Identification of efficient cropping zone for major vegetable crops in different districts of Chhattisgarh

ABSTRACT

A study was carried out in the Department of Vegetable Science, IGKV Raipur to identify the efficient cropping zones for major vegetable crops grown in different districts of Chhattisgarh. Production and productivity of the Major Vegetable crops (Tomato, Potato, Chilli, Brinjal, Onion, Cauliflower, Cabbage and Okra) for 6 years (2004-05 to 2010-11) and 8 years (2011-12 to 2018-19) were collected from the Directorate of Horticulture and Farm Forestry (Department of Agriculture, Government of Chhattisgarh) and Directorate of Economics and Statistics, Government of Chhattisgarh. Two indices i.e. Relative Spread Index (RSI) and Relative Yield Index (RYI) were computed and the potential cropping districts for the study crops were identified. The outcome of study conducted from 2004-05 to 2010-11, revealed that out of 18 districts, three, one, four, three, four, two, four and two districts were found most efficient cropping zones (MECZ) for Tomato, Potato, Chilli, Brinjal, Onion, Cauliflower, Cabbage and Okra, respectively. Out of 18 districts, four, six, four, five, five, three, seven and six districts were fall under efficient cropping zones (ECZ) for Tomato, Potato, Chilli, Brinjal, Onion, Cauliflower, Cabbage and Okra, respectively. In Chhattisgarh, among 18 districts, six, five, four, three, three, four, two and five districts were considered as a less efficient cropping zones (LECZ) for Tomato, Potato, Chilli, Brinjal, Onion, Cauliflower, Cabbage and Okra, respectively. Similarly, out of 18 districts of the state, five, six, six, seven, six, nine, five and five districts were categorized under not efficient cropping zones (NECZ) for Tomato, Potato, Chilli, Brinjal, Onion, Cauliflower, Cabbage and Okra, respectively.

Results obtained during 2011-12 to 2018-19 revealed that out of 27 districts, four, three, three, one, six, four, six and two districts were considered as most efficient cropping zones (MECZ) for Tomato, Potato, Chilli, Brinjal, Onion, Cauliflower, Cabbage and Okra, respectively. Similarly, seven, ten, eight, seven, five, five, five and six were under efficient cropping zones (ECZ) for Tomato, Potato, Chilli, Brinjal, Onion, Cauliflower, Cabbage and Okra, respectively. While, five, seven, six, six, six, six, five and eight districts were considered as a less efficient cropping zones (LECZ) for Tomato, Potato, Chilli, Brinjal, Onion, Cauliflower, Cabbage and Okra, respectively. Among 27 districts of the state, eleven, seven, ten, thirteen, ten, eleven, eleven and eleven districts are considered under not efficient cropping zones (NECZ) for Tomato, Potato, Chilli, Brinjal, Onion, Cauliflower, Cabbage and Okra, respectively.

The outcome of analysis of long term data of area and production of vegetable crops grown in different districts of Chhattisgarh indicated that the area and production of

various vegetable crops have been shifted from old districts two new districts during the period of 2004-2010 and 2011-2018.

Keywords: Efficient cropping zones, RSI, RYI, MECZ, LECZ and NECZ

INTRODUCTION

India's diverse climate ensures availability of all varieties of fresh vegetables though out the year. It ranks second in vegetables production in the world, after China. As per National Horticulture Database (Second Advance Estimates) published by National Horticulture Board, during 2019-20, India produced 191.77 million metric tons of vegetables. The area under cultivation of vegetables stood at 10.35 million hectares. The vast production base offers India tremendous opportunities for export. During 2020-21, India exported vegetables worth Rs.4,969.73 crores (667.61 Millions US $).Onions, Mixed Vegetables, Potatoes, Tomatoes, Green Chilli contribute largely to the vegetable export basket. In spite of sizable area under vegetable crops and good amount of production in our country, still the per capita availability is comparatively low as recommended by WHO. So we have to identify the efficient area which are suitable for growing vegetables and thereby we can increase the productivity of vegetables per unit area and time.

Efficient Cropping Zone (ECZ) is a potential area of the respective crops which can identify with the help of calculated Relative Yield Index (RYI) and Relative Spread Index (RSI)which in turn efficient cropping zone for the respective crops **(Veeraputhiran and Kathikeyan 2003**). In crop production, an efficient zone is an area which has suitable soil and climate to obtain the maximum productivity of a crop **(Narayanan and Balasubramanian 2003).** The productivity level of each and every crop is varying from place to place and therefore, identification of efficient cropping zone will be helpful to prepare a strategic plan for optimum use of available resources and obtaining higher yield. On the basis of outcome of this study, we can identify the area suitable for particular crops, if crops not fall an efficient cropping zone then that crop can be replaced by the other suitable crops which have good potential to achieve optimum yield **(Thavaprakaash *et al.* 2008).**

MATERIAL AND METHOD

The data related to area, production and productivity of Tomato, Potato, Chilli, Brinjal, Okra, Onion, Cauliflower and Cabbage crops and total cultivable area in18 districts of Chhattisgarh were collected for 2004–05 to 2010– 2011 (06 years) and 27 districts of Chhattisgarh were collected for 2011-12 to 2018-19 (08 years) from the Directorate of Horticulture, Raipur Chhattisgarh and Directorate of Economics and Statistics, Government of Chhattisgarh. The formula given by **Kanwar (1972)** was used to find out Relative Spread Index (RSI) and Relative Yield Index (RYI) for each crop to identify efficient crop zone for the selected/respective vegetable crops in 18and27 districts of Chhattisgarh. The details are given here under

$$\textbf{RSI} = \frac{\text{Area of particular crop expressed as percentage of total cultivable area in the district}}{\text{Area of crop expressed as percentage to the total cultivable area in the state}} X\ 100$$

Where,

RSI: Relative Spread Index.

$$\textbf{RYI} = \frac{\text{Mean yield of a particular crop in a district (Kg/ha))}}{\text{Mean yield of the crop in the state (Kg/ha)}} \text{ X } 100$$

Where,

RYI: Relative Yield Index

Table1A: Criteria for efficient cropping zone

S. No.	RSI	RYI	Combination of RSI and RYI	Cropping Zone
01	>100(High)	>100(High)	High + High	Most Efficient Cropping Zone (MECZ)
02	<100(Low)	>100(High)	Low + High	Efficient Cropping Zone (ECZ)
03	>100(High)	<100(Low)	High + Low	Less Efficient Cropping Zone (LECZ)
04	<100(Low)	<100(Low)	Low + Low	Not Efficient Cropping Zone (NECZ)

RESULTS

Efficient Cropping Zone for Tomato

During the study period of 2004-2010 (6 Years), results shown in table 1(a) and (b) revealed that out of 18 districts, the district Durg, Mahasamund and Raigarh falls under Most Efficient Cropping Zones (MECZs). The districts Dantewada, Bastar, Kabirdham and Narayanpur were considered as an Efficient Cropping Zones (ECZs) where RSI Value was low and RYI Value was high. Although the productivity of tomato in these districts was high but its spread was low, so efforts should be made to increase the area of tomato crop. The districts Bilaspur, Janjgir, Jashpur, Koriya, Raipur and Surguja comes under Less Efficient Cropping Zone (LECZs). Lastly, district like Bijapur, Dhamtari, Kanker, Korba and Rajnandgaon were reported Under the Not Efficient Cropping Zone (NECZs).

