"A Geographical Study of Major Crops in Osmanabad District"

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Abstract

Agriculture plays very vital role in our economy. Agriculture is backbone of Indian economy. Nearly 75 percent peoples are engaged in agriculture. In recent years, agricultural growth in Osmanabad has accelerated remarkably, but most of this growth has been driven by increased yield per unit area rather than by expansion of the cultivated area. Looking towards future, to meet the demand for grain and to feed a growing population on the available arable land, it is suggested that annual crop production and yield should be increased. The objectives of this paper are to summarize the historical trend of crop production in Osmanabad and to examine the main constraints to the further increase of crop productivity. The paper provides a perspective on the challenge faced by technology in agriculture which must be met both in terms of increased crop productivity but also in increased resource use efficiency and the protection of environmental quality. Along with crops and their productivities the C-DAP deals with all the infrastructural and allied activities like soil health and conservation, optimal utilization of land and water resources, adequacy and purity of inputs, credit, marketing, livestock, dairying, poultry, fisheries, sericulture, agro-processing, agro services and strengthening of research, education and extension services, for continuing technological up gradation of the entire farming system.

Keywords:- *Agriculture, crops, Climate change, Irrigation, Production and productivity etc.*

Introduction

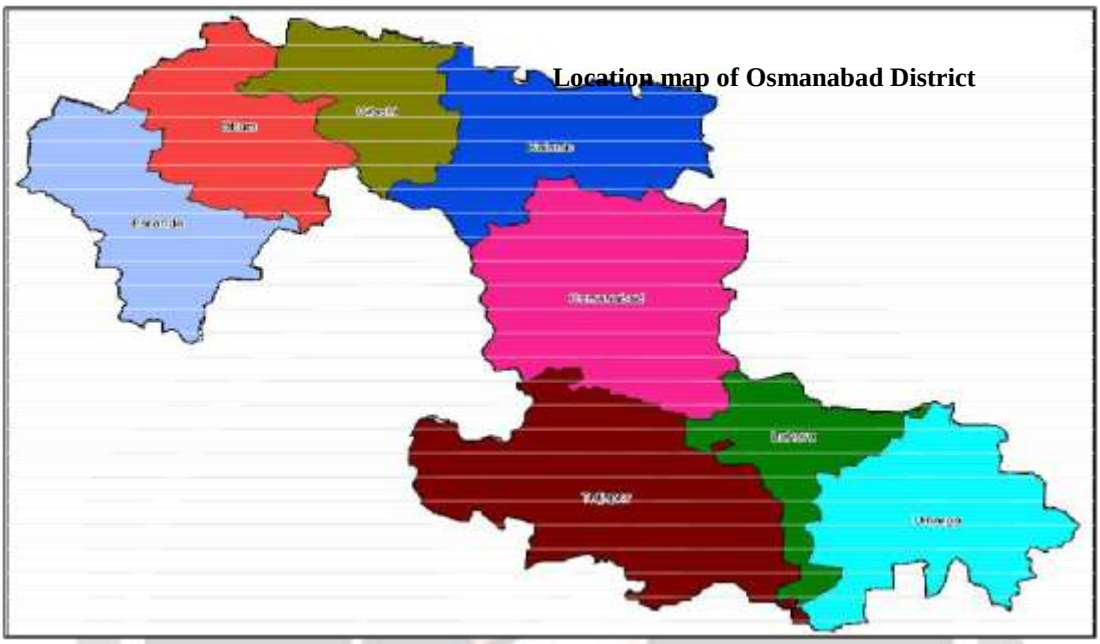
Agriculture has always been India's dominant economic sector and the Green, Blue, White and Yellow revolutions brought about vast changes in the agrarian scene since independence. While the agricultural sector has witnessed many success stories, the economic potential of this economic activity leaves much to be desired and has a long way to go. The growth rate in the agricultural sector has always lagged behind the overall growth rate of the economy.

Agricultural development is also a key to a number of national goals, such as reducing rural poverty, providing food and nutritional security, supplying raw materials for major industries such as textiles, earning foreign exchange through exports and opening up avenues for employment by promoting agro-processing units. Growth in the agricultural sector by contributing to increased rural incomes can also build a strong foundation for consumer demand in rural areas, which in turn can stimulate growth in secondary and tertiary sectors of the economy.

