



Paddy growers profile, knowledge and adoption of plant protection measures

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ABSTRACT

The study was conducted in the randomly selected villages of Talukas of Raichur district during 2009-2010. Manvi and Sindhanur Talukas were purposively selected since these Talukas were having more number of paddy growers and occupied more area under paddy cultivation as compared to the other Talukas in the district and also based on the criteria of high diseases and pest infestation level. Majority of the farmers (88.57 % and 62.85%) had knowledge about brown plant hoppers and ear head cutting caterpillar. Majority (77.14%) of the farmers knew about Phorate. About 46.85 per cent of the farmers adopted Furadan pesticide for control of stem borer. Only 17.14 and 21.71 per cent of them adopted proper concentration of Carbofuran and Dimethoate, whereas 58.28 per cent of the farmers had adopted proper concentration of Endosulfan 35 EC. High majority (96%) of the respondents possessed television sets. Vehicles and sprayers and dusters were possessed by 90.85 and 89.71 per cent of the respondents, respectively. Lack of knowledge about chemicals, lack of knowledge about to number of sprays and lack of knowledge with regard to technology application were the major constraints as expressed by 43.42, 62.85 and 83.42 per cent of respondents, respectively. High cost of chemicals and high cost of equipments were also the major constraints expressed by 76.00 and 51.42 per cent of respondents.

Manjunath, T., Manjunath, L., Natikar, K.V., Jahagirdar, K. A. and Megeri, S.N. (2011). Paddy growers profile, knowledge and adoption of plant protection measures *Agric. Update*, 6(1):21-27.

INTRODUCTION

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". The United Nations General Assembly, in a resolution declared the year of 2004 as the "International Year of Rice", which has tremendous significance to food security. It very eloquently upheld the need to heighten awareness about the role of rice in alleviating poverty and malnutrition (Barath and Pandey, 2005). It is an important food crop of India and stands first in area and second in total food production. The yield levels in India are low as compared to other major rice producing countries viz., Japan, China and Indonesia. About 67 per cent of the area under paddy in India is under high yielding varieties.

In India, the highest area under paddy is in Uttar Pradesh (59.20 lakh ha), followed by West Bengal (56.90 lakh ha), Orissa (44.50 lakh West Bengal (56.90 lakh ha), Orissa (44.50

lakh ha), Andhra Pradesh (39.80 lakh ha) and Karnataka (14.20 lakh ha). Production-wise, West Bengal stands first (147.50 lakh tonnes), followed by Andhra Pradesh (118.70 lakh tonnes), Uttar Pradesh (111.20 lakh tonnes) and Karnataka (34.50 lakh tonnes). The highest yield is observed in the state of Punjab (3870 kg/ha), followed by Assam (3360 kg/ha) and Karnataka (2464 kg/ha) (Anonymous, 2008). In plant protection plays a vital role in modern agriculture. Fertilizers, plant protection measures, irrigation and improved seeds are the key elements of modern agriculture. The new technology is associated with the high pests and disease incidences. In the absence of adequate plant protection measures, the positive contribution of improved seeds, fertilizers and irrigation to output could completely nullify and farmers may incur heavy losses.

METHODOLOGY

The study was conducted in the randomly

Key words :

Paddy growers,
Plant protection
measures,
Knowledge and
adoption

Received:
August, 2010;
Accepted :
September, 2010

selected villages of Talukas of Raichur district during 2009-2010. Manvi and Sindhanur Taluka were purposively selected since these Taluka are having more number of paddy growers and occupy more area under paddy cultivation as compared to the other Taluka in the districts and also based on the criteria of high diseases and pest infestation level. Raichur district comes under North-Eastern dry Zone of the Agro-climatic zones classified in the state which lies in the 16.15° N of north latitude and 77.0° of east longitude. The district has varied climatic, topographical, soil and water resources and cropping systems and has an altitude of 3981.23 mts from MSL. The district comprises of five Talukas namely, Raichur, Deodurga, Lingsugur, Sindhanur and Manvi. From each village 25 farmers were selected randomly. Thus, 175 paddy growing farmers spread over seven villages of Sindhanur and Manvi talukas constituted the sample for

the study.

