

International Journal of Statistics and Applied Mathematics

ISSN: 2456-1452

Maths 2024; SP-9(2): 177-182

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www.mathsjournal.com

Received: 22-01-2024

Accepted: 03-03-2024

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Changes in cropping pattern in Maharashtra

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Abstract

The cropping pattern represents the agricultural economy of a region or area and is a key factor in determining the level of agricultural production. The present study was conducted to know the changes in the cropping pattern of Maharashtra using absolute and relative changes and coefficient of variation analysis. Time series data on the area under different crops grown from the period 2001-02 to 2020-21 were collected and analyzed for four regions wise and its division wise of Maharashtra. The results revealed that, over the period of study in Vidarbha region area under kharif jowar over base year showed negative absolute and relative change in area. Soybean showed positive absolute and relative change in the area. The cotton crop showed negative absolute and relative change in area. In Marathwada region, over base year, Rabi jowar and wheat showed negative absolute and relative change in area. The absolute and relative change for area in soybean was positive. While, in Western Maharashtra region except kharif bajra and Rabi jowar all the selected crop showed positive absolute and relative change in the area over base year. Sugarcane is one of the cash crop grown in Western Maharashtra region, the absolute and relative change in area was positive. In Konkan region absolute and relative change in area of kharif paddy were negative.

Keywords: Absolute change, relative change, cropping pattern

Introduction

India, a nation of roughly a billion people, depends heavily on agriculture for its economic health. In other words, for as long as India's economy has existed, agriculture will continue to be its mainstay. Indirectly and directly, agriculture supports over 65 per cent of the population. Gross Domestic Product (GDP) declined from 20 per cent in 2003-04 to 18.8 per cent in 2021-2022, according to agricoop.nc.in. As the green revolution has grown, our country's agricultural sector has undergone significant change. A cropping pattern is characterized by the mix of crops planted in the variety of crops planted in a given geographic area defines a cropping pattern. A change in the cropping schedule causes a difference in the percentage of land planted to different crops. The area under different crops, the crop rotation pattern, and the percentage of land under different crops at any given time are all revealed by the cropping pattern of the region. One of the main factors influencing the amount of agricultural production is the cropping pattern, which symbolizes the agricultural economy of a state or region.

While short-term fluctuations in cropped area and productivity were brought on by the whims of nature, such as rainfall and other institutional factors contend that the building of irrigation infrastructure may be the cause of long-term changes in cropping patterns in any region. Both the environment and the farmer's financial returns are significantly impacted by these short- and long-term changes. To gain a deeper understanding of the process of agricultural development, it is imperative to evaluate changes in cropping patterns across different regions. Hence, present study was conducted with the specific objectives to work out the absolute and relative changes in cropping pattern over the year or period in different regions and its divisions of Maharashtra.

Materials and Methods

Absolute and relative changes

To understand the changes in the relative contribution of each crop to the changes in cropping pattern in various regions of Maharashtra state absolute and relative changes was worked out.

The absolute change in land use (under cropping pattern system) and relative changes in area, production and productivity of major crops during the period under consideration was measured using the base year and current year values. The base and current year value of crop in respect of area, production and productivity based on the base year and current year of the study. Time series data was used to worked out the absolute and relative changes. The absolute changes and relative changes were measured as given below:
 Absolute change. Absolute change was calculated by using the formula given below

$$\text{Absolute change} = \text{Current year} - \text{base year}$$

Where,

Current year = Area/ production/ productivity of current year value (2020-21)

Base year = Area/ production / productivity of base year value (2001-02)

Relative change: Relative change expressed in percentage and calculated by the following formula

$$\text{Relative change} = \frac{\text{Current year} - \text{base year}}{\text{Base year}} \times 100$$

Where,

Current year = Area/ production/productivity of current year value (2020-21)

Base year = Area/production/productivity of base year value (2001-02)

Coefficient of variation

This is measure of relative dispersion for the purpose of comparing two or more statistical series. Coefficient of Variation (CV) was estimated by the formula:

$$\text{CV (\%)} = \frac{\text{Standard Deviation (SD)}}{\text{Mean}} \times 100$$