It is quite clear from the table 3 (a) and (b) that during the 8 years of study period (2011-2018) out of 27 districts in Chhattisgarh, only four district viz Durg, Koriya, Narayanpur and Raipur were considered as Most Efficient Cropping Zones (MECZs) as both the value of RSI and RYI were high. Similarly, the districts Balod, Bemetara, Janjgir, Kabirdham, Mahasmund, Mungeli and Sukma considered as Efficient cropping zones (ECZs), where as the district Bilaspur,Jashpur, Kondagaon, Raigarh and Surguja were under Less Efficient Cropping Zone (LECZs). The districts Balodabazar, Balrampur, Bijapur, Dantewada, Dhamtari, Gariyaband, Jagdalpur, Kanker, Korba, Rajnandgaon, Surajpur were considered under Not Efficient Cropping Zone (NECZs).

Table 1B - Shifting of district during study period I 2004 -10 to 2011-18 for Tomato cultivation

S. No.	Category	Study Period I (2004 -10)	Study Period II (2010-18)

1.	MECZ	Durg, Mahasamund and Raigarh	Durg, Koriya, Narayanpur and Raipur
2.	ECZ	Dantewada, Bastar, Kabirdham and Narayanpur	Balod, Bemetara, Janjgir, Kabirdham, Mahasmund, Mungeli and Sukma
3	LECZ	Bilaspur, Janjgir, Jashpur, Koriya, Raipur and Surguja	Bilaspur, Jashpur, Kondagaon, Raigarh and Surguja
4	NECZ	Bijapur, Dhamtari, Kanker, Korba and Rajnandgaon	Balodabazar, Balrampur,Bijapur, Dantewada,Dhamtari, Gariyaband,Jagdalpur, Kanker, Korba,Rajnandgaon,Surajpur

It is clear from Table A, that district Koriya, Narayanpur and Raipur emerged as Most Efficient Cropping Zone for tomato cultivation during 2010-2018

Efficient Cropping Zone for Potato

During the study period of 2004-2010, only one district i.e. Raigarh reported as the Most Efficient Cropping Zone (MECZs), because of the High RSI and RYI value as shown in table 1(a) and (b) for Potato crop. The district Dantewada, Dhamtari, Durg, Jagdalpur, Kabirdham and Raipur comes under Efficient Cropping Zone (ECZs) with low RSI and High RYI. Though the yield potential is good, the spread is low and hence efforts should be made mainly to increase the area of this crop. Under Less Efficient Cropping Zone (LECZs) most of the districts come because for high RSI and low RYI in the district Bilaspur, Jashpur, Korba, Koriya and Sarguja. Out of 18 districts, six districts were Bijapur, Janjgir, Kanker, Mahasmund, Narayanpur and Rajnandgaon which were under Not Efficient Cropping Zone (NECZs) with both low RSI and RYI.

A close observation of table 3 (a) and (b) indicated that the district Jashpur, Raipur and Surajpur were categorized under the Most Efficient Cropping Zone (MECZs) because of high RSI and high RYI value of Potato crop during the study period of 2011-2018. The districts Dantewada, Durg, Jagdalpur, Janjgir, Balod, Bemetara, Kabirdham, Mungeli, Narayanpur and Sukma come under Efficient Cropping Zone (ECZs) with high RYI and low RSI Value. Though the yield potential good in these districts but the area is low and hence efforts should be made to increase the area of this crop with the help of public and private sectors. Out of 27 Districts, Seven Districts, viz., Korba, Koriya, Balrampur, Bilaspur, Kondagaon, Raigarh and Surguja were considered as Less Efficient Cropping Zone (LECZs). Lastly, the district Balodabazar, Bijapur, Dhamtari, Gariyaband, Kanker, Mahasmund and Rajnandgaon were under Not Efficient Cropping Zone (NECZs). In these districts crop diversification is required.

Table 1C - Shifting of district during study period I 2004 -10 to 2011-18 for Potato cultivation

S.N.	Category	Study Period I(2004 -10)	Study Period II(2010-18)

1.	MECZ	Raigarh	Jashpur, Raipur and Surajpur
2.	ECZ	Dantewada, Dhamtari, Durg, Jagdalpur, Kabirdham and Raipur.	Dantewada, Durg,Jagdalpur, Janjgir,Balod, Bemetara,Kabirdham, Mungeli,Narayanpur and Sukma
3	LECZ	Bilaspur, Jashpur, Korba, Koriya and Sarguja.	Korba, Koriya,Balrampur,Bilaspur,Kondagaon, Raigarh and Surguja
4	NECZ	Bijapur, Janjgir, Kanker, Mahasmund, Narayanpur and Rajnandgaon	Balodabazar, Bijapur,Dhamtari, Gariyaband, Kanker,Mahasmund and Rajnandgaon

The district Jashpur, Raipur and Surajpur emerged as Most Efficient Cropping Zone for potato cultivation during 2010-2018

Efficient Cropping Zone for Chilli

It is quite clear from the table 1(a) and 1(b) that the outcome of analysis of 06 years data (2004-2010) of area and production of Chilli crop revealed that districts Bilaspur, Kabirdham, Korba and Surguja were considered as Most Efficient Cropping Zone (MECZs) because of the high RSI and RYI Value. Here high-tech production technology can be introduced to harness potential yield of the crop. The districts Bijapur, Dhamtari, Janjgir and Kanker were under Efficient Cropping Zone (ECZs) with low RSI and high RYI values. The districts Jashpur, Koriya, Narayanpur and Raigarh were considered as Less Efficient Cropping Zone (LECZs) where the RSI value was high but RYI low values. Among 18 distircts Dantewada, Durg, Jagdalpur, Mahasamund, Raipur and Rajnandgaon under Not Efficient Cropping Zone (NECZs) where both RSI and RYI values were below 100 percent.

During the period of 2011-2018, the district Kabirdham, Korba and Surguja reported as Most Efficient Cropping Zone (MECZs) which has high RSI and RYI value for Chilli cultivation. The districts Dhamtari, Balrampur, Jagdalpur, Kanker, Mahasmund, Mungeli, Raipur and Surajpur were categorized under Efficient Cropping Zone (ECZs) with low RSI and high RYI values which indicated that in these districts area under Chilli cultivation is less but production is high. The outcome of 27 districts revealed that the, districts Bilaspur, Durg, Koriya, Kondagaon, Narayanpur and Raigarh falls under Less Efficient Cropping Zone (LECZs), while the district Sukma, Gariyaband, Bemetara, Balod, Balodabazar, Bijapur, Dantewada, Janjgir, Jashpur and Rajnandgaon were considered as Not Efficient Cropping Zone (NECZs) as shown in the table 3(a) and (b).