The data were collected by using a structured interview schedule based on experience gained. The interview schedule was modified wherever needed and finalized. The final interview schedule was used to elicit the information from the respondents by personal interview method. The data were analysed by using appropriate statistical tools. The statistical tools such as mean, standard deviation, frequency, percentage and correlation were employed wherever found appropriate and data were analysed to draw valid inferences.

RESULTS AND DISCUSSION

The data presented in Table 1 indicate that majority of the respondents (58.85%) belonged to middle age group. Further, respondents between 31 to 45 years of age group have more physical vigour and also more

Variable	Category	Respondents	
		Frequency	Percentage
1. Age	Young age (upto 30 years)	12	6.85
	Middle age (31 - 50 years)	103	58.85
	Old age (> 51 years)	60	34.28
2. Education	Illiterate	64	36.57
	Primary School	23	13.14
	Middle School	45	25.71
	High School	32	18.28
	PUC	07	4.00
	Graduate	04	2.28
3. Land holding (acres)	Marginal (upto 2.50)	25	14.28
	Small (2.51-5.00)	31	17.71
	Semi-medium (5.01-10.00)	41	23.42
	Medium (10.01-25.00)	57	32.57
	Big (>25.00)	21	12.00
4. Annual income	Low income (< Rs. 49,310)	68	38.85
	Medium income (Rs. 49,310 - 1,21,217)	62	35.42
	High income (> Rs. 1,21,217)	45	25.71
5. Family size	Small (< 5)	100	57.14
	Medium (5-8)	55	31.42
	Large (>8)	20	11.40
6. Innovative proneness	Low (<12.30)	85	48.57
	Medium (12.30-13.06)	53	30.28
	High (>13.06)	37	21.14
	Mean=12.68, SD=0.90		
7. Economic motivation	Low (<5.68)	45	25.71
	Medium (5.68-6.02)	100	57.14
	High (>6.02)	30	17.14
	Mean=5.85, SD=0.40		

Table 2: Extension participation of paddy growers**(n=175)**

Sr. No.	Extension activities	Degree of Participation					
		Regular		Occasionally		Never	
		F	%	F	%	F	%
1.	Training programme	43	24.57	52	29.71	80	45.71
2.	Demonstrations	18	10.28	46	26.28	111	63.42
3.	Educational tour	57	32.57	70	40.00	48	27.42
4.	Field day	30	17.14	46	26.28	99	56.57
5.	Group discussion	41	23.42	53	30.28	81	46.28
6.	Agricultural exhibitions	32	18.28	39	22.28	104	59.42
7.	Krishimela	72	41.14	48	27.42	55	31.42

responsibility towards family than the younger ones. This might be the important reason to find that majority of the respondents in the age group of 31 to 45 years. The results are in line with the research findings reported by Reshmy(1998), Lakshmisha (2000) and Babanna (2002). It was observed that 36.57 per cent were illiterates, whereas 13.14 per cent of the respondents had received Primary education, followed by 25.71 per cent of respondents had received Middle School education, more over only 18.28 per cent of respondents had received High School education, while 4.00 per cent and 2.28 per cent of the respondents had education upto PUC and degree level, respectively. Non-realization of the influence of formal education in one's life, illiteracy of the parents might have come in the way of getting them better education by their parents. These findings got support from the studies conducted by Yogananda (1992), Balasubramani (1997), Raghavendra (1997), Reshmy (1998), Lakshmisha (2000) and Babanna (2002).

The results revealed that medium land holders category was more (32.57%), followed by 23.42 per cent of them were semi-medium land holders, 17.71 per cent of respondents were small land holders. With a least of 14.28 and 12.00 per cent of the respondents were marginal and big land holders, respectively. The possible reason might be that the ancestor land was fragmented into smaller and smaller sized land holdings, those who had other occupations other than agriculture might have less acres of land holdings since they did not find sufficient time to devote for agriculture which is the labour intensive activity.

