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Variation of Per Hectare Yield and Production of Selected Crops in Marathwada Region

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Abstract :

Agricultural geography is as the study of regional variations in agriculture and the factors responsible for them. In the modern agricultural geography the major trust of geographers is to investigate the Spatio-temporal variability of agricultural activity. Landuse and Productivity are the most obvious spatial variable. Agricultural productivity is defined as efficiency of various inputs used in productive operations. Variation in per hectare yield and production is essential to identify stable or instable areas in order to do rational and scientific planning for the agricultural development. Therefore an attempt is made here to analyze agricultural productivity. The paper is based on secondary data. The magnitude of variability has been determined by applying Karl Person's formula of coefficient of variation. The study reveals that high fluctuation in yield and production of Bajara and Tur in all districts because these are rain fed crops and rainfall is uncertain.

Key wards: Per hectare yield, production, coefficient of variation.

Introduction

Agriculture geography has been defined as the science which deals with the regional or spatial variations in the distribution of agricultural entities and to explain the causes of such variations (Husain, Majeed, 2002). Agricultural geography is as the study of regional variations in agriculture and the factors responsible for them. In India development of agriculture and allied activities provides a source of live hoods to over 70 percent of its total population. (Katar Sing, 2009). Agriculture is base of industry, trade and transportation India. In the modern agricultural geography the major trust of geographers is to investigate the Spatio-temporal variability of agricultural activity. Landuse and Productivity are the most obvious spatial variable.

Agricultural productivity could be defined as the ratio of output to input in relation to land, capital, and overall resources employed in agriculture (Mohmad Noor,1995). Agricultural productivity is defined as efficiency of various inputs used in productive operations. The productivity is thus bound to vary from region to region with the variation in various physical, technological and institutional factors operating in the region (Siddiqui, 1987). Agricultural productivity is the function of a number of factors including physical, socio-economic and technological organization (Mohamd and Majeed, 1995). Agricultural productivity exhibits wide regional disparities with the result of very divers set of condition. Broadly, variation in the agricultural productivity can be attributed to the environmental institutional and technological factors. All these factors are highly variable and dynamic in nature (Munirabdul, Khan F. M., Qazi M. A., 1989) therefore productivity also dynamic in nature.

The methods of mapping of variation of per hectare yield and production provides rational base for further orientation in agricultural planning. The determination of variations in agricultural productivity and there probable causes will make it possible to demarcate the regions of agricultural productivity. It will be immense help in appropriate planning of development of each region according to its physio-socio-economic conditions (Mohamd and Thakur, 1995). Variation in per hectare yield and production is essential to identify stable or instable areas in order to do rational and scientific planning for the agricultural development. Therefore an attempt is made here to analyze agricultural productivity.

1. The Study Area

The Maharashtra State is administratively divided into six divisions, viz. Konkan, Nasik, Pune, Amravati, Nagpur and Aurangabad. The Aurangabad division is also known as Marathwada

was formerly a part of Hyderabad state. Marathwada forms the South central portion of Maharashtra with Aurangabad city being located almost at the centre of the state (Map-1). Marathwada is one of the most backward regions of Maharashtra state.

The Marathwada region lies in the upper Godavari basin. The absolute location of region is $17^{\circ}38'53''$ North latitude to $20^{\circ}40'51''$ North latitude and $74^{\circ}33'28''$ East longitude to $78^{\circ}21'12''$ East longitude. The study region is bounded to the north by Jalgaon, Buldhana, and Washim districts, to the north east by Yavatmal district to the east by Nizamabad and Adilabad districts of Andhra Pradesh to the south and south east by Bidar and Gulbarga districts of Karnataka state, to the west by Ahmednagar to the Southwest by Solapur and to the North West by Nasik district. Its shape is roughly triangular. East-West maximum extension of region is 394 Kilometers and North-south extension in of region is 330 Kilometers. Total Geographical area of region is 64434 Square Kilometer which is 20.95 per cent of the state and its population is 1.87 cores

