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Temporal Land Use and Cropping Pattern in Amravati District of Maharashtra State

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Abstract: *Agriculture sector plays a pivotal role in Indian economy. The study intended to temporal land use pattern and changes in cropping pattern in Amravati district. The research was based on secondary data collected from Government Publications. This paper an attempt is made to study the temporal land use pattern and changes in cropping pattern in Amravati district. The data covered a period of 22 years i.e. 1990-91 to 2012-13. All major crops were considered for study. Exponential function was used to estimate the growth rates of area. Simple tabular analysis was used to examined the changes in cropping pattern in Amravati .In majority of tahsils of Amravati district growth rates estimated for area under different land use categories showed a significant positive growth in area under current fallow, which reflects the consequence of year to year rainfall variations and Net sown area registered a significant negative growth. Cropping pattern changes in Amaravati distict revealed that cotton, jowar and soybean were the major crops of Amravati district. Soybean is emerging as one of the major crop of the district.*

Keywords: *Temporal, land use pattern, growth rates.*

INTRODUCTION

Agriculture is the backbone of Indian economy. It depends mostly on unpredictable behavior of monsoon. Indian farming therefore not remunerative. India possesses 328 million hectares of land, out of which 143 million hectares is under cultivation and 123 million hectares together under forest, pastures and waste land rest is uncultivable, fallow, grooves etc. 50 million hectares land has access to irrigation and over two third area of the cultivable land is under rain fed cultivation (Hegde, 1990).

Maharashtra is an important state and has been considered as one of the progressive state in India. It is second largest in the country both in population and geographical area. Since its formation in 1960, the state has secured higher growth rate vis-à-vis Indian economy for almost three decades and need to move at a much faster pace. Planning commissions assessment indicate that the average annual growth rate for Maharashtra would be 7.3 per cent. The compound growth rate achieved during 1993-1994 to 1999-2000 was 5.9 per cent. It was envisaged that the growth rate could be achieved by adoption comprehensive policy package and institutional reforms. Land use is any kind of permanent or cyclic human intervention to satisfy human needs, either material or spiritual or both, from the complex of natural and artificial resource, which together are called "land" (Vink, 1975). The land use pattern of a region is an outcome of an interaction of natural, social and economic factors and their utilization by man in time and

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space. Land is becoming a scarce resource due to agricultural and demographic pressure. Hence, information on land use/land cover and potential for their best possible use is necessary for the selection, planning and implementation of land use schemes to meet the increasing demands for basic human needs and welfare. Satellite Remote Sensing plays an important role in generating information about the latest land use pattern in its spatial and temporal changes. The information being in digital form can be integrated into Geographical Information System (GIS) to provide a suitable platform for data analysis, update and retrieval. The first two decades after independence did not show much growth of agriculture, which was 2.6% per annum. It was attributed to expansion of land area sown under different crops and not by technological changes. The shift of farming before independence and after independence of the country has an effect of the behavior of the farmers who were more adherent to traditional farming. Because of the increasing pressure of population and stagnant productivity of agriculture, the country was heavily dependent on import of food grains to meet the internal demands of food.

Cropping pattern has been dynamic to crop up the changing scenario and to meet ever changing demands of growing population. Limited availability of land to rising population and declining yields. Force farmers to search for alternate ways for raising farm income, with the passage of time farmers because increasingly commercialized and started farming for maximizing their output. Now the realization prevails the farmers for long term returns and they are in search of optimum cropping pattern which can fulfill their aspirations. The study was undertaken with the objectives to study the temporal land use pattern in Amravati district and to analyze the changes in cropping pattern in Amravati district.

METHODOLOGY

Time series secondary data for the year 1990-1991 to 2011-2012 on area were collected from District Socio economic review-Amaravati District and various published sources of the selected crops. The study has been confined to the selected tahsils of Amravati district in Vidarbha region of Maharashtra State. Three tahsils were purposively selected for the present study were namely Achalpur, Bhatkuli, Chandur Bazar,for examining the growth in the area of different land use categories was estimated using the exponential growth function of the form

$$Y = ab^t$$

Where,

Y – Dependent variable for which growth rate was estimated (area)

a – Intercept

b – Regression coefficient

t – Years which takes values, 1, 2, ...n

The compound growth rate in percentage was then computed from the relationship,

$$CGR = [\text{Antilog of } (\log b)\text{-}1]*100$$

The significance of the regression coefficient was tested using the students 't' test.

The cropping pattern changes were studied by tabular analysis for all the major crops. Cropping pattern in terms of percent share of individual crop in grossed crop area were worked out at different points of time.

