

**RESEARCH ARTICLE :**

Paddy growers' technical knowledge on integrated pest management practices in Upper Brahmaputra Valley Zone of Assam

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SUMMARY : The importance of integrated pest management (IPM) lies with the fact that, dependency for increasing agricultural production by heavy application of pesticides and chemical fertilizers has negative impact on human health as well as on the natural resource base. IPM is a concept that integrates all cultural, mechanical, biological and chemical practices of crop production which control prevent and eradicate pest population in field and makes the pest management practice a stronger approach rather than sole application of chemical pesticides. The study revealed that majority of the respondents aged between 41-53 years (56.43%), studied upto High School (46.07%) and had membership of at least one organization (70.72%). Most of the farmers had family size of 5-7 members (62.50%), agricultural experience between 16-23 years (62.85%) and in between 4-9.6 years involved in pesticide application (60.71%). The knowledge regarding various IPM practices plays a vital role in its application. The study found that more than half (52.85%) of the paddy growers had moderate level of knowledge on IPM practices next to which 27.85 per cent of the farmers had low level of knowledge and 19.28 per cent of them had high level of knowledge regarding IPM practices. The farmers had great extent of knowledge on the practices like proper summer ploughing, trimming of bunds and destruction of crop residues before transplanting of rice to minimize the insect pest and disease intensity as reported by all the respondents and use bird perches for predatory birds against insect pests of rice was reported by 90.00 per cent of the respondents. However, majority (69.28%) of the respondents did not know about application of *Trichogramma* as a biocontrol agent against rice stem borer, rice leaf folder and more than three fourth of the respondents (76.78%) did not know about pattern of release of *Trichogramma* in the field. It shows that farmers had very low knowledge in application of biological pest control techniques in the field comparing to cultural practices.

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BACKGROUND AND OBJECTIVES

India is well known for its agriculture from the time immemorial and almost 70 per

cent of the total population's livelihoods come from agriculture. The era of green revolution made a notable change in the scenario of Indian agriculture with the introduction of

chemical fertilizers, HYV seed, pesticides etc. to increase food production and sustain food security. However, dependency for increasing agricultural production by heavy application of pesticides and chemical fertilizers has negative impact on human health and is considered as threat to the natural resource base. To overcome these problems, Integrated pest management can be recognized as an important strategy towards pest control or management which integrates all approaches to manage and control pest with all the resources available with the farmers and utilizing environment friendly practices at first to eradicate pest. According to Hoyt (2008), IPM is an effective and environmentally sensitive approach to pest management that relies on combination of common sense practice. The integration of cultural, mechanical, biological and chemical practices make the pest management practice a stronger approach rather than sole application of chemical pesticides.

In Assam, under the ambient of IPM programme, the regional Central Integrated Pest Management Centre (CIPMC) has organized a total of 657 numbers of Farmer's Field School from 1994 to 2015 in different districts of the state. Along with it Krishi Vigyan Kendras, district Agricultural Office from Department of Agriculture has conducted enormous training programmes on Integrated Pest Management for paddy crop throughout the state. It is seen that inspite of getting training on IPM, dependence on synthetic pesticides has not been eliminated from the farmer's field. The knowledge and skill gain from the IPM programmes plays an important role in adoption of the IPM practices. Therefore, questions arise as to what is the knowledge level of farmers in IPM practices? Keeping in mind these views the present study was conducted with the objectives:

- To study the socio-personal characteristics of the paddy growers
- To determine knowledge level of paddy growers in IPM practices
- To analyse practice wise extent of knowledge of paddy growers about IPM practices.

RESOURCES AND METHODS

The study was conducted in all five districts of Upper Brahmaputra Valley Zone (UPBZ) of Assam. From every district two ADO circles were selected. From each ADO circle two AEA elakas were selected purposively based

on training given on IPM in paddy to the farmers. A total of 280 farmer's respondents were selected from 20 villages under 20 AEA elakas of 10 ADO circle in 5 districts. Prior data collection, a knowledge test was done among 60 IPM trained farmers from non sampling area with 55 items. After item analysis, the 'item difficulty index' with 'P' values ranging from 30 to 70 and items with 'discrimination index' $E^{1/3}$ value ranging from 0.30 to 0.55 were considered for the final selection and the items selected were pre-tested separately by administering the items to IPM trained farmers from non sampling area. Finally, 20 such items were identified and modified to 'statements' to determine the knowledge level of farmers in a three point continuum as having knowledge on a particular item 'to a great extent', 'to a lesser extent', and 'do not know'. The data in the present study were collected directly from the respondents with the help of structured schedule, through the personal interview method.

