



INTERNATIONAL JOURNAL OF TROPICAL AGRICULTURE

ISSN : 0254-8755

available at <http://www.serialsjournal.com>

© Serials Publications Pvt. Ltd.

Volume 35 • Number 4 • 2017

Diversification of Major Crops in Amravati District

Sunita N. Suryawanshi¹, Swati A. Gawande², Nillima Nandeshwar³,
V. J. Rathod⁴, Manjusha Gaikwad⁵ and Varsha Bane⁶

¹ Asstt. Professor, Agricultural Economics and Statistics, college of Agriculture, Dr. P.D.K.V., Akola

² Asstt. Professor, Extension Education, college of Agriculture, Dr.P.D.K.V., Akola .

³ Asstt. Professor, Agricultural Economics and Statistics, Anand Niketan Agriculture college, Warora

⁴ Asstt. Professor, Agricultural Economics and Statistics, college of Agriculture, Dr. P.D.K.V., Akola.

⁵ Asstt. Professor, Plant Pathology, college of Agriculture, Dr. P.D.K.V., Akola .

⁶ PG student, Department of Agricultural Economics and Statistics, Dr. P.D.K.V., Akola

Abstract. Agriculture plays a very important role in the economic development of the country where 70 percent of the population is directly or indirectly depends on agriculture geographical studies particularly relevant to agricultural geography. The growth of population leads to change in land use and cropping pattern. The study intended to study the crop diversification and land use pattern in Amravati district. The research was based on secondary data collected from Government Publications. The data covered a period of 22 years i.e. 1990-91 to 2012-13. All major crops were considered for study. In order to quantify extent of diversification Herfindahl and Entropy indices have been used . Simple tabular analysis was used to examined the changes in cropping pattern. In majority of tahsils of Amravati district i.e. Achalpur, Bhatkuli and Chandur Bazar diversification has significantly increased during the study period. The diversification from subsistence crop to more commercial crops were took place in selected tahsils. Crop diversification indices was positive and highly significant. This is indicated that in Amravati district an selected tahsils of Amravati district the crop diversification increased significantly over a period of study. 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: Crops, Diversification, land use pattern.

INTRODUCTION

Agriculture is largely commercial, cultivated for profit. Whereas in developing countries like India, the objective for practicing agriculture is to maximize the production to meet the food requirements as well as to cater other financial obligations of the farmer's family.

Crop diversification is defined as diverting of sizeable areas from the existing cropping pattern to other crops and enterprises to meet the ever increasing demand for food, fodder, fiber and other needs. It can also be defined as producing increased variety of agricultural commodities.

The main advantage of the study of diversification in a region lies in the fact that it enables us to understand the impact of physical and socio-economic conditions on the agriculture. Moreover, it helps us in knowing the contemporary competition among crop for area, for crop rotation and effect on double cropping, total production and per hectare productivity (Bhalsing, 2009). The study of changes in cropping pattern would help the farmers to use the better availability of microclimate, inputs and changing scenario of market condition. The study of crop diversification also helps the policy makers to formulate Policies and work according to changing trend. Economics of various crops gives an idea about their profitability which would help the farmers to allocation of scarce resources with the objectives to analyze the changes in cropping pattern in Amravati district and to study the crop diversification 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 Amravati 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.

The major food grain and non food grain crops of Amravati district were selected from Amravati district. Time series secondary data on the area of selected crops, farm harvest prices and other agricultural statistical data were obtained from various Government published sources. 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.

The extent of crop diversification were studied by using different diversification indices.

- a) **Herfindahl index (HI):** Herfindahl index (HI) was computed by taking sum of squares of acreage proportion of each crop to the total cropped area.

$$HI = \sum_{i=1}^n P_i^2$$

n = The total number of crops.

P_i = Proportion of acreage under ith crop to total cropped area.

The value of HI is bounded by zero (perfect diversification) and one (complete diversification). The value of HI approaches zero as one becomes large and takes value one when only one crop is cultivated.

- b) **Entropy index (EI):** It is calculated as,

$$EI = \sum_{i=1}^n \left\{ P_i \log \left(\frac{1}{P_i} \right) \right\}$$

The index tends to zero when there is a perfect concentration and the value increases with the increase with the increase in diversification of crop. If a value lies between zero and one then the upper limit of this index depends on the base of logarithm and the number of crop.

