KNOWLEDGE AND ADOPTION OF CONTROL MEASURE PRACTICES OF VARIOUS WEEDS OF RICE CROP IN CHHATTISGARH

R.K. Shori[1], K.K. Shrivastava[2], Dilip Kumar[3] and P. Shrivastava[4]

[1] *Dept. of Ag. Extension, COA, IGKV, Raipur (C.G.).*
[2] *Dept. of Ag. Extension, COA, IGKV, Raipur (C.G.).*
[3] *Dept. of Ag. Extension, COA, IGKV, Raipur (C.G.).*
[4] *SMS, KVK, Chhattarpur, JNKVV, Jabalpur (M.P.)*

Abstract: Rice (*Oryza sativa* L. var. *Indica*) is the most important major cereal food crop in agriculture and economy of India. In world, rice is the second most widely consumed cereal next to wheat. Chhattisgarh is popularly known as the "Rice Bowl of India". The extent of yield reduction of rice due to weeds is estimated to be 15-95 per cent. In Chhattisgarh state, farmers generally control weeds manually. The physical methods are costly, labour consuming and the advantage of manual weeding could only be achieved when it is performed timely. Chemical and mechanical weed controls are regarded to be better than hand weeding and meagre availability of labour at peak period of weed infestation. In this respect, application of new and wide spectrum herbicide is done or in combination may give satisfactory weed control. Out of the thirty weeds infesting paddy crop, nine weeds are of major economic importance. A research was organised to assess the knowledge and adoption of control measure practices of various weeds of rice crop and average yield loses due to various weeds. In all one hundred and sixty rice growing farmers were randomly selected from purposively chosen Dhamtari and Nagri blocks of Dhamtari district of Chhattisgarh and personally interviewed with the help of structured interview schedule to collect the relevant information from the respondents. The data were statistically analysed and logically presented in tabular form. The result of the study revealed that the exception of Resamkata (*Alternanthera sessilis* L.), majority of the rice growers had medium knowledge regarding control measure practices of various weeds of rice corp viz. Motha (*Cyperus spp.*), Kala bhengra (*Eclipta prostrata* L.), Sol ghas (*Aeschynomene indica* L.), Kaua keni (*Commelina benghalensis* L.), Pekereal weed (*Monochoria vaginalis*), Badauri (*Ischaemum rugosum* L.), Machharia (*Corchorus aestuans* L.) and Sawa (*Echinochloa colona* L.). Sawa followed by Resamkata (14.38%), Motha (6.25%), and Kala bhingra (6.25%). As regards low knowledge 38.12, 25.00, 18.12, 18.12, 17.50, 16.25, 12.50 and 11.25 per cent respondents were found to have low knowledge about Resamkata, Machharia, Pekereal weed, Badauri, Kaua Sol ghas, Kala bhengra and Motha respectively. It was also observed that majority of the respondents 71.87, 68.75, 66.87 and 58.75 per cent had medium adoption of control measure practices of Sol ghas, Motha, Sawa and Machharia respectively. 41.25 per cent respondents had high adoption of control measure practices of Resamkata while 23.12 per cent had low adoption of control measure practices of Resamkata.

Keywords: Knowledge, Adoption, Rice weeds

INTRODUCTION

Rice *(Oryza sativa* Linn.*)* is the most consumed cereal grain in the world, constituting the dietary staple food for more than half of the planets human population. In world, rice has occupied an area of 161.420 million hectares, with a total production of 678.688 million tonnes in 2009 (Anonymous, 2010). In Asian countries, rice is the major staple crop covering about ninety per cent of rice grown in the world, with two countries, China and India, growing more than half of the total crop.

India is the second largest producer after China and had an area of over 43.77 million hectares under rice and production 96.43 million tonnes of rice in 2008 (Viraktamath and Shobharani). Rice being the main source of livelihood for more than 120-150 million rural household is the backbone of the Indian Agriculture. It occupies about 23.3 per cent of the food grain production and 55 per cent of cereal production. The rice plays a vital role in the national food security. The country's population of more than a billion is growing at 1.8 per cent per year, outpacing the 1.4% annual growth rate of rice production. In order to maintain self-sufficiency, annual production needed to increase by 2 million tones every year.

