalgaon-Jamod, Mehkar, Buldhana and Lonar tahsil during 1995-2000. moderate degree crop concentration was found in Shegaon and Malkapur tahsils where low degree crop concentration was found in Sangrampur, Nandura, Motala, Khamgaon, Chikhli and Deulgaonraja tahsils during the same period.

74. Very high degree of Tur concentration was not found in any tahsil. High degree of crop concentration was observed in Jalgaon-Jamod, Sangrampur, Nandura, Mehkar and Sindkhedraja tahsils during 1995-2000. Moderate degree crop concentration was recorded in Shegaon, Motala, Khamgaon, Buldhana, Deulgaonraja and Lonar tahsils where low degree crop concentration of Tur was noticed in Malkapur and Chikhli tahsils.
75. During 1995-2000, very high degree of Mung concentration was found in Mehkar tahsils. High degree crop concentration was recorded in Chikhli, Buldhana, Sindkhedraja, and Lonar tahsils while moderate degree crop concentration was observed in Sangrampur, Nandura and Khamgaon tahsils. Low degree Mung concentration was noticed in Jalgaon-Jamod, Shegaon, Malkapur, Motala and Deulgaonraja tahsils during same period.

76. Very high degree groundnut crop concentration was found in Motala and Buldhana tahsils while high degree crop concentration was observed in Jalgaon-Jamod and Sangrampur tahsils during 1995-2000. Moderate degree crop concentration was recorded in Khamgaon, Mehkar and Chikhli tahsils whereas low degree of groundnut concentration was noticed in Shegaon, Nandura, Malkapur, Deulgaonraja, Sindkhedraja and Lonar tahsils during same period.

77. Lonar tahsil recorded very high degree safflower concentration while Mehkar, Chikhli, Deulgaonraja and Sindkhedraja tahsils observed high degree crop concentration under safflower during 1995-2000. Low degree crop concentration was noticed in Jalgaon-Jamod, Sangrampur, Shegaon, Nandura, Malkapur, Motala, Khamgaon and Buldhana tahsils during the same period.

78. Sindkhedraja and Lonar tahsils recorded very high degree Sugarcane concentration whereas high degree of sugarcane crop concentration was found in Mehkar, Buldhana and Deulgaonraja tahsils. Low degree crop concentration was noticed in Jalgaon-Jamod, Sangrampur, Motala, Shegaon, Nandura, Malkapur, Khamgaon and Chikhli tahsils during 1995-2000.

79. Areas of very high diversification was found in Mehkar,
Buldhana and Lonar tahsils whereas high diversification was observed in Khamgaon and Chikhli and Moderate diversification was noticed in Nandura, Deulgaonraja and Sindkhedraja tahsils during 1995-2000. Low diversification was recorded in Jalgaon Jamod, Sangrampur, Malkapur and Motala tahsils during the same period.

80. No change in diversification was recorded in Shegaon, Nandura and Malkapur tahsils. Changes were recorded in crop diversification from very high to high in Mehkar, Buldhana and Lonar, High to moderate in Khamgaon, Moderate to high in Sindkhedraja and Moderate to very high in Deulgaonraja, Low to high in Jalgaon Jamod and Motala whereas Low to moderate in Sangrampur, High to very high in Chikhli tahsil between 1995-2000 to 2010-15.

81. Productivity of Rice was increased up to 210.45 in 2010-15. High level productivity (Above 100%) was observed in Mehkar, Buldhana, Sindkhedraja and Lonar tahsils whereas moderate level productivity was not found in any tahsil. Low level of Rice productivity (below 80%) was found in Jalgaon-Jamod, Sangrampur, Shegaon, Nandura, Malkapur, Motala, Khamgaon, Chikhli and Deulgaonraja tahsils.

82. Above 100% high productivity of Wheat was found in Jalgaon-Jamod, Motala, Buldhana, and Sindkhedraja tahsils in 2010-15. Moderate level of Wheat productivity was experienced in Sangrampur, Nandura, Malkapur, Khamgaon, Mehkar, Chikhli and Deulgaonraja and low level productivity was received from Shegaon and Lonar tahsils during the study period.