RESULTS AND DISCUSSION

Land use pattern in Amravati district is presented in Table 1. It is revealed that the total geographical area was 1252.896 ha. The percentage of net sown area to total geographical area was 62.41 per cent. The area under forest land was accounted 5.87 per cent to total geographical area. Land put to non agricultural use was occupied a share of 4.79 per cent to total geographical area. The area under current fallow, fallow other than current fallow and cultivable waste land was accounted 2.39 per cent, 4.39 per cent and 0.40 per cent to total geographical area respectively. Barren and uncultivable land was occupied 3.19 per cent and permanent pastures and other grazing land was accounted 1.60 per cent to total geographical area.Ramanaiah *et.al.* (1990) reported that the non cultivable land in the state showed an increase from 14.9 per cent of the total area in 1963-64 to 16.4 percent in 1978-79 .Land under miscellaneous tree crops and grower was accounted 2.31 per cent to total geographical area. Area sown more than once was occupied 11.67 per

cent to total geographical area and gross cropped area accounted 74.08 per cent to total geographical area in the Amravati district. The cropping intensity was 118.70 per cent.

Table 1
Land use pattern in Amravati district (2012-13)
(Area in '000' ha)

Sr. No.	Particulars	Area (ha) area	Per cent to total geographical
1.	Total geographical area	1252.896	100.00
2.	Land under forest	73.59	5.87
3.	Land not available for cultivation	100	7.98
	(a) Land put to non-agricultural use	60	4.79
	(b) Barren and uncultivable land	40	3.19
4.	Land not cultivable other than barren land	54	4.31
	(a) Permanent pasture and other grazing land	20	1.60
	(b) Land under miscellaneous tree crops and grower	29	2.31
	(c) Cultivable waste land	5	0.40
5.	Fallow other than current fallow	55	4.39
	(a) Current fallow	30	2.39
	(b) Other fallow	25	2.00
6.	Net sown area	782	62.41
7.	Area sown more than once	146.201	11.67
8	Gross cropped area	928.201	74.08
9.	Cropping intensity	–	118.70

Source: – Districtwise statistical information of Maharashtra, D.S.A.O 2012-2013.

Current fallow and cultivable waste land was accounted 2.39 per cent, 4.39 per cent and 0.40 per cent to total geographical area respectively. Sreeja (2004) studied the dynamics of land use pattern in Kollam district of Kerala and the result indicated that there was a substantial growth in the current fallow .Barren and uncultivable land was occupied 3.19 per cent and permanent pastures and other grazing land was accounted 1.60 per cent to total geographical area. Land under miscellaneous tree crops and grower was accounted 2.31 per cent to total geographical area. Area sown more than once was occupied 11.67 per cent to total geographical area and gross cropped area accounted 74.08 per cent to total geographical area in the Amravati district. The cropping intensity was 118.70 per cent.

Table 2
Growth rates for different land use categories in Amravati district (1990-91 to 2012-13)

	Land use category / Taluka	Achalpur	Bhatkuli	Chandur bazaar	Amravati district
1.	Forest	1.03	0.07**	0.59	0.23**
2.	Land put to non agriculture use	–5.80	–4.92	–4.31	3.62**
3.	Barren and uncultivable land	1.59	0.69	2.61	–0.01
4.	Permanent pasture and other grazing land	–1.30**	–0.45**	0.45	–0.99**
5.	Land under miscellaneous tree crop and grower	0.26	–0.50	–1.33	0.70**
6.	Cultivable waste	–4.38**	–0.88*	6.08*	1.02**
7.	Current fallow	3.61	–1.72	–2.01	4.22**
8.	Fallow than current fallow	6.23**	–0.88	–3.42	3.29
9.	Net sown area	–3.45	1.84	–0.11	–1.02*
10.	Area sown more than once	–1.30*	3.93**	–1.26	–0.65*
11.	Grossed cropped area	–0.52	3.01	0.88	–2.10**

(*, **, *** indicate statistically significance at 10, 5, 1 per cent level)

Table 2 revealed that the growth rates of gross cropped area was negatively significant at 5 per cent level of significance in Amravati district (2.10%).The highest positive growth rate was observed in Bhatkuli tahsil (3.01%) which is non-significant at one per cent level of significance and the lowest positive growth was observed in Chandur Bazar (0.88%) which is non-significant. Area under forest category of Achalpur, Bhatkuli and Chandur Bazar was 1.03 per cent, 0.07 per cent and 0.59 per cent. Area under Bhatkuli was positively significance at 5 % level of significance. A considerable decrease has been recorded in the proportion of area under land put under non agricultural use. The growth rate was negative in all selected tahsils. The negative growth rates were statistically non-significant. In Achalpur (5.80%), Bhatkuli (4.92%) and Chandur Bazar (4.31%). The district as a whole registered a significant positive growth of 3.62 per cent at 5 %

