Agriculture Update
Volume **9** | Issue 1 | February, 2014 | 139-144

A Case Study

An empirical study on farmers knowledge and adoption of improved paddy cultivation practices

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ARTICLE CHRONICLE :
Received :
12.10.2013;
Accepted :
27.01.2014

SUMMARY : The present study was conducted in Raichur and Manvi taluks of Raichur district during 2012-13 with 120 respondents. The ex post facto research design was used for the study. The data were collected using structured and pre tested interview schedule. The results of the study indicated that, majority of the respondents possessed full knowledge with respect to practices like recommended variety, seed rate, micro nutrients, manual weeding and time of harvesting and partial knowledge in practices like seed treatment, age of seedlings at transplanting, organic manure, application of chemical fertilizers, irrigation management and pest and disease management. Majority of them fully adopted the practices like recommended variety, seed rate, micro nutrients, time of harvesting and chemical weed control. Majority of the respondents were having full knowledge regarding simple practices and have adopted the same. Some of the practices like number of seedlings per hill, application of chemical fertilizers, recommended dose of organic manure, manual weeding, chemical weed control, management of pests and diseases were also partially adopted by majority of the respondents.

How to cite this article : Maraddi, G.N., Sathish, H.S. and Rajeshwari (2014). An empirical study on farmers knowledge and adoption of improved paddy cultivation practices. *Agric. Update*, **9**(1): 139-144.

KEY WORDS :
Adoption,
Component wise practices,
Constraints,
Knowledge

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BACKGROUND AND OBJECTIVES

Paddy (*Oryza sativa* L.) is one of the important cereal crops of the world and forms the staple food for more than 50 per cent of population and is known as "king of cereals". In Asia, India has the largest area under the rice accounting for 28.5 per cent of the global rice area. Rice is an important food crop of India and stands first in area and second in total food production. Among the rice growing countries, India has the largest area under rice in the world (43.97 million ha) with a total production of 104.32 million tonnes during 2011-12 and it stood next only to China in the world with respect to production.

In India, the highest area under paddy is in Uttar Pradesh (5.95 million ha), followed by West Bengal (5.46 million ha), Andhra Pradesh (4.10 million ha), Odisha (4.02 million ha), and Karnataka (1.39 million ha). Production-wise, West Bengal stands first (14.80 million tonnes), followed by Uttar Pradesh (14.03 million tonnes), Andhra Pradesh (12.89 million tonnes), and Karnataka (4.04 million tonnes). The highest yield is observed in the state of Punjab (3741 kg/ha) followed by Tamil Nadu (3423 kg/ha), Andhra Pradesh (3146 kg/ha) and Karnataka (2897 kg/ha) (Anonymous, 2012).

Karnataka is one of the major rice growing states in India. It is grown in an area of 1.39 million ha with an annual production of 4.04 million tonnes. The area under rice production is increasing over the years. Rice is grown under varied conditions and bulk of the area is under assured rainfall and irrigated conditions of canals. The important rice growing districts of the state are, Haveri, Uttar Kannada, Dharwad, Koppal, Raichur, Mysore, Hassan, and Chitradurga. Even though rice is grown under varied agro climatic

conditions, the production and productivity is low in Karnataka compared to other rice growing states. The knowledge and adoption of improved rice production technologies plays a important role in improving the production and productivity of rice. With this background the present study was conducted in Raichur district of Karnataka to assess the knowledge and adoption level of improved paddy cultivation practices by the farmers.

RESOURCES AND METHODS

The research study was conducted in Raichur district which was purposively selected during 2012-13. Two taluks namely Raichur and Manvi were selected purposively with the criteria of convenience to the researcher. Further, three villages were identified from each taluk and from each village twenty respondents were selected randomly from each village. Thus, the total sample constituted 120 respondents. Ex post facto research design was employed in the study. The data were collected from the respondents using structured and pre-tested interview schedule personally. The collected data were tabulated and analyzed using appropriate statistical tools.