Results and Discussion

Changes in area, production and productivity of major crops in Maharashtra

The cropping pattern of a particular region emerges and also changes through the interaction of physical, social, economic, technological and infra-structural factors. The decisions of a farmer regarding cropping patten are based on monitory returns, availability of production technologies, accessibility of resources and many others. During last two decades considerable changes has been occurred in the agricultural scenario these changes have resulted into drastic changes in the cropping pattern of the particular region. So, it is essential to examine the magnitude and direction of changes in the cropping pattern over two decades. The changes in cropping pattern have been examined for Vidarbha, Marathwada, Western Maharashtra and Konkan regions of Maharashtra. Also, the cropping pattern changes have been examined for different administrative divisions of the region. The changes in the cropping pattern were examined for area, production

and productivity of the selected major crops for respective region.

Cropping pattern changes of Vidarbha region of Maharashtra

Vidarbha region, located in the state of Maharashtra, India, is predominantly an agricultural region. However, the cropping pattern in this region has seen significant changes over the years. This analysis aims to examine the absolute and relative changes in the cropping pattern in Vidarbha, focusing on key crops such as cotton, soybean, turn, kharif paddy, kharif jowar, wheat and gram. The data table provides insights into the area, production and productivity of these crops, comparing their performance over a period of time. This analysis is crucial in understanding the trends and implications of crop production in Vidarbha.

Over the 20 years period under review, area and production under kharif jowar changed considerably. Table 1 showed kharif jowar area showing an absolute negative change of 5834 hundred ha and -91.60 per cent was relative change. It indicated that, over the period under reference the area under kharif jowar drastically decreased. The relative change for production and productivity in kharif jowar were also negative and it was -95.21 per cent for production and -43.01 per cent for productivity. On the other hand, absolute change of area between base year (2001-02) and current year (2020-21) was 5641 hundred ha and the relative change in area of gram was 289.73 per cent. Similarly, the absolute change for wheat was 2070 hundred ha and relative change in area was 123.66 per cent. The absolute change in area for soybean was 9663 hundred ha and the relative change in area of soybean was 113.28 per cent. The relative change in productivity in soybean was super singly negative during the period of study and it was -19.23 per cent. The absolute change in area between base year and current year was comparatively less in cotton and kharif paddy. It was 955 hundred ha in cotton followed by kharif paddy 744 hundred ha. The relative change in area in case of kharif paddy was 11.03 per cent followed by cotton 5.96 per cent. The highest variability in area was seen in kharif jowar i.e. 69.04 per cent followed by gram 35.00 per cent, wheat 30.03 per cent, soybean 21.99 per cent and tur 11.00 per cent respectively. The lowest variability was seen in kharif paddy area i.e. 4.30 per cent. It indicated that the area under kharif paddy was stable during the period under reference.

Cropping pattern changes of Amravati division in Vidarbha region of Maharashtra

Table 1 showed that, the fluctuations and variability in area, production and productivity in major crops of Amravati division in Vidarbha region of Maharashtra. Over the period under study. During the period of study, in Amravati division for area of cotton and kharif paddy showed negative absolute change and also relative change. The absolute change in area of cotton over base year was -1775 hundred ha and relative change -13.54 per cent. Similarly, the absolute change in area for kharif paddy was -104 hundred ha and relative change was -62.65 per cent. The absolute and relative change in production and productivity of kharif.