RESULTS AND DISCUSSION

1. Changes in cropping pattern in Achalpur tahsil

The changes in cropping pattern in Achalpur tahsil during 1990-91 to 2013-14 are presented in the Table 1.

It is revealed from the table 1 that in year 1990-91 cotton and kharif jowar was accounted 61.66 per cent and 24.09 per cent to gross cropped area in the span of 22 years cropping pattern has changed substantially. The proportion of jowar was 18.21 per cent in the year 2005-06 has reduced to 6.13 per cent in 2013-2014. In case of cotton, its share over gross cropped area has fallen to the level of 26.65 per cent in 2005-06 from 61.66 per cent in 1990-91. The proportion of area under Black gram was highest in

2.5 per cent in year 2000-01 and wheat over gross cropped area were found highest in year 2005-6 i.e. 9.80 per cent which has reduced upto 5.51 per cent in year 2013-14. It is observed that the proportion of area under cotton was the highest in 1990-91 (41.40 %) and lowest in 2005-6 (26.65 %). Decreased proportion of area was observed in respect of cotton. The proportion of area under mung (2.35%) was the highest in 1990-91. The proportion of soybean was 25.24 per cent in the year 2010-11 thereafter increased to the level 38.97 per cent in 2013-14.

2. Changes in cropping pattern in Bhatkuli tahsil

The changes in cropping pattern in Bhatkuli tahsil during 1990-91 to 2013-14 are presented in the table 2

Table 1
Changes in cropping pattern in Achalpur tahsil

(Area in hectares)

Sr. No.	Crop	Years					
		1990-91	1995-96	2000-01	2005-06	2010-11	2013-14
1	Soybean	-	-	24220 (31.88)	17452 (34.57)	12790 (25.24)	17980 (38.97)
2	Cotton	30364 (61.66)	28967 (60.50)	26090 (34.34)	13450 (26.65)	16155 (31.88)	15320 (33.20)
3	Kharif jawar	11862 (24.09)	11762 (24.57)	12513 (16.47)	9190 (18.21)	7590 (14.98)	2830 (6.13)
4	Mung	1159 (2.35)	592 (1.24)	377 (0.50)	200 (0.40)	490 (0.97)	320 (0.69)
5	Black Gram	385 (0.78)	1520 (3.17)	1630 (2.15)	135 (0.27)	360 (0.71)	370 (0.80)
6	Tur	3941 (8.00)	3197 (6.68)	10000 (13.16)	5100 (10.10)	8920 (17.60)	6778 (14.69)
7	Wheat	1536 (3.12)	1840 (3.84)	1140 (1.50)	4950 (9.80)	4370 (8.62)	2542 (5.51)
Gross cropped area		49247 (100)	47878 (100)	75970 (100)	50477 (100)	50675 (100)	46140 (100)

(Figures in the parentheses are percentage to gross cropped area)

It is revealed from the table 2 that in year 1990-91 cotton and jowar crop contributed 58.83 per cent and 22.85 per cent of gross cropped area in the span of 22 years cropping pattern has changed substantially. The proportion of jowar crop was 22.85 per cent in the year 1990-91 has reduced to 1.67 per cent in the year 2013-14. In case of cotton, the area share under cotton has reduced to the level of 16.37 per cent in 2013-14 from 56.11 per cent in 2000-01 to the grossed crop area.. The proportion of area under wheat was highest in year 1995-96 i.e. 2.12 per cent which was reduced up to 0.28 per cent in year 2013-14 respectively. It was observed that the area under mung crop was the lowest during the year 1990-91 (0.39%). Proportion of area under cotton was the highest in 2000-01 i.e. 56.11 per cent. Proportion of area under soybean was the highest in 2013-14 i.e. 56.10 per cent. Increased proportion

of area was observed in respect of tur (18.04 %) in 2013-14, as compared to 1990-91 to 2005-06 years.