Agriculture is the major occupation of majority of the population in Osmanabad District. Economic, industrial, educational, social development of this area is dependent on agricultural production. Despite of higher promotions per capita availability of food over time did not increase significantly. At present the growth rate of agricultural production is less than 2%. The growth rate of production in agriculture must be more than the growth rate of population. Hence, there is an urgent need to accelerate agricultural growth to address issues on food security, nutritional adequacy and income generation. This can be achieved by identifying the problems in crop production, infrastructure facilities, issues related to the natural resources, input management and accordingly there is need to improve agricultural services keeping in view the vision and objectives.

Study Area

It is one of the historical towns of the Marathwada Region. It is located in the southern part of Marathwada, between 17.35^0 to 18.40^0 North latitude and 75.16^0 to 76.40^0 East longitudes. It is located about 600 meters above the sea level. It is bounded by Solapur district to the South – West, by Ahmednagar district to North – West, by Beed district to the North and by Latur district to East.



Location map of Osmanabad District

Objectives:-

Main objectives of the study are as follows:

- To determine the population growth pattern in study area in terms of food crops at the various locations.
- To study the major crops of the district.
- To study crops production and productivity in district.
- To suggest the measures for strengthening crops production and suggest suitable remedies for crop related problems.

Methodology

Methodology refers to set of principles through which objectives are perceived. For the present study, the Agriculture data of 2005 to 2016 has used. The information regarding Agriculture has used from the internet from the websites of Census of India. The General and Geographical information of Osmanabad collected from Govt. Gazetteer and Govt. Website of the district. The help of Tahsil Statistical Office and Tahsil Agriculture office will be taken in order to collect the data. To include the tahsil data regarding agriculture, area under different crops, annual tahsil statistic book has used. The data collected through Govt. Of Maharashtra website especially data provided to Osmanabad district Govt. Website.

On the collected data, tables under various heading will be prepared. In the preparation of tables, tahsil data will be used to notice the variation in district. The decadal variation regarding agriculture, general population

growth, density level, occupational structure and crop combination calculated with the help of collected data. With the help of table, volume of change during the study period was noticed and analyzed. Graphs, maps and diagrams were added wherever necessary in the work to show the variation and for quick understanding.

Data analysis tools and techniques:-

1. Compound Annual Growth Rate (CAGR): The compound annual growth rate (CAGR) is a useful measure of growth over multiple time periods. For estimating the projected level of output at given period of time (for 5 years) compound growth rates (CGR) are used. i.e. 4% for agriculture, and 6% for allied activities'.'-The following formula is used.

$$A = p\left(\frac{1}{0}\right)^{\overline{10}} \quad \text{..... (1)}$$

Where, A = Amount or final output,

P = Initial output,

R = Growth rate,

N = Number of years.

2. **Estimation of Intra-District Growth Differentials:** For estimation of intra district (or inter-taluka) difference, the district average is considered as the base or (100). The productivity of each crop at the district level has been compared with the productivity of that crop at taluka level and productivity indices prepared. Finally, the productivity indices of major crops in each taluka are added and a composite' index of all crops was prepared. This composite index represents the intra- district growth differentials of that district.

3. **Gap Analysis:** For estimating the difference between district/taluka level per hectare productivity and the productivity per hectare of Front Line Demonstration, the gap analysis is followed. Formula for estimating growth rate: $R = \{(A/P)^{1/n} - 1\}$

4. **Usefulness of the method :** Generally productivity / production of crops differs from year to year, may be due to climatic conditions scanty & irregular rainfall, diseases, etc. the least square method eliminates such fluctuations and a trend growth rate over a period can be obtained. This trend growth rate can be used for projections during the 5 year period.