Table 1: Cropping pattern changes of Vidarbha region of Maharashtra

Crop	Particulars	Division						Region		
		Amravati			Nagpur			Vidarbha		
		Absolute Change	Relative Change	CV (%)	Absolute Change	Relative Change	CV (%)	Absolute Change	Relative Change	CV (%)
Kharif crops										
Cotton	Area	-1775.00	-13.54	8.52	2730.00	93.62	39.75	955.00	5.96	10.90
	Production	13808.00	136.19	37.95	12440.00	485.56	74.08	26248.00	206.66	43.19
	Productivity	228.00	174.05	40.33	303.00	203.36	38.65	265.50	189.64	36.94
Soybean	Area	10482.00	256.97	34.02	-819.00	-18.40	24.05	9663.00	113.28	21.99
	Production	15006.00	305.75	49.93	-3218.00	-61.60	39.16	11788.00	116.34	36.83
	Productivity	165.00	13.72	38.34	-622.00	-52.98	32.87	-228.50	-19.23	32.25
Tur	Area	956.00	26.29	10.30	645.00	44.39	15.21	1601.00	31.45	11.00
	Production	756.00	21.48	30.30	1913.00	122.79	54.15	2669.00	52.56	36.52
	Productivity	-37.00	-3.82	25.55	582.00	54.29	42.13	272.50	26.72	31.60
Kharif jowar	Area	-4853.00	-90.59	65.26	-981.00	-96.94	100.81	-5834.00	-91.60	69.04
	Production	-6495.00	-94.80	78.46	-911.00	-98.17	110.09	-7406.00	-95.21	80.48
	Productivity	-572.00	-44.72	35.89	-373.00	-40.63	31.57	-472.50	-43.01	26.65
Kharif Paddy	Area	-104.00	-62.65	50.85	848.00	12.89	4.79	744.00	11.03	4.30
	Production	-124.00	-77.50	80.07	4759.00	54.94	27.77	4635.00	52.54	27.52
	Productivity	-373.00	-38.69	54.69	491.00	37.31	26.33	59.00	5.18	22.23
Rabi crops										
Wheat	Area	1340.00	173.35	40.36	730.00	81.02	23.36	2070.00	123.66	30.03
	Production	2673.00	235.09	50.48	2247.00	245.04	43.10	4920.00	239.53	42.08
	Productivity	332.00	22.57	21.86	922.00	90.57	23.06	627.00	50.38	19.01
Gram	Area	4365.00	351.17	39.88	1276.00	181.25	24.63	5641.00	289.73	35.00
	Production	6134.00	700.23	57.31	1936.00	469.9029	46.98	8070.00	626.55	53.93
	Productivity	545.00	77.30	26.38	600.00	102.3891	27.35	572.50	88.69	24.05

Area in '00' ha, Production in 00 tonnes and Productivity in Kg/ha

Paddy were also negative and also the absolute and relative change in area, production and productivity of kharif jowar is also negative. The absolute change in area was -4853 hundred ha and relative change -90.59 per cent. The relative change in area of gram was 351.17 per cent followed by soybean 256.97 per cent, wheat 173.35 per cent and tur 26.29 per cent, respectively. The relative change in productivity of tur was negative i.e. -3.82 per cent. The highest variability in area was seen in kharif jowar 65.26 per cent followed by kharif paddy 50.85 per cent, gram 39.88 per cent and soybean 34.02 per cent, respectively.

Cropping pattern changes of Nagpur division in Vidarbha region of Maharashtra

It was observed from Table 1 that, the fluctuations and variability in area, production and productivity in major crops of Nagpur division in Vidarbha region of Maharashtra. In Nagpur division the absolute and relative change in area of kharif jowar and soybean were negative. The absolute change in area for kharif jowar was -981 hundred ha and relative change was 96.94 per cent. Similarly absolute change in area of soybean was -819 hundred ha and the relative change -18.40 per cent. The relatively change in the area of gram over base year was 181.25 per cent followed by cotton 93.62 per cent, wheat 81.02 per cent and tur 44.39 per cent, respectively. The highest variability in area was seen in kharif jowar 100.81 per cent followed by cotton 39.75 per cent, gram 24.63 per cent and soybean 24.05 per cent, respectively.

Cropping pattern changes of Marathwada region of Maharashtra

Table 2 shows the fluctuations and variability in area, production and productivity in major crops of Marathwada region in Maharashtra over the period under study. In Marathwada region for Rabi jowar and wheat absolute and relative change of area was negative. The absolute change in area of Rabi jowar was -5451 hundred ha and relative change

-47.65 per cent. Similarly, the absolute and relative change in production of Rabi jowar was also negative. The absolute production change was -633 hundred tonnes and relative change -8.16 per cent. The absolute change in area of wheat was -168 hundred ha and relative change -6.71 per cent. Among the selected crops absolute and relative change in area and production of soybean was highest. The absolute change for area in soybean was 19055 hundred ha and relative change 2022.82 per cent. The absolute change in the production of soybean was 30637 hundred tonnes and relative change 2696.92 per cent. The relative change in area of gram was 244.29 per cent followed by cotton 76.06 per cent and tur 30.48 per cent, respectively. The highest variability in area was seen in soybean 55.93 per cent followed by gram 43.48 per cent, cotton 23.57 per cent, Rabi jowar and wheat around 22.14 per cent.