The economic position of the families of the respondents indicated that 25.71 per cent of the respondents had annual income higher than Rs. 1,21,217 followed by annual income in between Rs. 49,310 to Rs. 1,21,217 (35.42%). The possible reason that could be attributed was their better socio-economic conditions. As the result showed that majority (32.57%) of the

respondents families were medium land holders. This might be one of the important reasons for having higher income. The economic position of families of the respondents indicated that 38.85 per cent of them had low income below Rs. 49310. It may be due to their lower socio-economic status. The results are in confirmity with the findings of Balasubramani (1997) and Raghavendra (1997) and Lakshmisha (2000).

Majority (57.14%) of the respondents belonged to small family, followed by medium family (31.42%) and remaining 11.40 per cent belonged to large family. The probable reasons behind these findings could be that young and middle aged people would prefer to live in nuclear families and old age people prefer joint family. Further, awareness and formal education of respondents might have helped them to maintain the small size family.

The data presented in Table 2 indicate that majority of the respondents participated in field trips organized for the benefit of farmers. Similarly, most of the respondents were participated in Krishimela, exhibitions to acquire more knowledge as well as to update the knowledge. The participation of the respondents in other activities was comparatively less. The results implied that the participation in various extension activities was low because of lack of motivation and less interest and less educational level of the respondents. The results were in line with the findings of Nityashree (1999) and Siddaramaiah (1993) and Balasubramani (1997), who found that majority of the farmers participation in extension activities was very low.

The data presente in Table 3 indicate that more than forty four per cent and 38.28 per cent of the respondents regularly and occasionally read newspapers, respectively. Whereas, 61.14 and 22.28 per cent of them regularly and occasionally listened to radio, respectively. Again, 50.85 and 34.28 per cent of them regularly and occasionally viewed Krishidarshan programme on TV, respectively. Television, the most popular mass media was possessed

Sr. No.	Media	Regular		Occasionally		Never	
		F	%	F	%	F	%
1.	Reading newspaper	78	44.57	67	38.28	30	17.14
2.	Listening to radio	107	61.14	39	22.28	29	66.85
3.	Do you read farm magazines/ leaflets and other related literatures on agriculture	26	14.85	32	18.28	117	66.85
4.	Viewing Krishidarshan programme on TV	89	50.85	60	34.28	26	14.85

by majority of the respondents. Even though, the cost of television is high, its possession indicated the social status, the television viewing behaviour. When analysed, it showed that this mass media was mainly used for the purpose of entertainment. Majority of them viewed agricultural programmes (Krishidarshan) occasionally. Lack of time, interest, language profiles and inconvenient timings of the programme might be attributed to this trend. These findings get support from the studies conducted by Raghavendra (1997) and Lakshisha (2000), who reported that mass media considered as credible source of information by majority of the respondents studied.

The data presented in Table 4 indicate that about 26.28 per cent of the respondents were members in milk cooperative society and 13.14 per cent of them participated occasionally, followed by 18.85 per cent of them were members in farmers cooperative society and only 2.28 per cent of them participated occasionally. Whereas, 2.28 per cent of them were members in Zila Parishad and only 2.28 per cent of them participated occasionally. Co-operative and voluntary organizations take an active role in rural development and are struggling very hard to bring the people under one roof at the local level. This implied that the participation in milk co-operative society was very high as compared to other selected organizations. It clearly indicated that the interest of the farmers to enrol

themselves in milk co-operatives. This might be mainly because, co-operative work on the “principle of democracy” and “service is the main motto”.

In case of innovation proneness, majority of the respondents (48.57%) had low proneness. This might be due to majority of the respondents were illiterates and had Middle School education level because of that the paddy growers were with low innovation proneness.