OBSERVATIONS AND ANALYSIS

The experimental findings obtained from the present study have been discussed in following heads:

Component wise knowledge status of paddy cultivation practices by the respondents:

Seeds and sowing:

It is clear from the Table 1 that, majority (87.50 %) of the respondents were having full knowledge with respect to recommended variety. Only 10.00 and 2.50 per cent of them had partial and no knowledge, respectively. This might be due to regular contact of the farmers with the university scientists, input supply agencies, government and private extension organizations. Similar results were also reported by Kirar and Mehta (2009). With respect to seed rate, 73.33 per cent

Table 1: Component wise knowledge of paddy cultivation practices by the respondents

Sr. No.	Particulars of technology components	Full knowledge		Partial knowledge		No knowledge	
		F	%	F	%	F	%
1.	**Seeds and sowing**						
	Recommended variety	105	87.50	12	10.00	3	2.50
	Seed rate	88	73.33	26	21.67	6	5.00
	Seed treatment	34	28.33	56	46.67	30	25.00
	Spacing	21	17.50	43	35.83	56	46.67
	Age of seedlings at transplanting	24	20.00	55	45.83	41	34.17
	No. of seedlings per hill	39	32.50	65	54.17	16	13.33
2.	**Manures and fertilizers**						
	Organic Recommended dose	24	20.00	74	61.67	22	18.33
	Manure/FYM Time of application	31	25.83	62	51.67	27	22.50
	Chemical fertilizers	29	24.17	86	71.67	5	4.17
	Micro nutrients	64	53.33	47	39.17	9	7.50
3.	**Weed management**						
	Manual weeding	62	51.67	58	48.33	0	0.00
	Mechanical weeding	31	25.83	28	23.33	61	50.83
	Chemical weed control	45	37.50	58	48.33	17	14.17
4.	**Irrigation management**	29	24.17	79	65.83	12	10.00
5.	**Pest management**						
	Stem borer	28	23.33	74	61.67	18	15.00
	Brown Plant hopper	19	15.83	69	57.50	32	26.67
	Mites	22	18.33	78	65.00	20	16.67
6.	**Disease management**						
	Blast	25	20.83	79	65.83	16	13.33
	Sheath blight	18	15.00	74	61.67	28	23.33
	Brown spot	31	25.83	85	70.83	4	3.33
7.	**Harvesting and threshing**						
	Time of harvesting	114	95.00	4	3.33	2	1.67
	Method of harvesting and Manual	0	0.00	0	0.00	0	0.00
	threshing Mechanical	120	100.00	0	0.00	0	0.00

of the respondents were having full knowledge, followed by partial knowledge (21.67 %) and no knowledge (5.00 %) . Around forty seven per cent (46.67 %) of the respondents were having partial knowledge with regard to seed treatment. The per cent of respondents with full knowledge and no knowledge was found to be 28.33 and 25.00, respectively. This could be due to ignorance of the farmers to know about the importance of seed treatment and also lack of contact with the extension functionaries. Similar results were reported by Kirar and Mehta (2009).

With regard to spacing, around forty seven per cent (46.67 %) of the respondents were having no knowledge. Around 35 per cent of the respondents were having partial knowledge and only 17.50 per cent of them were having full knowledge. This might be due to tendency of farmers to follow their own way of deciding on the spacing and generally they do not follow recommended spacing. The results are in conformity with the findings of Barman and Pathak (2000).

In case of number of seedlings per hill, more than half (54.17 %) of the respondents were having partial knowledge. The per cent of respondents having full knowledge and no knowledge was found to be 32.50 and 13.33, respectively.

Manures and fertilizers:

With respect to organic manure, the application of recommended dose was partially known to 61.67 per cent of the respondents. Twenty per cent of them knew the practice fully and remaining 18.33 per cent of them do not knew the practice. With regard to time of application, around half (51.67 %) of the respondents partially knew the practice. The per cent of respondents with full knowledge was found to be 25.83 per cent and remaining 22.50 per cent were not having any knowledge. This could be attributed to the ignorance of the farmers to know about the application of organic manure, meagre contact with the scientist, agriculture officer coupled with less exposure to expert system, information kiosks and other ICT tools. With regard to chemical fertilizers, 71.67 per cent of the respondents were having partial knowledge. About 24 per cent of them were having full knowledge. Negligible per cent of them were having no knowledge. The results are in conformity with the results of Kirar and Mehta (2009).