Table 1D - Shifting of district during study period I 2004 -10 to 2011-18 for Chilli cultivation

S. N.	Category	Study Period I(2004 -10)	Study Period II(2010-18)

1	MECZ	Bilaspur,Kabirdham,Korba and Surguja	Kabirdham,Korba and Surguja
2	ECZ	Bijapur,Dhamtari,Janjgir and Kanker	Dhamtari, Balrampur,Jagdalpur, Kanker,Mahasmund,Mungeli, Raipur and Surajpur
3.	LECZ	Jashpur,Koriya,Narayanpur and Raigarh	Bilaspur, Durg,Koriya,Kondagaon,Narayanpur and Raigarh
4.	NECZ	Mahasamund,Raipur and Rajnandgaon	Sukma, Gariyaband,Bemetara, Balod,Balodabazar, Bijapur,Dantewada, Janjgir,Jashpur and Rajnandgaon

Above Table C indicates that only one district *i.e.* Bilaspur which has been shifted from most efficient cropping zone to efficient cropping zone otherwise there was no change in MECZ category

Efficient Cropping Zone for Brinjal

A close observation of table 1 (a) and (b) indicated that the district Durg, Narayanpur and Korba were categorized under Most Efficient Cropping Zone (MECZs) for Brinjal cultivation during the period of 2004-2010 (06 years) because of high RSI and RYI Values. Out of 18 districts, five districts viz., Dantewada, Dhamtari, Jagdalpur, Mahasamund and Raigarh, fell under Efficient Cropping Zone (ECZs) as RSI value is low and RYI. The districts Kanker, Raipur and Sarguja were considered as Less Efficient Cropping Zone (LECZs) because of high RSI values and low RYI values. Out of 18 districts, seven districts (Bijapur, Bilaspur, Janjgir,Jashpur, Kabirdham, Koriya and Rajnandgaon) comes under Not Efficient Cropping Zone (NECZs) wherein RSI and RYI values both were low.

It is quite clear from the table 3 (a) and (b) that during the period of 2011 to 2018 the district Durg recorded high RSI and high RYI values therefore it is considered as Most efficient cropping zone (MECZs). Out of 27 districts, seven districts Balod, Bemetara, Janjgir, Kabirdham, Koriya, Mungeli and Sukma exhibited low RSI and high RYI values and were classified as Efficient Cropping Zone (ECZs). In contrast to this, 6 districts viz Surguja, Raipur, Narayanpur, Korba, Kondagaon and Bilaspur where in area under Brinjal crop was more but the production is comparatively low, hence they are categorized under Less Efficient Cropping Zone (LECZs). Among 27 districts, 13 viz., districts Balodabazar, Balrampur, Bijapur, Dantewada, Dhamtari, Gariyaband, Jagdalpur, Jashpur, Kanker, Mahasmund, Raigarh, Surajpur and Rajnandgaon fells under Not Efficient Cropping Zone (NECZs) due to less area and low production.

Table 1E - Shifting of district during study period I 2004 -10 to 2011-18 for Brinjal cultivation

S.No.	Category	Study Period I(2004-10)	Study Period II(2010-18)
1.	MECZ	Durg, Narayanpur and Korba	Durg
2.	ECZ	Dantewada, Dhamtari, Jagdalpur, Mahasamund and Raigarh	Balod, Bemetara, Janjgir, Kabirdham, Koriya, Mungeli andSukma
3.	LECZ	Kanker, Raipur and Sarguja	Surguja, Raipur, Naryanpur, Korba, Kondagaon and Bilaspur.
4.	NECZ	Bijapur, Bilaspur,Janjgir, Jashpur,Kabirdham,Koriya and Rajnandgaon	Balodabazar, Balrampur, Bijapur,Dantewada,Dhamtari,Gariya band,Jagdalpur, Jashpur,Kanker, Mahasmund, Raigarh, Surajpur and Rajnandgaon

It is clear from the above Table D that there has been changes in most efficient cropping zone and Narayanpur and Korba district shifted from MECZ to LECZ while, only one district, Durg remain in same category i.e. under MECZ.

Efficient Cropping Zone for Onion

The outcome of analysis of data (2004-2010) of Area and Production of onion crop as shown in table 2(a) and (b) revealed that the district Dhamtari, Mahasmund, Raigarh and Sarguja reported higher values of RSI and RYI and were considered under Most efficient cropping zone (MECZs). The district Dantewada, Durg, Jagdalpur, Janjgir and Raipur come under Efficient Cropping Zone (ECZs) with low RSI and high RYI Values. Although the yield potential was good, but the spreadi slow and hence efforts should be made to increase the area of this crop. Out of 27 districts, three districts viz., Korba, Koriya and Narayanpur were considered as Less Efficient Cropping Zone (LECZs). Among 27 districts, six viz., districts Bijapur, Bilaspur, Jashpur, Kabirdham, Kanker and Rajnandgaon were categorized under Not Efficient Cropping Zone(NECZs).

The perusal of table 4 (a) and (b) indicated that the districts Balrampur, Durg, Kanker, Koriya, Narayanpur and Raipur fell under Most Efficient Cropping Zone (MECZs) because ofhigh RSI and RYI value. Out of 27 districts, five districts viz., Balod, Bemetara, Gariyaband,Janjgir and Mungeli comes under Efficient Cropping Zone (ECZs) because RSI value was low and RYI Value was high. High Value of RSI and low RYI Value obtained through analysis indicated that the districts Kondagaon, Korba, Mahasamund, Raigarh, Surajpur and Surguja were considered as Less Efficient Cropping Zone (LECZs). Among 27 districts, 10 districts viz., Balodabazar, Bijapur, Bilaspur, Dantewada, Dhamtari, Jagdalpur, Jashpur, Kabirdham, Sukma and Rajnandgaon were categorized under Not Efficient Cropping Zone (NECZs).

Table 1F - Shifting of district during study period I 2004 -10 to 2011-18 for Onion cultivation

S. N.	Category	Study Period I(2004-10)	Study Period II(2010-18)
1	MECZ	Dhamtari, Mahasmund, Raigarh and Sarguja	Balrampur, Durg, Kanker, Koriya, Narayanpur and Raipur
2	ECZ	Dantewada, Durg, Jagdalpur, Janjgir and Raipur	Balod, Bemetara, Gariyaband,Janjgir and Mungeli
3	LECZ	Korba, Koriya, Narayanpur	Kondagaon, Korba, Mahasamund, Raigarh, Surajpur and Surguja
4	NECZ	Bijapur, Bilaspur, Jashpur, Kabirdham, Kanker and Rajnandgaon	Balodabazar, Bijapur, Bilaspur, Dantewada, Dhamtari, Jagdalpur, Jashpur, Kabirdham, Sukma and Rajnandgaon

It is clear from above Table E that District Balrampur, Durg, Kanker, Koriya,Narayanpur and Raipur emerge as most efficient cropping zone for onion cultivation during 2010-2018.