83. In 1995-2000, highest productivity of Jowar was received from Malkapur tahsil where it was 116.83%. Above 100% Jowar
productivity was recorded in Jalgaon-Jamod, Shegaon, Nandura, Motala, Khamgaon, Deulgaonraja and Sindkhedraja tahsils during 1995-2000. Moderate level productivity was recorded in Sangrampur, Chikhli, Buldhana and Lonar tahsils whereas low level productivity was got from Mehkar tahsil (67.79%).

84. High level Maize productivity was found in Jalgaon-Jamod, Mehkar and Buldhana tahsils while moderate level productivity of Maize was recorded in Motala, Khamgaon, Chikhli and Deulgaonraja tahsils. Low level productivity of Maize crop was observed in Sangrampur, Shegaon, Nandura, Malkapur, Sindkhedraja and Lonar tahsils during 1995-2000.

85. High level of Tur productivity was received in Jalgaon-Jamod, Sangrampur, Nandura, Khamgaon, Mehkar, Buldhana and Sindkhedraja tahsil on the other hand the moderate level of Tur productivity was recorded in Shegaon, Malkapur, Motala, Deulgaonraja and Lonar tahsils. Low level productivity was found in Chikhli tahsil during 1995-2000.

86. High level Tur productivity was observed in Khamgaon and Lonar tahsils whereas moderate level Tur productivity was found in Jalgaon-Jamod, Sangrampur, Nandura, Malkapur, Motala, Mehkar, Chikhli and Deulgaonraja tahsils. Low level productivity of Tur was recorded in Shegaon, Buldhana and Sindkhedraja tahsils during 2010-15.

87. High level Mung productivity (above 100%) was recorded in Mehkar, Chikhli, Buldhana, Sindkhedraja and Lonar tahsils while the moderate level Mung productivity was experienced in Sangrampur, Nandura, Khamgaon, and Deulgaonraja tahsils. Low level Mung productivity was found in Jalgaon-Jamod, Shegaon, Malkapur and Motala during 1995-2000.
88. Above 100% Gram productivity was found in Mehkar and Chikhli tahsils and moderate level Gram productivity (80% to 100%) was found in Nandura, Deulgaonraja and Lonar tahsils during 2010-15. Low level Gram productivity was experienced in Jalgaon-Jamod, Sangrampur, Shegaon, Malkapur, Motala, Khamgaon, Buldhana and Sindkhedraja tahsils during 2010-15.

89. High level of Safflower productivity (Above 100%) was found in Mehkar, Chikhli, Buldhana, Sindkhedraja and Lonar tahsils. The moderate level of Safflower productivity (80% to 100%) received from Deulgaonraja tahsil whereas low level productivity (below 80%) was found in Jalgaon-Jamod, Sangrampur, Shegaon, Nandura, Malkapur, Motala and Khamgaon tahsils during 2010-15.

90. High level of Sugarcane productivity (Above 100%) was found in Mehkar, Buldhana, Deulgaonraja, and Sindkhedraja tahsils. The moderate level of Sugarcane productivity (80% to 100%) received from Lonar and Chikhli tahsils whereas low level productivity (below 80%) was found in Jalgaon-Jamod, Sangrampur, Shegaon, Nandura, Malkapur, Motala and Khamgaon tahsils during 2010-15.

91. High level of Cotton productivity (Above 100%) was found in Jalgaon-Jamod, Sangrampur, Shegaon, Nandura, Malkapur, Motala, Khamgaon, Deulgaonraja and Sindkhedraja tahsils. The moderate level of Cotton productivity (80% to 100%) was not received from any tahsil. Low level productivity (below 80%) was found in Mehkar, Chikhli, Buldhana, and Lonar tahsils during 2010-15.

