



“A GEOGRAPHICAL ANALYSIS OF CHANGE IN CROPPING PATTERN; A CASE STUDY OF FARM POND HOLDING FARMERS IN AHMEDNAGAR DISTRICT (M.S.)”

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Abstract:

Recently, Irrigation has become more essential and without it, most crops cannot be grown. Artificial irrigation became instrumental due to variability of monsoon and uneven distribution of rainfall. The Ahmednagar district mainly suffers from scarcity of water and lies in core zone of drought prone area. The farmers, especially small and marginal have limited resources to resolve the issue of scarcity of water. For such farmers, the concept of ‘Farm-pond’ is quite useful. (Dr. D.S Ghungarde) ^[2] . The present research examines the impact of Farm ponds on change in cropping pattern in Ahmednagar district. The present study made use of primary data. The primary data was obtained from tehsilwise 10% Farm pond holding farmers (980 Farmers) respondents using well-structured questionnaire using, Random Sampling Technique. The quantitative information regarding the cropped area has been compiled using simple tabular analysis and percentage of area under each crop with respect to NSA is found out. Before and after farm-pond, the change in cropping pattern clearly indicates that some crops fetching better profit such as fruits and cash crops has significantly increased due to newly created water resource such as farm-ponds. The ponds have not only affected the cropping pattern but also tendency of the farmers to choose commercial crops by compromising area under food crops.

Keywords: Irrigation, Farm pond, Cropping pattern, NSA etc.

Article History

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1. Introduction:

Agricultural development is depends mainly upon productivity of various crops. The factors affecting crop yield are mainly irrigation technology, storage and market facilities etc. Therefore, it is necessary to find out the availability and nature of such factors. The present study area mainly suffers from scarcity of water and lies in core zone of drought prone area. The canal irrigation may be feasible in the limited areas. Availability of ground water is low and most of the wells are deep and they dry up from April to July. Secondly long dry spells during monsoon has put forth the need of water supply to avoid wilting of crops.

Wali V.S. et. al. (2019) ^[4] studied and analysed the cropping pattern prevailing in the Malaprabha Project Command area and also compared the recommended cropping pattern with the actual practice and identify the deviation. Anonymous (1977) ^[1] reported that since water is the first limiting natural component for crop production in dry and semi-arid regions. In rain-fed agriculture only rain falls in a given area is utilized, thus the pond or catchment area is naturally concentrated for the study of crop management, resource conservation and utilization. Shivarudrappa (2010) ^[3] studied and gave information about the success story of the ponds of the fields implemented under the project at *Pampanur Thanda* in *Anantapur* district of Andhra Pradesh. The author found in the case study that, Productivity and Diversity of crops along with cultivation of perennial crops can be enhanced by adopting farm ponds for soil and water Conservation.

The farmers, especially small and marginal have limited resources to resolve the issue of scarcity of water. For such farmers, the concept of '**Farm-pond**' is quite useful. The present investigation aims at finding out key role of farm-ponds in agriculture such as cropping pattern. The study of cropping pattern is based on quantitative information regarding areal strength of major crops grown in the district.

2. Objective:

The present research paper examines the impact of Farm ponds on change in cropping pattern of farm pond holding farmers in Ahmednagar district.

3. Study Area:

Ahmednagar district is selected as the study area in the state of Maharashtra. Ahmednagar district is situated to some extent in the upper Godavari valley and to some extent in the Bhima valley. It is between 18⁰10' to 20⁰00' North Latitude and 73⁰30' to 75⁰37' East Longitude. (Figure 1). The district lies in the rain shadow zone of the western ghat. The distribution of the rainfall is very uneven and average annual rainfall received is 583.5 mm. About 75% of the annual rainfall is received during the southwest monsoon season.

4. Material and Method:

The present study made use of primary data. The primary data was obtained from Farm pond holding farmer respondents using well-structured questionnaire. During 2005 to 2015, there are total 9798 farm ponds

constructed in the district. Out of that, tehsilwise 10% sample farm pond holding farmers (980 farmers) were selected using Random sampling technique.

