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RESEARCH PAPER

Adoption of existing package of practices by the farmers in *rice-utera* cropping system in Chhattisgarh plains

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ABSTRACT

The research work was conducted in ten rainfed villages of Mahasamund and Rajnandgaon district of Chhattisgarh state, where the project work (NATP-RRPS-34) was carried out. A total of 12 farmers practicing *rice-utera* cropping system from each village were selected randomly. In this way, a total of 120 farmers were taken as respondents. The data were collected through personal interview method. The main important reasons for the low productivity of grasspea in *utera* system are inadequate plant stand, lack of suitable varieties, losses due to insects, pests particularly thrips and pod borer, losses due to weeds, moisture stress and no use of fertilizers. To over come these situations, various extension efforts have been made so far but their impact could not be visible in this region. Thus, there was a need to produce more pulses per unit area by exploiting all agro-resources through skillful development of location specific agro-techniques. Rice was grown mostly by broadcast *biasi* method in *utera* system. Grasspea was widely adopted in *utera* system followed by chickpea, linseed and lentil. Swarna was found as the most popular rice variety. Majority of the respondents were using more than 100 kg ha^{-1} seed of rice in broadcast *biasi* and 68 kg ha^{-1} seed of grasspea.

KEY WORDS : Adoption, *Rice-utera*, Package of practices

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Chhattisgarh emerged as a new state in the country's map in November 2000. The state is categorized in three agroclimatic zones *i.e*. Chhattisgarh plains, Bastar plateau and Northern hills, which are predominated by tribes (45% of the total population) practicing subsistence agriculture. Chhattisgarh state is comprised of 16 districts with 5.9 million ha cultivated area. Out of this, 80 per cent area is under rainfed condition. It receives an annual average rainfall of 1200-1600 mm. The irrigation facility in the state is very meagre and it is hardly about 24 per cent, which is available as protective irrigation for rice crop mainly through canal.

Rice is the major crop in *Kharif* season. Majority of land during *Rabi* and *Zaid* is fallow and farmers have tendency to free their cattle's for grazing. The cropping intensity of the region is hardly more than 122-126 per cent. In order to meet out the present day food and fodder requirements and to generate income and labour employment avenues in this region, these lands have to be reconfigured under cultivation with profitable crops. Grasspea *(Lathyrus sativus* L.) which is locally called as *"Khesari" "Teora"* and *"Lakh/Lakhdi"* is an important post monsoon pulse crop of this region.

Grasspea is mainly grown under three farming systems namely, sole crop in *Kharif* fallow, *relay* or *utera* system and as mixed cropping. In rainfed areas where *Kharif* fallow

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is there, it is grown as sole crop during winter season. It is mostly grown on Vertisols where sufficient moisture is ..... *Relay* or *utera* system is also the most prevalent system in rice growing region in Chhattisgarh. *Utera* cultivation of grasspea has its own advantage as it is easy to cultivate without much effort, but it is very difficult to boost up its productivity under this system. Farmers broadcast the seed of grasspea in standing crop of paddy, nearly 20-30 days before its harvest and after that they just turn-up for its fodder and consider grain yield as bonus. This crop is considered drought resistant and performs better under moisture stress conditions.

The technology generated by agricultural scientists for boosting up its productivity is not reaching to the farmers due to lack of knowledge about grasspea cultivation technology. It requires keen attention about transfer of technology pertaining to grasspea cultivation among the farmers. Lot of work has been done at research stations to enhance its productivity potential. However, very limited work has been done to examine the reasons responsible for low yield at farmers level in increasing the productivity under *rice-utera* cropping system in Chhattisgarh. The present investigation is an attempt to study the adoption of existing package of practices by the farmers in *rice-utera* cropping system in Chhattisgarh plains.

Objective:

To study about the adoption of existing package of practices by the farmers in *rice-utera* cropping system.

METHODOLOGY

The study was conducted in two selected districts, namely Mahasamund and Rajnandgaon of Chhattisgarh state. Grasspea is the major *Rabi* pulse crop of the region and it is mostly grown as *utera* and to some extent under drilled condition. In *utera* system, *Lathyrus* is prominent crop. The other important crops grown under *utera* are linseed, lentil and chickpea.