Efficient Cropping Zone for Cauliflower

The results shown in table 2 (a) and (b) indicate that during 2004-2010 the districts Durg and Narayanpur where high RSI and RYI Value recorded were considered as the Most Efficient Cropping Zone (MECZs). Out of 18 districts, three districts Dhamtari, Kabirdham and Raigarh categorized under Efficient Cropping Zone (ECZs) with low RSI values and high RYI values. Among 18 districts, the district Kanker, Korba, Koriya and Raipur considered as Less Efficient Cropping Zone (LECZs) because of high RSI and low RYI Values. Considering the low area and low production, the districts Bijapur, Bilaspur, Dantewada, Jagdalpur, Janjgir, Jashpur, Mahasmund, Rajnandgaon and Sarguja fell under Not Efficient Cropping Zone (NECZs).

It is quite clear from the table 4 (a) and (b) that the districts Raipur, Kondagaon, Durg, Bemetara, Balod were considered as the Most Efficient Cropping Zone (MECZs) with high RSI andhigh RYI values for Cauliflower cultivation during the period of 2011-2018. Among 27 districts,5 districts Balodabazar, Janjgeer, Kabirdham, Mungeli, Sukma fall under Efficient CroppingZone (ECZs) with low RSI values and high RYI Values. Out of 27 districts, six districts Bilaspur, Korba, Koriya, Narayanpur, Surajpur and Surguja were categorized under Less Efficient Cropping Zone (LECZs) where the districts registered high RSI and low RYI values. Among 27 distircts, 11 distircts Balrampur, Bijapur, Dhamtari, Gariyaband, Kanker, Dantewada, Jagdalpur, Jashpur, Korba, Mahasamund, Raigarh and Rajnandgaon come under Not Efficient Cropping Zone (NECZs) where area and production of cauliflower was below 100%.

Table 1G- Shifting of district during study period I 2004 -10 to 2011-18 for Cauliflower

cultivation

S. N.	Category	Study Period I(2004-10)	Study Period II(2011-18)
1	MECZ	Durg and Narayanpur	Raipur, Kondagaon, Durg, Bemetara, Balod
2	ECZ	Dhamtari, Kabirdham and Raigarh	Balodabazar, Janjgeer, Kabirdham, Mungeli, Sukma
3	LECZ	Kanker, Korba, Koriya and Raipur	Bilaspur, Korba, Koriya, Narayanpur, Surajpur and Surguja
4.	NECZ	Bijapur, Bilaspur, Dantewada, Jagdalpur, Janjgir, Jashpur, Mahasmund, Rajnandgaon and Sarguja	Balrampur, Bijapur, Dhamtari, Kanker, Gariyab and Dantewada, Jagdalpur, Jashpur, Korba, Mahasamund, Raigarh and Rajnandgaon

Above table F indicated that districts Raipur, Kondagaon, Durg, Bemetara, Balod considered as most efficient cropping zone for cauliflower cultivation during 2011-2018

Efficient Cropping Zone for Cabbage

A close observation of table 2(a) and (b) indicated that the district Durg, Korba, Narayanpur and Raigarh fell under Most efficient cropping zone (MECZs) because of high value of RSI and RYI during 2004-2010. Out of 18 districts, seven districts Dantewada, Dhamtari, Jagdalpur, Kabirdham, Kanker, Mahasmund and Sarguja exhibited low area under cabbage cultivation with high production and were classified as Efficient Cropping Zone (ECZs). In contrast to this, 2 districts viz Bilaspur, Koriya, were area under Cabbage cultivation was more but the production was low, categorized under Less Efficient Cropping Zone (LECZs). Among 18 districts, 5 districts Bijapur, Janjgir, Jashpur, Raipur and Rajnandga on considered as Not Efficient Cropping Zone (NECZs) due to both less spread and low productivity.

During the study period of 2011 to 2018 table 4 (a) and (b) indicates that six districts viz., Balod, Bemetara, Durg, Korba, Narayanpur, Raipur, considered as Most Efficient Cropping Zone (MECZs), mainly because of higher value registered for RSI and RYI. Among 27 districts, five districts viz., Balodabazar, Dantewada, Janjgir, Mungeli and Sukma were categorized under Efficient Cropping Zone (ECZs) with low RSI and high RYI values. Under Less Efficient Cropping Zone (LECZs) most of the districts come because for high area and low yield. These districts are Bilaspur, Kondagaon, Koriya Surajpurand Surguja. Out of 27 districts, 11 districts (Balrampur, Bijapur, Dhamtari, Gariyaband, Janjgir, Jagdalpur, Jashpur, Kanker, Mahasamund, Raigarh and Rajnandgaon) fell under Not Efficient Cropping Zone (NECZs) with both low RSI and RYI values.

Table 1H - Shifting of district during study period I 2004 -10 to 2011-18 for Cabbage

cultivation

S. No.	Category	Study Period I (2004-10)	Study Period II (2010-18)
1	MECZ	Durg, Korba, Narayanpur and Raigarh	Balod, Bemetara, Durg, Korba, Narayanpur,Raipur.
2	ECZ	Dantewada, Dhamtari, Jagdalpur, Kabirdham, Kanker, Mahasmund and Sarguja	Balodabazar, Dantewada, Janjgir, Mungeli and Sukma
3	LECZ	Bilaspur, Koriya,	Bilaspur, Kondagaon, Koriya, Surajpur and Surguja
4.	NECZ	Bijapur, Janjgir, Jashpur, Raipur and Rajnandgaon	Balrampur, Bijapur, Dhamtari, Kabirdham, Gariyaband, Janjgir, Jagdalpur, Jashpur, Kanker, Mahasmund, Raigarh and Rajnandgaon

It is quite clear from the above Table G that for profitable cultivation of cabbage the districts viz., Balod, Bemetara, Durg, Korba, Narayanpur and Raipur were considered as most efficient cropping zone during 2010-2018

Efficient Cropping Zone for Okra

The results of analysis for the period of 2004-2010 as shown in table 2(a) and (b) indicates that out of 18 districts, two districts viz., Durg and Korba were considered as Most Efficient Cropping Zone (MECZs) because the RSI and RYI values were high. The districts Bijapur, Dantewada, Dhamtari, Jagdalpur, Kabirdham and Raigarh were categorized under Efficient Cropping Zone (ECZs) as RSI Value was low and RYI was high. Out of 18 districts, five districts viz., Kanker, Koriya, Narayanpur, Raipur and Surguja were considered as Less Efficient Cropping Zone (LECZs) because of high RSI and low RYI Values. The districts Bilaspur, Janjgir, Jashpur, Mahasamund and Raigarh were Categorized under Not Efficient Cropping Zone (NECZs) because RSI and RYI Value were below 100%.

