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Identification of efficient cropping zone for rice in Tamil Nadu

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Abstract

Rice is the staple food of over half of the world's population. In Asia alone, more than 2 billion people obtain 60 to 70 percent of their energy intake from rice and its derivatives. The theme of the International Year of Rice 2004 - "Rice is life" - reflected the importance of rice as a primary food source, and was drawn from an understanding that rice-based systems are essential for food security, poverty alleviation and improved livelihoods. The productivity level of crops has to be enhanced and sustained and this is possible only when efficient locations have been identified for the crops. This information would help to replace the uneconomical crop in the identified areas. The data related to area, production and productivity and total cultivable area of rice in different districts and state were collected for 2005-'06 to 2015-'2016 (11 years) from the respective Season and Crop Report. Most Efficient Cropping Zone (MECZ) which has high RSI and high RYI for rice was found in Kancheepuram, Villupuram, Tiruvannamalai, Tiruchirappalli, Madurai and Tirunelveli. The Nilgiris, Kanyakumari, and Vellore. Virudhunagar and Sivagangai are comes under highly inefficient cropping zone these areas.

Keywords: Efficient cropping zone, relative spread index (RSI), relative yield index (RYI)

Introduction

The productivity level of crops has to be enhanced and sustained and this is possible only when efficient locations have been identified for the crops. This information would help to replace the uneconomical crop in the identified areas. This gives an opportunity to use the natural resources to the maximum extent possible without any degradation: These uneconomical crops will be replaced by the crops with good potential to achieve the sustainability and self-sufficiency. The scientific information-based crop cultivation also not stable for over years and the suitability of crops of a region to be verified frequently. By this means, the farmers can take up likely crops or go for alternate cropping pattern which boost them to harvest better yield and fetch more income. Advances in the agricultural sciences helped in the development of several techniques for finding out the suitable crops in the specified areas. Rice has shaped the culture, diets and economic of thousand of millions of peoples. For more than half of the humanity "rice is life". Considering its importance position, the United Nation designated year 2004 as the "International Year of rice.

One such tool for identifying the potential area of crops is by calculating Relative Yield Index and Relative Spread Index and in turn Efficient Cropping Zone of the crops

Material and Methods

The data related to area, production and productivity and total cultivable area of rice in different districts and state were collected for 2005-'06 to 2015-'2016 (11 years) from the respective Season and Crop Report. From the data, Relative Spread Index (RSI) and Relative Yield Index (RYI) were computed by using the following formula.

$$RSI = \frac{\text{Area of particular crop expressed as \% of total cultivable area in the district}}{\text{Area of crop expressed as percentage to the total cultivable area in the State}} \times 100$$

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

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

Inference

The collected data were analysed and presented in Table 2. Based on the above analysis Most Efficient Cropping Zone (MECZ) which has high RSI and high RYI for rice was found in Kancheepuram, Villupuram, Tiruvannamalai,

Tiruchirappalli, Madurai and Tirunelveli. Because these districts are situated in and around river basins. This similar result was obtained by Kokilavani.S and V.Geethalakshmi (2013) [2]. Efficient cropping zone (ECZ) has high RSI and RYI was found in Thiruvallur, Salem, Namakkal, Dharmapuri, Krishnagiri, Coimbatore, Thiruppur, Erode, Karur, Perambalur, Ariyalur, Theni, Dindigul, Thoothukudi, The Nilgiris, Kanyakumari, and Vellore. Virudhunagar and Sivagangai are comes under highly inefficient cropping zone these areas. Adoption of suitable improved varieties with timely plant protection measures in these areas can bring more production of rice.