The details regarding area under different crops have been obtained from the farmers having farm-ponds before and after farm-pond construction. While collecting data, it was supported by field observation. This has improved validity of the data. The quantitative information regarding the cropped area has been compiled using simple tabular analysis as shown in the appendix (Appendix 1 to 3) in the appendix section of this paper. The summary of the same is depicted in the table (Table 1) and bar graph (Figure 2). The area of each crop has been converted into percentage to NSA. The change in area under each crop has also been calculated (Figure 3).

5. Result and Discussion:

The table (Table 1) and the figure (Figure 2) show that area under fruit crops has significantly increased due to farm-ponds. The newly created water body is being successfully used for protective irrigation. The field observations reveal that micro-irrigational techniques are applied especially for horticultural crops. The requirement of volume of water for such trees is very low as compared to sugarcane. However, the period of requirement of water for fruit crops is throughout the year. Therefore, water resource from the ponds may be considered as crucial factor for the crops like pomegranate, orange, mango, guava, lemon, etc. The next crop which showed areal increment due to ponds is Onion. The ponds can easily fulfil water requirement of this crop, as it is a seasonal crop.

Vegetables and flowers are increased by 6.58 % in the district. This means that farmers have a tendency to grow cash crops on the basis of newly created water resources.

Among the grains, wheat (+3.49) is preferred mainly because it has better marketability compared with other foodgrain crops.

Before and after farm-pond, the change in cropping pattern clearly indicates, the changes that have taken place in agricultural development of the district. Some crops fetching better profit have shown increase in sown area. These crops are Wheat (+3.49%), Sugarcane (+1.58%), Cotton (+1.68%), Fruit crops (+9.25%), Onion (+7.19%), other vegetables and Flower (+6.58%). Obviously with limited land resource the farmers have reduced the area under the crops getting low income. These are Jowar (-12.46%), Bajra (-13.41%), Pulses (-2.01%), Oilseeds (-1.45%) etc.

It must be noted here that, the reduction of area under oilseeds, especially groundnut and pulses has important implication on environment. Such crops are necessary to maintain soil ecology. This point is well felt mainly due to the changing tendency of the farmers. The ponds have not only affected the cropping pattern but also tendency of the farmers to choose commercial crops by compromising area under food crops.

After the above discussion, it is suggested to construct more and more farm ponds in drought prone areas like Ahmednagar district to have sufficient protective irrigation. It is also suggested to implement Micro irrigation techniques likes Drip irrigation, Sprinkler irrigation etc.

6. Conclusion:

It is concluded that, this type of study is important for future of agricultural planning to achieve a holistic growth. This will definitely be useful for planners, researchers and implementing agencies. Such studies can also exhibit a good example of utility of geographical studies for agricultural development.

7. References:

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- [4] Wali V. S., Poddar R., Mundinamani S. M., Yenagi B. S. (2019): A Research Article on “An Analysis of Cropping Pattern in Malaprabha Project Command Area” published in International Journal of Agriculture sciences, ISSN: 0975-3710 & E-ISSN: 0975-9107, Volume 11, Issue 2, 2019, pp.-7739-7742.

