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# Spatial Analysis Of Agricultural Landuse In Ahmednagar District In 2010-11

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**Abstract** - The net sown area, current fallows and land under tree crops and groves are included in agricultural land use. Use of land is an important factor for planning process because of the predetermined nature of land resource. In Ahmednagar district covered an area of about three-fifth area under plough in Kharif (62 percent to net sown area) and less than two-fifth was under Rabi (38 percent to net sown area) season in the district. The crops viz. Bajra, Rice, Cotton, Wheat, Jawar, Maize, Vegetable, Pulses, Fodder crops, Oilseeds, Sugarcane and Fruits were cultivated in the district. Jawar is leading crop in Ahmednagar District. The Percentage of Jawar is 25.31 percent, Bajara is 19.29 percent, Sugarcane is 6.90 percent, Pulses is 5.37 percent, Wheat is 5.29 percent, Fodder crops are 4.90 percent, Oilseeds are 4.68 percent, Cotton is 4.63 percent, Vegetables are 3.46 percent, Fruits are 1.41 percent, Maize is 1.16 percent, Rice is 0.77 and Other crops are 0.76 percent recorded. Percentage area under cultivation of bajara, oilseeds, Jawar, pulses, wheat and rice was found to be decreased, while percentage area of vegetable, fodder, fruits and sugarcane was found to be increased.

**Key Words** - Crop, Spatial analysis, Agricultural Landuse.

## INTRODUCTION

The fundamental utility of land is fulfilling the human needs of food habitation and housing materials. It is essential to choose proper mode of agricultural landuse planning and allocation to various ingredients of optimum landuse to solve the human needs (Kellong, 1980) has rightly pointed out that this calls for the clear understanding of land classification for successful planning and development. The application of various inputs in land may change the allocation of land to different uses. The factors, conservation and quality of our socio economic environments are most elemental for the proper use of our land in each crop. This statement is true not only of percent Jawar is large urban centre as well as most of the remote areas. In order to deal with these and to plan for optimum utilization of land, it is necessary to have accurate and up to date information in all possible details on crops. It is therefore, the study of classification of under crop area in agricultural landuse pattern in Ahmednagar District would be helpful for preparation of the completed need of food and development plan for the district.

## DATA SOURCE & METHODOLOGY

The area of covered each crop had converted into percentage to net sown area. Secondary data has been used from Socio-Economic Reviews and District Statistical Abstracts of Ahmednagar District in 2010-11. The description of each land classification has been supplemented by numerous spot-inquires, besides information embodied by using the Ahmednagar District Census Handbook, District Gazetteer and District Socio Economic Review of Ahmednagar District.

## OBJECTIVES

1. To highlight the agricultural land use in Ahmednagar district in 2010-11.
2. To analysis the spatial distribution of each crop in kharif and rabbi seasons.