Result and Discussion

Kharif:-Agriculture and allied activities are the main sources of livelihood for majority of rural masses and control the economy of the district. During the period 2011-12 to 2012-13, the area under kharif crops constituted 46.21 percent of GCA. The area under kharif crops was mostly dominated by foodgrains, especially cereals. Out of the total area under kharif crops, cereals constituted 15.30 per cent while pulses constituted 14.19 percent (Table 1.2). Hence together, cereals and pulses constituted 29.49 percent of total area under Kharif crops. Among cereals, bajra was the main crop and 4.76 percent of area under cereals was under bajra. Further, bajra constituted 58 percent of the area under Kharif crops and more than 18 percent of GCA.

Among oilseeds, the main crops cultivated were soybean and sunflower. The other oilseed crop grown in the district was groundnut. Besides foodgrains and oilseed crop, two commercial crops viz. sugarcane and cotton were grown in the district, which accounts for 6.73 percent of Kharif area.

Rabi:

As mentioned earlier, agriculture in Osmanabad district is dominated by rabi crops and 36.87 percent of GCA is under rabi crops during 2012-13. The area under rabi crops is dominated by foodgrains and as much as 95 percent of area under rabi crops is under foodgrains. Major area (15 percent) under foodgrains is under cereals

(Table 1.1). The main foodgrain crop in the rabi season is jowar and about 60.37 percent of area under rabi cereals is under rabi jowar. Further, rabi jowar constitutes 6.53 percent of GCA. Wheat is also a rabi crop and constitutes about 7 percent of GCA. The main pulse crop is gram which constitutes 4 percent of GCA. Rabi oilseeds are negligible and constitute hardly 2.5 percent of GCA. The major area under rabi oilseeds is under safflower.

Summer: Summer crops in Osmanabad district are negligible and constitute 16.92 percent of GCA. The main pulse crop is moog and groundnut is the main oilseed crop cultivated in summer (Table 1.2).

Overall, it can be concluded that in Osmanabad district, about 68 percent of GCA is under foodgrains with 62 percent under cereals and about 7 percent under pulses. Rabi jowar is the main cereal crop accounting for 34 percent of GCA, followed by kharif bajra which occupies 19 percent of GCA. Rabi jowar and Kharif Bajra together account for 53 percent of GCA. The area under oilseeds is 4.4 percent of GCA.

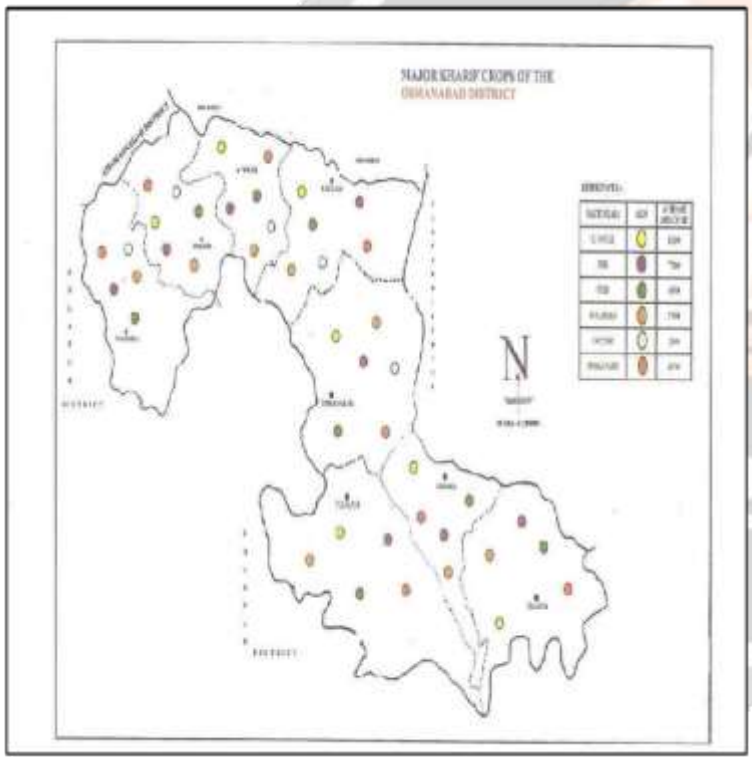
TABLE NO. 1.1

AREA PRODUCTION AND PRODUCTIVITY OF CROPS (AVERAGE OF 2011-12 TO 2013-2014)