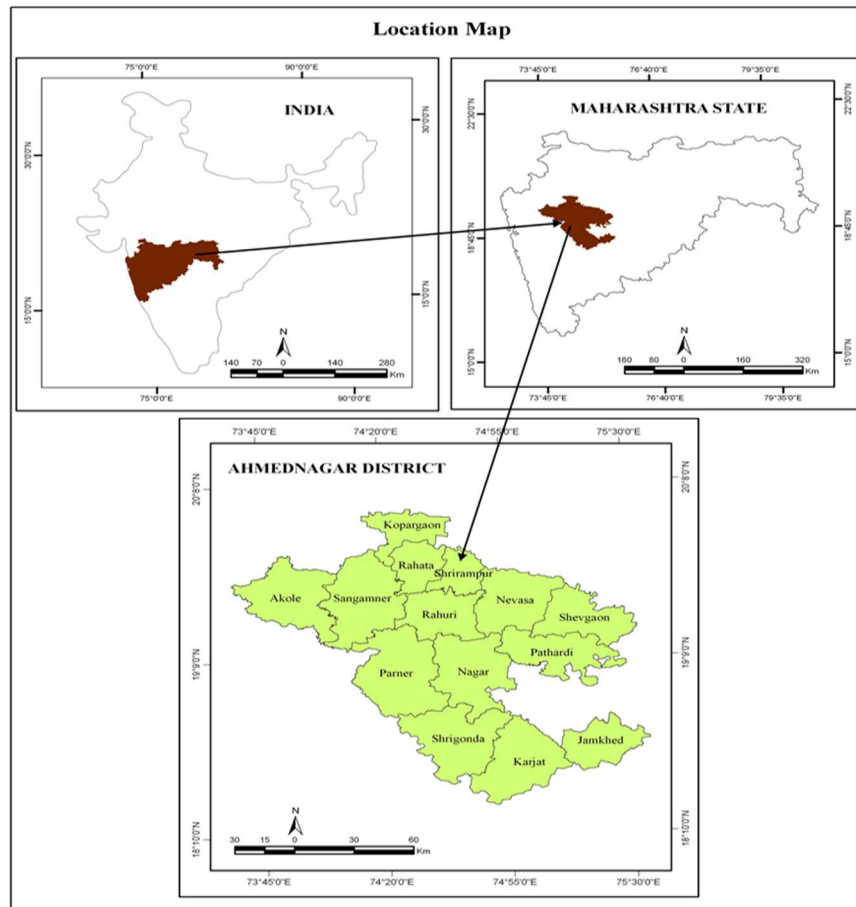
Table 1: Area under Major crops of Farm pond holding farmers, Ahmednagar district

Area under Major crops before and after farm-pond construction (in hect)						
Sr. No.	Crops	Before Farm-pond		After Farm-pond		Volume of change in % of area
		Cropped area (hect)	% to district	Cropped area (hect)	% to district	
1	Jowar	451.14	21.68	216.42	9.22	- 12.46
2	Bajra	366.03	17.59	98.07	4.18	- 13.41
3	Wheat	103.35	4.97	198.52	8.46	+ 3.49
4	Pulses	144.66	6.95	116.04	4.95	- 2.01
5	Oilseed	74.51	3.58	49.96	2.13	- 1.45
6	Sugarcane	98.43	4.73	148.16	6.31	+ 1.58
7	Cotton	37.75	1.81	81.99	3.49	+ 1.68
8	Fruit crops	327.66	15.75	586.53	25.00	+ 9.25
9	Onion	245.50	11.80	445.58	18.99	+ 7.19

10	Other Vegetables	123.93	5.96	234.61	10.00	+ 4.04
11	Flowers	51.38	2.47	117.55	5.01	+ 2.54
12	Fodder	36.12	1.74	40.76	1.74	N.C.
13	Rice	20.30	0.98	12.20	0.52	- 0.46
Total Cropped Area		2080.76	100	2346.38	100	+ 6.95

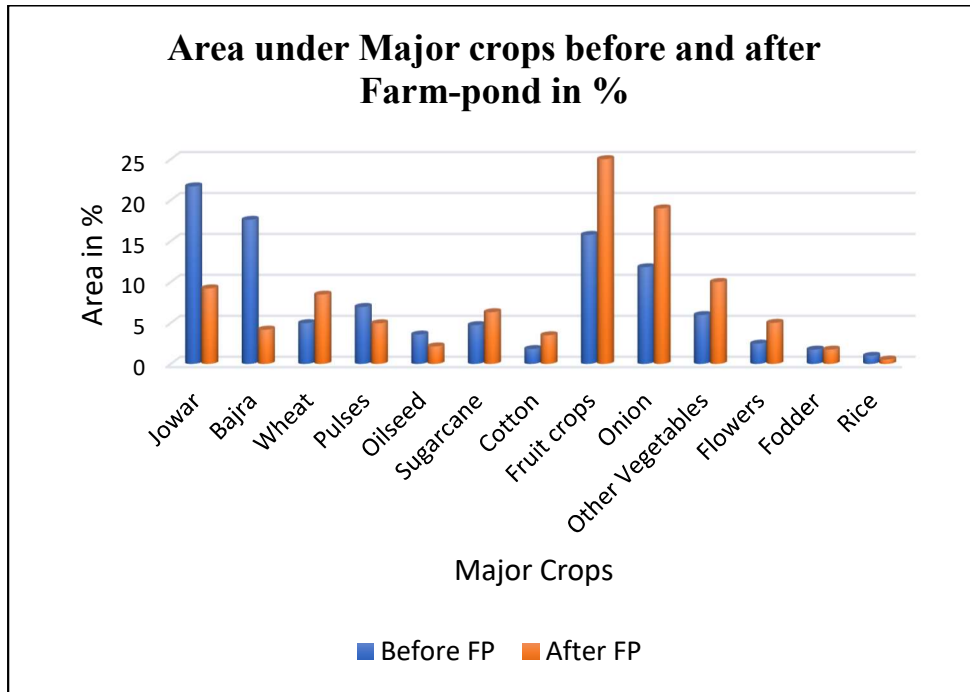
(Source: Computed by researcher based on primary survey)