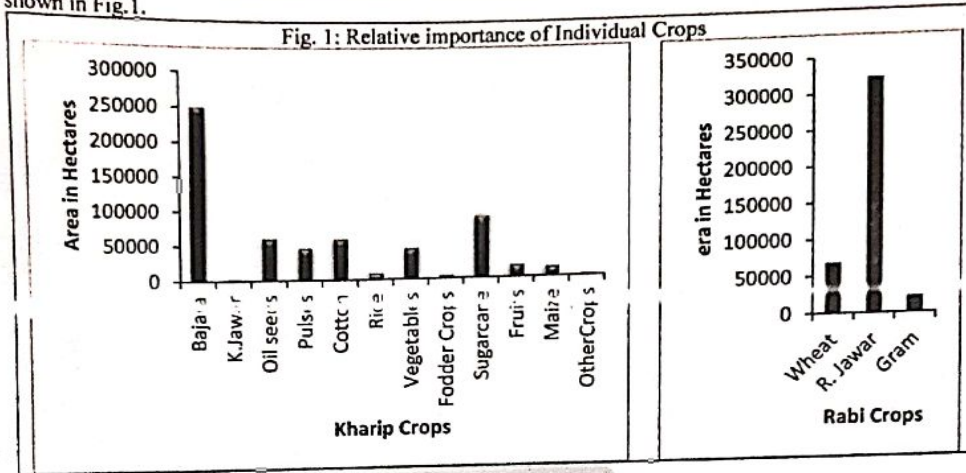
## STUDY AREA

Ahmednagar district is situated partly in the upper Godavari Basin. It lies between 18°2' North latitude to 19° 9' North latitude and 73°9' East longitudes to 75° 5' East longitudes. It is surrounded by Nashik district in the North, Beed and Aurangabad districts in the East, Pune district in the South, Thane and Raigad district in the North-West. Ahmednagar district has an area of 17410 square km and a population is 4543159 (2011 Census). It ranks first in terms of area and sixth in terms of population amongst the district of the state. The main stream of hills in the Sahyadri which is runs north-south in the western proportion of the district. It acts as a watershed between the Pravara and its tributaries which drain towards the Godavari. The climate of the district is generally dry except during the South-West monsoon season. The average annual rainfall for the district as a whole is 488.4 mm. Within the district there are considerable variations in rainfall. The rainfall in generally decrease as one proceed from West to East. Temperature begins to increase rapidly from the latter half of February. May is the hottest month and December is the coldest month with the Maximum temperature at 36.38°C and minimum temperature at 19.92°C at Ahmednagar. The soil of the district is essentially derived from the Deccan Trap which is the predominant rock formation of the district

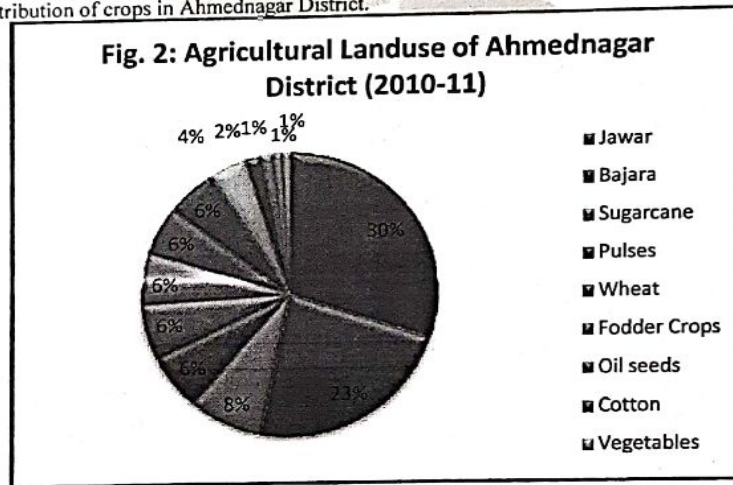


**SPATIAL ANALYSIS OF AGRICULTURAL LANDUSE**

Ahmednagar District is an important region involving 20.5 percent working force in agricultural practice. The crops viz. Bajra, Rice, Cotton, Wheat, Jawar, Maize, Vegetable, Pulses, Fodder crops, Oilseeds, Sugarcane and Fruits were cultivated in the district. The variations in areal extent under these crops were mostly depends on adoption of improved varieties of seeds for sowing, local environment and traditional approach of farmers in the area under review. Besides these soil types and rainfall influencing on the crop cultivation and cropping pattern. The relative importance of kharif and Rabi Crops were shown in Fig.1. It was seen that more than three-fifth area under plough in Kharif (62 percent to net sown area) and less than two-fifth was under Rabi (38 percent to net sown area) season in the district. The relative importance of individual crop in kharif and rabi are shown in Fig.1.



The relative significance of crops and their spatial variation in the area under review has studied in detail with ecology, land operations and spatial distribution of crops in Ahmednagar District.



**Table 1: Talukawise Cropping Area Ahmednagar District (2010-11)**

Talukas	Akole		Sangamner		Kopargaon		Rahata		Shrirampur	
	Area	%	Area	%	Area	%	Area	%	Area	%
Bajara	28	0.03	53378	64.13	8845	17.18	10221	17.49	8461	20.53
Jawar	37	0.04	1997	2.40	2174	4.22	2467	4.22	2099	5.09
Wheat	3885	4.25	4754	5.71	8445	16.40	6794	11.62	5849	14.19
Oil seeds	2020	2.21	4975	5.98	16994	33.00	14327	24.51	7172	17.40
Pulses	3025	3.31	3199	3.84	4035	7.84	2849	4.87	3621	8.79
Cotton	0	0.00	1141	1.37	5162	10.02	1073	1.84	3060	7.43
Rice	9810	10.73	145	0.17	0	0.00	0	0.00	0	0.00
Vegetables	4355	4.76	10358	12.45	6118	11.88	1502	2.57	1549	3.76

Fodder Crops	42621	46.61	3851	4.63	2341	4.55	2172	3.72	3667	8.90
Sugarcane	1935	2.12	9282	11.15	3252	6.31	3314	5.67	2302	5.59
Fruits	210	0.26	3198	3.81	757	1.17	2392	1.09	121	1.02
Maize	68	0.07	2541	3.05	6185	12.01	1383	2.37	804	1.95
Other Crops	6087	6.66	213	0.26	152	0.30	71	0.12	133	0.32
NSA	91433		83228		51498		58454		41210	

Table no 1 continue...