Sr. No.	**Crops**	**Area in "00" ha.**	**Production in "00" MT.**	**Productivity in kg/ha.**
1	Kh. Jowar	464	385	829
2	Rice	142	20	143
3	Bajra	142	74	523
4	Maize	208	189	910
	Other cereals	17	6	330
5	Tur	906	673	743
6	Mung	150	71	476
7	Udid	419	214	510
	Other Pulses	20	9	426
8	Groundnut	54	37	679
9	Sunflower	84	42	501
10	Soyabean	1138	1603	1409
11	Sesamum	36	10	267
12	Nigerseed	52	14	260
	Other Kh. Oil seed crops	17	7	385
13	Sugarcane	430	24510	57000
14	Cotton	226	168	743
	Total Kh. Season	**4505**	**28031**	
15	R. Jowar	2079	1586	763
16	Wheat	297	232	781
17	R. Maize	46	65	1412
	Other cereals	9	3	345
18	Gram	724	496	685
	Other Pulses	13	5	392
19	Safflower	198	87	438

20	R. Sunflower	173	88	509
21	Linseed	45	9	211
	Other R. Oil seed crops	10	4	376
	Total Rabbi Crops	**3594**	**2575**	
22	Summer Groundnut	1650	1157	701
23	Summer Sunflower	123	57	466
	Total Summer Crops	**1650**	**1214**	
	Gross cropped area	9749	31820	
	Total cereals	3404	2560	
	Total Pulses	2232	1468	
	Total Oilseeds	3580	3114	

Source:- Comprehensive Development Agriculture plan Osmanabad District,



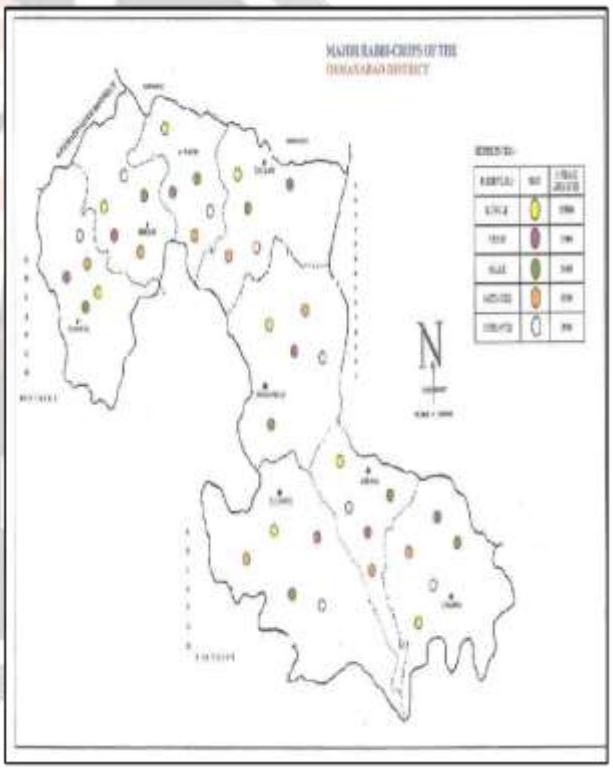


TABLE NO. 1.2. Distribution of area under different crops.

Sr. No.	**Crops**	**Distribution of area under different crops (%)**
1	Kh. Jowar	4.76
2	Rice	1.46
3	Bajra	1.46
4	Maize	2.13
	Other cereals	0.17
5	Tur	9.29
6	mung	1.54
7	Udid	4.30
	Other Pulses	0.21
8	Groundnut	0.55
9	Sunflower	0.86
10	Soyabean	11.67
11	Sesamum	0.37
12	Nigerseed	0.53
	Other Kh. Oil seed crops	0.17
13	Sugarcane	4.41
14	Cotton	2.32
	Total Kh. Season	**46.21**
15	R. Jowar	21.33
16	Wheat	3.05
17	R. Maize	0.47
	Other cereals	0.09
18	Gram	7.43
	Other Pulses	0.13
19	Safflower	2.03
20	R. Sunflower	1.77
21	Linseed	0.46
	Other R. Oil seed crops	0.10
	Total Rabbi Crops	**36.87**
22	Summer Groundnut	16.92
23	Summer Sunflower	1.26
	Total Summer Crops	**16.92**
	Gross cropped area	100.00
	Total cereals	34.92
	Total Pulses	22.89
	Total Oilseeds	36.72

