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Research Article

Crop Diversification in Selected Tahsils of Yavatmal District- A Micro Level Analysis

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ABSTRACT

The present study is an attempt to examined the crop diversification in selected tahsils of Yavatmal district of Maharashtra. The study is based on secondary data collected from various Government publications and pertains to a period of 13 years i.e. from 2003-04 to 2015-16. The selected tahsils of Yavatmal district were Mahagaon, Wani, Maregaon, Zari Jamni,Kelapur and Ralegaon. In order to work out growth in area of major crops exponential model was fitted and to work out instability in area of major crops CV was calculated. To study the crop diversification Herfindahl and Entropy indices have been worked out. The results the study showed that the compound growth rates of area of major crops i.e Soybean, and Tur were significantly positive. The area of Cotton in Mahagaon and Wani tahsil was significantly negative. Highest variability in the area of Soybean was observed in Mahagaon tahsil. The diversification from subsistence crop to more commercial crops were took place in the selected tahsils of Yavatmal district.

Keywords: *Crop Diversification, Herfindahl index, Entropy Index, Growth and Instability, CV*

INTRODUCTION

The study of cropping pattern assumes a great significance as it is one of the important path for balanced development of agriculture to meet the requirements. The adoption of better cropping pattern optimally suited to the technological changes is an important one for augmenting agricultural growth. Cropping pattern of a particular area either state, region, districts, etc. emerges through the interaction of physical, social, economic, technological, and infrastructural factors. It is a function of climatic elements, their periodicity expressed in terms of seasons, nature of soils, physiographic and man introduced factors like irrigation, fertilizers, etc. Amongst the climatic factor, precipitation, its distribution and periodicity has a greater determinant value. The impact of each of these factors would differ depending upon the prevailing situation of a place. The variation in cropping pattern is also influenced by economic conditions and behavior of farmers who decide the type of crops to be grown.

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Farmer might choose such crops combination which will be best suited to his field under the given conditions. Change in cropping pattern would be an integral part and popular mode of diversification and resource mobilization available to cultivators for higher agricultural production.

Cropping pattern has been dynamic to cope up the changing scenario and to meet ever changing demands of growing population. Limited availability of land, raising population and declining yields, forced farmers to search for alternate ways for raising farm income, with the passage of time farmers becomes increasingly commercialized and started farming for maximizing their output. Now the realization prevails amongst the farmers for the long term returns, and they are in search of optimum cropping pattern which can fulfill their aspirations. Hence, the present study was undertaken to study the crop diversification in selected tahsils of Yavatmal district with the following objectives.

Objectives:

1) To estimate the growth and instability in area of major crops in selected tahsils.

2) To study the crop diversification in selected tahsils.

MATERIALS AND METHODS

For the present study six tahsils of Yavatmal district namely Mahagaon, Wani, Maregaon, Zari Jamni, Kelapur ,and Ralegaon were purposively selected. The study was based on secondary data collected from various Government publications and pertains to a period of 13 years i.e. from 2003-04 to 2015-16.

Tools of Analysis

1) Growth and Instability

a) Exponential model

For examining the performance of different crops in terms of growth in area, growth rates of area, of major crops were estimated using exponential model.

$$Y = ab^t$$

Where,

Y = area under a particular crop

a & b = parameters to be estimated from exponential model

CGR = $[Antilog(\log b) - 1] \times 100$

b) Coefficient of variation (C.V)

Coefficient of variation of area under a particular crop was calculated by using the following formula

$$\text{c.v.} = \frac{\text{S.D.}}{\text{Mean}} \times 100$$

2) Analysis for the extent of crop diversification

The extent of crop diversification was studied by using Herfindahl and Entropy indices of crop diversification.

a) Herfindahl index (HI)

Herfindahl index was computed by taking the sum of squares of acreage proportion of each crop to the total cropped area.

$HI=\sum_{i=1}^{N} Pi^2$

Where,

N= The total number of crops.

Pi= Proportion of acreage under I^{th} crop to total cropped area.

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

b) Entropy Index (EI)

Entropy index is regarded as an inverse measure of concentration having logarithmic character.

$$(E.I)=\sum_{i=1}^{n} P\, i^2 \log \frac{1}{Pi}$$

An index close to zero indicates the concentration towards a or a few crops if it is near to one it indicates complete diversification.

RESULTS AND DISCUSSION

Growth rates of area of major crops in selected tahsils

The compound growth rates of area under major crops in selected tahsils is presented in table1. From the table it is seen that in Mahagaon tahsil area growth in kharif jowar, moong ,and udid were significantly negative during the study period.The area growth of kharif jowar was declined by -18% per annum during the study period. The area growth in

moong and udid were significantly declined by -7.91% and -7.51%. The area growth in tur and cotton showed stagnant picture. On other hand soybean area growth was significantly increased by 12.58% per annum.

In respect of Wani tahsil the area growth rates of kharif jowar, tur, moong and udid were significantly negative. Wereas the growth rate of cotton area was significantly positive and it was increased by 3.32% per annum, Soybean showed stagnant picture for area growth rate over the period of study.