Crops	Newasa		Shevgaon		Pathardi		Nagar		Rahuri	
	Area	%	Area	%	Area	%	Area	%	Area	%
Bajara	1705	1.58	6500	6.70	27136	59.33	46164	40.49	15450	25.70
Jawar	1609	1.49	5670	5.85	23137	50.58	60186	52.79	1315	2.19
Wheat	3401	3.15	1120	1.15	129	0.28	6922	6.07	11450	19.04
Oil seeds	1654	1.53	118	0.12	254	0.56	1436	1.26	559	0.93
Pulses	4051	3.75	710	0.73	1474	3.22	1989	1.74	2802	4.66
Cotton	28006	25.94	14330	14.77	4590	10.04	19	0.02	350	0.58
Rice	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Vegetables	2430	2.25	4168	4.30	157	0.34	1379	1.21	2194	3.65
Fodder Crops	1674	1.55	491	0.51	284	0.62	671	0.59	3200	5.32
Sugarcane	47140	43.67	190	0.20	1430	3.13	152	0.13	15285	25.42
Fruits	3954	3.66	337	0.35	2442	5.34	268	0.24	537	0.89
Maize	550	0.51	65	0.07	139	0.30	402	0.35	980	1.63
Other Crops	1323	1.23	52	0.05	17	0.04	157	0.14	178	0.30
NSA	107953		97000		45739		114003		60125	

Table no 1 continue...

Crops	Parner		Shrigonda		Karjat		Jamkhed	
	Area	%	Area	%	Area	%	Area	%
Bajara	50060	34.23	2325	2.10	13382	17.69	6195	11.79
Jawar	73240	50.08	65470	59.09	45265	59.83	43170	82.15
Wheat	3800	2.60	9635	8.70	1921	2.54	408	0.78
Oil seeds	7944	5.43	224	0.20	181	0.24	2814	5.35
Pulses	12144	8.30	1824	1.65	2728	3.61	25149	47.85
Cotton	22	0.02	7	0.01	398	0.53	1782	3.39
Rice	0	0.00	0	0.00	0	0.00	0	0.00
Vegetables	5505	3.76	2446	2.21	2140	2.83	537	1.02
Fodder Crops	988	0.68	341	0.31	209	0.28	902	1.72
Sugarcane	1296	0.89	2399	2.17	807	1.07	547	1.04
Maize	591	0.40	1075	0.97	29	0.04	311	0.59
Other Crops	738	0.50	316	0.29	282	0.37	89	0.17
NSA	146232		110795		75656		52553	

NSA: Net Sown Area

**1: Jawar**

Jawar is the principal crop in Ahmednagar district. It is rain fed crop cultivating in kharif and rabbi season. The average annual rainfall amount and soil types in the district support the cultivation of Jawar in every village in the 14 taluka. Akole taluka is less cultivating Jawar due to hilly area and heavy rainfall.

**Spatial Distribution:**

The spatial distribution of jawar is largely controlled by average annual rainfall, soil types and attitude of the farmers of the district. The main features of spatial distribution of jawar are as below;

1. The area of Jawar more than 10 percent land to net sown area: The major concentration of jawar is found in Jamkhed, Karjat, Shrigonda, Nagar, Pathardi and Parner talukas (Map 1).
2. 5 to 10 percent land to net sown area: About 5 to 10 percent land under jawar is found in Shevgaon and Shirampur taluka in the district.
3. Less than 5 percent area to net sown area: The third category of less than 5 percent land to net sown area under jawar is found in Kopargaon, Rahata, Sangamner, Rahuri, Newasa and Akole taluka in the area under study.



## 2: Bajra

Bajra is the second largest crop in Ahmednagar district. It is rain fed crop cultivated in kharif season. The average annual rainfall amount and soil types in the district support the cultivation of bajra in every village in the 14 talukas.