Chhattisgarh popularly known as "rice bowl of India" occupies an area of around 3610.47 thousand hectares with the production of 5.48 million tones and productivity of 1517 kg per hectare (Anonymous 2008-09). The prime causes of low productivity of rice in Chhattisgarh are limited irrigation (28.0%), lack of improved varieties suitable to different ecosystems low imbalance use of fertilizer and insufficient weed management. The production and productivity of the rice can be increased by considering the various factors, among them weed control is one of the main factor.

Paddy crop is attacked by more than thirty weeds, out of which nine weeds are of major economic importance, extent of losses due to damages of these weeds vary greatly from area to area and season to season.

In Chhattisgarh region the major weeds of rice are sawa (*Echinochloa colona* L.), motha (*Cyperus spp.*), badauri (*Ischaemum rugosum* L.), kaua keni (*Commelina benghalensis* L.), machharia (*Corchorus aestuans* L.), sole grass (*Aeschynomene indica* L.), pickreral weed (*Monochoria vaginalis*), reshamkata (*Alternanthera sessilis* L.) and bhrangraj (*Eclipta prostrata* L.). *Echinochloa colona* L. and *Cyperus spp*. are most serious weeds in rice crop. Thus the study was designed with following specific objectives:

- To study the knowledge level of rice growers regarding identification of weeds and their control measures.
- To study the extent of adoption of weed control measures in rice crop by the rice growers.

METHODOLOGY

The study was conducted in Dhamtari district of Chhattisgarh state. There are 4 blocks in Dhamtari district namely, Dhamtari, Nagri, Kurud, and Magarlod. Out of these, two blocks namely Dhamtari and Nagri were selected purposively for this study. Out of the total villages of Dhamtari and Nagri blocks, eight villages from each block were selected and 10 farmers from each villages were randomly selected as respondents for the study. Thus the total 160 farmers from two blocks were selected randomly for the study. A pre-tested and structured interview schedule was used as a data collection instrument and the primary data were collected by personal interview. English and English (1961) defined knowledge, as a body of understandable information possessed by an individual or by culture. The knowledge test consisted of items called questions covering various aspects of identification and control of various weeds in rice crop. The total 19 questions were finalized. The responses of respondents regarding knowledge were obtained into three point continuum as under.

Categories	Score
No knowledge	1
Partial knowledge	2
Complete knowledge	3

The knowledge index was worked as follows:

$$\text{Knowledge index} = \frac{\text{Sum of knowledge score actually obtained by the respondents}}{\text{Maximum possible obtainable knowledge score by the respondents}} \text{ X } 100$$

Further, the respondents were classified into three categories by using following formula:

K.I. = Mean (X) ± S.D. (Standard Deviation)

Categories	
Low level of knowledge (up to 169 score)	(< $\overline{X}$ – S.D.)
Medium level of knowledge (170 to 195 score)	(Between $\overline{X}$ ± S.D.)
High level of knowledge (above 195 score)	(> $\overline{X}$ + S.D.)

It is a mental process through which an individual passes from hearing about an innovation to final adoption (Rogers, 1995). It was operationalized as the degree of the use of control measure practices of various weeds of rice crop. Adoption refers to extent of use of control measure practices of various weeds of rice crop by the rice growers. To measure the extent of adoption of recommended control measure practices of various weeds of rice crop an interview schedule was prepared in which 66 items were converted in to questions.

