

Maximum Function of Fuzzy Matrices in Paddy Cultivation

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Abstract: Interval valued fuzzy matrices are introduced to make decision in the paddy cultivation. In decision making more concepts of fuzzy applications is used to analysis. Here we take Maximum operation of interval valued fuzzy matrices to make decision in three season's paddy cultivation.

Keywords: IVFM, DecisionMaking, Maximum operation.

1. INTRODUCTION

In 1977, Thomsan defined fuzzy matrices and he discussed the powers of fuzzy matrix. The max-min compositions of fuzzy Matrix were introduced by Ragab and Eman In 2006 Shyamal and pal were introduced the concepts of generalization of fuzzy matrix and extending the operation of Max-Min fuzzy Algebra. Interval valued fuzzy rows and columns are introduced by pal. The Max-Min iterates of fuzzy circulant was studied by Hemasinha pal and Bezdek. In fuzzy Algebra fuzzy Matrix is Major topic to Analysis. So many ideas are covered in fuzzy Matrices i.e reflexive, symmetric, transitive etc. In this paper we use maximum operation of interval valued fuzzy Matrix as a decision making matrices in paddy cultivation.

2. PRELIMINARIES

2.1 Interval valued Fuzzy Number

Let $A = [X_1, X_2]$ where $x_1, x_2 \in \mathbb{R}$ such that $x_1 < x_2$, it is known as interval valued fuzzy number.

2.2 Interval valued Fuzzy Matrix

The Matrix of order $m \times n$ and is defined as $y = (y_{ij})_{m \times n}$, where $[y_{ijL}, y_{ijU}]$ may represent the membership value of ij^{th} element of Y .

2.3 Max-Min Composition of IVFMF

Let the Matrices $m \times n$ over F of the set F_{mn} . The membership value of the Matrices is indicated by the element of F_{mn} , Such that $Y = (y_{ij}) \in F_{mp}$ and $Z = (z_{ij}) \in F_{pn}$.

Then the Max-Min product is denoted by $X.Y = [\sup_k \{\inf(Y_{ik}, Z_{kj})\}] \in F_{mn}$

2.4 Maximum operation on IVFM

Let $Y = (y_{ij})_{m \times n}$ Where $Y_{ij} = [y_{ijL}, y_{ijU}]$ and $Z = (z_{ij})_{m \times n}$ Where $[z_{ijL}, z_{ijU}]$ be the two interval valued fuzzy number matrices. The Maximum operation of IVFM is given by, $L_{\max} = \max(Y, Z) = \sup [Y_{ij}, Z_{ij}]$ Where $\sup [Y_{ij}, Z_{ij}] = [\sup(y_{ijL}, z_{ijL}), \sup(y_{ijU}, z_{ijU})]$ is the ij^{th} element of $\max(X, Y)$.

3. PADDY CULTIVATION

The paddy cultivation has large content of process. Here we consider Area, production and productivity. These functions are too defined in three types of season cultivation.

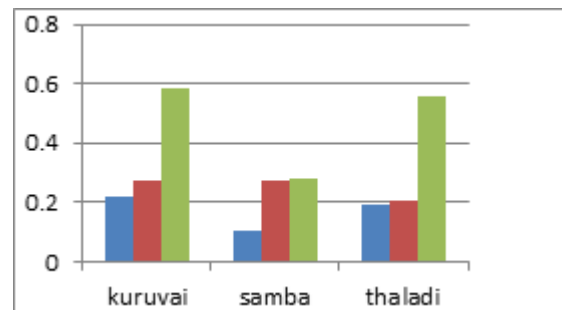


Fig1: The Year 2012-2013 Paddy Cultivation.

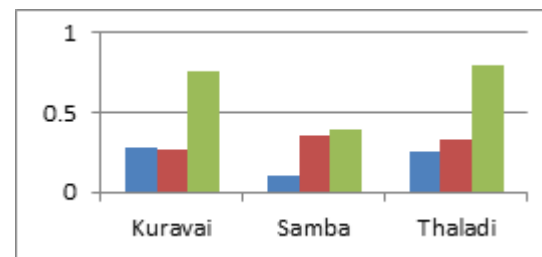


Fig2: The Year 2013-2014 Paddy Cultivation.

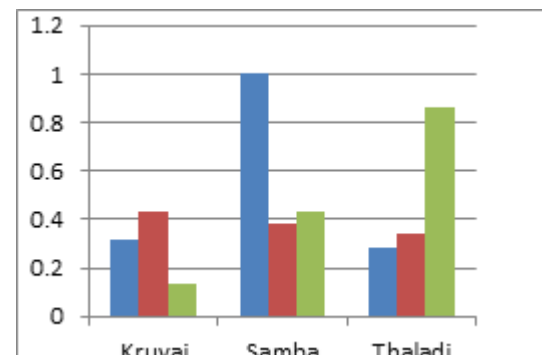


Fig3: The Year 2014-2015 Paddy Cultivation.