3. Changes in cropping pattern in Chandur Bazar tahsil

The changes in cropping pattern in Chandur Bazar during 1990-91 to 2013-14 are presented in the table 3. It is revealed from the table 3 that in year 1990-91 cotton and kharif jowar crop was contributed 59.15 per cent and 23.79 per cent to total gross cropped area in the span of 22 years cropping pattern has changed substantially in the tahsils. The proportion of jowar was 23.79 per cent in the year 1990-91 has reduced to 2.02 per cent in 2013-14. In case of cotton its share over gross cropped area has fallen to the level of 26.12 per cent in 2013-14 from 59.15 per cent in 1990-91. The proportion of area under Black gram over gross cropped area was constant in the

Table 2
Changes in cropping pattern in Bhatkuli tahsil

(Area in hectares)

Sr.No.	Crop	Years					
		1990-91	1995-96	2000-01	2005-06	2010-11	2013-14
1	Soybean	-	-	2620 (5.14)	15450 (30.93)	23000 (45.52)	30783 (56.10)
2	Cotton	36510 (58.83)	40109 (47.60)	28550 (56.11)	9800 (19.62)	8000 (15.83)	8981 (16.37)
3	Kharif jawar	14180 (22.85)	11443 (13.58)	5163 (10.15)	3800 (7.61)	2000 (3.96)	914 (1.67)
4	Mung	239 (0.39)	9741 (11.56)	7900 (15.53)	14000 (28.03)	7945 (15.72)	3327 (6.06)
5	Black Gram	3511 (5.66)	12338 (14.64)	200 (0.39)	600 (1.20)	355 (0.70)	813 (1.48)
6	Tur	6650 (10.64)	8837 (10.49)	6030 (11.85)	5925 (11.86)	9000 (17.81)	9899 (18.04)
7	Wheat	1015 (1.63)	1790 (2.12)	420 (0.83)	375 (0.75)	230 (0.46)	151 (0.28)
Gross cropped area		62060 (100)	84258 (100)	50883 (100)	49950 (100)	50530 (100)	54868 (100)

(Figures in the parenthesis are percentage to gross cropped area)

year 2000-01 (2.92%) and 2005-06 (2.16%), respectively. Decreased proportion of area under mung was the highest in the year 2000-01 i.e. 9.12 per cent. Proportion of area under cotton was the highest in 1995-96 i.e. 75.61 per cent. Proportion of area under soybean was the highest in 2013-14 i.e.

51.09 per cent. The proportion of area under tur crop was the highest in 2010-11 i.e. 17.66 and lowest in 1995-96 i.e. 8.83. The gross cropped area of Chandur Bazar tahsil showed decreasing trend from 56376 hectares in 1990-91 year to 51507 hectares in 2013-14.

Table 3
Changes in cropping pattern in Chandur Bazar (Area in hectares)

Sr.No.	Crop	Years					
		1990-91	1995-96	2000-01	2005-06	2010-11	2013-14
1	Soybean	-	-	19730 (31.14)	28904 (47.84)	26850 (42.55)	26315 (51.09)
2	Cotton	33348 (59.15)	41968 (75.61)	23500 (37.09)	11760 (19.47)	16375 (25.95)	13455 (26.12)
3	Kharif jawar	13412 (23.79)	5800 (10.45)	5223 (8.24)	6030 (9.98)	4550 (7.21)	1038 (2.02)
4	Mung	1175 (2.08)	1250 (2.25)	5780 (9.12)	3180 (5.26)	2540 (4.02)	499 (0.97)
5	Black Gram	495 (0.88)	650 (1.17)	1850 (2.92)	1305 (2.16)	345 (0.55)	327 (0.63)
6	Tur	4824 (8.56)	4901 (8.83)	6300 (9.94)	6136 (10.16)	11147 (17.66)	8157 (15.84)
7	Wheat	3122 (5.54)	940 (1.69)	974 (1.54)	3100 (5.13)	1300 (2.06)	1716 (3.33)
Gross cropped area		56376 (100)	55509 (100)	63357 (100)	60415 (100)	63107 (100)	51507 (100)

(Figures in the parentheses are percentage to gross cropped area)

4. Measurement of crop diversification: Herfindahl index

Herfindahl index is also a measure of concentration. The value of Herfindahl index varies from zero to one. It takes the value one when there is complete specialization and value zero when there is perfect diversification. It is observed from the table 4 that crop diversification indices was positive and highly significant. This indicated that in Amravati district and selected tahsils of Amravati district the crop diversification increased significantly over a period of study.

It is observed that in Achalpur, Chandur Bazar and Bhatkuli tahsils of Amravati district, the value of Herfindahl index were found lower than 0.5 it means that it is near to zero in all the selected tahsils, so diversification took place .The diversification from subsistence crop to more commercial crops were took place in Achalpur, Bhatkuli and Chandur Bazar tahsils.