The data presented in Table 5 indicate that with respect to materials possessed by respondents, high majority (96%) of the respondents possessed television. Vehicles and sprayers and dusters were possessed by 90.85 and 89.71 per cent of respondents, respectively. Agricultural implements and radio were possessed by 64 and 48 per cent of the respondents, respectively. Only 19.42 per cent of them were having bullock cart. Better economic conditions of the respondents, regular use of agricultural implements and others in cultivating crops might have made respondents to possess the required materials.

The data presented in Table 6 indicate that majority (40.00%) of the respondents had contact with Agricultural Assistant once in a two weeks, followed by 23.42 per cent of them had contact with Asst. Agricultural Officers once in a month and 24.00 per cent of the respondents had contact with Scientists of UAS whenever problem

Sr. No.	Organisation	Member		Office bearer	Member participation		
		Non-member	Member		Regularly	Occasionally	Never
1.	Zila Parishad	171 (97.71)	4 (2.28)	-	-	4 (2.28)	171 (97.71)
2.	Village Panchayat	168 (96.00)	7 (4.00)	-	2 (1.14)	5 (2.85)	168 (96.00)
3.	Farmers service cooperative society	142 (81.14)	33 (18.85)	7 (4.00)	2 (1.14)	4 (2.28)	169 (96.57)
4.	Land development bank	159 (90.85)	16 (9.14)	3 (1.71)	6 (3.42)	10 (5.71)	159 (90.85)
5.	Milk cooperative society	129 (73.71)	46 (26.28)	10 (5.71)	15 (8.57)	23 (13.14)	137 (78.28)

Sr. No	Particulars	Frequency	Percentage
1.	Bullock cart	34	19.42
2.	Agricultural implements (plough, harrow etc.)	112	64.00
3.	Radio	84	48.00
4.	Television	168	96.00
5.	Vehicles (two wheeler, four wheelers)	159	90.85
6.	Sprayers and dusters	157	89.71

arises. (Table 6). As mentioned earlier, majority (36.57%) of the respondents were illiterates. The data indicated that, majority of respondents never contacted Agricultural Assistant because of non-availability of this official, since his office is located at taluk level. Further, 55.42 per cent of the respondent farmers 'never' contacted the subject matter specialists of Department of Agriculture and University of Agricultural Sciences specialists as they are located at a distant place which might have prevented them to contact frequently.

With regard to pests, high per cent (96.0 %) of farmers had knowledge about the stem borer. Majority of the farmers with 88.57 per cent and 62.85 per cent had absolute knowledge about brown plant hoppers and ear head cutting caterpillar, respectively. About 52.57 per cent of farmers had the knowledge of gundhi bug (Table 7). With regard to pesticides, 77.14 per cent of the farmers knew about phorate which was used for stem borer control, 73.14 per cent of the farmers did know the dimethoate for control of brown plant hoppers. Similarly, 54.28 per cent of the farmers had knowledge about the methyl parathion for gundhi bug control and high per cent (88.0 %) of the farmers did know about the Endosulfan 35 EC for army worm control. In case of diseases, majority of the farmers (93.71%) did know about the blast disease,

whereas 88.00 per cent of the farmers had knowledge about brown spot. Whereas, 79.42 and 48.57 per cent of the farmers did know about the sheath blight and false smut, respectively. The reason may be that the paddy is an important crop grown by farmers in this region. The attack of pests and diseases is also said to be more in paddy.

Regarding fungicides, 83.42 per cent of the farmers had the knowledge about Mancozeb 75 WP in case of brown spot, whereas 51.42 per cent of farmers had the knowledge about Bavistin for blast control and 48.57 per cent did not know about Blitox for control of false smut. It is better to acquire knowledge in every practice as it enhances better adoption level. The findings were in conformity with the observations of Balasubramani (1997) and Raghavendra (1997).