92. Below 5% positive change in net sown area was observed under irrigation in Aland, Lonikale, Godri, Takarkhed, Pimpri Andhale,
Khandvi, Belura, Zadegaon and Yelgaon villages whereas 5% to 10% positive change in net irrigated area was found in Giroli, Pimparkhed, Kinhi, Adgaon, Ardav, Khandala, Saykhed, Makodi, Daregaon, Umapur, Chinchol, Dudha, Akola, Ghanegaon and Sonoshi villages during the study period. Above 10% positive change was recorded in Parda and Changefal village only during 1995-96 to 2015-16.

93. Below 15%, medium-15% to 20% and high-20% and above. Low category of cow was found in Yelgaon, Belura, Adgaon, Lonikale and Pimpri Andhali. Medium categories were observed in Umapur, Khandvi, Saykhed, Zadegaon, Khandala, Parda, Akola, Pimparkhed, Godri, Dudha and Giroli (BK) whereas high categories were recorded in Changefal, Takarkhed, Chinchol, Aland, Makodi, Ghanegaon, Sonoshi, Daregaon, Kinhi and Ardav village in 2015-16.

94. Bullock was ranking first in Belura village during 1995-96 and 2015-16 respectively. The percentage share of bullock was below 25% in Umapur, Khandvi, Changefal, Saykhed, Ghanegaon, Adgaon, Lonikale, Akola, and Godri while it was 25% to 30% in Khandala, Takarkhed, Chinchol, Pimpalkhed, Yelgaon, Dudha, Pimpri Andhali and Giroli during village during 2015-16. Above 30% share of bullocks was observed in Belura, Zadegaon, Aland, Makodi, Parda, Sonoshi, Daregaon, Kinhi and Ardav Villages during the same period.

95. The share of female buffaloes to the total livestock population was calculated for each village and grouped into three categories, which are low, medium and high. Female buffaloes in low category (below 10%) were found in Makodi, Parda, Ghanegaon, Adgaon, Lonikale and Giroli villages while medium
category (10% to 15%) of female buffaloes was observed in Umapur, Khandvi, Saykhed, Belura, Khandala, Aland, Akola, Pimpalkhed, Godri, Yelgaon, Dudha, Pimpri Andhali, Sonoshi, Daregaon, Kinhi and Ardv villages during 2015-16. Female buffaloes in high category were noticed in Changefal, Zadegaon, Takarkhed and Chinchol villages during the same period.

96. Farmers use the Male Buffaloes for the cultivation. The percentage share of Male Buffaloes was not found remarkable in the selected sample villages. Belura was ranking first in the population of male buffaloes in 1995-96 and it was ranking second in 2015-16. Takarkhed village was ranking second in population of Male Buffaloes during 1995-96, while it was ranking first in 2015-16.

97. Out of total selected villages eighteen villages were having sheep during the investigation period. The proportion of sheep was below 10% to total livestock in Umapur, Akola, Godri and Adgaon villages while above 10% in Khandvi, Saykhed, Zadegaon, Takarkhed, Makodi, Parda, Yelgaon, Giroli and Kinhi villages during 2015-16.

98. Out of the 26 selected villages 16 villages were ranking first in the goat population in the total livestock in 1995-96 and 18 villages in 2015-16. Lonikale village has the highest percentage of Goats population while the lowest percentage of Goats population was recorded in Zadegaon village during 2015-16.

99. Below 15% share of wooden plough observed in Lonikale, Ardv, Akola, Pimparkhed, Daregaon, Kinhi, Dudha, Sonoshi, Changefal, Takarkhed and Parda village whereas 15% to 20% share was observed in Adgaon, Khandvi, Pimpri Andhale, Belura, Giroli, Umapur, Saykhed, Godri, Zadegaon, Yelgaon and
Ghanegaon village. Above 20% share of wooden plough was observed in Khandala, Aland, Makodi and Chinchol village.