TABLE NO. 1.3. GROWTH RATES OF DIFFERENT CROPS IN LAST 3 YEARS

Sr. No.	Crops	Growth Rates
1	Paddy	3.53
2	Kh. Jowar	3.99
3	Bajra	6.43
4	Maize	1.55
5	Tur	2.22
6	Udid	-5.79
7	Mung	-1.02
8	Kh. Groundnut	8.43
9	Sesamum	0.78
10	Kh. Sunflower	3.32
11	Soyabean	-1.00
12	Niger	-4.34
13	Cotton	7.21
14	Sugarcane	5.27
15	Rabi Jowar	4.92
16	Wheat	4.40
17	Gram	6.31
18	Safflower	5.65
19	R. Sunflower	2.38

Source:- CDAP Osmanabad District

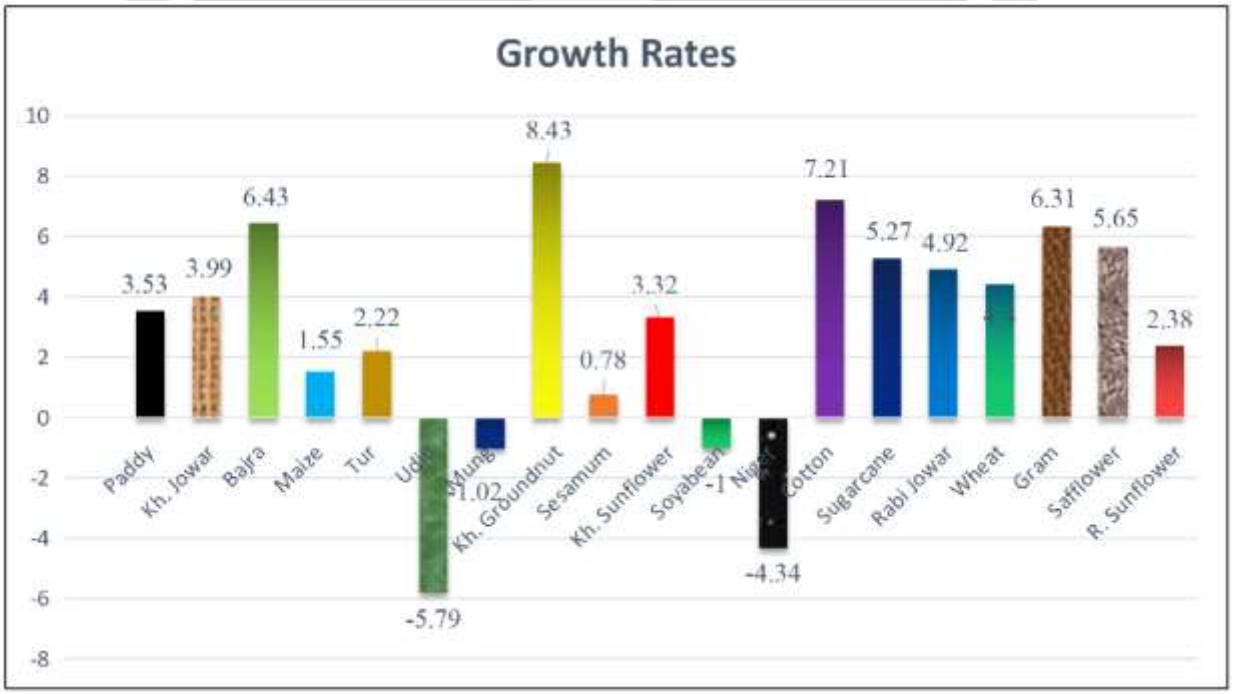


Table No. 1.4 Effects of Irrigation on Crop Yield.