It is quite clear from the table 4 (a) and (b) that the district Dhamtari and Surguja were categorized under Most Efficient Cropping Zone (MECZs) for Okra crop during the study period of 2011-2018 because of its higher RSI and RYI Value. Based on low RSI and high RYI Value, among 27 districts, six districts (Balodabazar, Kabirdham, Mungeli, Raigarh, Sukma and Surajpur) were kept under Efficient Cropping Zone (ECZs).The districts Balrampur, Durg, Bilaspur, Kondagaon, Korba, Koriya, Narayanpur and Raipur were considered as Less Efficient Cropping Zone (LECZs) because of its high RSI and low RYI values. Out of 27 districts, 11 districts (Balod, Bemetara, Bijapur, Dantewada, Gariyaband, Jagdalpur, Janjgir, Jashpur, Korba, Mahasamund and Rajnandgaon) comes under Not Efficient Cropping Zone (NECZs) because of low RSI and RYI Values.

Table 1I - Shifting of district during study period I 2004 -10 to 2011-18 for Okra cultivation

S. N.	Category	Study Period I(2004-10)	Study Period II(2011-18)
1	MECZ	Durg and Korba	Dhamtari and Surguja
2	ECZ	Bijapur, Dantewada, Dhamtari, Jagdalpur, Kabirdham and Raigarh	Balodabazar, Kabirdham, Mungeli, Raigarh, Sukma and Surajpur
3	LECZ	Kanker, Koriya, Narayanpur, Raipur and Surguja	Balrampur, Durg, Bilaspur, Kondagaon, Korba, Koriya, Narayanpur and Raipur
4.	NECZ	Bilaspur, Janjgir,Jashpur, Mahasmund, Rajnandgaon	Balod, Bemetara,Bijapur, Dantewada, Gariyaband, Kanker, Jagdalpur, Janjgir, Jashpur, Korba, Mahasamund and Rajnandgaon

During 2010-2018 the district Dhamatri and Surguja indentify as a most efficient cropping zone for cultivation of okra crops.

DISCUSSION

Many studies on quantitative analysis of efficient cropping zone done by several researchers such as **Sankar and Kowshika (2020)** who reported that the trend analysis of potato production was decreasing till early 21st century and thereafter increasing gradually with respect to cropping area and Chilli showed reduction in production over the years. They also revealed that the Nilgiris is the sole district which fell under Most Efficient Cropping Zone (MECZ), while district Dindigul and Krishnagiri were considered as efficient cropping zone (ECZ) for potato. Among 31 districts, 28 districts were categorized under Not Efficient Cropping Zone (NECZ) in Tamil Nadu. They also found that the district Virudhunagar has been the Most Efficient Cropping Zone (MECZ) for Chilli crop, while district Ramanathapuram, Sivagangai and Thoothukkudi were identified as potential efficient zone (ECZs) in Tamil Nadu. Out of 31 districts, 23 districts were considered as Not Efficient Cropping Zone (NECZ) in Tamil Nadu. Among 31 districts of Tamil Nadu, four districts (Tiruppur, Cuddalore, Ariyalu and Kanniyakumari) were categorized under Highly Inefficient Cropping Zone (HICZ) for potato crop. **Otung and Aniekan (2016)** concluded that the ten states (Akwa Ibom, Benue, Cross River, Enugu, Imo, Kaduna, Kogi, Oyo, Rivers and Taraba) out of thirty one (31) states spread across the six-political zones were identified as the most efficient cropping zones (MECZ) for cassava production. The outcome of 31 states revealed that, only two states Ogun and Ondo fell under Efficient Cropping Zone (ECZ), while only one state Delta was considered as Less Efficient Cropping Zone (LECZ). Two states Anambra and Osun were categorized under Not Efficient Cropping Zone (NECZ). Among 31 states, 16 states (Abuja, Abia, Adamawa, Bauchi, Bayelsa, Ebonyi, Edo, Ekiti, Gombe, Kwawa, Lagos, Nassarawa, Niger,

Plateau, Sokoto and Yobe) were considered as Highly Inefficient Cropping Zone (HICZ) in the Nigeria country. South-South geopolitical zone of the country had the highest number of states three (3) with the most efficient cropping zone; South-East was next with two (2) states. Others zones had one each. These were potentially mega-cassava producing hub in Nigeria.

CONCLUSION

On the basis of coverage of area and status of productivity of respective crops, there were four category of Cropping Zone. They are MECZs, ECZs, LECZs, NECZs, we have analyzed the area and productivity of important vegetable crops grown in different districts of Chhattisgarh and accordingly crop wise results have been shown in this paper. In First category those districts fell where RSI and RYI Values were high. In this zone, involvement of players of public and private sectors is required for use of advance high technology to increase production and productivity per unit area and time, including processing and value addition activities, ensuring more production and good quality produce as well as high net returns. The district belongs to 2nd category where the area of respective crop cultivation was comparatively low and productivity was high which requires activity through which we can increase the area of respective crops. The districts belong to 3rd category where the area of respective crop was high but productivity was low need to be addressed through which we can increase production by optimal use of advance production technology and inputs. The district which fell under 4th category where the area and productivity of respective crops are below 100% where crop diversification is prime need so that we can utilize the available resources of its optimum level and farmers may get maximum return from their resources and efforts.

The Results clearly indicated that the area and productivity of various vegetable crops grown in different districts has been shifted from the period of 2004-10 to 2011-2018. The possible reason might be due to formation of new districts, change in prevailing agro-climatic condition, physiographic consideration, socio economic consideration, availability of advance production technology as well as production inputs, focused implementation of Government policies, availability of facilities for processing and value addition and proper market linkages and demand etc.

Table 2 (a) Classification of Computed Valuation of Cropping Zone (2004-2010) of Tomato, Potato, Chilli and Brinjal