100. The share of iron plough were above 20% in Belura and Chanefal whereas 13% to 20% share of iron plough was observed in Umapur, Zadegaon, Makodi, Giroli, Dudha, Ghanegaon, Ardav, Adgaon and Khandala villages during 2015-16. Below 13% share of iron plough was noticed in Khandvi, Aland, Akola, Takarkhed, Chinchol, Lonikale, Pimpri Andhale, Godri, Yelgaon, Saykhed, Kinhi, Parda, Pimparkhed, Sonoshi and Daregaon villages.

101. Out of the selected villages the percentage share of tractors in the total agricultural implements was below 5% in Changefal, Chinchol, Umapur, Khandala, Saykhed, Zadegaon, Daregaon and Belura villages whereas 5% to 9% share was experienced in Pimparkhed, Kinhi, Pimpri Andhale, Dudha, Godri, Aland, Ardav, Khandvi and Parda villages during 2015-16. Above 9% share of tractors were found in Lonikale, Akola, Makodi, Sonoshi, Adgaon, Yelgaon, Takarkhed, Giroli and Ghanegaon villages during 2015-16.

102. Electric pump is the effective means of irrigation at the local and widely used by the farmers. It is used to lift water from tank, well and river for irrigation. The percentage share of electric pumps was below 55% in Makoli, Ghanegaon, Belura, Giroli, Khandala, Adgaon and Aland villages whereas 55% to 62% percentage share was found in Yelgaon, Changefal, Chinchol, Khandvi, Zadegaon, Takarkhed, Godri, Ardav, Umapur and Saykhed villages during 2015-16. Above 62% share of electric pumps was found in Sonoshi, Parda, Pimpri Andhale, Akola, Dudha, Kinhi, Lonikale, Daregaon and Pimparkhed villages.

103. Out of the 26 selected villages, 21 villages were having zero
percent area under forest in 1995-96 and 2015-16. Out of the total geographical area above 20% area under forest was found in Umapur village while 10% to 20% area under forest was observed in Giroli (11.01%). Below 10% forest area was noticed in Lonikale, Saykhed and Kinhi villages during 2015-16.

104. Out of the total geographical area above 5% area not available for cultivation was found in Yelgaon, Lonikale, Pimpri Andhale, Sonoshi, Dudha, Ghanegaon, Daregaon, Takarkhed and Adgaon village whereas 1% to 5% area was observed in Khandvi, Khanadala, Aland, Chinchol, Zadegaon, Akola, Belura, Changefal, Parda, Pimparkhed, Umapur, Godri, and Giroli village. Below 1% area not available for cultivation was received from Kinhi, Makodi, Saykhed and Arav village during 2015-16.

105. Out of the total geographical area below 2% area was found under other uncultivable land in Khandvi, Saykhed, Takarkhed, Khandala, Belura, Adgaon, Dudha, Yelgaon, Makodi, Changefal, Aland, Pimpri Andhale, Giroli and Zadegaon village whereas 2% to 4% area was found in Lonikale, Akola and Daregaon village during 2015-16. Above 4% area under this category was found in Parda, Chinchol, Kinhi, Godri and Pimparkhed villages during the same period.

106. Out of the total geographical area below 2% area under fallow land was found in Saykhed, Takarkhed, Akola, Khandvi, Lonikale, parda, Kinhi, Belura, Dudha, Umapur, Daregaon, Adgaon, Pimpri Andhale, Aland, Yelgaon, Sonoshi and Changefal. About 2% to 4% area under fallow land found in Chinchol, Zadegaon, Arav, Khandala and Makodi village during 2015-16. Above 4% area under fallow land was observed in Godri, Pimparkhed, Ghanegaon and Giroli village.
107. Out of the total geographical area below 85% area was experienced under net sown area in Yelgaon, Pimparkhed, Ghanegaon, Lonikale, Giroli and Umapur villages whereas 85% to 90% area was found under net sown area in Godri, Sonoshi, Pimpri Andhale, Daregaon, Kinhi and Dudha villages during 2015-16. Above 90% area under net sown area was noticed in Chinchol, Khandala, Adgaon, Takarkhed, Zadegaon, parda, Saykhed, Akola, Aland, Khandvi, Changefal, Makodi, Ar dav and Belura villages during the same period.