Table 3
Changes in cropping pattern in Amravati district
(Area in hectares)

		Years					
Sr. No.	*Crop*	*1990-91*	*1995-96*	*2000-01*	*2005-06*	*2010-11*	*2013-14*
1.	Soybean	–	–	180300(23.18)	293873(35.60)	269697(32.73)	366449(45.99)
2.	Cotton	373000(51.71)	371700(55.91)	309100(39.75)	160129(19.40)	207588(25.19)	129399(16.23)
3.	Kharif jawar	179200(24.85)	117900(17.74)	118700(15.26)	68798(8.33)	49125(5.96)	17988(2.58)
4.	Mung	25742(3.57)	24686(3.71)	19963(2.57)	74500(9.02)	60525(7.34)	34386(4.32)
5.	Black Gram	29500(4.08)	44200(6.65)	36600(4.71)	112961(13.68)	75440(9.15)	116402(14.61)
6.	Tur	83100(11.52)	90900(13.67)	99600(12.81)	76519(9.27)	122986(14.92)	92230(11.57)
7.	Wheat	30800(4.27)	15400(2.32)	13400(1.72)	38754(4.69)	38754(4.70)	40008(5.02)
Gross cropped area		721342(100)	664786(100)	777663(100)	825534(100)	824115(100)	796862(100)

Figures in the parentheses are percentage to gross cropped area.

