

# Identification of Efficient Cropping Zone for Maize in Tamil Nadu

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## **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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## **ABSTRACT**

An analytical study was made in the Department of Agronomy, Tamil Nadu Agricultural University (TNAU), Coimbatore. The study was conducted for finding the identification of potential district of maize in Tamil Nadu based on the area, production, productivity data collected from 1998-1999 to 2015-2016. Based on the data relative spread index (RSI) and relative yield index (RYI) were calculated. The results showed that among 32 districts of Tamil Nadu five districts such as Ariyalur, Coimbatore, Erode, Theni, Tiruppur are very potential districts for cultivating the maize crop. From the analysis, parameters like RYI and RSI are high and these are potential districts and some districts are having RSI more but RYI less which indicates that non-suitability of the crop to that area.

**Keywords:** *Relative Spread Index (RSI); Relative Yield Index (RYI).*

## **1. INTRODUCTION**

Maize (*Zea mays* L.) is the important grain crop in India and with respect to the Tamil Nadu maize is the important crop after rice crop.

According to the season and crop report of Tamil Nadu, cultivation of maize with respect to the area, production and productivity increased during 2014-15 was 2.68 lakh ha, 11.95 lakh tones and 4272 kg ha<sup>-1</sup> respectively [1-3]. The

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reason for increasing production is the high requirement of feed and 59% of total production is used as feed [4-6]. The productivity level of every crop is varying place to place and also through the identification of efficient cropping zone, the crops can utilize available natural resources leads to better yield. Through analysis of efficient cropping zone, if it is not an efficient cropping zone, the crop will be replaced by the other crop with good potential to achieve sustainability and self-sufficiency [7]. ECZ is a tool for identifying the potential area of the crop is by calculated relative index and relative spread index in turn efficient cropping zone of the crops.

## 2. MATERIALS AND METHODS

The area, production, productivity data of maize crop were collected from the year 1998-1999 to 2015-2016 from India state. Veeraputhiran, et al. [8] implied that calculation of RSI and RYI are best methods for calculating the efficient cropping zone. By using collected data, relative spread index and relative yield index (Kanwar, 1972) were computed by using the following formula

**RSI** = Area of particular crop expressed as % of total cultivable area in the district/ Area of

crop expressed as percentage to the total cultivable area in the State\* 100

**RYI** = Mean yield of a particular crop in a district (kg ha<sup>-1</sup>) / Mean yield of the crop in the State (kg ha<sup>-1</sup>)\* 100

## 3. RESULTS AND DISCUSSION

In Tamil Nadu, The MECZ which has high RSI and RYI for maize was found in Ariyalur, Coimbatore, Erode, Theni and Tiruppur. Maize crop is susceptible to both waterlogging and water stress so maintaining optimum moisture condition leads to the better yield and some districts like Kanyakumari, Karur, Krishnagiri, Namakkal, Pudukottai, Sivaganga and Thirunelveli categorized under ECZ with high RYI and low RSI values which indicate that these areas are having high yield but spreading are less so that it can improve through the extension methodologies. Dindigul, Perambalur, Salem, Villupuram and Virudhunagar districts are not efficient cropping zone and Cuddalore, Dharmapuri, Kancheepuram, Madurai, Nagapattinam, Ramanathapuram, Thanjavur, The Nilgiris, Thiruvallur, Thiruvannamalai, Thiruvarur, Trichirappalli, Tuticorin and Vellore are grouped into highly inefficient cropping zone.

**Table 1. Criteria for efficient cropping zone**

RSI	RYI	Cropping zone
>100 (High)	>100 (High)	Most Efficient Cropping Zone (MECZ)
>100 (High)	<100 (Low)	Efficient Cropping Zone (ECZ)
<100 (Low)	>100 (High)	Not Efficient Cropping Zone (NECZ)
<100 (Low)	<100 (Low)	Highly Inefficient Cropping Zone

Source: Indian Journal of Science and Technology- Identification of Efficient Cropping Zone for Rice, Maize and Groundnut in Tamil Nadu by S. Kokilavani and V. Geethalakshmi

**Table 2. Efficient cropping zone for maize in Tamil Nadu (1998-1999 To 2015-2016)**

Districts	RYI	RSI	Cropping zone
Ariyalur	111.2	193.2	Most efficient
Coimbatore	119.9	116.9	Most efficient
Cuddalore	54.0	70.3	Highly inefficient
Dharmapuri	81.0	31.3	Highly inefficient
Dindigul	93.2	245.1	Efficient
Erode	106.2	103.1	Most efficient
Kancheepuram	94.9	0.2	Highly inefficient
Kanyakumari	177.2	0.7	Not efficient
Karur	104.7	11.9	Not efficient
Krishnagiri	104.6	10.7	Not efficient
Madurai	70.0	46.8	Highly inefficient
Nagapattinam	95.4	0.2	Highly inefficient
Namakkal	102.9	42.2	Not efficient
Perambalur	69.0	610.3	Efficient



Among all districts of Tamil Nadu, five districts come under the most efficient cropping zone, seven districts come under the efficient cropping zone, five districts come under the not efficient cropping zone and twelve districts are highly inefficient zone for maize cultivation in Tamil Nadu.

#### 4. CONCLUSION

In this decadal analysis for maize crop, the most efficient cropping zones are Ariyalur, Coimbatore, Erode, Theni and Tiruppur. This area may have optimum soil fertility and favourable climatic condition for maize crop which leads to high yield. Some districts are having high areas under crop but low yield due to the lack of inputs and lack of technology adoption.

For this reason, input subsidies, transfer of technology and using high yielding hybrids help to increase the yield which will protect the farmers from loss of yield.

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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