### Spatial Distribution:

Bajra is successfully grown in Ahmednagar district. The spatial distribution of bajra is shown in Map 1. Map 1 show that this crop is found in three categories as under:

1. The area more than 40 percent to the net sown area in the district: The area of land occupying more than 40 percent of net sown area under bajra is found in Sangamner, Pathardi and Nagar talukas.
2. Land occupying between 20 to 40 percent to net sown area: The second category of 20 to 40 per cent area under bajra to net sown area occurs in three talukas viz. Parner, Rahuri and Shirampur in the district.
3. Area less than 20 percent to net sown area under bajra: Akole, Kopargaon, Rahata, Newasa, Shevgaon, Shrigonda, Karjat and Jamkhed talukas in the district occupying less than 20 per cent area of net sown area under bajra (Map 2).

## 3: Sugarcane

Sugarcane is one of the important cash crops of the district. Sugarcane ranks third in the district. It accounts for 6.90 percent to net sown area (89331 hectares). This crop is cultivated in all talukas of the district.

### Spatial Distribution:

Sugarcane is successfully grown in the district. The crop is grown on heavy black and well-drained soils with irrigation facilities. The spatial distribution of sugarcane is shown in Map 3. It is from Map 3 that this crop is found in three categories as under;

- 1) Areas having more than 10 percent land under sugarcane: The major concentration of sugarcane is found in Newasa, Rahuri and Sangamner taluka. This talukas is well developed for cannel irrigation and well irrigation.
- 2) Land between 5 to 10 percent: About 5 to 10 percent land under sugarcane is found in Kopargaon, Rahata and Shirampur talukas to net sown area.
- 3) Less than 5 percent area under sugarcane: The third category of less than 5 percent land to net sown area under sugarcane is found in Pathardi, Shrigonda, Akole, Karjat, Jamkhed, Parner, Shevgaon and Nagar talukas in the district.

## 4: Pulses

Pulses rank fourth in the district. It accounts for 5.37 per cent to the net sown area (69601 hectares) in the district. The chief pulses grown in the district are gram, hors gram, black-gram, mug and tur while math, chavali, vatana and Val are also grown on a small scale.

### Spatial Distribution:

The spatial distribution of pulses in Ahmednagar District can be studied under three classes as below;

- 1) Area having more than 10 percent land under pulses: Map 4 clearly shows that the major concentration of pulses (More than 10 percent) is found in only Jamkhed taluka in the district.
- 2) Land between 5 to 10 percent: About 5 to 10 percent land under pulses is found in Shirampur, Parner and Kopargaon talukas.
- 3) Less than 5 percent area under pulses: Less than 5 percent land under pulses was observed in ten talukas viz. Rahata, Rahuri, Sangamner, Newasa, Karjat, Akole, Pathardi, Nagar, Shrigonda and Shevgaon (Map 4).

## 5: Wheat

Wheat is Rabbi Crop in Ahmednagar District. It accounts 5.29 percent to net sown area (68513hectares) in all talukas of the district. Wheat ranks fifth in the district. It can be used for many purposes such as bread-making, chapatti and in different forms of food.