108. Tahsils like Jalgaon Jamod, Sangrampur and Buldhana have recorded high level of Agricultural Development. These tahsils have recorded high level of agricultural development as they have more suitable physical and environmental condition. Medium level of agricultural development was found in Malkapur, Mehkar, Deulgaonraja, Nandura and Sindkhedraja. Tahsils like Motala, Shegaon, Lonar, Khamgaon and Chikhli tahsils recorded low level of agricultural development.

8.3 Agricultural Problems of the Study Region:

Considering the study, researcher has noticed some important and basic problems of agricultural developments regarding the study region. The most important problems of agriculture in Buldhana district are as below:

1. Uneven Rainfall:

Buldhana district is badly affected by the uneven rainfall. It receives about 85% annual rainfall from south-west monsoon. But the monsoon rains in the study region are often marked by some important variations from the normal viz. i) the beginning of the rains may be delayed considerably over the large part of the region. ii) It may be end much earlier than usual causing damage to kharif crops and also make
the sowing of the rabi crops uncertain. iii) There may be prolonged breaks of rain lasting over the greater part of July or August. The normal duration of the monsoon varies from two to four months. It begins to withdraw from north-west by mid-September. It is unevenly distributed over the region.

The mean annual rainfall in the region varies from 538.70 to 844.96 for the period ranging from 1995 to 2015. Due to ups and downs in the rainfall cropping pattern and productivity have been affected.

2. **Less Irrigation:**

Irrigation is the artificial applications of water to soil for successful crop production. Irrigation water is applied to supplement the water available from rainfall and the contribution of ground water to soil moisture. Irrigation is essential to the raise crops, necessary to meet the food, fiber and fodder requirement. Irrigation is an old art as old as human civilization.

There are 12 medium irrigation projects, and 48381 irrigation wells in the study region. About 8.79% net sown area was found under irrigation in the district. Most of the medium projects, minor irrigation schemes and irrigation wells become dry in summer season. Since there are inadequate irrigational facilities, farmers are unable to supply water for the crops.

3. **Soil Erosion:**

This problem is associated with environmental degradation. Soil erosion is a process of detachment and transportation of soil materials by erosive agents like water and winds. Geological erosion, accelerated erosion, and water erosion these types of erosion are found in the study region. It is complicated problem and it varies from place to place according to soil characteristics. The rate of soil erosion depends upon the slope of the ground, vegetation coverage, use of soil and the nature
and amount of rainfall. In the study region shallow soils is found in a large scale. This type of soil is not fertile. Soil erosion directly affects the crop productivity

4. **Poverty:**

The process of economic development has made the rich, richer while the poor have rendered poorer. In the study region, large number of people living below poverty line has increased. They are unable to fulfill their basic needs of food, cloth, shelters and education. The poor farmers can be described as those who are not able to meet the basic requirements of physical life. The farmers who live below poverty line are not able to use chemical fertilizers, pesticides, biocides, and improved seeds in order to increase the yield per hectare. Due to this, agricultural development has become very slow.

5. **Inadequate Supply of Electricity:**

Electricity is very important for the development of agriculture, since it is cheap and convenient source of power. Rural electrification is one of the most basic needs for transformation of rural life and agricultural production and is a key factor in the development of rural industries. It is vital for the socio-economic betterment of the people living in the villages of study region. But in the study region, supply of electricity for agricultural operations is not available on priority basis. Interrupted and fluctuating supply of electricity is the common thing in the study region. Due to inadequate supply of electricity horticulture is not flourished in the district. Now a days farmers and the villagers are not satisfied with the policy of load shading of electricity.

6. **Processing and Marketing:**

Agriculture marketing still continues to be in a bad shape in rural areas of the study region. Market is essential for progressive agriculture. Regulated markets enable farmers to sale their agriculture produce and to
purchase farm implements, tools, fertilizers, pesticides and agricultural inputs as well as goods of daily use. It means processing and marketing facilities are not adequate in the study region. In the absence of sound marketing facility the farmers have to depend upon local traders and middlemen for the disposal of their farm produce, which is sold out at throw away price. Unfortunately, the region’s farmers do not get the regular marketing facility. Most of the farmers’ sale their farm produce in the village. Due to the lack of transport and communication marketing facilities are not developed in the region.