Cropping pattern changes of Aurangabad division in Marathwada region of Maharashtra

Table 2 showed that, the fluctuations and variability in area, production and productivity in major crops in Aurangabad division in Marathwada region of Maharashtra. In Aurangabad division, absolute and relative change in area for Rabi jowar and wheat was negative. The absolute change in Rabi jowar was -3719 hundred ha and relative change -57.87 per cent. The absolute and relative change in area for wheat was -41 hundred ha and -4.27 per cent, respectively. The absolute and relative change in area of cotton and soybean were comparatively more as compared to other selected crops. In case of cotton the absolute change was 8182 hundred ha and relative change 230.67 per cent. The absolute and relative change in area of soybean was 4225 hundred ha and 3039.57 per cent, respectively. The relative change in cotton and soybean for productivity were 143.24 per cent and 104.70 per cent, respectively. Highest variability in area was observed in soybean i.e. 74.35 per cent followed by gram 41.61 per cent,

cotton 32.34 per cent. The lowest variability for area was seen in tur i.e. 16.39 per cent.

Cropping pattern changes of Latur division in Marathwada region of Maharashtra

Table 2 shows the fluctuations and variability in area, production and productivity in major crops in Latur division of Marathwada region of Maharashtra. In respect of Latur division, absolute and relative change in area of cotton, Rabi jowar and wheat were negative. The absolute change in area of Rabi jowar was -1732 hundred ha and the relative change -34.54 per cent. The absolute change in area of cotton was -296 hundred ha and relative change -5.27 per cent. Similarly

in case of area in wheat absolute change was -127 hundred ha and relative change was -8.24 per cent. The highest absolute and relative change was observed for area and production of soybean. The absolute change in area and production of soybean were 14830 hundred ha and 22222 hundred tonnes, respectively. Similarly, the absolute and relative change in area and production of soybean were 1846.82 per cent and 2215.55 per cent. In respect of variability in area of selected crops, the highest variability was seen in soybean 52.25 per cent followed by gram 47.61 per cent, wheat 20.08 per cent, Rabi jowar 19.12 per cent and cotton 15.68 per cent respectively. The lowest variability in tur crop area was observed 12.97 per cent.

Table 2: Cropping pattern changes of Marathwada region of Maharashtra

Crop	Particulars	Division						Region		
		Aurangabad			Latur			Marathwada		
		Absolute Change	Relative Change	CV (%)	Absolute Change	Relative Change	CV (%)	Absolute Change	Relative Change	CV (%)
Kharif crops										
Cotton	Area	8182.00	230.67	32.34	-296.00	-5.27	15.68	7368.00	76.06	23.57
	Production	21284.00	600.06	58.47	4839.00	105.77	43.58	26123.00	321.63	49.01
	Productivity	212.00	143.24	42.61	162.00	117.39	38.71	187.00	130.77	36.95
Soybean	Area	4225.00	3039.57	74.35	14830.00	1846.82	52.25	19055.00	2022.82	55.93
	Production	8415.00	6327.07	107.21	22222.00	2215.55	71.50	30637.00	2696.92	75.44
	Productivity	1002.00	104.70	46.99	237.00	18.98	39.33	619.50	56.17	40.74
Tur	Area	361.00	30.31	16.39	827.00	30.56	12.97	1188.00	30.48	12.36
	Production	1380.00	315.79	56.32	2161.00	125.93	54.77	3541.00	164.47	53.12
	Productivity	804.00	219.07	46.71	463.00	73.03	44.01	633.50	126.57	42.61
Rabi crops										
Wheat	Area	-41.00	-4.27	31.01	-127.00	-8.24	20.08	-168.00	-6.71	22.14
	Production	605.00	53.26	49.61	365.00	18.46	36.69	970.00	31.16	39.30
	Productivity	709.00	59.98	27.20	373.00	29.07	27.40	541.00	43.89	25.03
Gram	Area	814.00	98.91	41.61	5645.00	309.99	47.61	6459.00	244.29	43.48
	Production	1102.00	264.90	62.48	6894.00	711.46	73.81	7996.00	577.33	68.16
	Productivity	421.00	83.20	31.19	521.00	97.93	30.70	471.00	90.75	28.15
Rabi jowar	Area	-3719.00	-57.87	30.91	-1732.00	-34.54	19.12	-5451.00	-47.65	22.08
	Production	-1108.00	-27.27	43.58	475.00	12.85	30.76	-633.00	-8.16	34.74
	Productivity	460.00	72.78	35.07	534.00	72.46	30.86	497.00	72.61	31.04