The adoption of plant protection measures depends on various factors such as farmers knowledge, situational factors, extent of support of change agent efforts, personal and socio-psychological characteristics of farmers, the characteristics of innovation itself, complexity of practices, timely availability of inputs etc. The findings of the present study in Table 8 reveals that considerable percentage (46.85%) of the paddy growers have applied Furadan pesticide for control of stem borer, 28.57 per cent of the farmers partially adopted Furadan and only 24.57 per cent of the farmers did not apply Furadan pesticide for control of stem borer. Similarly, 34.28 per cent of them applied Dimecron for the control of brown plant hopper, 42.85 per cent of the respondents partially applied Dimecron for the control of brown plant hopper, and only 22.85 per cent did not apply the Dimecron.

Similarly, majority of the respondents (74.28%) were found to apply endosulfan 35 EC pesticide for the control of army worm, 14.28 per cent did not apply endosulfan 35 EC for the control of army worm and 11.42 per cent of them partially applied endosulfan 35 EC for the control

Sr. No.	Extension worker	Frequency of contact									
		Once in a week		Once in a two week		Once in a month		Whenever problem arises		Never	
		F	%	F	%	F	%	F	%	F	%
1.	Agricultural Assistant	20	11.42	70	40.00	34	19.42	28	16.00	23	13.14
2.	Asst. Agricultural Officers	00	00.00	20	11.42	41	23.42	57	32.57	57	32.57
3.	Asst. Director of Agriculture	00	00.00	8	04.57	26	14.85	13	07.42	128	73.14
4.	Extension Guide	00	00.00	00	00.00	12	06.85	18	10.28	145	82.85
5.	Scientists of UAS	00	00.00	20	11.42	16	09.14	42	24.00	97	55.42
8.	Others (Extension worker/private consultancy)	22	12.57	65	37.14	20	11.42	24	13.71	44	25.14

Table 7: Knowledge level of paddy growers about plant protection measures (n=175)

Sr. No.	Knowledge level	Frequency	Percentage
1.	Pests		
	Stem borer	168	96.00
	Brown plant hoppers	155	88.57
	Gundhi bug	92	52.57
	Ear head cutting caterpillar or army worm	110	62.85
2.	Pesticides		
	Carbofuron or Phorate (Stem borer)	135	77.14
	Phosphamidon or Dimethoate (Brown plant hoppers)	128	73.14
	Methyl parathion (Gundhi bug)	95	54.28
	Endosulfan 35 EC(Ear head cutting caterpillar or army worm)	154	88.00
3.	Disease		
	Blast	164	93.71
	Brown spot	154	88.00
	False smut	85	48.57
	Sheath blight	139	79.42
4.	Fungicides		
	Carbendizime (Blast)	90	51.42
	Mancozeb 75 WP (Brown spot)	146	83.42
	Copperoxychloride (False smut)	85	48.57
	Carbendizime (Sheath blight)	62	35.42

Figures in parenthesis indicate percentage to the total

of army worm. Regarding fungicides, 37.14 per cent of the respondents were applying bavistin for the control of blast, 33.71 per cent of them were found to partially apply bavistin for the control of blast and only 29.14 per cent of them did not apply bavistin for the control of blast. Similarly, 47.42 per cent of the farmers fully adopted the use of mancozeb 75 WP to control the brown spot disease, 34.28 per cent of the farmers had partially adopted the use of mancozeb 75 WP to control the brown spot disease and only 18.28 per cent of the farmers did not use mancozeb 75 WP to control the brown spot disease. However, 33.14 per cent of the farmers fully adopted the use of blitox for control of false smut, 26.85 per cent of the farmers partially adopted the use of blitox for control of disease and maximum of 40.00 per cent of the farmers did not use the blitox for control of false smut disease. About 37.71 per cent of the farmers fully adopted the application of bavistin for control of sheath blight, whereas 29.14 per cent of the farmers partially adopted the application of bavistin for control of sheath blight and of 33.14 per cent

of the farmers did not use bavistin for control of sheath blight.