	2004-2010	TOMATO		POTATO		CHILLY		BRINJAL	
S. NO.	districts name	RSI	RYI	RSI	RYI	RSI	RYI	RSI	RYI
1	Bijapur	26.5	99.5	4.2	39.6	36.2	107.4	47.0	84.9
2	Bilaspur	231.0	73.7	102.6	91.2	158.0	107.0	91.6	81.5
3	Dantewara	45.6	146.4	6.6	128.1	55.2	63.7	46.0	101.9
4	Dhamtari	79.8	93.1	37.4	108.7	79.5	114.5	86.2	111.3
5	Durg	130.9	179.9	31.3	170.5	81.2	51.1	155.8	135.7
6	Jagdalpur	49.8	117.8	22.4	123.2	81.2	98.3	69.4	135.1
7	Janjgir	106.6	88.7	46.6	84.3	92.8	167.6	96.9	98.5
8	Jashpur	223.2	93.5	160.0	93.1	115.1	77.6	52.2	73.5
9	Kabirdham	44.6	110.7	10.9	127.0	121.0	178.0	63.8	92.6
10	Kanker	86.9	82.1	30.2	77.1	92.7	117.2	137.4	80.7
11	Korba	80.6	98.6	149.7	97.6	250.4	158.1	160.0	108.8
12	Koriya	132.1	73.7	295.8	96.7	242.0	71.2	88.6	88.3
13	Mahasmund	21.2	72.3	16.2	67.2	49.5	63.4	28.3	103.7
14	Narayanpur	95.2	105.8	42.1	88.2	164.6	54.9	158.4	108.0
15	Raigarh	171.2	113.7	197.7	118.8	163.3	82.9	91.9	121.1
16	Raipur	106.2	82.2	79.4	102.1	40.1	83.9	135.8	98.5
17	Rajnandgaon	57.9	90.4	34.1	87.7	75.6	78.9	54.5	93.2
18	Sarguja	110.6	78.0	401.8	99.0	121.5	124.4	120.9	83.0

Table 2 (b) Classification of Cropping Zone (2004-2010) of Tomato, Potato, Chilli and Brinjal

	2004-2010	TOMATO			POTATO			CHILLY			BRINJAL		
S. NO.	districts name	RSI	RYI	Cropping Zone	RSI	RYI	Cropping Zone	RSI	RYI	Cropping Zone	RSI	RYI	Cropping Zone
1	Bijapur	L	L	NECZ	L	L	NECZ	L	H	ECZ	L	L	NECZ
2	Bilaspur	H	L	LECZ	H	L	LECZ	H	H	MECZ	L	L	NECZ
3	Dantewara	L	H	ECZ	L	H	ECZ	L	L	NECZ	L	H	ECZ
4	Dhamtari	L	L	NECZ	L	H	ECZ	L	H	ECZ	L	H	ECZ
5	Durg	H	H	MECZ	L	H	ECZ	L	L	NECZ	H	H	MECZ
6	Jagdalpur	L	H	ECZ	L	H	ECZ	L	L	NECZ	L	H	ECZ
7	Janjgir	H	L	LECZ	L	L	NECZ	L	H	ECZ	L	L	NECZ
8	Jashpur	H	L	LECZ	H	L	LECZ	H	L	LECZ	L	L	NECZ
9	Kabirdham	L	H	ECZ	L	H	ECZ	H	H	MECZ	L	L	NECZ
10	Kanker	L	L	NECZ	L	L	NECZ	L	H	ECZ	H	L	LECZ
11	Korba	L	L	NECZ	H	L	LECZ	H	H	MECZ	H	H	MECZ
12	Koriya	H	L	LECZ	H	L	LECZ	H	L	LECZ	L	L	NECZ
13	Mahasmund	L	L	MECZ	L	L	NECZ	L	L	NECZ	L	H	ECZ
14	Narayanpur	L	H	ECZ	L	L	NECZ	H	L	LECZ	H	H	MECZ
15	Raigarh	H	H	MECZ	H	H	MECZ	H	L	LECZ	L	H	ECZ
16	Raipur	H	L	LECZ	L	H	ECZ	L	L	NECZ	H	L	LECZ
17	Rajnandgaon	L	L	NECZ	L	L	NECZ	L	L	NECZ	L	L	NECZ
18	Sarguja	H	L	LECZ	H	L	LECZ	H	H	MECZ	H	L	LECZ

Table 3 (a) Classification of Computed Valuation of Cropping Zone (2004-2010) of Onion, Cauliflower, Cabbage and Okra

	2004-2010	ONION		CAULIFLOWER		CABBAGE		OKRA	
S. NO.	districts name	RSI	RYI	RSI	RYI	RSI	RYI	RSI	RYI
1	Bijapur	24.2	65.0	4.9	98.2	17.3	83.3	40.1	102.5
2	Bilaspur	41.1	95.5	81.0	93.7	106.7	87.8	97.7	77.9
3	Dantewara	11.8	112.2	15.1	96.0	16.1	113.9	49.6	104.4
4	Dhamtari	123.6	105.2	67.9	115.6	94.1	104.7	87.6	107.8
5	Durg	71.6	162.8	211.0	107.2	234.7	119.0	145.6	105.7
6	Jagdalpur	31.5	187.5	82.4	94.5	88.8	120.7	50.8	113.5
7	Janjgir	72.9	115.9	73.1	94.7	92.9	91.2	90.5	72.4
8	Jashpur	61.1	95.6	28.9	96.4	61.9	76.1	43.5	87.7
9	Kabirdham	92.6	95.3	38.8	123.9	30.4	113.8	44.4	103.2
10	Kanker	97.0	88.2	128.4	88.3	58.5	103.7	107.1	91.8
11	Korba	157.4	73.5	172.4	96.6	226.4	102.3	319.8	139.2
12	Koriya	234.7	75.3	141.3	72.7	133.9	87.3	177.8	96.8
13	Mahasmund	55.9	48.2	27.1	93.8	29.8	105.8	20.4	86.1
14	Narayanpur	134.0	78.4	183.0	127.9	132.4	103.8	147.8	95.8
15	Raigarh	239.0	121.8	71.1	123.9	124.4	113.1	96.3	147.3
16	Raipur	67.2	109.5	146.7	98.2	83.4	89.7	134.3	89.1
17	Rajnandgaon	57.0	65.9	41.3	94.9	19.8	78.4	51.8	99.1
18	Sarguja	279.1	104.0	99.0	83.5	87.3	105.4	115.4	79.8

Table 3 (b) Classification of Cropping Zone (2004-2010) of Onion, Cauliflower, Cabbage andOkra

	2004-2010	ONION			CAULIFLOWER			CABBAGE			OKRA		
S. NO.	districts name	RSI	RYI	Cropping Zone	RSI	RYI	Cropping Zone	RSI	RYI	Cropping Zone	RSI	RYI	Cropping Zone
1	Bijapur	L	L	NECZ	L	L	NECZ	L	L	NECZ	L	H	ECZ
2	Bilaspur	L	L	NECZ	L	L	NECZ	H	L	LECZ	L	L	NECZ
3	Dantewara	L	H	ECZ	L	L	NECZ	L	H	ECZ	L	H	ECZ
4	Dhamtari	H	H	MECZ	L	H	ECZ	L	H	ECZ	L	H	ECZ
5	Durg	L	H	ECZ	H	H	MECZ	H	H	MECZ	H	H	MECZ
6	Jagdalpur	L	H	ECZ	L	L	NECZ	L	H	ECZ	L	H	ECZ
7	Janjgir	L	H	ECZ	L	L	NECZ	L	L	NECZ	L	L	NECZ
8	Jashpur	L	L	NECZ	L	L	NECZ	L	L	NECZ	L	L	NECZ
9	Kabirdham	L	L	NECZ	L	H	ECZ	L	H	ECZ	L	H	ECZ
10	Kanker	L	L	NECZ	H	L	LECZ	L	H	ECZ	H	L	LECZ
11	Korba	H	L	LECZ	H	L	LECZ	H	H	MECZ	H	H	MECZ
12	Koriya	H	L	LECZ	H	L	LECZ	H	L	LECZ	H	L	LECZ
13	Mahasmund	L	L	MECZ	L	L	NECZ	L	H	ECZ	L	L	NECZ
14	Narayanpur	H	L	LECZ	H	H	MECZ	H	H	MECZ	H	L	LECZ
15	Raigarh	H	H	MECZ	L	H	ECZ	H	H	MECZ	L	H	ECZ
16	Raipur	L	H	ECZ	H	L	LECZ	L	L	NECZ	H	L	LECZ
17	Rajnandgaon	L	L	NECZ	L	L	NECZ	L	L	NECZ	L	L	NECZ
18	Sarguja	H	H	MECZ	L	L	NECZ	L	H	ECZ	H	L	LECZ