Figure 1: Location Map of Study Area



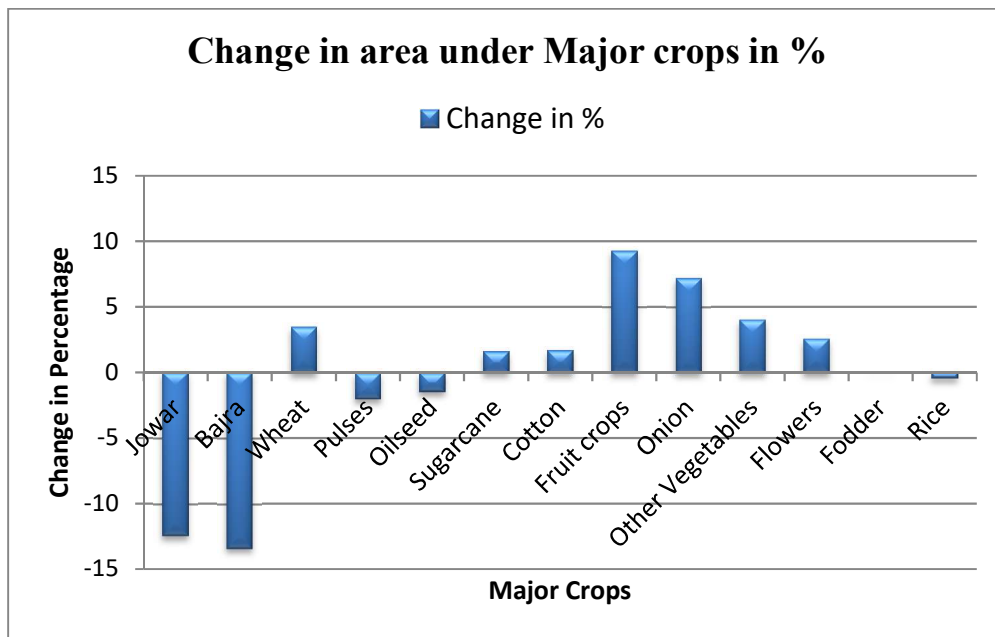
(Source: Prepared by researcher)

Figure 2: Area under Major Crops, Ahmednagar District



(Source: Prepared by researcher based on primary data)

Figure 3: Change in Area under Major crops, Ahmednagar District



(Source: Prepared by researcher based on primary data)

8. Appendix:

Appendix 1: Tehsilwise area under different crops before Farm ponds (Area in hect)