7. **Low Productivity:**

Majority farmers in the large part of the study region do practice of subsisting farming till today. Farmers cultivate small and scattered holding with the help of draught animal and family members. Techniques are primitive and tools are simple. Modern farm implements are particularly absents. Farmers are too poor to purchase fertilizers and HYV seeds, as a result of which the productivity is low. Facilities like electricity, irrigation, and credit are badly lacking.

8. **Inadequate Transport and Storage Facilities:**

One of the main handicaps with study region’s agriculture is the lack of cheap and efficient means of transportation. Most roads in the rural areas are bullock-carts roads and become useless in the rainy season. Under these circumstances, it is very difficult to the farmers to carry their produce to the main market. Hence they sell their produce in the local market at low price. Storage facilities in the study region especially in rural areas are either totally absent or grossly inadequate. Under such conditions the farmers are compelled to sell their produce immediately after the harvest at the prevailing market price, which are bound to be low. To protect the perishable and non-perishable produce of the field, ware houses and storage activities plays vital role.
9. **Lack of Uniform Price Policy and Incentives:**

The major aim of agricultural price policy should be to correct distortions which are generally, socially or economically harmful and which emerge from time to time because of the imperfections of the market mechanism. The interest of the producers of the farmers should be safeguarded through and price support operations when there is a sharp fall in prices. However the interest of the consumer particularly of the low income group of the population should be protected through the price policy. But in the study region there is a lack of uniform price policy. The uniform price policy is essential for encouraging investment in agriculture and for adoption of modern technology. The assurance of a remunerative price to the farmer is essential. The main demand of the farmer of the study region is that the price fixation should take into account the variation in the price inputs. The overall relationship between input and output prices within agriculture and the terms of trade between agriculture and other sectors of the economy should be such as to stimulate growth in rural areas. The minimum support price is expected to take into account change in input prices.

10. **Inadequate use of HYV Seeds, Chemical Fertilizers and Manures:**

In the study region, much of the crop losses, inflicted by a large variety of insects, pest and weeds. Systematic work has not been carried to determine the losses caused by insects, pests, weeds and plant disease in the district. Plant protection or chemical power has now been accepted as one of the supporting factors in increasing agricultural production, along with better seeds, fertilizers and irrigation.

Diseases in plants are mainly caused by fungi, bacteria, virus and the deficiency of essential foods. Such disease produce wilting, stunting,
drying up and malformation of parts like roots, stems, branches, flowers, leaves and fruits. Fungi attack not only the plant during its growth but also the produce after harvest, during storage and process. These problems are occurred in all tahsils of the district. But the most farmers of the study region are poor hence they are not able to use the costly pesticides on large scale and on proper time.

Use of fertilizers is important because they boost crop production and are also vital in the use of other improved techniques. Farmers get relatively quick returns if they use adequate fertilizers in proper time. The farmers of the study region do not know the efficient and balanced use of fertilizers and combined use of organic manures and fertilizers. It is essential for obtaining maximum potential yield from the land. Farmers know the success of farming based on modern technology would depend upon it. But unfortunately the farmers of the study region are not fully applying adequate manures and fertilizers to their field. High prices of fertilizers, poverty of cultivators, inadequate credit facilities, burning of cow dung as fuel, insufficient irrigational facilities, poor economic condition of farmers etc. these are the factors responsible for the less use of fertilizers in the study region.

11. Deforestation:

In the study area forest area is decreased to the large scale. All tahsils have shown negative change in area under forest. Only 7.08% area is observed under forest in the district. Very less percentage of forest area leads towards the ecological imbalances in the region.