Table 4 (a) Classification of Computed Valuation of Cropping Zone (2011-2018) of Tomato, Potato, Chilli and Brinjal

	2011-2018	TOMATO		POTATO		CHILLY		BRINJAL	
S. NO.	districts name	RSI	RYI	RSI	RYI	RSI	RYI	RSI	RYI
1	Balod	74.9	152.8	14.6	132.0	26.2	43.9	78.4	140.9
2	Balodabazar	46.3	82.3	45.0	90.6	29.1	51.7	82.1	97.1
3	Balrampur	87.8	91.3	240.8	92.7	79.1	127.9	91.8	91.0
4	Bemetara	69.1	175.9	32.9	158.2	46.8	40.0	67.3	137.6
5	Bijapur	21.1	44.5	8.7	26.7	11.2	87.0	22.4	55.6
6	Bilaspur	276.1	73.6	264.7	73.7	180.8	93.5	105.6	70.6
7	Dantewada	43.9	77.1	16.1	138.4	47.0	98.5	35.0	87.9
8	Dhamtari	71.0	56.2	32.7	57.4	76.9	114.3	95.0	81.0
9	Durg	332.9	135.3	81.8	158.9	131.3	44.9	335.8	138.6
10	Gariyaband	10.7	90.2	14.4	98.3	12.5	96.5	19.4	87.9
11	Jagdalpur	45.4	77.9	17.6	107.9	85.0	141.2	70.9	89.0
12	Janjgeer	79.0	118.1	41.4	115.4	56.8	91.3	77.2	111.0
13	Jashpur	197.6	92.4	137.6	106.1	95.1	93.0	21.1	91.6
14	Kabirdham	49.6	108.9	11.0	126.6	239.4	147.5	80.3	110.0
15	Kanker	61.2	62.4	33.1	72.6	34.2	118.8	98.0	80.9
16	Kondagoan	218.5	66.0	109.7	70.7	227.8	89.4	443.8	80.7
17	Korba	66.3	91.1	151.3	76.1	268.3	100.1	141.5	98.7
18	Koria	127.4	101.6	268.7	98.0	225.4	97.5	98.3	114.3
19	Mahasamund	52.6	123.5	39.8	73.7	91.0	109.4	88.1	84.3
20	Mungeli	85.0	166.8	81.0	101.9	47.8	127.8	36.2	166.1
21	Narayanpur	103.8	104.6	51.9	115.2	152.4	132.7	181.2	72.7
22	Raigarh	125.9	91.0	148.0	99.7	235.1	94.3	73.9	91.3
23	Raipur	181.7	103.5	207.0	103.1	49.0	107.7	255.1	97.0
24	Rajnandgoan	48.4	70.1	56.9	73.6	66.0	98.5	64.4	83.3
25	Sukma	13.5	168.0	4.2	138.9	38.0	78.6	13.6	167.0
26	Surajpur	61.3	90.1	214.7	103.3	90.6	136.4	68.7	86.4
27	Surguja	120.0	84.9	482.5	90.2	188.8	137.8	142.1	87.6

Table 4 (b) Classification of Cropping Zone (2011-2018) of Tomato, Potato, Chilli and Brinjal

S.	2011-2018	TOMATO			POTATO			CHILLY			BRINJAL		
NO.	districts name	RSI	RYI	Cropping Zone	RSI	RYI	Cropping Zone	RSI	RYI	Cropping Zone	RSI	RYI	Cropping Zone
1	Balod	L	H	ECZ	L	H	ECZ	L	L	NECZ	L	H	ECZ
2	Balodabazar	L	L	NECZ	L	L	NECZ	L	L	NECZ	L	L	NECZ
3	Balrampur	L	L	NECZ	H	L	LECZ	L	H	ECZ	L	L	NECZ
4	Bemetara	L	H	ECZ	L	H	ECZ	L	L	NECZ	L	H	ECZ
5	Bijapur	L	L	NECZ	L	L	NECZ	L	L	NECZ	L	L	NECZ
6	Bilaspur	H	L	LECZ	H	L	LECZ	H	L	LECZ	H	L	LECZ
7	Dantewada	L	L	NECZ	L	H	ECZ	L	L	NECZ	L	L	NECZ
8	Dhamtari	L	L	NECZ	L	L	NECZ	L	H	ECZ	L	L	NECZ
9	Durg	H	H	MECZ	L	H	ECZ	H	L	LECZ	H	H	MECZ
10	Gariyaband	L	L	NECZ	L	L	NECA	L	L	NECZ	L	L	NECZ
11	Jagdalpur	L	L	NECZ	L	H	ECZ	L	H	ECZ	L	L	NECZ
12	Janjgeer	L	H	ECZ	L	H	ECZ	L	L	NECZ	L	H	ECZ
13	Jashpur	H	L	LECZ	H	H	MECZ	L	L	NECZ	L	L	NECZ
14	Kabirdham	L	H	ECZ	L	H	ECZ	H	H	MECZ	L	H	ECZ
15	Kanker	L	L	NECZ	L	L	NECA	L	H	ECZ	L	L	NECZ
16	Kondagoan	H	L	LECZ	H	L	LECZ	H	L	LECZ	H	L	LECZ
17	Korba	L	L	NECZ	H	L	LECZ	H	H	MECZ	H	L	LECZ
18	Koria	H	H	MECZ	H	L	LECZ	H	L	LECZ	L	H	ECZ
19	Mahasamund	L	H	ECZ	L	L	NECZ	L	H	ECZ	L	L	NECZ
20	Mungeli	L	H	ECZ	L	H	ECZ	L	H	ECZ	L	H	ECZ
21	Narayanpur	H	H	MECZ	L	H	ECZ	H	H	LECZ	H	L	LECZ
22	Raigarh	H	L	LECZ	H	L	LECZ	H	L	LECZ	L	L	NECZ
23	Raipur	H	H	MECZ	H	H	MECZ	L	H	ECZ	H	L	LECZ
24	Rajnandgoan	L	L	NECZ	L	L	NECZ	L	L	NECZ	L	L	NECZ
25	Sukma	L	H	ECZ	L	H	ECZ	L	L	NECZ	L	H	ECZ
26	Surajpur	L	L	NECZ	H	H	MECZ	L	H	ECZ	L	L	NECZ
27	Surguja	H	L	LECZ	H	L	LECZ	H	H	MECZ	H	L	LECZ