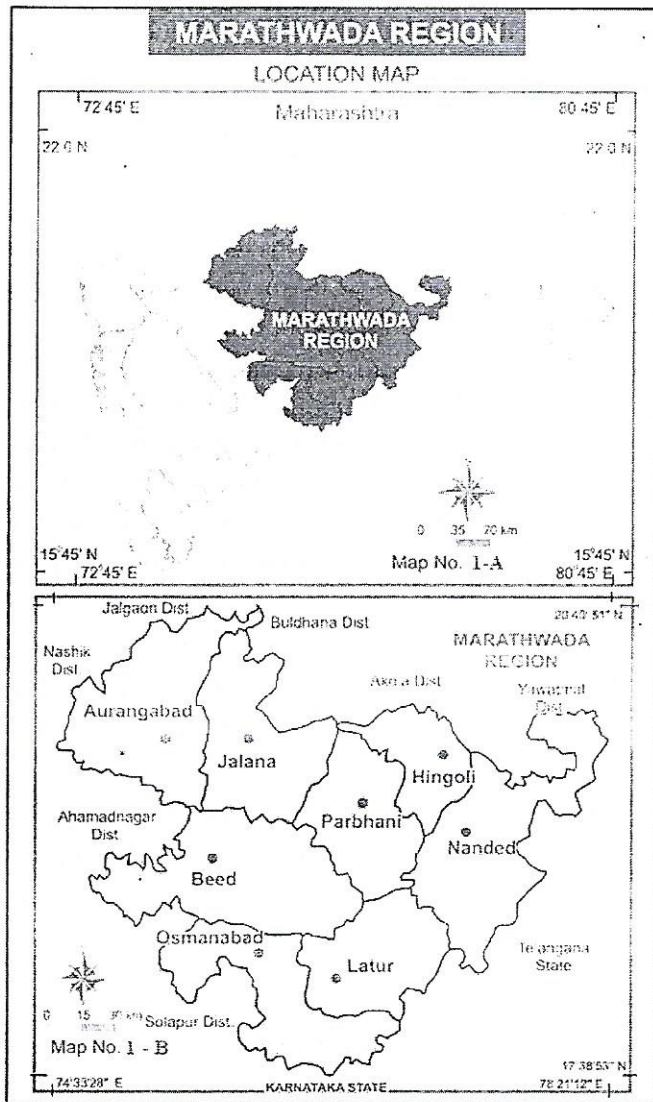


Figure-1

which is 16.66 percent of the state as per census of 2011. Administratively study region is divided into eight districts that are further divided into 76 tehasils.

Objectives:

The main objective of this paper is analyze variation in per hectare yield and production of selected crops in Marathwada region.

Data collection and Methodology:

The present study is based on secondary data source. In order to meet these objectives the relevant information and data regarding per hectare yield and production of selected crops collected from Socio Economic Review and District Statistical Abstract of Districts in Marathwada region and Season and Crop Reports for the year of 1981-82 to 1985-86 and 2005-06 to 2009-10. The data regarding population is collected from census of Maharashtra; the information about geographical area is collected from Gazetteers.

Collected rough data are processed and an attempt has been made to analyze total magnitude of fluctuations that may resulted due to both the positive as well as negative deviation and may reflect to a great extent the degree at stability and instability in a phenomena over the period under review.

The magnitude of variability has been determined by applying Karl Person's formula of coefficient of variation, which as below.

$$\text{Coefficient of Variation} = \frac{\text{S.D.}}{\text{Mean}} \times 100$$

Analysis of the study has been made with help of the statistical techniques and on the basis of this results and conclusion are drawn.

Discussion:

Variation in per hectare yield and production of Jowar

Per hectare yield

It is seen from table 6.6 and figure 6.18A the variability in per hectare yield of Jowar in the region as a whole was 33.92 percent. But, district level analysis varies ranging in between 23.75 and 50.29 percent. The high degree of variability is found in Hingoli, Parbhani and Nanded district i.e. above 41 percent of coefficient of variation, because most of irrigated area is devoted to cash crops. Whereas the low degree of variability is recorded in Aurangabad, Beed, Jalna, Latur and Osmanabad districts, i.e. below 33 percent.