Area in '00' ha, Production in tonnes and Productivity in Kg/ha

Table 3 Cropping pattern changes of Western Maharashtra region of Maharashtra

Table 3 revealed that the fluctuations and variability in area, production and productivity in major crops of Western Maharashtra region of Maharashtra over the period under study. In Western Maharashtra region, except kharif bajra and Rabi jowar all the selected crops showed positive absolute and relative change in the area. The absolute and relative change in the area of Rabi jowar was -8156 hundred ha and -38.30 per cent. Also, in case of kharif bajra absolute change in area was -4288 hundred ha and relative change -44.01 per cent. The absolute change in the area of cotton was 6076 hundred ha and relative change for it 113.97 per cent. Likewise, the absolute and relative change in area of soybean was 3131 hundred ha and 198.54 per cent, respectively. Over a period of time, the area under kharif maize was increased exponentially in Western Maharashtra region. The absolute change of area for kharif maize was 4916 hundred ha and relative change 418.74 per cent. Sugarcane is one of the important cash crop grown in Western Maharashtra region and the absolute change in area over base period was 4520.34 hundred ha and relative change 114.70 per cent. The relative change in area of gram and wheat was 91.42 per cent and 44.61 per cent, respectively. Highest variability for area was seen in kharif maize 45.62 per cent, followed by sugarcane 29.59 per cent, kharif bajra 29.15 per cent and soybean 28.74

per cent. The lowest variability in area was seen in kharif paddy i.e. 5.58 per cent.

Cropping pattern changes of Nashik division in Western Maharashtra region of Maharashtra

Table 3 showed that, the fluctuations and variability in area, production and productivity in major crops in Nashik division in Western Maharashtra region of Maharashtra. In Nashik division, in area and production the negative absolute and relative change in area was observed in kharif bajra and sugarcane. The absolute change in area for kharif bajra was -3744 hundred ha and relative change -68.52 per cent. Similarly, in the case of sugarcane absolute change in area was -87.03 hundred ha and the relative change -18.36 per cent. The absolute and relative change in the area of soybean was 1483 hundred ha and 1140.77 per cent. The absolute and relative change in the area of cotton was 4582 hundred ha and 90.00 per cent, respectively. The relative change in area for wheat and gram was 223.75 per cent and 229.80 per cent, respectively. The highest variability in area was observed in soybean i.e. 50.63 per cent followed by kharif maize 48.06 per cent, kharif bajra 35.69 per cent, gram 34.59 per cent and sugarcane 34.41, respectively. The lowest variability in area was observed in kharif paddy 15.79 per cent followed by Rabi jowar 17.52 per cent.