Application of micro nutrients was fully known to more than half (53.33 %) of the respondents. Partial knowledge was possessed by 39.17 per cent. Only 7.50 per cent of them were not having any knowledge.

Weed management:

Knowledge about manual weeding was possessed fully by 51.67 per cent of the respondents and remaining 48.33 per cent of them were having partial knowledge. About half of the respondents were not having any knowledge with respect to mechanical weeding in paddy. Full knowledge and partial knowledge was possessed by 25.83 and 23.33 per cent of the respondents, respectively. This might be due to complex nature of weedicide reaction at field coupled with higher price of chemicals in addition to less exposure to both result and method demonstration on application of weedicide. Chemical weed control was known to 48.33 per cent of the respondents partially and 37.50 per cent of them were having full knowledge. Remaining 14.17 per cent of them were not having any knowledge.

Irrigation:

Partial knowledge with respect to irrigation management was possessed by 65.83 per cent of the respondents. 24.17 per cent of them were having full knowledge. No knowledge in irrigation management was possessed by remaining 10 per cent of the respondents. The results are in conformity with the results of Kirar and Mehta (2009).

Pest management:

With respect to pest management, majority of the respondents were having partial knowledge with respect to stem borer (61.67 %), brown plant hopper (57.50 %) and mites (65.00 %). Remaining per cent of them were having full knowledge and no knowledge with regard to pest management practices.

Disease management:

Majority of the respondents were having partial knowledge with respect to management of blast (65.83 %), sheath blight (61.67 %) and brown spot (70.83 %). Full knowledge and no knowledge of these diseases was possessed by remaining per cent of the respondents. The probable reason for partial knowledge with respect to pest and disease management might be due to less exposure to information sources and low level of participation in extension activities coupled with complexity of incidence, spread, identification of symptoms and lack of exposure to demonstrations and other extension activities.

Harvesting and threshing:

Majority (95.00 %) of the respondents were having full knowledge with respect to time of harvesting. Very negligible per cent of the respondents were having partial knowledge (3.33 %) and no knowledge (1.67 %). With respect to method of harvesting and threshing, cent per cent of the respondents were having full knowledge.

Component wise adoption level of paddy cultivation practices by the respondents:

Seeds and sowing:

It is clear from the Table 2 that, majority (83.33 %) of

the respondents adopted the recommended variety followed by partial (13.33 %) and non- adoption (3.33 %), this might be due to easy availability of seeds of improved varieties to the farmers through input supply agencies and RSKs. With respect to seed rate, 66.67 per cent of them adopted the recommended seed rate. 25 per cent of them adopted partially and only 8.33 not adopted. This could be attributed to regular contact of the farmers with the input suppliers and RSKs who provide information to farmers about recommended seed rate. Seventy per cent of the respondents not adopted the recommended seed treatment. Only 16.67 and 13.33 per cent of the respondents adopted the seed treatment partially and fully, respectively. The probable reasons could be due to lack of knowledge and non availability of quality bio agents.

With regard to spacing, majority (61.67 %) of the respondents not adopted the practice. the per cent of respondents who adopted the practice partially was 30.00. Only 8.33 per cent of them fully adopted the recommended spacing. This might be due to the fact that farmers usually follow manual transplanting where in the labourers engaged in transplanting do not follow standard spacing. It is also known fact that farmers usually follow their own way of deciding on the spacing. More than forty per cent (43.33 %) of the respondents partially adopted the recommended number of seedlings per hill. Around 39 per cent of them not adopted the recommended practices and 17.50 per cent of them fully adopted the practice. This could be attributed to lack of knowledge of farmers about recommended number of seedlings per hill and exposure to demonstrations on wider row spacing coupled with lack of knowledge about importance and benefits of recommended spacing, intern which helps for carrying out manual weeding, fertilizer application, identifying pests and diseases at initial stages with less efforts.