Production

During the period under study, in the region as a whole has 31.24 per cent coefficient of variation in Jowar production. However, district level analysis varies ranging from 21.13 to 40.31 percent. The tables 6.6 indicates that the high degree of variability in Jowar production is found in Hingoli, Latur and Nanded district i.e. above 34 percent of coefficient of variation. It is moderate in Aurangabad and Osmanabad districts i.e. 28 to 34 percent of coefficient of variation, whereas the low degree of variability is recorded in Beed, Jalna and Parbhani districts, i.e. below 28 per cent (Figure-2 - A&B)

Variation in per hectare yield and production of wheat

Per hectare yield

Considering the per hectare yield of wheat, the region a whole shows 30.40 percent variability. The high degree variability is found in Aurangabad, Hingoli, Jalna and Parbhani district i. e. above 32. The medium degree of variation was recorded only in Nanded district i.e. 30.32 percent. The low degree variability is found in Beed, Latur and Osmanabad districts i.e. below 29 percent.

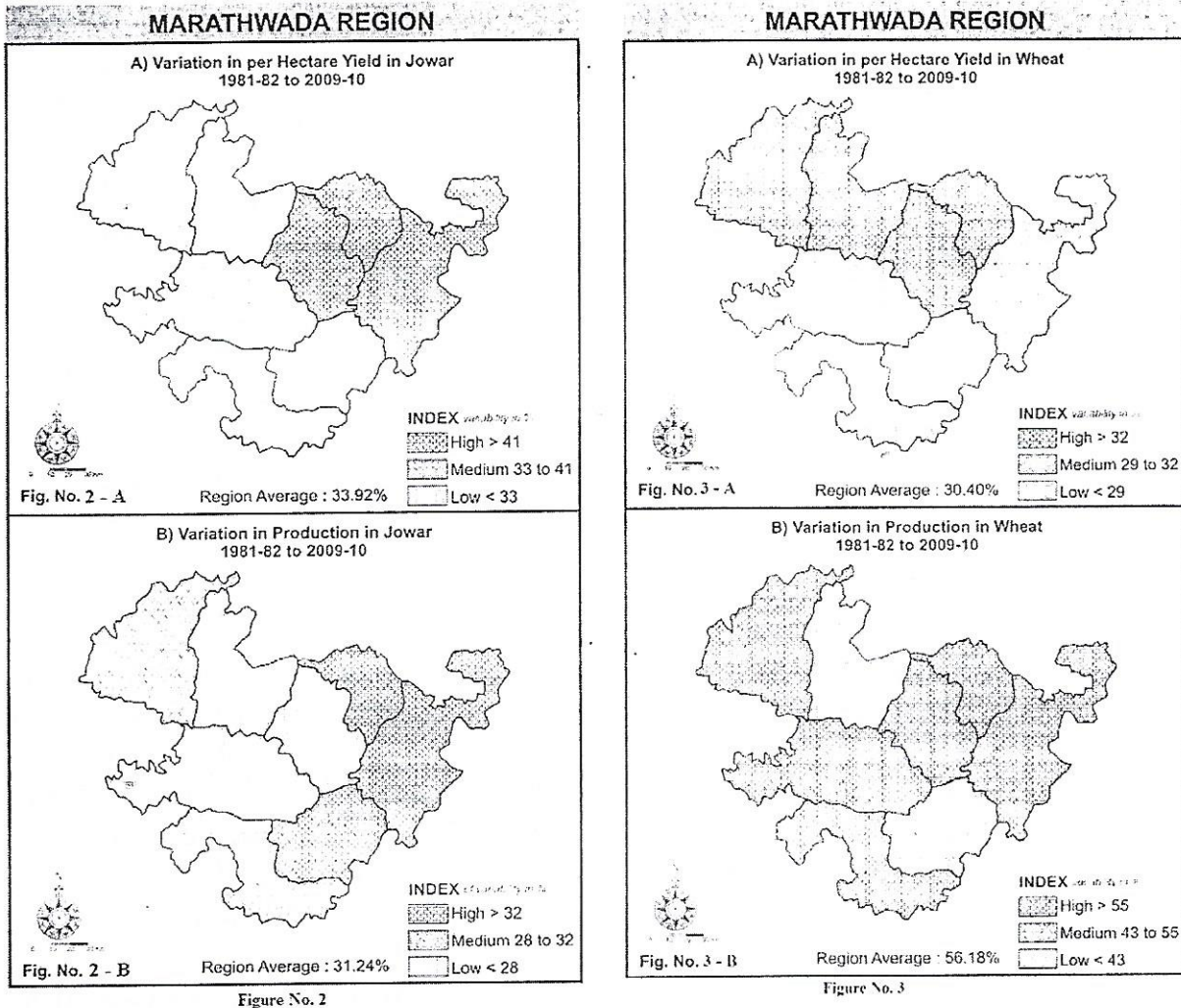


Table No. 1. Coefficient of Variation in Per Hectare Yield and Production in Marathwada Region - 1981-82 to 1985-86 and 2005-06 to 2009-10

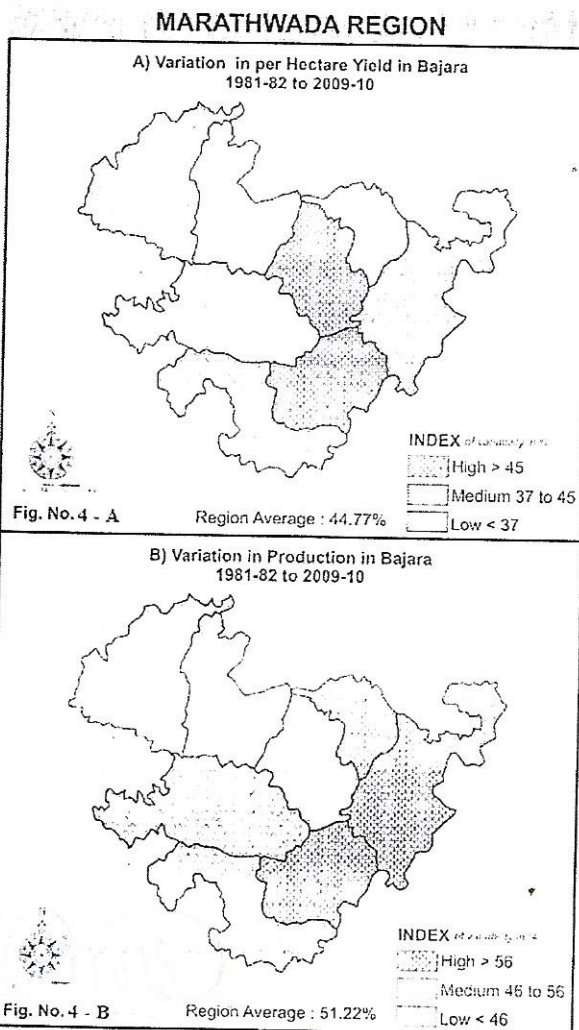
Crops	P.H. Yield/ Production	District / Region								
		Aurangabad	Beed	Hingoli	Jalna	Latur	Nanded	Osmanabad	Parbhani	Marathwada
Jowar	P.H. Yield	26.37	24.83	42.14	23.75	28.95	50.29	27.62	47.43	33.92
	Production	31.16	24.83	39.99	21.13	36.56	40.31	28.65	27.28	31.24
Wheat	P.H. Yield	35.94	25.22	32.53	33.15	25.04	30.32	27.54	33.48	30.40
	Production	59.13	55.94	63.29	31.64	44.32	65.78	62.9	66.45	56.18
Bajara	P.H. Yield	38.15	36.53	28.58	33.98	48.31	43.79	43.5	53.29	40.77
	Production	38.17	47.05	58.43	47.46	65.16	65.33	52.18	35.95	51.22
Tur	P.H. Yield	48.67	39.92	44.13	42.37	57.84	39.01	52.58	31.08	44.45
	Production	52.6	45.4	40.91	53.33	66.75	47.81	67.06	40.88	51.84