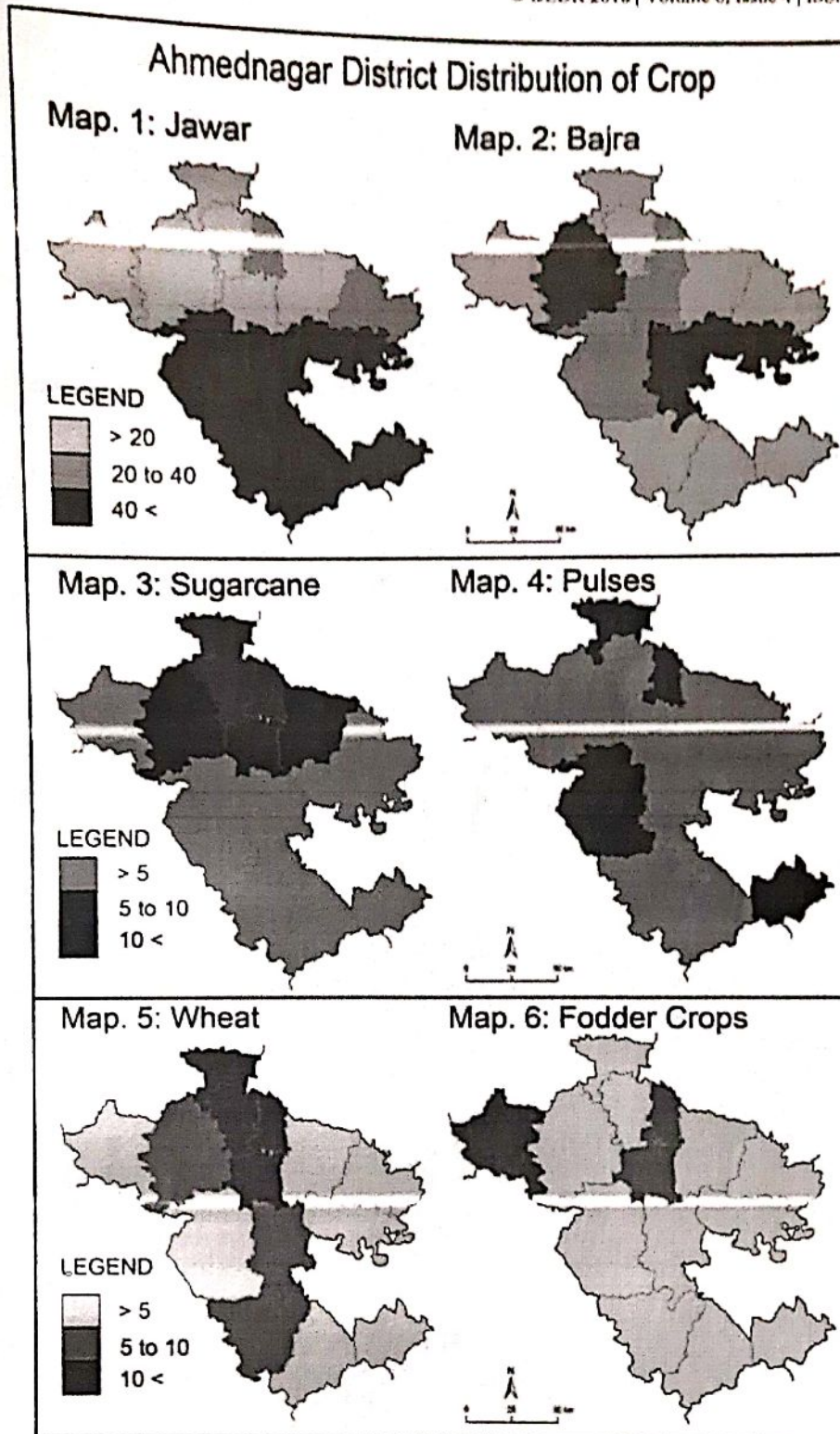
### Spatial Distribution:

Wheat is grown in all talukas in the district (Map 5). The distribution of wheat can be studied under following categories;

- 1) The area of wheat more than 10 percent land to net sown area: The major concentration of wheat is found in Rahuri, Kopargaon, Shirampur and Rahata talukas (Map 5).
- 2) About 5 to 10 percent land under wheat: About 5 to 10 percent land under wheat is found in three talukas namely, Shrigonda, Nagar and Sangamner.
- 3) Less than 5 percent area to net sown area: Less than 5 percent land to net sown area under wheat is found in Akole, Newasa, Parner, Karjat, Shevgaon, Jamkhed and Pathardi talukas in the area under study.

## 6: Fodder Crops

Fodder Crops is kharif as well as rabbi crop occupying 63422 hectares (4.90 percent to net sown area) and ranks sixth in the district. It can be used as food of the man and animals.



**Spatial Distribution:**

The spatial distribution of fodder crops is shown in Map 6. It observed that soil types do not correlate with distribution of fodder. The distribution of fodder can be studied as under;



- 1) Areas having more than 10 percent to net sown area: More than 10 percent land under fodder observed in Akole in the district where the soil are neutral in reaction, contain higher amounts of organic matter and are low in their basic status.
- 2) Areas having 5 to 10 percent to net sown area : Areas between 5 to 10 percent land under fodder crops observed in Shirampur and Rahuri talukas in the study area under review (Map 6).
- 3) Less than 5 percent land under fodder : The area under fodder crops having less than 5 percent to net sown area is found in eleven talukas namely Sangamner, Kopargaon, Rahata, Jamkhed, Newasa, Parner, Pathardi, Nagar, Shevgaon, Shrigonda and Karjat area under fodder to net sown area ( Map 6).

