

Original Research Article

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## Crop Diversification in Selected Tahsils of Yavatmal District

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### ABSTRACT

#### Keywords

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The present study is an attempt to examine 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 Babhulgaon, Arni, Ner, Digras, Pusad and Darwaha. 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 of study showed that the compound growth rates of area under soybean, were significantly positive in majority of the tahsils. The area growth in *kharif* sorghum, green gram and black gram were significantly decreased in all the selected tahsils. The diversification from subsistence crop to more commercial crops were taken place in the selected tahsils of Yavatmal district.

### Introduction

The study of cropping pattern assumes a great significance as it is one of the important paths 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. Farmer might choose such crop 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.

The main objectives of this study to estimate the growth and instability in area of major crops in selected tahsils. And also to study the crop diversification in selected tahsils.

## **Materials and Methods**

For the present study six tahsils of Yavatmal district namely Babhulgaon, Arni, Ner, Digras, Pusad and Darwaha 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**

### **Growth and Instability**

#### **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

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

### **Coefficient of variation (C.V)**

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

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

### **Analysis for the extent of crop diversification**

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

#### **Herfindahl index (HI)**

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

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

Where,

N= The total number of crops.

P<sub>i</sub>= Proportion of acreage under i<sup>th</sup> 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.

## Entropy Index (EI)

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

$$(E.I) = \sum_{i=1}^n P_i \log \frac{1}{P_i}$$

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 table 1. From the table it is seen that in Babulgaon tahsil the area growth in kharif sorghum, pigeon pea, green gram and black gram decreased significantly during the study period. On the other hand the area growth in soybean was increased significantly by 9.62 per cent per annum. The area growth in cotton showed stagnant picture.

The area growth rates of *kharif* sorghum, green gram and black gram were significantly decreased in Arni tahsil. Soybean crop showed significantly positive growth rate in area i.e. 6.51 per cent per annum. The area growth in cotton was stagnant.

The growth rates of area under soybean and pigeon pea showed significantly positive growth in Ner tahsil. On the other hand the area under kharif sorghum and green gram decreased by 13.88 per cent and 22.47 per cent in Arni tahsil.

In respect of Digras tahsil the growth rates for area under cotton and soybean significantly increased by 7.30 per cent 16.00 per cent respectively. The area growth in *kharif* sorghum, green gram and pigeon pea were significantly negative and it was -10.26 per cent, -35.16 per cent and -6.92 per cent respectively.

The area growth in black gram was decreased by 51.18 per cent.

In Pusad tahsil significant negative growth in area were observed in *kharif* sorghum, pigeon pea, green gram and black gram. The growth of area in cotton and soybean were increased by 3.35 per cent and 3.45 per cent per annum respectively.

In case of Darwaha tahsil growth in area of *kharif* sorghum, green gram and black gram were significantly negative. On the other hand area growth of soybean was significantly positive and it was increased by 17.59 per cent per annum. The area growth in cotton was found stagnant.

### Variability in area of Major crops in selected tahsils

The variability in area of major crops in selected tahsils of Yavatmal were presented in table 2, from the table it is observed that in Babulgaon tahsil the highest variability in area was observed in black gram i.e. 82.88 per cent followed by kharif sorghum 64.26 per cent and green gram 49.14 per cent. In Arni tahsil highest variability in area was observed in green gram i.e. 80.02 per cent followed by black gram 77.47 per cent and *kharif* sorghum 33.49 per cent. In Ner tahsil highest variability in area was observed in green gram i.e. 95.60 per cent followed by *kharif* sorghum 51.78 per cent. In Digras tahsil highest variability were observed in black gram i.e. 99.45 per cent. In Pusad highest variability was observed in black gram. In case of Darwaha tahsil highest variability were observed in green gram and pigeon pea i.e. 56.54 per cent each.

### 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.1** Compound growth rates of area of major crops in selected tahsils

Crops	Babhulgaon	Arni	Ner	Digras	Pusad	Darwaha
Kh.Sorghum	-20.08**	-8.67**	-13.88**	-10.26**	-6.90**	-9.52**
Cotton	1.97	0.87	-2.19	7.30**	3.35*	0.79
Soybean	9.62**	6.51*	14.98**	16.00**	3.45**	17.59**
Pigeon pea	-3.68**	-13.98	3.14**	-6.92**	-2.98**	-1.16
Green gram	-10.83**	-25.12**	-22.47**	-35.16**	-5.78*	-12.84**
Black gram	-19.12**	-28.13*	-2.60	-51.18**	-6.86**	-10.04**

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

**Table.2** Variability in Area of Major Crops in Selected Tahsils

Crops	Babhulgaon	Arni	Ner	Digras	Pusad	Darwaha
Kh.Sorghum	64.26	33.49	51.78	43.53	29.51	37.34
Cotton	24.47	14.07	22.88	29.37	16.52	12.57
Soybean	34.21	31.22	45.72	51.67	24.58	41.81
Pigeon pea	20.14	32.09	13.12	88.64	38.75	56.54
Green gram	49.14	80.20	95.60	86.64	36.75	56.54
Black gram	82.88	77.47	42.65	99.45	46.83	49.80

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

Years	Babhulgaon	Arni	Ner	Digras	Pusad	Darwaha
2003-04	0.40	0.20	0.30	0.24	0.14	0.41
2006-07	0.29	0.28	0.33	0.28	0.26	0.26
2009-10	0.35	0.30	0.31	0.28	0.11	0.27
2012-13	0.38	0.30	0.32	0.39	0.25	0.30
2015-16	0.38	0.35	0.34	0.41	0.28	0.32

**Table.4** Measurement of Crop Diversification: Entropy Indices of Selected Tahsils of Yavatmal District

Years	Babhulgaon	Arni	Ner	Digras	Pusad	Darwaha
2003-04	0.74	0.63	0.64	0.60	0.64	0.55
2006-07	0.68	0.62	0.59	0.59	0.59	0.54
2009-10	0.58	0.58	0.59	0.55	0.58	0.55
2012-13	0.55	0.53	0.63	0.51	0.61	0.49
2015-16	0.52	0.51	0.63	0.47	0.62	0.41

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.

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