Tehsil	Area under different crop (Area in hect) Before Farm ponds													Total
	Jowar	Bajra	Wheat	Pulses	Oils seed	Sugarcane	Cotton/Fiber	Fruits	Onion	Other Vegetables	Flower Crops	Fodder	Rice	NSA
Akole	0.00	59.69	13.63	18.30	6.67	17.40	0.00	38.40	18.60	16.80	5.41	10.20	20.30	225.40
Sangamner	23.94	80.40	15.32	12.60	7.50	10.14	17.80	48.60	31.40	20.20	6.00	2.60	0.00	276.50
Kopargaon	10.48	15.80	6.19	3.52	1.81	5.60	0.70	9.72	12.20	2.80	0.27	0.50	0.00	69.60
Rahata	10	18.44	5.47	4.99	0.06	7.10	0.59	14.76	10.80	3.67	5.95	1.37	0.00	83.20
Shrirampur	9.3	5.70	4.00	2.70	2.07	5.50	0.00	6.60	7.24	2.80	0.00	0.74	0.00	46.65
Newasa	11.06	10.20	3.60	5.03	1.08	14.19	0.61	19.20	7.20	3.56	0.00	0.62	0.00	76.35
Shevgaon	40.15	21.66	4.20	9.40	8.80	10.75	11.70	18.40	30.20	15.20	0.37	1.52	0.00	172.35
Pathardi	40.22	72.95	3.46	11.72	3.94	6.43	0.30	58.20	20.40	7.60	4.41	0.99	0.00	230.62
Nagar	76.16	28.61	8.11	25.33	14.25	0.86	0.09	24.60	13.80	14.20	10.61	3.63	0.00	220.25
Rahuri	9.42	10.90	10.70	3.60	1.22	7.60	0.34	13.28	9.51	8.00	1.00	3.82	0.00	79.40
Parner	85.6	21.50	17.60	22.80	8.80	2.81	0.40	32.20	29.80	10.60	10.55	5.70	0.00	248.35
Shrigonda	39.18	4.04	5.20	7.35	3.62	5.70	0.02	22.30	20.20	6.40	2.10	1.29	0.00	117.40
Karjat	70.56	10.25	4.67	15.73	7.94	4.14	3.20	16.20	27.40	10.80	4.71	2.76	0.00	178.36
Jamkhed	25.07	5.90	1.20	1.59	6.75	0.22	2.00	5.20	6.75	1.30	0.00	0.38	0.00	56.36

District	451.14	366.03	103.35	144.66	74.51	98.43	37.75	327.66	245.50	123.93	51.38	36.12	20.30	2080.78
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(Source: Computed by researcher based on primary data)

Appendix 2: Tehsilwise area under different crops After Farm ponds (Area in hect)

Tehsil	Area under different crop (Area in hect) After Farm ponds													Total
	Jowar	Bajra	Wheat	Pulses	Oilsseed	Sugarcane	Cotton/Fiber	Fruits	Onion	Other Vegetables	Flower Crops	Fodder	Rice	
Akole	0	10.20	19.45	17.51	11.10	21.00	0.00	63.64	41.42	38.80	10.20	8.83	12.2	254.35
Sangamner	10.75	25.40	22.40	5.50	4.33	12.67	5.54	102.80	62.80	49.93	12.00	7.38	0	321.50
Kopargaon	1.69	4.70	9.53	1.20	1.80	18.76	1.03	11.20	13.70	3.52	2.06	1.00	0	70.19
Rahata	2.20	2.56	9.58	3.41	4.40	20.35	0.50	18.40	11.40	5.10	6.16	1.34	0	85.40
Shrirampur	4.44	1.40	8.15	1.20	3.22	9.20	0.80	7.00	8.20	3.20	0.18	1.10	0	48.09
Newasa	2.80	1.10	9.12	4.40	0.50	19.20	6.80	20.00	8.40	4.02	0.40	1.76	0	78.50
Shevgaon	30.70	5.20	7.71	4.20	4.54	15.50	30.80	25.45	40.40	20.29	3.41	2.20	0	190.40
Pathardi	20.80	14.80	19.48	8.10	4.73	5.80	20.50	103.56	56.81	11.22	8.35	1.20	0	275.35
Nagar	28.17	5.38	14.25	22.24	2.20	1.60	0.20	66.20	33.90	32.21	32.18	1.50	0	240.03
Rahuri	2.96	5.60	15.20	4.80	3.34	7.08	1.20	15.85	11.00	9.20	1.80	4.40	0	82.43
Parner	50.20	8.40	30.40	26.60	4.20	2.80	0.00	61.80	57.20	26.40	23.60	3.80	0	295.40
Shrigonda	19.11	1.60	9.55	4.10	0.00	8.50	0.00	49.99	29.35	10.91	7.09	2.40	0	142.60
Karjat	35.80	8.87	15.50	10.32	4.40	5.70	4.42	29.01	54.40	15.61	10.12	2.85	0	197.00