#### 7: Oilseeds

Soyabin, Groundnut, Sunflower, Kardai, Caster and Khurasani etc oilseeds are produced in the district. Of these, soyabin is an important cash crop produced extensively in the district. Next to Kardai, Groundnut Sunflower assumes third and fourth position in the field of oilseeds production.

#### Spatial Distribution

It is observed from Map 7 that Ahmednagar District has cultivated oilseeds everywhere in the district. The spatial distribution of oilseeds can be studied as under;

- 1) Area having more than 10 percent to net sown area: It is observed that more than 10 percent land under oilseeds occur in Kopargaon, Rahata and Shirampur talukas.
- 2) About 5 to 10 percent land under oil seeds: About 5 to 10 percent land under oilseeds have observed in Sangamner, Parner and Jamkhed talukas.
- 3) Less than 5 percent : Less than 5 percent land under oilseeds is found in Akole, Newasa, Nagar, Rahuri, Pathardi, Karjat, Shrigonda and Shevgaon talukas in the area under review ( Map 7).

#### 8: Cotton

Cotton ranks eighth in Ahmednagar District with 4.63 percent to net sown area (59939 hectares). The crop is grown in the low rainfall areas of 13 talukas except Akole taluka. In Akole taluka not cultivated cotton due to hilly area, lack of irrigation facilities and heavy rainfall.

#### Spatial Distribution:

The spatial distribution of cotton is shown in Map 8. It is observed that soil types do not correlate with distribution of cotton. The distribution of cotton can be studied as under;

- 1) Area having more than 10 percent to net sown area : It is observed that more than 10 percent land under cotton occurs in Newasa, Shevgaon, Pathardi and Kopargaon talukas.
- 2) About 5 to 10 percent land under cotton: 5 to 10 percent land under cotton has observed only in Shirampur taluka.
- 3) Less than 5 percent hectare: Less than 5 percent land under cotton found in Jamkhed, Rahata, Sangamner, Rahuri, Karjat, Nagar, Parner and Shrigonda talukas in the district (Map 9).