Out of total 16 districts of the state which are spread in three agro-climatic zones as Chhattisgarh Plains (11 districts), Northern Hills (3 districts) and Bastar Plateau (2 districts), the research work was conducted in Mahasamund and Rajnandgaon districts because the project work (NATP RRPS-34) was carried out in these districts. From each of the selected districts, five rainfed villages having soil type Vertisols were purposively selected, where the activity of project work was carried out. In this way, 10 villages from the two districts were considered for this study. A total of 12 farmers practicing *rice-utera* cropping system, from each selected village were selected randomly. In this way, a total of 120 farmers were taken as the respondents for this investigation.

Rogers (1983) defined adoption as a decision to make full use of an innovation to the best course of action available. In the present study, the extent of adoption was ascertained in terms of adoption index based on four selected recommended technologies adopted by farmers namely, seed rate, seed treatment, pest management and weed management. Farmers were interviewed through personal interview technique.

ANALYSIS AND DISCUSSION

Based on adoption of existing package of practices by the farmers in *rice-utera* cropping system as depicted in Table 1, it reveals that most of the respondents (51%) were using more than 100 kg ha^{-1} seed of rice. The majority of the respondents were using > 60, > 90, 40-50 and 20-30 kg ha^{-1} seed rate of *Lathyrus*, chickpea, lentil and linseed, respectively under *utera* system. The seed treatment practiced in rice as well as *utera* crops were adopted by only 10.00 per cent respondents. Kareem and Manohari (2001) found that 100 per cent of the respondents did not practice the seed treatment. Very few farmers were aware of the benefits of the seed treatment.

It is indicated in Table 2 that *Echinocloa* spp. and *Cynodon dactylon* were the major weeds in rice, as reported by 84.17 and 51.67 per cent of the respondents, respectively, while in *utera* crops Zillo (52.50%) and Senji (35%) were the major weeds. Weed management in rice was practiced by most of the respondents by hand weeding (85.83%). In *utera* system, only 19 farmers were practicing weeding that too by manual methods.

In relation to existing pest management practices by the respondents in *rice-utera* cropping system, Table 3 shows that BPH (65.83%) and blast (60.00%) were the most important pest and disease, respectively in rice, while thrips (50.83%), pod borer (26.67%) and powdery mildew (62.50%) were the important pest and diseases, respectively found in *utera* crops. Monocrotophos (74.45%) and Carbofuron (21.81%) were the mostly used pesticides in rice, while in *utera* crops about 65.38 per cent of the respondents were not using pest management practices. Asthana and Dixit (1997) reported that thrips are one of the serious pests of *Lathyrus* particularly in Central zone of India.

As far as the adoption level of the respondents is concerned, Table 4 reveals that, majority of the respondents (60.83%) had medium adoption level about selected technologies in *rice-utera* cropping system. It was found that 20.00 and 19.16 per cent of the respondents had low and high adoption, respectively about selected agricultural technologies. These findings are in conformity with the observations of Kareem and Manohari (2001) and Chauhan *et al.* (2003).

Table 1 : Adoption of seed rate and seed treatment practices by the respondents in rice based *utera*-cropping system

(n = 120)*

Sr. No.	Particulars	Frequency	Percentage
1.	Seed rate (kg/ha)		
	Rice (n = 120)		
	< 8 0	28	23.34
	80-100	31	25.83
	> 100	61	50.83
	***Utera Lathyrus* (n = 75)**		
	< 5 0	07	9.33
	50-60	20	26.67
	> 6 0	48	64.00
	***Utera* chickpea (n = 26)**		
	< 8 0	03	11.54
	80-90	08	30.77
	> 9 0	15	57.69
	***Utera* lentil (n = 80)**		
	< 4 0	20	25.00
	40-50	40	50.00
	> 5 0	20	25.00
	***Utera* linseed (n = 20)**		
	< 2 0	03	15.00
	20-30	11	55.00
	> 3 0	06	30.00
2.	Seed treatment		
	Practiced in rice (n=120)		
	Always	03	2.50
	Seldom	09	7.50
	Never	108	90.00
	Measures used in rice (n=12)		
	Fungicide	12	100.00
	Bio-fertilizer	00	00.00
	Pesticide	00	00.00
	Other	00	00.00
	Practiced in *Lathyrus utera* (n=75)		
	Always	00	00.00
	Seldom	04	5.33
	Never	71	94.67
	Measures used in *Lathyrus utera* (n=4)*		
	Rhizobium	04	100.00
	Bio-fertilizer	01	25.00
	Fungicide/pesticide	01	25.00
	Practiced in chickpea *utera* (n=26)		
	Always	01	3.85
	Seldom	05	19.23
	Never	20	76.92
	Measures used-Chickpea *utera* (n=6)*		
	Rhizobium	05	83.33
	Bio-fertilizer	01	16.67
	Fungicide/pesticide	01	16.67