5. Measurement of crop diversification : Entropy index

Entropy index is also a measure of concentration. The value of Entropy index varies from zero to one.

It takes the value zero when there is complete specialization and value one when there is perfect diversification.

Table 4
**Measurement of crop diversification :
Herfindahl index**

Year	Achalpur	Bhatkuli	Chandur Bazar	Amravati District
1990-91	0.31	0.36	0.32	0.32
1995-96	0.30	0.26	0.41	0.32
2000-01	0.26	0.44	0.26	0.25
2005-06	0.24	0.23	0.29	0.21
2009-10	0.23	0.29	0.29	0.21
2013-14	0.29	0.39	0.39	0.28

Table 5
**Measurement of crop diversification :
Entropy index**

Year	Achalpur	Bhatkuli	Chandur Bazar	Amravati
1990-91	0.60	0.57	0.61	0.62
1995-96	0.60	0.70	0.52	0.65
2000-01	0.64	0.57	0.67	0.70
2005-06	0.66	0.69	0.66	0.76
2009-10	0.70	0.62	0.63	0.75
2013-14	0.61	0.54	0.54	0.68

It is observed from the table 5 that crop diversification indices was positive and highly significant. This is indicated that in Amravati district selected tahsils of Amravati district the crop diversification increased significantly over a period of study.

It is observed that in Achalpur, Chandur Bazar and Bhatkuli tahsils of Amravati district and Amravati as a whole the value of Entropy index were more than 0.5 i.e. it is nearer to one at selected data points. It means diversification is increased in all selected tahsils of Amravati district during the period

of study took place .The diversification from subsistence crop to more commercial crops were took place Achalpur, Bhatkiuli and Chandur Bazar tahsils.

CONCLUSIONS

1. Area under kharif jowar reduced in Achalpur (6.13%), Bhatkuli (1.67%) and Chandur Bazar (2.02%).
2. Crop diversification increased in different tahsils of Amravati.
3. Proportion of area under cotton reduced in selected tahsils of Amravati district i.e. Achalpur (33.20%), Bhatkuli (16.37%) and Chandur Bazar (26.12%) in the year 2013-14.
4. Cotton is more adventitious crop over jowar, soybean and tur in Achalpur Bhatkuli and Chandur Bazar tahsils of Amravati district.

LITERATURE CITED

- Arora, V. P. S. and S.K. Srivastava. (1996), Diversification of cropping pattern and food grain mix in India. Pace magnitude and Implications. Indian Journal of Agricultural Economics 54(4): 699.
- Batla Seema., (2008), Regional dimensions of inter crop diversification in India : Implications for production and productivitygrowth. Agric. Situ. India, 64 (12) : 601-620.
- Dinesh K. Marothia, Singh, R. K. and A. K. Koshta, (2007), Crop diversification : Post-reform lessons learnt from Chattisgarh. Agric. Situ. India, 64(5): 215-226.
- Gehlot Neeru and Kaur Navneet, (2015), Crop diversification for sustainable agricultural development : a casse of Haryana (India). Indian Journal of Economics and Development, vol 11(1): 21-30.
- Joshi, P. K., Gu1ati, A., Birthal, B. S., Tewari, L. (2004), 'Agriculture Diversification in South Asia: Patterns, Determinants and Policy Implications', Economic and Political Weekly, 39(24), 2457-2467.

- Kaur Indpreet, (2015), Need of crop diversification to achieve sustainable agriculture in Punjab : a brief review. *Indian Journal of Economics and Development*, vol 11(1): 41-51.
- Kebede, Ergano, Mehta, V.P. and Dixit, (2000), Diversification of agriculture in Haryana: An empirical analysis. *Agric. Situ. India*, New Delhi.
- Prahadeeswaran M., C. Ramasamy and K. N. Selvaraj. (2009), Changing pattern of crop Diversification and Evidences for commercialization of Agriculture. *District Level Inquiry in Tamil Nadu, Agricultural Stuation in India* 2753 AGRI / 09-7B
- Premakumar and Seema. (2013), Land Use Pattern in India and Karnatka : A comparative Analysis. *International Journal of Scientific Research*. Vol. 2 : 1-2.