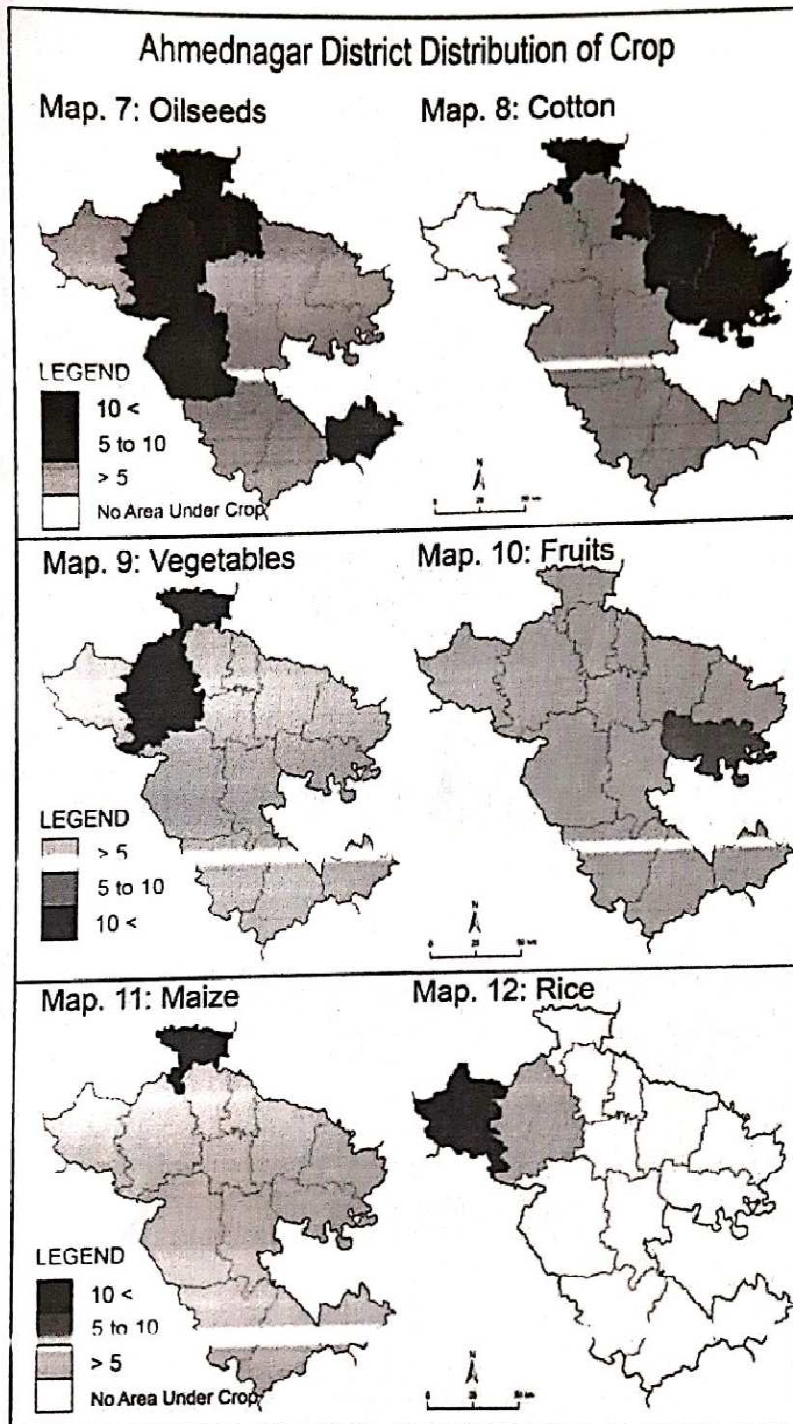
#### 9. Vegetables

Vegetables are extensively grown in Ahmednagar District due to the nearness of the district head quarter and Pune and Nashik market where much of the produce is sold profitably. Besides the land and climatic condition in Ahmednagar is very favorable for vegetable cultivation. It occupied an area of 44838 hectares in 2010-2011. The main vegetables grown in the district are onion, brinjal, fenugreek, lady's finger, carrot, sweet potato, potato, cabbage, tomato, radish etc.

#### Spatial Distribution:

Vegetables are extensively grown in all the talukas in the district. The distribution of vegetable in the district shown as under;

- 1) Area more than 10 per cent to net sown area: The most concentration of vegetable is found in Sangamner and Kopargaon talukas.
- 2) Land between 5 to 10 per cent: About 5 to 10 per cent land under vegetables none of taluka found in this category.
- 3) Less than 5 percent area under vegetable: Less than 5 percent land under vegetables is found in Akole, Shevgaon, Shirampur, Parner, Rahuri, Karjat, Rahata, Newasa, Shrigonda, Nagar, Jamkhed and Pathardi talukas (Map 9).



**10: Fruits**

Grapes, pomegranate, guava, mango, lemon, papaya, banana etc. are grown in the district. These grapes and pomegranates are important and are grown widely in the district. Besides other fruits are also grown but to a very limited extent.



**Spatial Distribution:**

The spatial distribution of total fruits in the district is shown in Map 10. The trend of the fruit cultivation is going on increase in the farmers. Map 10 reveals three distinct areas of fruits distribution are as under;

- 1) Area having more than 10 percent to net sown area: The land more than 10 percent to net sown area under fruits is none of taluka found in Ahmednagar District.
- 2) About 5 to 10 percent fruit to net sown area: About 5 to 10 percent land under fruits observed in only one taluka viz, Pathardi.
- 3) Less than 5 percent is under fruits to net sown area: The third area of having less than 5 percent is under fruits to net sown area is found in seven talukas in the district viz, Rahata, Sangamner, Newasa, Jamkhed, Kopargaon, Shirampur, Shrigonda, Rahuri, Karjat, Parner, Shevgaon, Akole and Nagar talukas.

**11: Maize**

Maize is staple crop and provides food to human and fodder to livestock. This improved variety of seeds are producing high yield per hectares.

**Spatial Distribution:**

Maize is successfully grown in the north eastern part of the district (Map 11). The improved seeds of this crop assured high yield per hectares. The medium to deep black soil in the district is also useful to widespread of this crop and hence the spatial distribution and its areal extent are confined by these factors. The main features of spatial distribution of maize are as below:

- 1) The area of maize more than 10 percent land to net sown: It is observed that more than 10 percent land to net sown area has concentrated in Kopargaon taluka.
- 2) 5 to 10 percent land under maize to net sown area: About 5 to 10 percent land to net sown area is none of taluka found in the district.
- 3) Maize having less than 5 percent area to net sown area: Less than 5 percent land under maize was observed in thirteen talukas, viz. Sangamner, Rahata, Shirampur, Rahuri, Shrigonda, Jamkhed, Newasa, Parner, Nagar, Pathardi, Shevgaon, Akole and Karjat.