Jamkh ed	6.80	2.8 6	8.20	2.46	1.20	0.00	10.2 0	11.6 3	16.6 0	4.20	0.00	1.00	0	65.1 5
Distric t	216. 42	98. 07	198. 52	116. 04	49.9 6	148.16	81.9 9	586. 53	445. 58	234.61	117. 55	40.7 6	12. 20	2346 .38

(Source: Computed by researcher based on primary data)

Appendix 3: Tehsilwise Area in percentage under cultivation Before, After and Volume of Change in various crops

Tehsi l	Tehsilwise Area in percentage under cultivation Before, After and Volume of Change in various crops																	
	Jowar			Bajra			Wheat			Pulses			Oilseed			Sugarcane		
	B. F	A. F	Cha nge	B. F	A. F	Cha nge	B. F	A. F	Cha nge	B. F	A. F	Cha nge	B. F	A. F	Cha nge	B. F	A. F	Vol. Cha nge
Akole	0	0	0	26. 48	4. 01	- 22.4 7	6.0 5	7.6 5	1.60	8.1 2	6. 88	- 1.23	2.9 6	4. 36	1.40	7.7 2	8.2 6	0.54
Sanga mner	8.6 6	3.3 4	- 5.31	29. 08	7. 90	- 21.1 8	5.5 4	6.9 7	1.43	4.5 6	1. 71	- 2.85	2.7 1	1. 35	- 1.37	3.6 7	3.9 4	0.27
Kopar gaon	15. 06	2.4 1	- 12.6 5	22. 70	6. 69	- 16.0 1	8.9 0	13. 58	4.68	5.0 6	1. 71	- 3.35	2.6 0	2. 56	- 0.04	8.0 5	26. 73	18.6 8
Rahat a	12. 02	2.5 8	- 9.44	22. 16	3. 00	- 19.1 7	6.5 7	11. 22	4.64	6.0 0	3. 99	- 2.01	0.0 7	5. 15	5.08	8.5 3	23. 83	15.3 0
Shrira mpur	19. 94	9.2 3	- 10.7 0	12. 22	2. 91	- 9.31	8.5 7	16. 94	8.37	5.7 9	2. 50	- 3.29	4.4 4	6. 70	2.26	11. 79	19. 13	7.34
Newa sa	14. 49	3.5 7	- 10.9 2	13. 36	1. 40	- 11.9 6	4.7 2	11. 62	6.90	6.5 9	5. 61	- 0.98	1.4 2	0. 64	- 0.78	18. 58	24. 46	5.88
Shevg aon	23. 30	16. 12	- 7.17	12. 57	2. 73	- 9.84	2.4 4	4.0 5	1.61	5.4 5	2. 21	- 3.25	5.1 1	2. 38	- 2.72	6.2 4	8.1 4	1.90
Pathar di	17. 44	7.5 5	- 9.89	31. 63	5. 37	- 26.2 6	1.5 0	7.0 7	5.57	5.0 8	2. 94	- 2.14	1.7 1	1. 72	0.01	2.7 9	2.1 1	- 0.68

Nagar	34.58	11.74	-22.84	12.99	2.24	-10.75	3.68	5.94	2.26	11.50	9.27	-2.23	6.47	0.92	-5.55	0.39	0.67	0.28
Rahuri	11.86	3.59	-8.28	13.73	6.79	-6.94	13.48	18.44	4.96	4.54	5.82	1.28	1.54	4.05	2.52	9.57	8.59	-0.98
Parner	34.47	16.99	-17.47	8.66	2.84	-5.81	7.09	10.29	3.20	9.18	9.00	-0.18	3.54	1.42	-2.12	1.13	0.95	-0.18
Shrigonda	33.37	13.40	-19.97	3.44	1.12	-2.32	4.43	6.70	2.27	6.26	2.88	-3.38	3.08	0.00	-3.08	4.86	5.96	1.11
Karjat	39.56	18.17	-21.39	5.75	4.50	-1.24	2.62	7.87	5.25	8.82	5.24	-3.58	4.45	2.23	-2.22	2.32	2.89	0.57
Jamkhed	44.48	10.44	-34.05	10.47	4.39	-6.08	2.13	12.59	10.46	2.82	3.78	0.96	11.98	1.84	-10.14	0.39	0.00	-0.39
District	21.68	9.22	-12.46	17.59	4.18	-13.41	4.97	8.46	3.49	6.95	4.95	-2.01	3.58	2.13	-1.45	4.73	6.31	1.58