12. Agricultural Training Centers:

Most of the farmers of the study area are not having the sufficient knowledge regarding use of modern implements and techniques in the farming. Since these centres are few in numbers they are unable to provide the knowledge and training to all the farmers of the
13. **Unawareness about Government Schemes:**

There are many schemes related to agriculture and rural development started by the state government and central government in order to improve the economic condition of the farmers. But many farmers are not aware about the schemes. Efforts of Government are not enough to make aware the farmers about schemes and facilities.

14. **Population Pressure on Agriculture:**

In the study region about 70% to 75% population is depend on agriculture. Agricultural density of population has increased from 96 persons per sq. km. to 124 persons per sq. km from 2001 to 2011.

**8.4 Suggestions:**

1. The rainfall is the dominant single weather element influencing the intensity and location of the farming system and farmers choice of the enterprises. To overcome the problem of erratic rainfall it is very essential to percolate the each and every drop of rainwater in the soil. To stop the surface running water in the region more percolation tanks, more kolhapur type bandhares and field tanks should be constructed in each and every villages in the study region. Weather forecast system and information should be made available so that the farmers of the region do their farming activity on the proper time.

2. During the period of investigation it is found that very slight increase in area under irrigation. It is very essential to increase the irrigational facilities in all the tahsils. Natural situation cannot be change, but effective use of available water plays vital role to overcome the problem of less irrigation in the region. To solve this problem government should regularly repair the old medium and minor irrigation schemes. New canals should be constructed
in the region. New irrigation techniques such as drip irrigation, sprinkle irrigation should be made available to the farmers on subsidy so that most of the farmers can get benefit of it.

3. Soil erosion directly effects on agricultural productivity. Contour farming can reduce run of and soil loss from agricultural water shades so that preferences should be given to this farming in all tahsils. The work of contour bunding, land leveling, graded bunding and bench terracing on steep slopes should be undertake on priority base. Cultivator should pay their attention towards rotation of crops. It controls erosion, reduces soil loss and preserves productivity. Grazing of animals should be controlled. Especially sheep and goats are more destructive than cattle. Certain parts of the land should be used for rotational grazing. Soils should be covered at optimum level with plant or crops.

4. Land is the significant productive asset in rural areas and the distribution of land is highly uneven in the study region. Small and marginal farmers are very poor. To improve their economic condition poverty alleviation programmes should be implemented in the study region.

Integrated rural development programme, Jawahar Rojgar Yojna, Employment Assurance Scheme these schemes should be effectively implemented to raise up the standard of living of farmers of the study region. Effective employment policy is the important element for removing poverty from the rural area.

5. Electricity makes a significant contribution in the development of agriculture. Electricity is required for many farm operations. To solve the problem of inadequate supply of electricity, state government should pay attention towards it. MSEDCL (Former MSEB) Ltd, should provide uninterrupted supply of electricity at
cheaper rates. During rabi season, when crop needs water, continuous electric supply should be provide. The problem of irregular, insufficient and interrupted supply of electricity should be stopped at any cost to improve the farm production. Efforts should be made to reduce the load shading of electricity supply or it should be completely stopped. More electric power should be made available to the rural areas and provide the connections to farmers without delay. Electricity rates should be reasonable, so that poor farmers can also take advantage of it.

6. The provision of marketing facility is very essential at reasonable returns to the cultivators and for the availability of goods at reasonable costs to the consumer. To solve this problem an efficient marketing structure has to be developed in the study region. The farmers should get the market facility within a radius of five kilometer from the place of production. The existing weekly markets should be developed into assembling or sub-markets.

Net market should be organized in areas brought under irrigation and areas of intensive production. The bigger market should be regulated on a priority basis and necessary amenities should be provided therein. Market intelligence services should be organized in the interest of farmers. Separate market boards for fruits and vegetables should be established. Co-operative market system should be developed. More information regarding goods prices should be given regularly to the farmers through the means of communication. There should be regular checking the use of standard weights and other measures to stop the cheating.