To measure extent of adoption, recommended control measure practices were listed and responses for each practice were obtained into three point scale as under:

Categories	Score
Not adopted	0
Partially adopted	1
Fully adopted	2

The farmer's extent of adoption was ascertained in terms of selected practices of recommended control measure practices of various weeds. The adoption index was worked out as follows:

Adoption index = $\frac{\text{Sum of adoption score actually obtained by the respondents}}{\text{Maximum possible obtainable adoption score by the respondents}}$ X 100

The respondents were classified into three categories by using following formula:

A.I. = Mean ($\overline{X}$) ± S.D. (Standard Deviation)

Categories	
Low level of adoption	(< $\overline{X}$ – S.D.)
Medium level of adoption	(in between $\overline{X}$ ± S.D.)
High level of adoption	(> $\overline{X}$ + S.D.)

RESULT AND DISCUSSION

Table 1: Distribution of respondents according to their level of knowledge regarding control measure practices of various weeds of rice crop

(n=160)

S.N.	**Name of weeds**	**Level of knowledge**	**Frequency**	**Per cent**
1.	Sawa (*Echinochloa colona* L.)	Low (up to 18 score) Medium (19-20 score) High (above 20 score)	9 110 41	5.63 68.75 26.62
		$\overline{X}$ = 19.06 **S.D**.= 1.37	**160**	**100.00**
2.	Motha (*Cyperus spp*.)	Low (up to 21 score) Medium (22-24 score) High (above 24 score)	18 132 10	11.25 82.50 6.25
		$\overline{X}$ = 22.75 **S.D**.=1.14	**160**	**100.00**
3.	Kaua keni (*Commelina benghalensis* L.)	Low (up to 9 score) Medium (10-11 score) High (above 11 score)	28 127 5	17.50 79.37 3.13
		$\overline{X}$ = 10.15 **S.D**.= 0.98	**160**	**100.00**
4.	Machharia (*Corchorus aestuans* L.)	Low (up to 9 score) Medium (10-11 score) High (above 11 score)	40 120 0	25.00 75.00 0.00
		$\overline{X}$ = 9.93 **S.D**.= 0.86	**160**	**100.00**
5.	Pekereal weed (*Monochoria vaginalis*)	Low (up to 9 score) Medium (10-11 score) High (above 11 score)	29 123 8	18.12 76.88 5.00
		$\overline{X}$ = 10.09 **S.D**.= 1.00	**160**	**100.00**
6.	Badauri (*Ischaemum rugosum* L.)	Low (up to 9 score) Medium (10-14 score) High (above 14 score)	29 123 8	18.12 76.88 5.00
		$\overline{X}$ = 12.66 **S.D**.= 1.06	**160**	**100.00**
7.	Sol ghas (*Aeschynomene indica* L.)	Low (up to 9 score) Medium (10-11score) High (above 11 score)	26 128 6	16.25 80.00 3.75
		$\overline{X}$ = 10.33 **S.D**.= 1.14	**160**	**100.00**
8.	Resamkata (*Alternanthera sessilis* L.)	Low (up to 5 score) Medium (6-10 score) High (above 10 score)	61 76 23	38.12 47.50 14.38
		$\overline{X}$ = 7.46 **S.D**.= 2.49	**160**	**100.00**
9.	Kala bhengra (*Eclipta prostrata* L.)	Low (up to 11 score) Medium (12-14 score) High (above 14 score)	20 130 10	12.50 81.25 6.25
		$\overline{X}$ = 12.70 **S.D**.= 1.31	**160**	**100.00**

It was found that majority of the respondents (75.00%) had medium level of knowledge regarding control measure practices of machharia (*Corchorus aestuans* L.), followed by 25.00 per cent respondents who were having low knowledge regarding control measure practices of machharia (*Corchorus aestuans* L.), whereas none of the respondents were having

high level of knowledge regarding control measure practices of machharia (*Corchorus aestuans* L.).

It was found that majority of the respondents (76.88%) had medium level of knowledge regarding control measure practices of pekereal weed (*Monochoria vaginalis*), whereas, 18.12 and 5.00 per cent of the respondents were having low and high level of knowledge, respectively regarding control measure practices of pekereal weed.