Table 3: Cropping pattern changes of Western Maharashtra region of Maharashtra

Crop	Particulars	Division									Region		
		Nashik			Pune			Kolhapur			Western Maharashtra		
		Absolute Change	Relative Change	CV (%)	Absolute Change	Relative Change	CV (%)	Absolute Change	Relative Change	CV (%)	Absolute Change	Relative Change	CV (%)
Kharif crops													
Cotton	Area	4582.00	90.00	23.29	1555.00	878.53	65.13	-61.00	-96.83	79.21	6076.00	113.97	26.90
	Production	18098.00	311.71	42.95	3799.00	1844.17	87.80	-60.00	-98.36	98.42	21837.00	359.58	45.60
	Productivity	226.00	116.49	28.90	195.00	98.48	39.96	-78.00	-46.99	61.50	222.28	114.78	31.24
Soybean	Area	1483.00	1140.77	50.63	1399.00	1665.48	53.77	249.00	18.27	10.25	3131.00	198.54	28.74
	Production	2423.00	1181.95	50.83	2497.00	2497.00	70.21	1438.00	63.01	18.31	6358.00	245.77	31.80
	Productivity	53.00	3.36	19.56	562.00	47.23	34.39	633.00	37.81	15.65	259.50	15.82	16.07
Kharif maize	Area	3792.00	628.86	48.06	876.00	438.00	44.84	248.00	66.85	42.73	4916.00	418.74	45.62
	Production	14239.00	1232.81	61.92	2967.00	1586.63	67.37	1165.00	314.02	61.09	18371.00	1072.45	60.03
	Productivity	1587.00	82.87	27.40	1997.00	213.58	35.22	338.00	15.78	27.49	1838.75	126.02	25.29
Kharif Bajra	Area	-3744.00	-68.52	35.69	-707.00	-22.13	28.51	163.00	15.01	44.46	-4288.00	-44.01	29.15
	Production	-1344.00	-35.15	31.57	1550.00	89.59	37.21	789.00	204.40	67.94	995.00	16.75	29.84
	Productivity	741.00	105.86	28.16	777.00	143.36	33.77	586.00	165.07	43.45	701.33	131.75	30.06
Kharif Paddy	Area	389.00	53.51	15.79	131.00	19.55	10.09	-40.00	-2.38	3.50	480.00	15.59	5.58
	Production	1316.00	175.70	42.30	725.00	79.41	34.08	799.00	19.31	12.16	2840.00	48.97	18.26
	Productivity	820.00	79.61	29.49	682.00	50.04	30.87	546.00	22.20	12.42	543.92	28.87	19.32
Sugarcane	Area	-87.03	-18.36	34.41	2823.07	175.89	39.18	1784.30	95.83	25.20	4520.34	114.70	29.59
	Production	-153.00	-0.44	35.82	356226.00	289.83	45.92	201651.0	115.91	32.05	557724.0	168.09	36.42
	Productivity	20.00	27.03	13.77	31.00	40.26	14.59	10.00	10.75	10.87	20.94	24.87	11.80
Rabi crops													
Wheat	Area	1752.00	223.75	30.43	-39.00	-1.88	27.92	-114.00	-15.60	17.18	1599.00	44.61	21.47
	Production	3588.00	329.17	40.95	423.00	13.21	35.25	41.00	3.12	20.70	4052.00	72.27	30.26
	Productivity	453.00	32.54	16.07	237.00	15.32	15.76	399.00	22.18	10.97	553.91	35.41	12.21
Gram	Area	1689.00	229.80	34.59	1077.00	72.87	33.31	-102.00	-14.55	12.36	2664.00	91.42	27.55
	Production	1924.00	405.05	53.92	1311.00	152.98	48.47	155.00	32.91	20.36	3390.00	188.02	44.95
	Productivity	343.00	53.10	22.12	269.00	46.38	21.91	374.00	55.65	16.17	312.24	50.46	18.16
Rabi jowar	Area	-28.00	-3.56	17.52	-7714.00	-44.60	18.46	-414.00	-12.89	12.76	-8156.00	-38.30	15.09
	Production	429.00	60.25	24.36	-453.00	-6.25	45.99	536.00	24.93	27.16	512.00	5.07	35.85
	Productivity	600.00	66.37	14.52	290.00	69.21	66.81	291.00	43.50	23.00	333.55	70.28	24.97

Area in ‘00’ ha, Production in ‘00’ tonnes and Productivity in Kg/ha

Cropping pattern changes of Pune division in Western Maharashtra region of Maharashtra