7. To increase the agricultural productivity soil erosion should be stop by using various measures. Source of manure should be
increase in order to increase the productivity of agricultural land. Provision should be made of education, research and extension, agro-economic services to spread the knowledge of improved methods of farming. The government should undertake large-scale irrigation and land reclamation programmes. Farmers should apply improved and scientific methods of cultivation. Fertilizers, pesticides and improved seeds should be made available at reasonable prices to the farmers. Modern techniques and implements should be used for the cultivation.

8. Many villages of the study area are not yet well connected with main roads or with market centers. Most roads in rural areas are bullock cart roads and become useless in rainy season. To overcome this problem, availability of village road should be increased. Village to village melted road should be constructed. Good quality road should be constructed in villages, market places and towns; all villages should connect with market centers by roads. Storage facility in the region is not enough. To overcome this problem, scientific storage facilities should be made available in all blocks and market centers. State warehousing corporation should start more warehouses in the study region. More Godowns should be constructed at the village level through the schemes of national grid of rural godowns. Storage facilities should be provided to the farmers near their fields and in a particular to small and marginal farmers. Rural storage centers should be established to serve the economic interest of the farming community.

9. In the study region most of the farmers are not aware about the use of HYV. Many farmers are still using local seeds, it causes
less output. Workshops and training programmes should be arranged to make awareness among the farmers regarding the use of improved varieties. Government should provide high yielding variety seeds to the poor and marginal farmers on concession. Government should make it clear to get the original improved seeds to all the farmers on proper time. High yielding seeds of different crops should be distributed through Grampanchayat or credit societies in every village.

In order to avoid the loss of crops biocides should be used. Pests, weeds and diseases should be checked by proper doses of insecticides, pesticides and weedicides on proper time. For optimum results the adoption of pests control operation on area basis is essential and should be made compulsory with the provisions to recover proportionate cost from the beneficiary.

In the study region farmers are using insufficient chemical fertilizers because of their poor economic condition. It is very essential to use the chemical fertilizers such as nitrogen, phosphate, potash for increasing yield. For that, soil should be flourished by providing adequate manures and fertilizers. Cow dung should be used because it provides the best manure to the soil. Organic manures should be used for keeping the soil in the good health. There should be greater application of organic matter and wastes in study region in order to permanently improve the physical and biological conditions of the soil for which regarding of processed waste in all available forms is a matter of urgent necessity.

10. Less forest area is found in the district. In order to increase the forest area in the region government should undertake the social forestry projects. Incentives should be given to the plantation.
Horticulture schemes should effectively implement. Efforts should be made to bring barren and fallow land under forest. Road side plantation should undertake and care should be taken up to the full growth of trees.

11. It is necessary to increase number of Agricultural Training Centers in the district. The existing Training Centers and Krishi Vigyan Kendra should organize workshops and training programmes regarding various practices of agriculture. Agricultural training centers and Krishi Vigyan Kendra should provide help and guidance at every step to the farmer i.e. testing of soil, selection of seeds, sowing, watching the plants in their growth, providing for pest control, harvesting and storage etc. Krishi Vigyan Kendra should adopt the parent-ship of neighboring villages to provide extension service regarding agriculture. Three days pre-season workshop should be organized before kharif and rabbi season in every village. Agricultural department should arrange block-wise monthly workshop for farmers. At least one Krishi Vigyan Kendra should be started in every block.

12. Central Government and State Government have started many significant schemes for the development agriculture. But the propagation of those schemes has not done effectively. To overcome this problem government should give regular information about schemes and programmes regarding agriculture development to the farmers through media. Gramsevak and Talhati should give direct information about the government schemes to the farmers. The information regarding schemes should put on notice boards of grampanchayat. Agriculture assistant should mix up with farmers and make them aware
about the schemes.

13. To reduce the population pressure on agriculture, Agro-base industries like oil mills, cotton mills and food processing should start in rural area to reduce the population pressure from agriculture. Potential agricultural land should bring under cultivation. Intensive farming should be adopted to increase the agricultural output in the region. Benefits of government schemes should provide only to those agricultural families who have two children. Dairy farming should be undertaken.