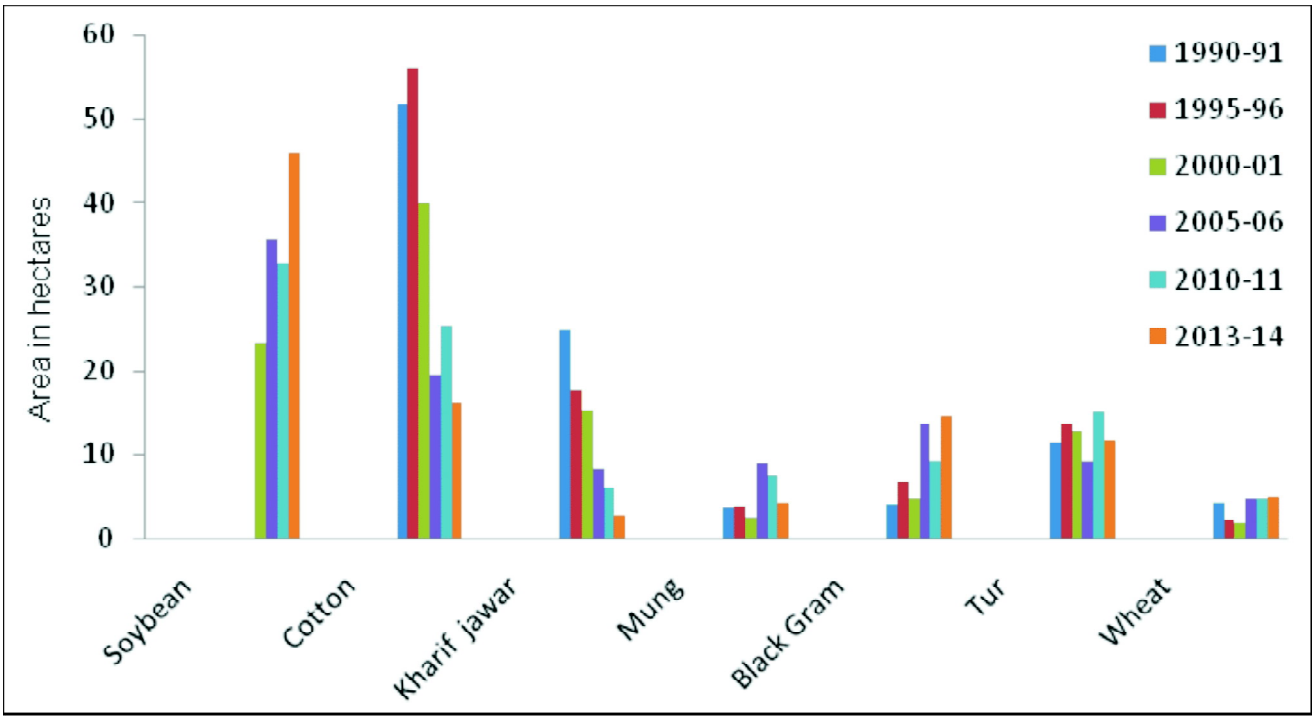

Figure 1: Per cent change in cropping pattern in Amravati district

level of significance. Barren and uncultivable land cannot be brought under cultivation unless at very high cost with possible low returns. The proportion of area under barren and uncultivable land of Achalpur, Bhatkuli and Chandur Bazar showed a positive growth *i.e.* 1.59 per cent, 0.09 per cent and 2.61 per cent, which is non-significant. While the Amravati district as a whole registered a negative growth rate was 0.01 per cent. Area under Permanent pasture and other grazing land category of Achalpur, Bhatkuli was show negative growth rate (1.03%), (0.45%). Area under Chandur Bazar was 0.45 per cent which was positively significance at 5 % level of significance

Land under miscellaneous tree crops includes all cultivable land. Which is not included under the net sown area, but it put to sown agricultural uses other than seasonal cropping. The Achalpur tahsil

showed the highest positive growth rate of land under miscellaneous tree 0.26 per cent at 5 % level of significance. Whereas Chandur Bazar and Bhatkuli was observed negative growth rate (1.33%) and (0.50%), respectively. It was recorded a positive growth rate of 51.90 per cent per annum for the district as a whole.The land under cultivable waste contributed a highest positive growth rate of 6.08 per cent of Chandur Bazar tahsil which is significant at 5% level of significance. The negative growth rate was observed in Achalpur (4.38%) and Bhatkuli (0.38%). The area under cultivable waste of Amravati district was 1.08 per cent which were positively significant at 5% level of significance

Current fallow means the land left unsown during the current agricultural year to regain fertility or some other reasons. The land under current fallow contributed a highest positive growth rate of 3.61 per cent of Achalpur tahsil which is non-significant. The negative growth rate was observed in Chandur Bazar (2.01%) and Bhatkuli (1.72%). The area under current fallow of Amravati district was 0.70 per cent which were positively significant at 5% level of significance. Other fallow land includes all land which were cultivated earlier and are temporarily unsown for a period of not less than one year and not more than five years. The fallow other than current fallow was accounted an negative growth Chandur Bazar (3.04%) and Bhatkuli (0.88%) which is non-significant. The positive growth rate observed in Achalpur tahsil was 6.23 per cent which were significant at 5% level of significance. The district as a whole was observed positive growth with 3.29 per cent per annum.

The area sown more than once was showed a negative significant growth rate 0.65 per cent for the entire district. The Bhatkuli tahsil was accounted positive growth rate (3.01 %) which is significant at 5 % level of significance. Whereas Achalpur tahsils showed negative growth rate (0.52) and Chandur Bazar tahsils showed positive growth rate (0.88%), which is non-significant.

The changes in cropping pattern in Amravati district during 1990-91 to 2013-14 are presented in Table 3. It is revealed that in year 1990-91 cotton and wheat was contributed 51.71 per cent and 4.27 per cent to gross cropped area in the span of 22 years cropping pattern has changed substantially. Krishnan *et al*. (1991) studied growth and instability of Agriculture in Kerala and observed that cropping pattern shifted in favour of plantation and commercial crop. The proportion of wheat was observed 4.27 per cent in the year 1990-91 has reduced to 1.72 per cent in 2000-01 further increased in 2013-14 up to 5.02 per cent. Tingre *et al.*(2007) reported that there are changes in cropping pattern and crop diversification in Amaravati district ,majority of cereal crops showed negative and low growth rates of area. In case of cotton its share over gross cropped area has fallen to the level of 19.40 per cent in 2005-06 from 39.75 per cent in 2000-01,but thereafter increased to 25.19 per cent in 2010-11 further reduced upto 16.23 per cent in the year 2013-14. The proportion of area under Black Gram over gross cropped area was 6.65 per cent in the year 1995-96 has increased in year 2013-14 *i.e.* 14.61 per cent, respectively. Goswami and challa (2004) studied the proportion of area under total cereals to total crop reduced from 61.1 percent in 1950-51 to –53.08 per cent in 1997-98.Decreased proportion of area under mung (9.02 %) was the highest in 2005-6. Proportion of area under cotton (51.71) was the highest in year 1990-91. Proportion of area under soybean was highest in year 2013-14 *i.e.* 45.99 per cent.

CONCLUSIONS

1. Area under different land use categories showed a significant positive growth in area under current fallow, which reflects the consequence of year to year rainfall variations.
2. Net sown area registered a significant negative growth of 1.02 per cent per annum.
3. Cropping pattern changes in Amaravati distict revealed that cotton, jowar and soybean were the major crops of Amravati district. Soybean is emerging as one of the major crop of the district.

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