Manures and fertilizers:

With respect organic manure, 46.67 per cent of the respondents not adopted the recommended dose, followed by partial (43.33 %) and full (10.00 %) adoption. More than

Table 2 : Component wise adoption of respondents about paddy cultivation

Sr. No.	Particulars of technology components		Full adoption		Partial adoption		Non adoption	
			F	%	F	%	F	%
1.	**Seeds and sowing**							
	Recommended variety		100	83.33	16	13.33	4	3.33
	Seed rate		80	66.67	30	25.00	10	8.33
	Seed treatment		16	13.33	20	16.67	84	70.00
	Spacing		10	8.33	36	30.00	74	61.67
	Age of seedlings at transplanting		12	10.00	44	36.67	64	53.33
	No. of seedlings per hill		21	17.50	52	43.33	47	39.17
2.	**Manures and fertilizers**							
	Organic manure	Recommended dose	12	10.00	52	43.33	56	46.67
		Time of application	24	20.00	44	36.67	52	43.33
	Chemical fertilizers		11	9.17	109	90.83	0	0.00
	Micro nutrients		60	50.00	34	28.33	26	21.67
3.	**Weed management**							
	Manual weeding		23	19.17	67	55.83	30	25.00
	Mechanical weeding		9	7.50	17	14.17	94	78.33
	Chemical weed control		45	37.50	66	55.00	9	7.50
4.	**Irrigation**		13	10.83	85	70.83	22	18.33
5.	**Pest management**							
	Stem borer		23	19.17	65	54.17	32	26.67
	Brown plant hopper		12	10.00	76	63.33	32	26.67
	Mites		16	13.33	61	50.83	43	35.83
6.	**Disease management**							
	Blast		20	16.67	63	52.50	37	30.83
	Sheath blight		12	10.00	69	57.50	39	32.50
	Brown spot		20	16.67	68	56.67	32	26.67
7.	**Harvesting and threshing**							
	Time of harvesting		99	82.50	11	9.17	10	8.33
	Method of harvesting and	Manual	0	0.00	0	0.00	0	0.00
	threshing	Mechanical	120	100.00	0	0.00	0	0.00

forty per cent (43.33 %) of the respondents not adopted the right time of application of organic manure. 36.67 and 20 per cent of them adopted this practice partially and fully, respectively. This might be due to non-availability and high cost of organic manure and also lack of knowledge regarding importance of use of organic manure in agriculture. In addition gradually decreasing livestock population both at micro and macro level and lack of knowledge about preparation of compost and recycling mechanism.

With regard to chemical fertilizers, major (90.83 %) chunk of the respondents partially adopted the application of recommended dose of chemical fertilizers followed by full (9.17 %) adoption. The application of recommended dose of fertilizers depends on the availability and purchasing power. Usually farmers apply chemical fertilizers according to their calculations. In case of application of micro nutrients, half of the respondents adopted the recommended practice. Among remaining half, 28.33 and 21.67 per cent of them adopted the practice partially and fully, respectively. This could be due to awareness of the respondents about the importance of micro nutrients.

Weed management:

Manual weeding was adopted partially by more than half (55.83 %) of the respondents followed by non-adoption (25.00 %) and full adoption (19.17 %). Manual weeding is the most common weed management practice followed by most of the paddy growing farmers. Majority (78.33 %) of the respondents adopted not adopted the mechanical weeding in paddy. Only 14.17 and 7.50 per cent of them adopted the practice partially and fully. This could be due to lack of awareness and knowledge about mechanical weeding in paddy, respectively. Chemical weed control was adopted partially by majority (55.00 %) of the respondents. The per cent of respondents adopting the chemical weed control fully was found to be 37.50. Only 7.50 per cent of them not adopted the practice. This could be due to lack of knowledge about herbicide usage due to low education level of the farmers, high cost of chemicals and poor extension activities with respect to herbicide technology. The results are in line with the findings of Ojehomon *et al.* (2006).