It was observed that majority of the respondents (76.88%) had medium level of knowledge regarding control measure practices of badauri (*Ischaemum rugosum* L.), 18.12 and 5.00 per cent of the respondents were having low and high level of knowledge, respectively regarding control measure practices of badauri.

It was observed that majority of the respondents (80.00%) had medium level of knowledge regarding control measure practices of Sol ghas (*Aeschynomene indica* L.), 16.25and 3.75 per cent of the respondents were having low and high level of knowledge, respectively regarding control measure practices of sol ghas.

It was found that maximum number of the respondents (47.50%) had medium level of knowledge regarding control measure practices of resamkata (*Alternanthera sessilis* L.), whereas, 38.12 and 14.38 per cent of the respondents were having low and high level of knowledge, respectively regarding control measure practices of resamkata.

It was found that majority of the respondents (81.25%) had medium level of knowledge regarding control measure practices of kala bhengra (*Eclipta prostrata* L.), whereas, 12.50 and 6.25 per cent of the respondents were having low and high level of knowledge, respectively regarding control measure practices of kala bhengra.

Table 2: Distribution of respondents according to their level of adoption regarding control measure practices of various weeds of rice crop (n=160)

S.N.	Name of weeds	Level of adoption	Frequency	Per cent
1.	Sawa (*Echinochloa colona* L.)	Low (up to 17 score) Medium (18-19 score) High (above 19 score)	39 107 14	24.37 66.87 8.76
		$\overline{X}$ = 18.23 **S.D.**= 1.02	**160**	**100.00**
2.	Motha (*Cyperus spp*.)	Low (up to 22 score) Medium (23-24 score) High (above 24 score)	21 110 29	13.12 68.75 18.13
		$\overline{X}$ = 23.11 **S.D.**= 1.48	**160**	**100.00**
3.	Kaua keni (*Commelina benghalensis* L.)	Low (up to 19 score) Medium (20-21 score) High (above 21 score)	54 84 22	33.75 52.50 13.75
		$\overline{X}$ = 20.01 **S.D.**= 1.24	**160**	**100.00**
4.	Machharia (*Corchorus aestuans* L.)	Low (up to 14 score) Medium (15-17 score) High (above 17 score)	50 94 16	31.25 58.75 10.00
		$\overline{X}$ = 15.44 **S.D.**= 1.42	**160**	**100.00**
5.	Pekereal weed (*Monochoria vaginalis*)	Low (up to 15 score) Medium (16-17score) High (above 17 score)	58 91 11	36.25 56.87 6.88
		$\overline{X}$ = 15.83 **S.D.**= 1.22	**160**	**100.00**
6.	Badauri (*Ischaemum rugosum* L.)	Low (up to 14 score) Medium (15-16 score) High (16 above score)	57 87 16	35.62 54.38 10.00
		$\overline{X}$ = 14.88 **S.D.**= 1.07	**160**	**100.00**
7.	Sol ghas (*Aeschynomene indica* L.)	Low (up to 15 score) Medium (16-18 score) High (above score)	36 115 9	22.50 71.87 5.63
		$\overline{X}$ = 14.36 **S.D.**= 1.72	**160**	**100.00**
8.	Resamkata (*Alternanthera sessilis* L.)	Low (up to 7 score) Medium (8-13 score) High (above 13 score)	66 57 37	41.25 35.63 23.12
		$\overline{X}$ = 10.21 **S.D.**= 3.36	**160**	**100.00**

9.	Kala bhengra (*Eclipta prostrata* L.)	Low (up to 15 score) Medium (16-18 score) High (above 18 score)	28 122 10	17.50 76.25 6.25
		$\overline{X}$ = 16.13 **S.D.**= 1.13	**160**	**100.00**

The data represented in Table 2 indicated that majority of the respondents (66.87%) had medium level of adoption regarding control measure practices of sawa (*Echinochloa colona* L.), followed by 24.37 per cent respondents were having low adoption regarding control measure practices of sawa (*Echinochloa colona* L.), where as 8.76 per cent respondents had high level of adoption regarding control measure practices of sawa (*Echinochloa colona* L.).