Table 2: Calculation of RSI and RYI

S. No	Districts	Average (11 years)		Values		Interpretation		Results
		% area	Productivity kg/ha	RYI	RSI	RSI	RYI	
1	Kancheepuram	69.61	3974	118.8	218.4	HIGH	HIGH	MECZ
2	Thiruvallur	61.93	3655	109.3	194.3	LOW	HIGH	NECZ
3	Cuddalore	39.66	3125	93.4	124.4	HIGH	LOW	ECZ
4	Villupuram	38.43	3659	109.4	120.5	HIGH	HIGH	MECZ
5	Vellore	20.96	3844	114.9	65.7	LOW	HIGH	NECZ
6	Thiruvannamalai	42.09	3504	104.8	132.0	HIGH	HIGH	MECZ
7	Salem	9.43	4287	128.2	29.6	LOW	HIGH	NECZ
8	Namakkal	6.03	4354	130.2	18.9	LOW	HIGH	NECZ
9	Dharmapuri	11.15	4179	124.9	35.0	LOW	HIGH	NECZ
10	Krishnagiri	9.31	3935	117.6	29.2	LOW	HIGH	NECZ
11	Coimbatore	1.52	3868	115.6	4.8	LOW	HIGH	NECZ
12	Thiruppur	4.82	4470	133.6	15.1	LOW	HIGH	NECZ
13	Erode	14.67	4028	120.4	46.0	LOW	HIGH	NECZ
14	Tiruchirappalli	34.10	3794	113.4	107.0	HIGH	HIGH	MECZ
15	Karur	15.19	3656	109.3	47.7	LOW	HIGH	NECZ
16	Perambalur	12.76	3360	100.5	40.0	LOW	HIGH	NECZ
17	Ariyalur	21.50	4085	122.1	67.4	LOW	HIGH	NECZ
18	Pudukottai	59.27	2430	72.6	185.9	HIGH	LOW	ECZ
19	Thanjavur	63.08	3027	90.5	197.9	HIGH	LOW	ECZ
20	Thiruvarur	64.00	2566	76.7	200.7	HIGH	LOW	ECZ
21	Nagapattinam	59.91	2257	67.5	187.9	HIGH	LOW	ECZ
22	Madurai	39.38	3640	108.8	123.5	HIGH	HIGH	MECZ
23	Theni	11.61	4371	130.7	36.4	LOW	HIGH	NECZ
24	Dindigul	6.63	4219	126.1	20.8	LOW	HIGH	NECZ
25	Ramanathapuram	66.79	1638	49.0	209.5	HIGH	LOW	ECZ
26	Virudhunagar	20.56	3136	93.8	64.5	LOW	LOW	HICZ
27	Sivagangai	69.95	1892	56.6	219.4	LOW	LOW	HICZ
28	Tirunelveli	43.87	4125	123.3	137.5	HIGH	HIGH	MECZ
29	Thoothukudi	9.32	4062	121.4	29.2	LOW	HIGH	NECZ
30	The Nilgiris	0.79	3581	107.0	2.5	LOW	HIGH	NECZ
31	Kanyakumari	19.10	4228	126.4	59.9	LOW	HIGH	NECZ

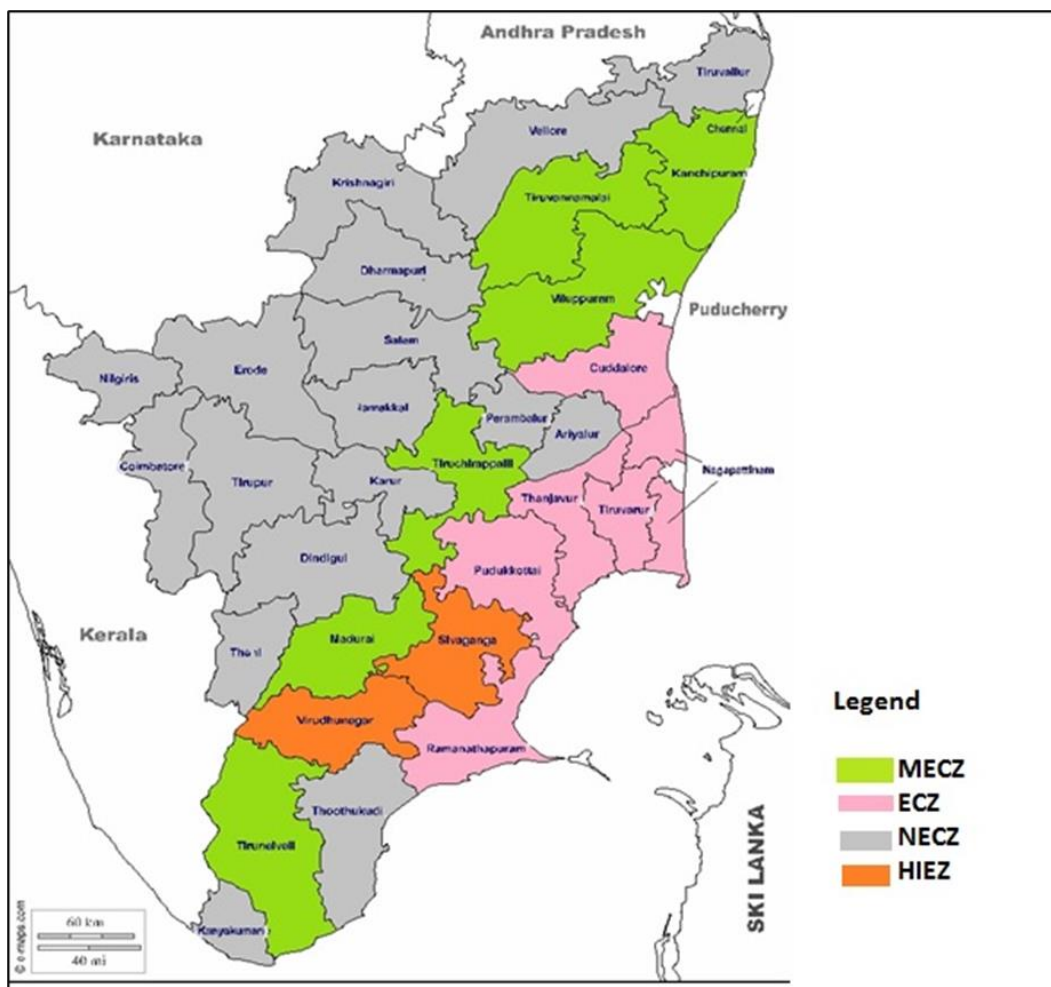


Fig 1: Efficient cropping zone for rice in Tamil Nadu

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