* Percentage is based on multiple response

Table 2: Adoption of weed management practices by the respondents in rice based *utera*-cropping system

(n = 120)*

S. No.	Particulars	Frequency	Percentage
1.	Weed management		
	Major weeds*		
	Rice (n=120)		
	- Swarna *(Echinocloa spp)*	101	84.17
	- Dub *(Cynodon dactylon)*	62	51.67
	- Motha *(Cyprus spp)*	39	32.50
	- Other grasses	43	35.83
	***Utera* (n=120)**		
	- Senji *(Melilotus spp)*	42	35.00
	- Motha *(Cyprus spp)*	26	21.67
	- Dudhi *(Euphorbia spp)*	28	23.33
	- Hirankhuri *(C. arvensis)*	30	25.00
	- Zillo (Common vetch)	63	52.50
	- Krishanneel *(A. arvensis)*	31	25.83
	Weed management in rice (n=120)		
	Always	111	92.50
	Seldom	09	7.50
	Never	00	00.00
	Method used (n=120)*		
	Mechanical/baisi	98	81.67
	Chemical	08	6.67
	Manual	103	85.83
	WM in *Lathyrus*/chickpea *utera* (n=101)		
	Always	01	0.99
	Seldom	18	17.83
	Never	82	81.18
	Method used (n=19)		
	Mechanical	00	00.00
	Chemical	00	00.00
	Manual	19	100.00
	Chemical used for weeds (n=8)		
	Rice		
	Pre-emergence weedicide	07	87.50
	Post emergence	01	12.50
	Utera	00	00.00

* Percentage is based on multiple response

Table 3 : Adoption of pest management practices by the respondents in rice based *utera*-cropping system (n = 120)*

Sr. No.	Particulars frequency		Percentage
1.	Pest management		
	Major pests and diseases (n=120)*		
	Rice		
	- Blast	72	60.00
	- Blight	50	41.67
	- BPH	79	65.83
	- Stem Borer	38	31.67
	- Gall midge	20	16.67
	- Cutworm/army worm	28	23.33
	- Leaf roller/leaf minor	31	25.83
	Utera		
	- Thrips	6 1	50.83
	- Pod borer	32	26.67
	- Aphids/Jassid	14	11.67
	- Powdery mildew	75	62.50
	Pest and disease management in rice		
	Always	35	29.17
	Seldom	75	62.50
	Never	1 0	8.33
	Pesticide and fungicide used in rice (n=110)*		
	Monocrotophos	83	75.45
	Carbofuron	24	21.81
	Ecalux	1 8	16.36
	Bavistin	08	7.27
	Pest and disease management in *Lathyrus/chickpea utera* (n=101)		
	Always	22	21.78
	Seldom	56	55.44
	Never	23	22.78
	Pesticide and fungicide used in *utera* (n=78)*		
	Monocrotophos	26	33.33
	Fungicide (Bavistin/Dithane M-45)	1 1	14.10
	No use	51	65.38

* Percentage is based on multiple response

Table 4: Distribution of the respondents according to their adoption level about selected agricultural technologies (n = 120)

Level of adoption	Frequency	Percentage
• Nil	00	00.00
• Low (up to 33.33%)	24	20.00
• Medium (33.34 - 66.66%)	73	60.83
• High (> 66.66%)	23	19.16

Conclusion:

After studying the adoption of existing package of practices by the farmers in *rice-utera* cropping system, it can be conclude that, majority of the respondents were using more than 100 kg ha^{-1} seed of rice but the seed treatment practiced in rice as well as *utera* crops were adopted by (10.00%) respondents only. *Echinocloa* spp. and *Cynodon dactylon* were the major weeds found in rice. Most of the respondents used hand weeding (85.83%) as the major weed management practice in rice.

BPH and blast were the most important pest and diseases, respectively while monocrotophos was the mostly used pesticide in rice. It indicates that majority of the respondents in the study area had medium level of adoption about selected agricultural technologies (seed rate, seed treatment, weed management, pest management) in *rice-utera* cropping system. Therefore, it is recommended for profitable *rice-utera* cropping system, proper crop management practices should be initiated from rice to *utera crops.*

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