It was found that majority of the respondents (68.75%) had medium level of adoption regarding control measure practices of motha (*Cyperus* spp.), whereas, 13.12 and 18.13 per cent of the respondents were having low and high level of adoption, respectively regarding control measure practices of motha.

It was observed that maximum number of the respondents (52.50%) had medium level of adoption regarding control measure practices of kaua keni (*Commelina benghalensis* L.), 33.75 and 13.75 per cent of the respondents were having low and high level of adoption, respectively regarding control measure practices of kaua keni.

It was found that majority of the respondents (58.75%) had medium level of adoption regarding control measure practices of machharia (*Corchorus aestuans* L.), 31.25 and 10.00 per cent of the respondents were having low and high level of knowledge, respectively regarding control measure practices of machharia.

It was found that majority of the respondents (56.87%) had medium level of adoption regarding control measure practices of pekereal weed (*Monochoria vaginalis*), whereas, 36.25 and 6.88 per cent of the respondents were having low and high level of adoption, respectively regarding control measure practices of pekereal weed.

It was observed that maximum number of the respondents (54.38%) had medium level of adoption regarding control measure practices of badauri (*Ischaemum rugosum* L.), 35.62 and 10.00 per cent of the respondents were having low and high level of adoption, respectively regarding control measure practices of badauri.

It was observed that majority of the respondents (71.87%) had medium level adoption regarding control measure practices of sol ghas (*Aeschynomene indica* L.), 22.50 and 5.63 per cent of the respondents were having low and high level of adoption, respectively regarding control measure practices of sol ghas.

It was found that maximum number of the respondents (41.25%) had high level of adoption regarding control measure practices of resamkata (*Alternanthera sessilis* L.), whereas, 35.63 and 23.12 per cent of the respondents were having medium and low level of adoption, respectively regarding control measure practices of resamkata.

It was found that majority of the respondents (76.25%) had medium level of adoption regarding control measure practices of kala bhengra (*Eclipta prostrata* L.), whereas, 17.50 and 6.25 per cent of the respondents were having low and high level of adoption, respectively regarding control measure practices of kala bhengra.

CONCLUSION

It can be concluded that 68.76 per cent, 82.50 per cent, 79.37 per cent, 75.00 per cent, 76.88 per cent, 76.88 per cent, 80.00 per cent, 47.50 per cent and 81.25 per cent of the respondents had medium level of knowledge regarding control measure practices of various weeds of rice crop *i.e.* sawa (*Echinochloa colona* L.), motha (*Cyperus spp*.), kaua keni (*Commelina benghalensis* L.), machharia (*Corchorus aestuans* L.), pekereal weed (*Monochoria vaginalis*), badauri (*Ischaemum rugosum* L.), sol ghas (*Aeschynomene indica* L.), kala bhengra (*Eclipta prostrata* L.) and resamkata (*Alternanthera sessilis* L.) respectively. It can be concluded that 66.87 per cent, 68.75 per cent, 52.50 per cent, 58.75 per cent, 56.87 per cent, 54.38 per cent, 71.87 per cent and 76.25 per cent of the respondents had medium level of adoption regarding control measure practices of various weeds of rice crop *i.e.* sawa (*Echinochloa colona* L.), motha (*Cyperus spp*.), kaua keni (*Commelina benghalensis* L.), machharia (*Corchorus aestuans* L.), pekereal weed (*Monochoria vaginalis*), badauri (*Ischaemum rugosum* L.), sol ghas (*Aeschynomene indica* L.), kala bhengra (*Eclipta prostrata* L.) respectively.

It was found that majority of the respondents (82.50%) had medium level of knowledge regarding control measure practices of various weeds of rice crop; whereas majority of the respondents (76.26%) had medium level of adoption regarding control measure practices of various weeds of rice crop.

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