Table 5 (a) Classification of Computed Valuation of Cropping Zone (2011-2018) of Onion, Cauliflower, Cabbage and Okra

	2011-18	ONION		CAULIFLOWER		CABBAGE		OKRA	
S. NO.	districts name	RSI	RYI	RSI	RYI	RSI	RYI	RSI	RYI
1	Balod	44.6	129.1	114.4	112.9	147.4	113.3	63.0	61.7
2	Balodabazar	50.5	55.3	60.8	110.1	42.5	111.8	51.5	117.9
3	Balrampur	159.2	90.9	62.5	91.1	72.2	87.2	106.9	80.1
4	Bemetara	49.4	123.0	100.8	111.2	116.5	107.6	81.1	78.3
5	Bijapur	80.0	57.1	5.8	66.0	14.7	53.1	27.6	83.4
6	Bilaspur	36.9	95.0	110.9	80.6	122.9	77.3	141.3	69.7
7	Dantewada	37.6	89.7	21.9	95.0	28.4	101.6	66.2	82.1
8	Dhamtari	77.1	93.4	70.5	79.1	76.0	76.1	105.9	140.4
9	Durg	209.5	123.7	419.2	113.8	471.0	107.9	256.7	90.4
10	Gariyaband	31.3	187.0	33.4	52.8	20.4	76.9	15.0	90.9
11	Jagdalpur	75.2	79.2	72.5	94.1	98.8	95.8	62.8	80.3
12	Janjgeer	63.7	112.4	61.2	119.5	66.6	119.2	78.6	84.1
13	Jashpur	41.5	98.4	25.6	93.5	31.4	94.8	24.4	88.0
14	Kabirdham	96.9	92.5	54.2	100.0	33.7	96.3	52.5	132.9
15	Kanker	141.3	114.0	96.7	89.7	73.6	88.8	92.1	87.1
16	Kondagoan	276.1	67.9	380.3	169.8	343.9	85.6	370.1	78.7
17	Korba	104.3	25.4	191.3	96.6	222.4	114.7	268.9	85.0
18	Koria	120.3	115.8	145.4	97.0	134.5	88.1	209.5	90.1
19	Mahasamund	126.2	96.9	51.1	84.4	72.7	84.1	50.2	90.7
20	Mungeli	41.1	103.9	43.5	154.6	46.8	206.8	44.8	177.3
21	Narayanpur	222.7	166.0	165.5	76.7	123.3	101.9	168.0	86.5
22	Raigarh	146.9	96.5	60.1	93.6	93.0	94.6	92.0	117.0
23	Raipur	308.1	105.7	199.8	102.0	145.3	101.3	231.3	91.0
24	Rajnandgoan	39.7	95.6	47.4	86.9	9.9	86.5	49.7	90.0
25	Sukma	16.0	97.2	5.2	154.6	6.4	157.0	22.9	123.5
26	Surajpur	190.5	93.2	175.4	84.0	137.6	90.6	98.5	119.5
27	Surguja	169.2	95.1	147.6	90.3	154.9	81.0	163.5	183.3

Table 5 (b) Classification of Cropping Zones (2011-2018) of Onion, Cauliflower, Cabbage and Okra.

	2011-18	ONION			CAULIFLOWER			CABBAGE			OKRA		
S. NO.	districts name	RSI	RYI	Cropping Zone	RSI	RYI	Cropping Zone	RSI	RYI	Cropping Zone	RSI	RYI	Cropping Zone
1	Balod	L	H	ECZ	H	H	MECZ	H	H	MECZ	L	L	NECZ
2	Balodabazar	L	L	NECZ	L	H	ECZ	L	H	ECZ	L	H	ECZ
3	Balrampur	H	H	MECZ	L	L	NECZ	L	L	NECZ	H	L	LECZ
4	Bemetara	L	H	ECZ	H	H	MECZ	H	H	MECZ	L	L	NECZ
5	Bijapur	L	L	NECZ	L	L	NECZ	L	L	NECZ	L	L	NECZ
6	Bilaspur	L	L	NECZ	H	L	LECZ	H	L	LECZ	H	L	LECZ
7	Dantewada	L	L	NECZ	L	L	NECZ	L	H	ECZ	L	L	NECZ
8	Dhamtari	L	L	NECZ	L	L	NECZ	L	L	NECZ	H	H	MECZ
9	Durg	H	H	MECZ	H	H	MECZ	H	H	MECZ	H	L	LECZ
10	Gariyaband	L	H	ECZ	L	L	NECZ	L	L	NECZ	L	L	NECZ
11	Jagdalpur	L	L	NECZ	L	L	NECZ	L	L	NECZ	L	L	NECZ
12	Janjgeer	L	H	ECZ	L	H	ECZ	L	H	ECZ	L	L	NECZ
13	Jashpur	L	L	NECZ	L	L	NECZ	L	L	NECZ	L	L	NECZ
14	Kabirdham	L	L	NECZ	L	H	ECZ	L	L	NECZ	L	H	ECZ
15	Kanker	H	H	MECZ	L	L	NECZ	L	L	NECZ	L	L	NECZ
16	Kondagoan	H	L	LECZ	H	H	MECZ	H	L	LECZ	H	L	LECZ
17	Korba	H	L	LECZ	H	L	LECZ	H	H	MECZ	H	L	LECZ
18	Koria	H	H	MECZ	H	L	LECZ	H	L	LECZ	H	L	LECZ
19	Mahasamund	H	L	LECZ	L	L	NECZ	L	L	NECZ	L	L	NECZ
20	Mungeli	L	H	ECZ	L	H	ECZ	L	H	ECZ	L	H	ECZ
21	Narayanpur	H	H	MECZ	H	L	LECZ	H	H	MECZ	H	L	LECZ
22	Raigarh	H	L	LECZ	L	L	NECZ	L	L	NECZ	L	H	ECZ
23	Raipur	H	H	MECZ	H	H	MECZ	H	H	MECZ	H	L	LECZ
24	Rajnandgoan	L	L	NECZ	L	L	NECZ	L	L	NECZ	L	L	NECZ
25	Sukma	L	L	NECZ	L	H	ECZ	L	H	ECZ	L	H	ECZ
26	Surajpur	H	L	LECZ	H	L	LECZ	H	L	LECZ	L	H	ECZ
27	Surguja	H	L	LECZ	H	L	LECZ	H	L	LECZ	H	H	MECZ

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