Irrigation:

With respect to irrigation, 70.83 per cent of the respondents adopted partially. Only 18.33 and 10.83 per cent of them not adopted and fully adopted the practice, respectively.

Pest management:

More than half of the respondents partially adopted the management practices of stem borer (54.17 %), brown plant hopper (63.33 %) and mites (50.83 %), followed by non-adoption and full adoption. This could be attributed to complexity of the practice and also lack of knowledge about use of recommended chemicals and dose of chemical.

Disease management:

More than half of the respondents partially adopted the management practices of diseases like blast (52.50 %), sheath blight (57.50 %) and brown spot (56.67 %). Remaining per cent of the respondents adopted the management practices partially and fully. Lack of knowledge about disease management practices and also the complexity involved in the identification of the disease and selection of suitable recommended chemical might be the probable reasons for the above findings.

Harvesting and threshing:

Majority (82.50 %) of the respondents fully adopted the correct time of harvesting. Only negligible per cent of them partially adopted correct time of harvesting. only 8.33 per cent of them not adopted the practice. With regard to method of harvesting and threshing, cent per cent of the respondents full adopted the mechanical harvesting and

Table 3: Difficulties experienced by the farmers in paddy cultivation

Sr. No.	Type of input	Constraints	Frequency	Percentage
1.	Seeds	Lack of reliable source	79	65.83
		Non-availability of quality seeds in time	113	94.17
		High cost	109	90.83
2.	Fertilizers	Non-availability of sufficient quantity	63	52.50
		Lack of more percentage of subsidies	81	67.50
3.	Plant protection chemicals	High cost of chemicals	94	78.33
		Lack of knowledge regarding use of chemicals	67	55.83
4.	Credit / implements	High rate of interest	116	96.67
		Non-availability required credit in time	91	75.83
		Complex of procedure to avail loan	67	55.83
		Lack of implements repairing facilities in villages	59	49.17
5.	Others	High cost and non-availability of labour	116	96.67
		Lack of knowledge regarding seed treatment	69	57.50

threshing. The probable reasons for the above findings might be non-availability of labour during peak season and high wages of labour in the villages.

Difficulties experienced by the farmers in paddy cultivation:

It is clear from the Table 3 that, non-availability of quality seeds in time was the major seeds related difficulty as expressed by 94.17 per cent of the respondents. High cost (90.83 %) and lack of more percentage of subsidies (67.50 %) were the major fertilizer related difficulty as expressed by majority of the respondents. With regard to plant protection chemicals, high cost of chemicals was the major difficulty experienced by majority (78.33 %) followed by lack of knowledge regarding use of chemicals (55.83 %). High rate of interest and non-availability required credit in time were the major credit related difficulty as experienced by 96.67 and 75.83 per cent of the respondents, respectively. High cost and non-availability of labour was also one of the major difficulty as experienced by 96.67 per cent of the paddy growers.

Conclusion:

It is clear from the results of the study that, majority of the respondents possessed full knowledge with respect to practices like recommended variety, seed rate, micro nutrients, manual weeding and time of harvesting. Majority of them fully adopted the practices like recommended variety, seed rate, micro nutrients, time of harvesting and chemical weed control. Majority of the respondents were having full knowledge regarding simple practices and have adopted the same. Therefore, administrators and policy makers of the extension organizations and developmental departments should formulate more intensive extension programmes to improve the knowledge level of the farmers about improved paddy cultivation practices and motivate the farmers to adopt the same to improve the production and productivity of cotton. Emphasis should be given to use participatory approaches like farmers field school, participatory rural appraisal, participatory learning and action and participatory technology development while disseminating more complex technologies so that the technologies will be clearly understood by the average farmers. Hobli wise and season wise campaign should be organized on seed treatment, fertilizers application and plant protection measures.

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