4. ALGORITHM

Step: 1

Define a Matrixes $Y = (y_{ij})_{m \times n}$ and $Z = (z_{ij})_{m \times n}$.

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Step: 2

Take $Y_{ij}=[y_{ijL}, y_{ijU}]$ and $Z=[Z_{ijL}, Z_{ijU}]$ the Membership value of ij^{th} elemof of Y and Z.

Step: 3

Find the sup $[y_{ijL}, Z_{ijL}]$ and sup $[y_{ijU}, Z_{ijU}]$

Step: 4

Find the Maximum operation of $L_{max}=\max (y,z)= \sup (Y_{ij}, Z_{ij})$

Step: 5

Take the decision which has the Maximum value. 5.Interval valued Fuzzy Matrix of Maximum OperationThe Area, Production and productivity of the paddy cultivation for the seasons Kuruvai, Samba and Thaladi is Analysis and evaluated by the interval valued fuzzy Matrices of Maximum operations is given below.

Step: 1

We take the $Y= (y_{ij})$ $Z= (Z_{ij})$ Matrix as the elements of Area, Production and Productivity values

Step: 2

$$Y=y_{ij}= \begin{pmatrix} (0.21655, 0.2711) & (0.28294, 0.2682) & (0.31836, 0.4330) \\ (0.102939, 0.2732) & (0.106077, 0.3548) & (0.99961, 0.3830) \\ (0.19003, 0.2028) & (0.25588, 0.3366) & (0.28522, 0.3442) \end{pmatrix}$$

$$Z=Z_{ij}= \begin{pmatrix} (0.2711, 0.58707) & (0.2682, 0.75885), & (0.4330, 0.137850) \\ (0.2732, 0.277621) & (0.3548, 0.397018), & (0.3830, 0.433074) \\ (0.2028, 0.55524) & (0.3366, 0.79403), & (0.3442, 0.86614) \end{pmatrix}$$

Step: 3

$$\sup(y,z) = \begin{pmatrix} (0.21655, 0.2711) & (0.28294, 0.2682) & (0.31836, 0.4330) \\ (0.102939,0.2732) & (0.106077,0.3548) & (0.99961,0.3830) \\ (0.19003, 0.2028) & (0.25588, 0.3366) & (0.28522, 0.3442) \end{pmatrix}$$

$$\sup(y_{ijL}, Z_{ijL}) = \begin{pmatrix} 0.21655 & 0.28294 & 0.31836 \\ 0.102939 & 0.106077 & 0.99961 \\ 0.19003 & 0.25588 & 0.28522 \end{pmatrix}$$

$$\sup(y,z) = \begin{pmatrix} (0.2711, 0.58707) & (0.2682, 0.75885) & (0.4330, 0.137850) \\ (0.2732, 0.277621) & (0.3548, 0.397018) & (0.3830,0.433074) \\ (0.2028, 0.55524) & (0.3366, 0.79403) & (0.3442, 0.86614) \end{pmatrix}$$

$$\sup(y_{ijU}, Z_{ijU}) = \begin{pmatrix} 0.58707 & 0.75885 & 0.137850 \\ 0.277621 & 0.397018 & 0.433074 \\ 0.55524 & 0.79403 & 0.86614 \end{pmatrix}$$

Step :4

$$S = \begin{pmatrix} (0.21655, 0.58707) & (0.28294, 0.75885) & (0.31836, 0.137850) \\ (0.102939, 0.277621) & (0.106077, 0.397018) & (0.99961, 0.433074) \\ (0.19003, 0.55524) & (0.25588, 0.79403) & (0.28522, 0.86614) \end{pmatrix}$$

$$\sup(y_{ij}, Z_{ij}) = \begin{pmatrix} 0.58707 & 0.75885 & 0.137850 \\ 0.277621 & 0.397018 & 0.433074 \\ 0.55524 & 0.79403 & 0.86614 \end{pmatrix}$$

Step:5

$$L_{max}= \begin{pmatrix} 0.137850 \\ 0.433074 \\ 0.86614 \end{pmatrix}$$

Thus the result of paddy cultivation has maximum requirement in the year 2014-15.

5 CONCLUSION

The Kuruvai, Samba, Thaladi Season cultivation has Maximum production in the year 2014-15. The Future work is to Analysis the reason for low production of the year 2012-2013 and 2013-2014.

6 REFERENCE

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