Gram	P.H. Yield	38.04	26.00	28.18	32.99	31.48	36.45	32.34	27.39	31.61
	Production	56.51	60.86	62.97	51.97	64.49	78.44	60.96	62.45	62.33
Groundnut	P.H. Yield	109.59	47.14	26.14	46.43	52.37	42.8	43.97	43.11	51.44
	Production	49.71	57.06	117.21	65.23	54.00	76.11	46.62	117.6	72.94
Sugar-cane	P.H. Yield	46.31	49.17	43.56	48.03	47.01	45.39	42.82	45.43	45.97
	Production	60.83	64.39	94.45	88.8	82.76	75.08	52.24	67.96	73.31
Cotton	P.H. Yield	132.07	119.73	168.17	140.67	142.06	113.3	148.08	145.53	138.7
	Production	103.46	99.8	51.97	71.45	64.87	34.51	107.63	50.26	72.99

Source: Compiled by Researcher, on the basis of Socio economic Review and district Statistical Abstract of all district of marathwada region 1981-82 to 2009-10, Chief Statistical Office of Agriculture Maharashtra state pune.

Production

During the period under study, the region as a whole has 56.18 percent coefficient of variation of Wheat production. However, district level analysis varies ranging from 31.64 to 66.45 percent. It is seen from table 6.6 that the high degree of variability in Wheat production is found in Aurangabad, Beed, Hingoli, Osmanabad, Parbhani and Nanded district i.e. above 55 percent of coefficient of variation. It is moderate in Latur district i.e. 44.32 percent of coefficient of variation,



whereas the low degree of variability is recorded in Jalna district, i.e. below 43 percent. (Fig.3 - A & B)

5.3. Variation in per hectare yield and production of Bajara Per hectare yield

The region as whole has 40.77 percent, the variability in per hectare yield of Bajara during the period of investigation. However, regional analysis varies; the range of variation is in between 28.58 and 53.29 percent. The high variability in per hectare yield of Bajara was recorded in Latur and Parbhani districts i. e. above 45percent, due to scarcity of rainfall. The medium degree of variability was recorded in Aurangabad, Osmanabad and Nanded districts i.e. 37 to 45percent. The low degree variability in per hectare yield of Bajara was found in Beed, Hingoli and Jalna districts i.e. below 37 percent respectively.

Production

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During the period of investigation, the study region as whole has 51.22 percent variability in Bajara production. The spatial distribution is uneven and range of variability of Bajara production is in between 35.95 and 65.33 percent. The high level variability in production of Bajara is recorded in Hingoli, Latur and Nanded districts i. e. above 56 percent. (Figure – 4 - A & B)

The Moderate degree of variation is found in Jalna, Osmanabad and Beed districts i.e. ranging 46 to 56 percent. The low degree variability in production of Bajara is noticed in Aurangabad and Parbhani districts i.e. below 46 percent, because they are benefited by Jaykwadi major project.

5.4. Variation in per hectare yield and production of tur

Per hectare yield

It is seen from table 1 that the coefficient of variation in the per hectare yield of Tur in the region as a whole is 44.45 percent. District level analysis reveals uneven distribution ranging from 31.08 to 57.84. The high level variability in per hectare yield of Tur was recorded in Latur and Osmanabad districts i. e. above 49 percent, due to uncertain rainfall. The moderate degree of variation is recorded in Aurangabad, Hingoli and Jalna districts i.e. 40 to 49 percent. The low degree variability in per hectare yield of Tur was found in Beed, Nanded and Parbhani districts i.e. below 40.00 percent.

Production

There is 51.84 percent variability in Tur production in Marathwada region, but spatial distribution varies from district to district. The high degree of variability was observed in Latur and Osmanabad district i.e. above 58 percent and causes are same as mentioned earlier. While it is moderate in Aurangabad and Jalna districts i.e. 50 to 58 percent. The Low variability of Tur production is observed in Beed, Hingoli, Nanded and Parbhani districts i.e. below 50 percent.

5.5. Variation in per hectare yield and production of Gram

Per hectare yield

During the period of investigation, the variability of per hectare yield of Gram was 31.61 percent in the entire study region. However, regional analysis varies; the range of variation is in between 26.00 and 38.04 percent. The high level variability in per hectare yield of Gram is recorded in Aurangabad and Nanded districts i. e. above 34 percent. The medium degree of variation was recorded in Jalna, Osmanabad and Latur districts i.e. 30 to 34 percent. The low degree of variability in per hectare yield of Gram is found in Hingoli, Beed and Parbhani districts i.e. below 30 percent.