(Source: Computed by researcher based on primary data)

Tehsil	Tehsilwise Area in percentage under cultivation Before, After and Volume of Change in various crops																	
	Cotton/ Fiber			Fruits Crops			Onion			Vegetables			Flowers Crops			Fodder Crops		
	B. F	A. F	Change	B. F	A. F	Change	B. F	A. F	Change	B. F	A. F	Change	B. F	A. F	Change	B. F	A. F	Change
Akole	0.00	0.00	0.00	17.04	25.02	7.98	8.25	16.28	8.03	7.45	15.25	7.80	2.40	4.01	1.61	4.53	3.47	-1.05
Sangamner	6.44	1.72	-4.72	17.58	31.98	14.40	11.36	19.53	8.18	7.31	15.53	8.22	2.17	3.73	1.56	0.94	2.30	1.36
Kopargaon	1.01	1.47	0.46	13.97	15.96	1.99	17.53	19.52	1.99	4.02	5.02	0.99	0.39	2.94	2.55	0.72	1.42	0.71

Rahata	0.71	0.59	-0.12	17.74	21.55	3.80	12.98	13.35	0.37	4.41	5.97	1.56	7.15	7.21	0.06	1.65	1.57	-0.08
Shrirampur	0.00	1.66	1.66	14.15	14.56	0.41	15.52	17.05	1.53	6.00	6.65	0.65	0.00	0.37	0.37	1.59	2.29	0.70
Newasa	0.80	8.66	7.86	25.15	25.48	0.33	9.43	10.70	1.27	4.66	5.12	0.46	0.00	0.51	0.51	0.81	2.24	1.43
Shevgaoan	6.79	16.18	9.39	10.68	13.37	2.69	17.52	21.22	3.70	8.82	10.66	1.84	0.21	1.79	1.58	0.88	1.16	0.28
Pathardi	0.13	7.45	7.32	25.24	37.61	12.37	8.85	20.63	11.79	3.30	4.07	0.78	1.91	3.03	1.12	0.43	0.44	0.01
Nagar	0.04	0.08	0.04	11.17	27.58	16.41	6.27	14.12	7.86	6.45	13.42	6.97	4.82	13.41	8.59	1.65	0.62	-1.03
Rahuri	0.43	1.46	1.03	16.73	19.23	2.50	11.98	13.34	1.37	10.08	11.16	1.08	1.26	2.18	0.92	4.81	5.34	0.53
Parner	0.16	0.00	-0.16	12.97	20.92	7.96	12.00	19.36	7.36	4.27	8.94	4.67	4.25	7.99	3.74	2.30	1.29	-1.01
Shrigonda	0.02	0.00	-0.02	19.00	35.06	16.06	17.21	20.58	3.38	5.45	7.65	2.20	1.79	4.97	3.18	1.10	1.68	0.58
Karjat	1.79	2.24	0.45	9.08	14.73	5.64	15.36	27.61	12.25	6.06	7.92	1.87	2.64	5.14	2.50	1.55	1.45	-0.10
Jamkhed	3.55	15.66	12.11	9.23	17.85	8.62	11.98	25.48	13.50	2.31	6.45	4.14	0.00	0.00	0.00	0.67	1.53	0.86
District	1.81	3.49	1.68	15.75	25.00	9.25	11.80	18.99	7.19	5.96	10.00	4.04	2.47	5.01	2.54	1.74	1.74	0.00

(Source: Computed by researcher based on primary data)