OBSERVATIONS AND ANALYSIS

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

Socio-personal characteristics of the paddy growers:

The findings on socio-personal characteristics of the paddy growers have been presented in Table 1. It is apparent from the table that majority of the respondents (56.43%) were between the age group 41-53 years which is followed by 27.14 per cent of the respondents who were 54 years old or above 54 years. It can be noticed that few respondents (16.43%) of age 40 or below 40 years of age were engaged in farming activity. Less involvement of young people in farming may be due to the fact that the youth of today do not want to take up agriculture as their main occupation and do not consider it as a profitable venture. Moreover, a large majority of rural youth is migrating to urban areas and other cities across for livelihood and to find some formal employment rather than taking up agriculture or farming as livelihood. It was seen that majority of the respondents (46.07%) studied upto High School. It is followed by 30.71 per cent of the respondents who had minimum education upto primary school. The respondents having educational qualification upto Higher Secondary were only 16.43 per cent whereas a small per cent of respondents (6.79 %) were found to be Graduate/ Post graduate among the

farmers respondents. The study also revealed that more than two third of the respondents (62.50%) had family sized with 5-7 members in the family followed by 24.28 per cent of respondents who had families with less than 5 members in the family. A small amount of respondents (13.21%) had families where numbers of family members were 7 or more than it. The social participation of the respondents reflects that majority of the respondents (70.72%) had membership of at least one organization. It was found that these members were member of Farmers field school in the study area whereas a small section of respondents (26.78%) did not have any membership in any organization. A negligible per centage of respondents (2.50%) were having membership of more than one organization and not a single respondent was reported to be office bearer among the paddy

growers in the study area. More than half (62.85%) of the respondents were found to have 16.1-23.7 years of agricultural experience while 25.71 per cent had more than 23 years of experience in agriculture and only 11.42 per cent of the respondents had below 16 years of experience. The result shows that the farmers have enough experience that could enable them to decide whether to adopt or not to adopt IPM practices in his paddy cultivation. The findings reveals that though agricultural experience ranges from 16 to 23 years but the years involved in pesticide application is quiet low. Almost two third (60.71%) of the respondents 4-9.6 years of involvement in pesticide application that range from 4-9.6 years followed by 33.57 per cent had more than 9.6 years of experience and only 5.71 per cent of the respondents had less than 4 years of experience in

Table 1: Socio-personal characteristics of the paddy growers

Sr. No.	Socio-personal characteristics	Range	Frequency	Percentage
1.	Age (Years)	Below 40	46	16.43
		41-53	158	56.43
		54 and above	76	27.14
2.	Education	Upto primary school	86	30.71
		High school	129	46.07
		Higher secondary	46	16.43
		Graduate/ Post graduate	19	6.79
3.	Family size	<5	68	24.28
		5-7	175	62.50
		>7	37	13.21
4.	Social participation	No membership	75	26.78
		Member of one organization	198	70.72
		Member of more than one organization	07	2.50
5.	Agricultural experience	Office bearer	0	0.00
		< 16.1	32	11.42
		16.1-23.7	176	62.85
6.	Years involved in pesticide application	> 23.7	72	25.71
		< 4	16	5.71
		4-9.6	170	60.71
		> 9.6	94	33.57

Table 2: Paddy growers' level of knowledge about IPM practices

Sr. No.	Category	Score range	Frequency	Percentage	Mean	S.D.
1.	Low	< 32.44	78	27.85		
2.	Moderate	32.44-51.77	148	52.85	42.11	9.66
3.	High	> 51.77	54	19.28		
	Total		280	100.00		

pesticide application. This is because, though the farmers have more years of experience in farming but application of pesticides for paddy cultivation is a concept that had entered only some years back in to their farming community.

Knowledge level of paddy growers in IPM practices:

It is evident from the data presented in Table 2 that more than half (52.85%) of the total respondents had moderate level of knowledge on IPM practices which is followed by 27.85 per cent of the respondents having low level of knowledge and 19.28 per cent of them had high level of knowledge regarding IPM practices. This could be explained by the findings that the group of respondents had more knowledge in IPM practices which they have gained through training and which they have been practicing for a long time. Through their experiences in farming, they have accumulated a vast amount of knowledge on some of the cultural and mechanical IPM practices which are passing down from generations to generations. The reason for low level of knowledge could be because these farmers were less exposed to new biological pest management practices and less exposure to training. This finding is similar to the findings of Escalada and Heong (1993) attributed the slow spread of IPM techniques among rice farmers in the Philippines to a lack of knowledge among growers.