In case of Maregaon tahsil the area growth rates in cotton and soybean were significantly increased by 1.82% and 4.91% respectively. On the other hand. Other selected crops of study showed stagnant picture.

In Zari Jamni tahsil the growth rates of area of moong, udid, soybean and jowar crops were significantly negative wereas area growth rate of cotton and tur were significantly increased by 3.37% and 2.88% respectively.

In case of Kelapur tahsil the area growth rates of kharif jowar ,moong, and udid significantly negative over the period of study, on the other hand cotton and tur showed a stagnant picture in area growth. The growth rate of soybean is increased by 7.30% during the study period.

In respect of Ralegaon tahsil the growth in area of tur, moong and udid significantly declined by -8.52%, -40.23% and -28.15% respectively during study period on the other hand cotton showed significant positive growth rate 5.44% per annum, the growth in area of kharif jowar and soybean were stagnant during the study period.

Table 1: Compound growth rates of area of major crops for the year 2003-04 to 2015-16 of selected tahsils

Crops	Mahagaon	Wani	Maregaon	Zari Jamni	Kelapur	Ralegaon
Kh.Jowar	-18.50**	-15.40**	-2.71	-6.8**	-9.8**	-2.66
Cotton	0.96	3.32**	1.82*	3.68**	0.65	5.44**
Soybean	12.58**	2.03	4.91**	-7.00**	7.85*	1.40
Tur	3.49	-7.16**	2.17	2.88**	-0.15	-8.52**
Moong	-7.91**	-44.25**	-1.37	-35.26**	-45.41**	-40.33**
Udid	-7.51**	-41.47**	0.00	-21.51**	-40.15**	-28.15**

Note-,*** denotes Significance at 1% and 5% level of significance respectively.

Variability in area of Major crops in selected tahsils

The variability of area of major crops in selected tahsils of Yavatmal were presented in table 2, form the table it is observed that in Mahagaon tahsil the highest variability in area was observed in kharif jowar i.e 54.30% followed by soybean 46.91% and moong 43.92. In Wani tahsil high variability in area was observed in udid 100.18% followed by moong 91.14% and kharif jowar 71.99%.

In respect of Maregaon tahsil higest variability observed in udid 108.44% followed by moong 59.12%.In Zari Jamni highest variability in area was observed in moong 75.63% followed by udid 57% and soybean 50.43%. In respect of Kelapur highest variability found in udid i.e.102.83% followed by moong 81.82%. In Ralegaon tahsil highest variability in area was observed in moong 78.43% followed by udid 65.95% and kharif jowar 55.57% respectively.

Table 2: Variability in Area of Major Crops in Selected Tahsils during the year 2003-04 to 2015-16

Crops	Mahagaon	Wani	Maregaon	Zari Jamni	Kelapur	Ralegaon
Kh.Jowar	54.30	71.99	22.98	27.61	34.43	55.57
Cotton	13.58	13.81	9.29	14.20	9.57	24.72
Soybean	46.91	26.07	24.13	50.43	36.56	50.76
Tur	32.83	27.16	15.88	11.78	6.00	31.63
Moong	43.92	91.14	59.12	75.63	81.82	78.43
Udid	40.81	100.18	108.44	57.93	102.83	65.95

Crop diversification in Selected Tahsils

Herfindahal diversification Indices of selected tahsils are presented in the table 3. It has been observed from the values of Herfindahl index which is less than 0.5 in almost all the selected tahsils, indicated that diversification took place in the selected tahsils over the period of study.

Table 3: Measurement of Crop Diversification: Herfindahl Index of Selected Tahsils of Yavatmal District

Years	Mahagaon	Wani	Maregaon	Zari Jamni	Kelapur	Ralegaon
2003-04	0.28	0.34	0.35	0.39	0.38	0.39
2006-07	0.34	0.34	0.35	0.37	0.38	0.38
2009-10	0.32	0.35	0.35	0.36	0.36	0.37
2012-13	0.36	0.46	0.34	0.49	0.41	0.51
2015-16	0.34	0.48	0.33	0.54	0.38	0.60

The Entropy indices of selected tahsils of Yavatmal district are presented in the table 4. From the table it is observed that the value of Entropy indices is above 0.5 it indicated that the diversification took place in all the selected tahsils of Yavatmal district over the study period.

Table 4: Measurement of Crop Diversification: Entorpy Indices of Selected Tahsils of Yavatmal District

Years	Mahagaon	Wani	Maregaon	Zari Jamni	Kelapur	Ralegaon
2003-04	0.82	0.63	0.64	0.60	0.64	0.55
2006-07	0.73	0.62	0.59	0.59	0.59	0.54
2009-10	0.66	0.58	0.59	0.55	0.58	0.55
2012-13	0.64	0.53	0.63	0.51	0.61	0.49
2015-16	0.65	0.51	0.63	0.47	0.62	0.41

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