The inference that could be drawn from the above findings that large number of farmers did not adopt recommended plant protection chemicals. Results support the non-availability of plant protection inputs/equipments. The other reason for low adoption of plant protection might be the lack of extension support to educate and providing knowledge to the farmers regarding plant protection measures and severe consequences of indiscriminate use of chemical pesticides. In case of concentration of the pesticides, only 17.14 per cent of the respondents adopted the application of exact concentration of carbofuran and 33.14 per cent of them partially adopted the application of exact concentration of the chemical. Application of recommended concentration of Dimethoate and Endosulfan 35 EC were adopted by only 21.71 and 58.28 per cent of respondents. 53.14 and 22.85 per cent of them not adopted the application of exact concentration, respectively.

In case of concentration of the fungicides, 27.42 per cent of the farmers fully adopted the application of carbendazim with the concentration of 0.1 per cent, whereas 33.71 per cent of the farmers partially adopted the application of carbendazim with the concentration of 0.1 per cent and 38.85 per cent of the farmers had not adopted the mentioned concentration. However, 26.85 per cent of the farmers were adopted the use of Mancozeb 75 WP for brown spot with the concentration of 0.2 per cent, followed by 22.28 per cent of the farmers partially adopted the application of Mancozeb 75 WP for brown spot with the concentration of 0.2 per cent and a maximum of 50.85 per cent of the farmers did not use the Mancozeb 75 WP. Similarly, 18.28 per cent of the farmers had adopted the application of Carbendazim (Bavistin) at the rate of 1 kg per ha in 1000 litres of water for the control of sheath blight disease. Whereas, 30.85 per cent of the farmers partially adopted the application of Carbendazim (Bavistin) at the same rate for the control of sheath blight disease and a maximum of 50.85 per cent of the farmers did not use the application of Carbendazim (Bavistin).

Adoption of the plant protection measures is complex one as it involves skills and more risk. Since, the more number of farmers were small land holders, their income was very low. Hence, they were not ready to take risk. And for many other reasons like non-availability of plant protection inputs, lack of technical knowledge regarding plant protection were responsible for low adoption of plant protection measures. The findings of the study were in accordance with the results of Vasanthakumar (2000).

Table 8 : Extent of adoption of plant protection measures**(n=175)**

Sr. No	Plant protection measures	Adoption respondents					
		Full adoption		Partial adoption		Non – adoption	
		No.	%	No.	%	No.	%
Pests							
1.	Pesticides						
	Carbofuron or Phorate (Stem borer)	82	46.85	50	28.57	43	24.57
	Phosphamidon or Dimethoate (Brown plant hoppers)	60	34.28	75	42.85	40	22.85
	Methyl parathion (Gundhi bug)	38	21.71	42	24.00	95	54.28
	Endosulfan 35 EC (Ear head cutting caterpillar or army worm)	130	74.28	20	11.42	25	14.28
2.	Concentration of pesticides						
	Carbofuron (30-33 kg of granules per ha)	30	17.14	58	33.14	87	49.71
	Dimethoate (1.75 ml in 1 litre of water)	38	21.71	44	25.14	93	53.14
	Endosulfan 35 EC (1.25 ml in 1 litre of water)	102	58.28	33	18.85	40	22.85
Diseases							
1.	Fungicides						
	Carbendizime (Blast)	65	37.14	59	33.71	51	29.14
	Mancozeb 75 WP (Brown spot)	83	47.42	60	34.28	32	18.28
	Copper oxy chloride (False smut)	58	33.14	47	26.85	70	40.00
	Carbendizime (Sheath blight)	66	37.71	51	29.14	58	33.14
2.	Concentration of fungicides						
	Carbendizime (0.1 per cent of Carbendizime)	48	27.42	59	33.71	68	38.85
	Mancozeb 75 WP (0.2 per cent of Mancozeb)	47	26.85	39	22.28	89	50.85
	Carbendizime (Bavistin) (1 kg per ha in 1000 litres of water)	32	18.28	54	30.85	89	50.85

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