The fluctuations and variability in area, production and productivity in major crops in Pune division in Western Maharashtra region of Maharashtra was presented in Table 3. In Pune administrative division negative absolute and relative change was observed in respect of kharif bajra, Rabi jowar and wheat. The absolute change for area in Rabi jowar was -7714 hundred ha and relative change -44.60 per cent. The negative relative change in kharif bajra and wheat -22.13 per cent and -1.88 per cent, respectively. The highest absolute change was observed in the area of sugarcane i.e. 2823.07 hundred ha and relative change was 1665.48 per cent in soybean. The absolute and relative change in the area of cotton was 1555 hundred ha and 878.53 per cent, respectively. Similarly, the relative change of area in kharif maize was 438 per cent followed by gram 72.87 per cent. High variability in area was observed in cotton 65.13 per cent followed by soybean 53.77 per cent, kharif maize 44.84 per cent and sugarcane 39.18 per cent, respectively. The lowest variability in area was observed in kharif paddy 10.09 per cent.

Cropping pattern changes of Kolhapur division in Western Maharashtra region of Maharashtra

Table 3 revealed that the fluctuations and variability in area, production and productivity in major crops in Kolhapur division in Western Maharashtra region of Maharashtra. In Kolhapur division, negative absolute and relative change was observed in cotton i.e. -61 hundred ha and -96.83 per cent. In

wheat the negative absolute and relative change in area was -114 hundred ha and -15.60 per cent. Also, in case of gram absolute and relative change in area was -102 hundred ha and -14.55 per cent. The relative change in area were positive for soybean 18.27 per cent, kharif maize 66.85 per cent, kharif bajra 15.01 per cent, sugarcane 95.83 per cent, respectively. In Kolhapur division the highest variability in area was observed in cotton 79.21 per cent followed by kharif bajra 44.46 per cent, kharif maize 42.73 per cent and sugarcane 25.2 per cent, respectively. The lowest variability in area was observed in kharif paddy 3.50 per cent.

Cropping pattern changes of Konkan region of Maharashtra

The fluctuations and variability in area, production and productivity in major crops in Konkan region of Maharashtra was presented in Table 4. In Konkan region absolute and relative changes in area, production and productivity of kharif paddy were negative. The highest absolute and relative change was observed in the production of kharif paddy. The absolute change in the production of kharif paddy was -2563 hundred tonnes and the relative change -23.94 per cent. The absolute and relative change in area was -517.02 hundred ha and -12.41 per cent. The absolute and relative change in productivity was -338 kg ha and -13.15 per cent. The highest variability was observed in the production of paddy i.e. 11.31 per cent followed by productivity 10.72 per cent and for area 4.69 per cent, respectively.

Table 4: Cropping pattern changes of Konkan region of Maharashtra

Crop	Particulars	Konkan		
		Absolute Change	Relative Change	CV (%)
Kharif paddy	Area	-517.02	-12.41	4.69
	Production	-2563.00	-23.94	11.31
	Productivity	-338.00	-13.15	10.72

Area in '00' ha, Production in '00' tonnes and Productivity in Kg/ha

Conclusions

Over the period of study in Vidarbha region area under kharif jowar over base year showed negative absolute and relative change in area. Soybean showed positive absolute and relative change in the area. The cotton crop showed negative absolute and relative change in area. In Marathwada region, over base year, Rabi jowar and wheat showed negative absolute and relative change in area. The absolute and relative change for area in soybean was positive.

In Western Maharashtra region except kharif bajra and Rabi jowar all the selected crop showed positive absolute and relative change in the area over base year. Sugarcane is one of the cash crops grown in Western Maharashtra region, the absolute and relative change in area was positive. In Konkan region absolute and relative change in area of kharif paddy were negative.

Policy Implication

- Since the jowar crop in the Vidarbha region was unstable during the study period, farmers may be encouraged to increase their cultivation through price support mechanisms.
- The area under kharif jowar was declined during last 20 years in Maharashtra. Kharif jowar is a staple food for rural population as well as fodder for the livestock. Therefore, it is necessary to allocate more area invariably under the cultivation of kharif jowar crop through extension activities and by providing high yielding varieties, improved technology and introducing kharif jowar based industries in Maharashtra state.
- Kharif paddy is mono crop in Konkan region, hence the government should form policy for crop diversification to introduce suitable cash crops to avoid mono cropping.
- The global market's persistent price increases and growing demand for organic cotton could encourage the growth of this crop.

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