Production

During the period of investigation, the entire study region had 62.33 percent of variability in Gram production. The regional analysis varies from district to district and range of variability of Gram production is from 51.97 to 78.44 percent. The high level variability in production of Gram is recorded in Nanded district i.e. 78.44 percent. The Moderate degree of variation is found in Hingoli, Latur, Osmanabad, Parbhani and Beed districts i.e. 60.5 to 69.5 percent. The low degree of variability in production of Gram was noticed in Aurangabad and Jalna districts i.e. below 60.5 percent, due to fertile soil in Godavari basin and surface irrigation.

Variation in per hectare yield and production of Groundnut

Per hectare yield

During the period of investigation, there is a 51.44 percent variation in per hectare yield of Groundnut in the region as a whole, but spatial distribution is very uneven. It is seen from table 6.6 that the highest degree of variability was recorded in the Aurangabad district i.e. 109.59 percent.

The low degree variability in per hectare yield of Groundnut is found in Beed, Hingoli, Jalna, Latur, Nanded, Osmanabad and Parbhani districts i.e. below 54percent.

Production

During the period of investigation, the region as whole has 72.94 percent variability in Groundnut production, but regional analysis is uneven ranging in between 46.62 and 117.60 percent. The high variability in production of Groundnut was recorded in Hingoli and Parbhani districts i. e. above 94 percent. The Moderate degree of variation is found in Nanded district i.e. 76.11 percent. The low degree variability in production of Groundnut was noticed in Aurangabad, Beed, Jalna, Latur and Osmanabad districts i.e. below 70 percent variation.

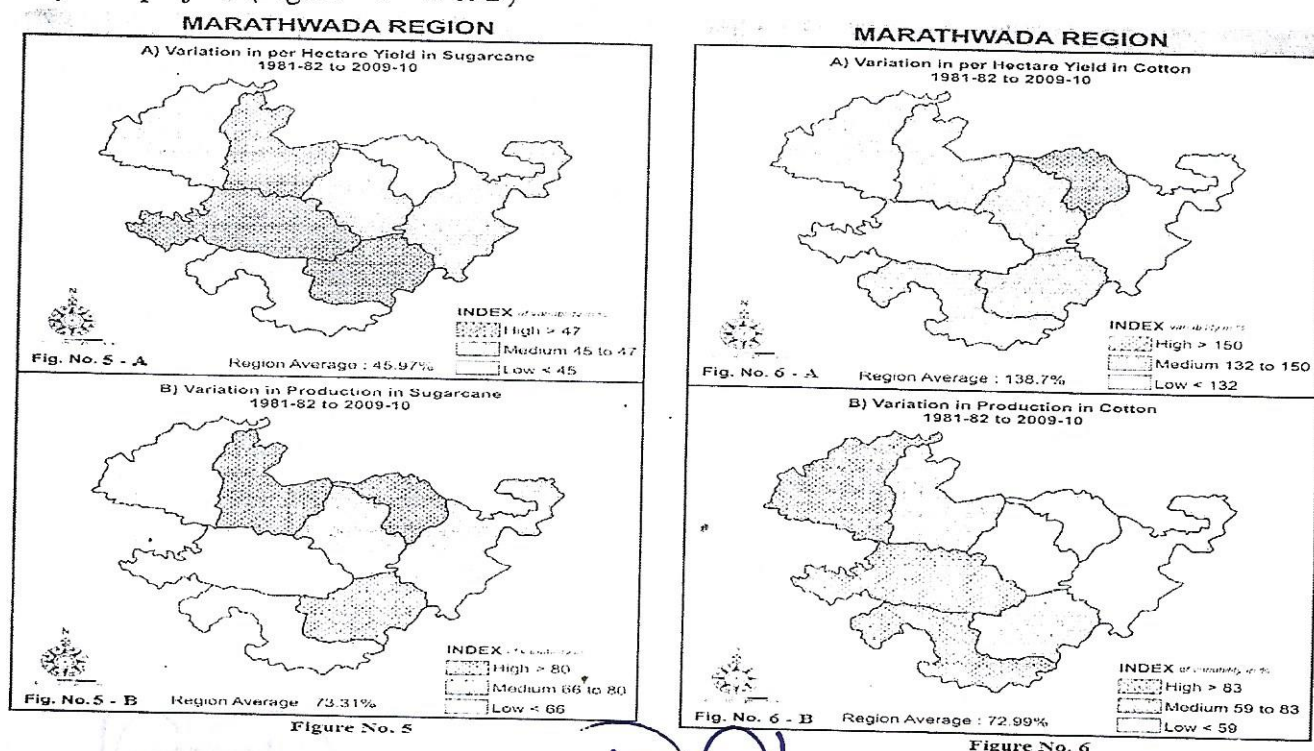
Variation in per hectare yield and production of sugarcane