**12: Rice**

It ranks 12<sup>th</sup> and grown to some extent almost all over the district, but mostly in Akole and Sangamner talukas.

**Spatial Distribution:**

The spatial distribution of rice in the district is shown in Map 12. This map reveals three distinct areas of rice distribution are as under;

- 1) Area having more than 10 percent to net sown area: The land more than 10 percent to net sown area under rice found in the western part of the district, viz. Akole.
- 2) About 5 to 10 percent land to net sown area: About 5 to 10 percent land to net sown area is no any one taluka found in the district.
- 3) The third category is less than 5 percent land to net sown area: It observed that less than 5 percent land to net sown area has concentrated in Sangamner taluka to net sown area (Map 12).

**13: Other Crops**

Other crops include Vari, Ragi, Cotton, Ambadi, Sann, Chilies, Garlic and Coriander (Dhane). In significant hectare are under this category (0.76 percent to net sown area) occupying 9808 hectare area of the district.

**Spatial Distribution:**

The spatial distribution of other crops is shown in Map 13. The distribution of other crop can be studied as under;

- 1) Areas having more than 1.00 percent to net sown area: More than 1.00 percent land under other crop is observed in Akole and Newasa talukas in the district.
- 2) Areas having 0.50 to 1.00 percent to net sown area: Areas between 0.50 to 1.00 percent land under other crop to net sown area found in Parner taluka in the study area under review (Map 13).
- 3) Less than 0.50 percent land under other crop: The area under other crops having less than 0.50 percent to net sown area found in eleven talukas namely Karjat, Shirampur, Kopargaon, Rahuri, Shrigonda, Sangamner, Jamkhed, Nagar, Rahata, Shevgaon and Pathardi area under other crop to net sown area (Map 13).

**SUMMARY AND CONCLUSION**

- Increasing awareness among farmers to adopt new varieties of crops for sowing has changed the cropping pattern of jawar and hence the major concentration of this crop is mostly confined to Parner, Shrigonda, Nagar, Karjat and Jamkhed talukas in the district. This crop is raised in 14 talukas of the district and occupying 327836 hectares (28.86 percent to net sown area) area of the district.
- The Bajara crop is raised in 14 talukas of the district and occupying 249850 hectares (19.29 percent to net sown area) area of the district. This crop very less concentration in Akole, Kopargaon, Rahata, Newasa, Shevgaon, Shrigonda, Karjat and Jamkhed talukas.
- The major concentration of sugarcane found in Newasa, Rahuri and Sangamner taluka while less than 5 percent land to net sown area under sugarcane found in Pathardi, Shrigonda, Akole, Karjat, Jamkhed, Parner, Shevgaon and Nagar talukas in the district.
- Pulses ranks fourth accounting for 5.37 per cent (69601 hectares) to net sown area for 2010-11 in Ahmednagar District. The maximum area of pulses is found at Jamkhed (47.85 percent to net sown area) in south-eastern part whereas minimum area under pulses is at Shrvgaon (0.73 percent to net sown area).

- Most of the area under wheat is found in Rahuri taluka (19.04 percent to net sown area) and less is in Pathardi (0.28 percent to net sown area). It is noticed that area under wheat is not extensive in each talukas due to the different physical condition.
- Maximum percent under fodder is found in Akole (46.61%) talukas; whereas minimum is in Karjat (0.28%) talukas.
- The area under all oilseeds was 60672 hectares in 2010-2011. Generally 4.68 percent of the total area under cultivation is under oilseeds in the district.
- Maximum percentages under cotton are found in Newasa (25.94%) to the eastern part of the district; whereas minimum percentages are found in Shrigonda (0.01%) to the southern part of the district.
- Vegetable ranks ninth in the district. It accounts for 3.46 percent to the net sown area (44838 hectares).
- Total fruits ranks Tenth in the district. It accounts for 18236 hectares (1.41 %) to the net sown area.
- Maize ranks eleventh in the district and account san area of 15023 hectares (1.16 %) to the net sown area in the district.
- Rice is a kharif crop sown on 9955 hectares (0.77 percent) to net sown area in Akole and Sangamner Talukas of the district.
- Maximum percent under other crop is found in Akole (6.66%) taluka; whereas minimum is in Pathardi (0.04%) taluka.

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