Sr. No.	Crops	Yield in kg/ha		Percentage increase in yield
		Irrigated	Rainfed	
1	Tur	1366	764	78.80
2	Groundnut	1098	642	71.03
3	Soyabean	1950	1286	51.63
4	Cotton	420	240	75.00
5	R. Jowar	1020	628	62.42
6	Wheat	1160	528	119.70
7	Gram	1025	559	83.36
8	R. Maize	1340	740	81.08
9	Safflower	800	480	66.67
10	R. Sunflower	706	453	55.85

In case of Kharif jowar the productivity is increasing but the area is decreasing, as a result the growth rate of production is slowed down. Average yield in the districts when it is compared with average yield obtained in frontline demonstration, the yield gap is 80 %. This indicates that there is a considerable scope to increase the productivity by improving the management practices. To reduce the risk, this crop should be grown in inter-cropping system. Considering the response of present varieties to manures, fertilizers, irrigation and other management practices, it is possible to improve the productivity with higher growth rate as 10 to 12. Among pulses, Tur, Mung and Udid are the major crops. Tur is a two seasonal crop having 170 days duration. This crop is sown in last week of June or First week of July. At the end of rainy season i.e. 90 to 100 days after sowing flowering starts in this crop. Because of low moisture in soil, there is shedding of flowers. It reduces the number of pods and finally the yield is low in rainfed situation. This crop responds very wells to improved crop management practices under irrigated condition. There is considerable scope for its improvement in productivity. The yield gap is more. Considering improvement in management practices and agricultural services the higher growth rate is proposed. Higher growth rate is also proposed for Mung and Udid. These are short duration crops. Irrigation is not required in normal situation. There is scope to improve their productivity. In rabi season, the major crops are Jowar, Wheat and Gram. Rabi Jawar is grown on stored soil moisture. The stored moisture is only about 30% to 45% of total water requirement of Jowar and hence the yield is low. This can be improved by irrigation, nutrient management and timely intercultural operations. The area under rabi jowar is more. If there is slight improvement in management there can be considerable increase in yield. The irrigated area of jowar will increase in future. Situation of gram is also same as rabi jowar. Productivity is high under irrigated condition. In addition to this, high yielding varieties of gram are released recently. These varieties under irrigated conditions will help in improving productivity. Hence, higher growth rate is proposed as for gram. Wheat is important crop in irrigated area. Farmers are also giving priority to wheat if irrigation water is available. Low yield of wheat might be due to inadequate irrigation water. Several times it is observed that there is no sever pest in case of wheat, which reduces the risk in cultivation and if irrigation water is available in adequate quantity, the productivity is higher. In future, it is possible to increase irrigated area and hence higher growth rate is proposed as.

Sugarcane is important irrigated crop. Maximum amount of irrigation water is used to this crop. Area under this crop is about 20000 ha in this District and average yield is only 70 ton/ha. Average yield of this crop was 110 ton in 1960-61, which has decreased as farmers are not adopting the concept of integrated nutrient management, improved irrigation management and soil health including management, productivity is low. This can be improved, hence higher growth rate is proposed.

Bajra is drought resistant crop grown on medium to coarse textured shallow soils. Short duration high yielding varieties are available. If there is slight improvement in management practices, such as seed treatment, to maintain optimum plant population, integrated nutrient management, intercultural operation for insitu moisture conservation in scarcity situation, the yields are very high. Considering the present varieties and future agricultural services the

higher growth rate of productivity is proposed. Maize is a heavy feeder. It gives good response to nutrient and irrigation. There is no much risk in crop production because there is no severe pest attack, hence area is increasing. Considering the situation higher growth rate is proposed.

Conclusions

In this paper, some extension methods and approaches were identified in Osmanabad district which have been implemented but there are many more which need to be implemented to make the farmers more climate smart. Therefore, climate-smart extension approaches need to be considered as part of a broader set of adaptation measures and policies for agricultural systems at a range of scales. Climate change is an ongoing phenomenon, thus the objective of the project was not to find any one solution but first to develop communities and groups of farmers into active researchers. Then this active research and exchange of knowledge and experience on different levels has created a sort of climate resilience tool box that can be dipped into to try and test and adapt in new situations.

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