Per hectare yield

The region as a whole has 45.97 percent variability in per hectare yield of Sugarcane during the period of investigation. But district level analysis is ranging from 42.82 to 49.17 percent. The high degree of variability was found in Latur, Beed and Jalna districts i.e. above 47 percent. The medium degree of variability is noticed in Aurangabad, Nanded and Parbhani districts i.e. from 45 to 47 percent. The low degree of variability was recorded in Hingoli and Osmanabad districts i.e. below 45 percent.

Production

During the period of investigation, the region as a whole has region 73.31 percent variability in Sugarcane production. The district level range of variability of Sugarcane production is from 52.24 to 94.45 percent. The figure 5- A exhibits that the high variability in production of Sugarcane is recorded in Hingoli, Latur and Jalna districts i. e. above 80percent, due to uncertainty in surface irrigation and rainfall. The Moderate degree of variation is found in Nanded and Parbhani districts i.e. 66 to 80 percent. The low degree variability in production of Sugarcane was noticed in Beed, Aurangabad and Osmanabad districts i.e. below 66 percent, as the benefited by major irrigation project. (Figure – 5 - A & B)



Variation in per hectare yield and production of Cotton

Per hectare yield

The region as a whole has 138.70 percent variability in per hectare yield of Cotton during the period of investigation, but district level analysis ranging from 113.30 to 168.17 percent. The high degree of variability is found in Hingoli district i.e. 150 percent, due to low development of surface irrigation. The medium degree of variability was noticed in Aurangabad, Jalna, Latur, Osmanabad and Parbhani districts i.e. between 132 to 150 percent. The low degree of variability is recorded in Beed and Nanded districts i.e. below 132 percent.

Production

During the period of investigation, the study region as a whole has 72.99 percent of variability in Cotton production. The district level range of variability of Cotton production is from 34.51 to 107.63 percent. The high level variability in production of Cotton is recorded in Aurangabad, Beed and Osmanabad districts i. e. above 83 percent, due to uncertain rainfall. The Moderate degree of variation is found in Jalna and Latur districts i.e. 59 to 83 percent. The low degree variability in production of Cotton is noticed in Hingoli, Parbhani and Nanded districts i.e. below 59 percent (Figure-6 - A & B).

Conclusions:

The analysis of coefficient of variation reveals that high fluctuation in yield of Jowar in Hingoli, Parbhani and Nanded district is result of uncertain rainfall and most of the irrigated area is devoted to cash crops, whereas more stability in yield of Jowar in Aurangabad, Beed, Jalna, Latur, and Osmanabad indicates that these districts are more consistence in Jowar production than others. The variability of wheat production is high as compare to yield in all districts indicates fluctuation in provision of irrigation. The coefficient of variation analysis reveals high fluctuation in yield and production of Bajara and Tur in all districts because these are rain fed crops and rainfall is uncertain. Relatively more stability in yield of gram than other pulses in all districts indicates that gram is more suited than other pulses in the study region. The very high variability in Groundnut production in all districts indicates that groundnut production is unsure in study region. More stability of sugarcane yield than Cotton is because it is irrigated crop, however high fluctuation in sugarcane production than the yield indicates uncertainty in irrigation facilities. The high variation in yield and production of cotton is mainly due to uncertain of rainfall as well as lower control of insects.

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