Practice wise extent of knowledge of paddy growers about IPM practices:

The data presented in the Table 3 are based on knowledge statements of IPM practices in paddy cultivation. The frequency distribution of respondents against each item was calculated. The findings found from the study indicates that all the respondents (100.00%) in the study area had great extent of knowledge on the practice of 'Proper summer ploughing, trimming of bunds and destruction of crop residues before transplanting of rice to minimize the insect pests and disease intensity'. Less than half of the total respondents (48.57%) had great extent of knowledge on "Use of high yielding variety of rice" whereas 27.85 per cent respondents did not know about it and 23.57 per cent knew about using high yielding variety to a lesser extent. The findings also shows that most of the respondents (52.14%) had a lesser extent of knowledge on 'application of recommended fertilizer dose (132kg urea, 125 kg SSP

and 66 kg MOP per ha of land) along with compost or FYM @ 10 t/ha to improve plant growth and resistance against insect pests' and 47.85 per cent of the total respondents did not know about recommended dose of fertilizer application. Not a single respondent was found to have full knowledge on recommended dose of fertilizer in paddy in the study area. More than half (52.85%) of the respondents had a lesser extent of knowledge on 'application of NPK fertilizers at a time to the field or in different time interval in respect to crop growth' followed by 29.28 per cent had great knowledge and 17.85 per cent of the respondents did not know about the pattern of application of NPK fertilizers. Using 'Urea' as top dressing at tillering and panicle initiation stage was known to a lesser extent to half of the respondents (50.71%) followed by 27.85 per cent knew it to a greater extent and 21.42 per cent did not know about the application of 'Urea'. More than one-third of the total respondents (39.28%) knew to a lesser extent about "Broadcasting of Carbofuran 3G @ 3 g/sq.m in the nursery bed at least 5-7 days before uprooting the seedlings" followed by 35.71 per cent knew to a greater extent and this practice was not known to 25.00 per cent of the respondents. It was found that "Practice of seedling root dip treatment by dipping seedling root in 1ml chloropyriphos 20EC in 1L water for 12 hours prior to transplanting or dipping the seedling roots only for 3hrs in a mixture solution of 1ml chloropyriphos in 1litre water + 1% urea (10 g/litre of water)" was known to a lesser extent to 43.57 per cent of the respondents followed by 32.8 per cent did not know about this practice against pest control and only 23.57 per cent of the respondents had great knowledge about seedling root dip treatment. More than three fourth (79.28%) of the respondents had great knowledge on "Practice of collecting egg masses and clipping of leaves" which was followed by 18.21 per cent respondents knew it to a lesser extent and 2.50 per cent of the respondents only did not know about egg mass collection.

Use of pheromone trap with 'Scirpolure' to attract rice stem borer is an important biological pest control method. However, this practice of pest control was not known to more than half of the respondents (56.42%) and 30.71 per cent of the respondents knew it to a lesser extent and 12.85 per cent had great extent of knowledge on it. A huge majority of the respondents (90.0%) had great knowledge on "Use of bird perches for predatory

birds against insect pests of rice” and only 10.00 per cent knew it to a lesser extent. No respondent was found not having knowledge about this practice. More than two third (69.28) of the respondents did not know about “Application of *Trichogramma* as a biocontrol agent against rice stem borer and rice leaf folder”. This practice was known to a lesser extent by 18.21 per cent

and 12.85 per cent knew it to a great extent. Likewise, “Release of *Trichogramma* in 6 different times at 10 days interval starting from 30-35 DAT” was also not known to vast majority (76.78%) of the respondents and almost one tenth (11.78%) of the respondents knew it to a lesser extent and similar (11.42%) result was found to reported by respondents as having great extent of

Table 3: Practice wise extent of knowledge of paddy growers about IPM practices

Sr. No.	Basic integrated pest management (IPM) practices	Extent of knowledge					
		To a great extent		To a lesser extent		Do not know	
		(f)	(%)	(f)	(%)	(f)	(%)
1.	Proper summer ploughing, trimming of bunds and destruction of crop residues are done before transplanting of rice to minimize the insect pest and disease intensity	280	100.00	0	0.00	0	0.00
2.	Use of high yielding variety of rice	136	48.57	66	23.57	78	27.85
3.	Application of recommended fertilizer dose of 132kg urea, 125 kg SSP and 66 kg MOP per ha of land along with compost or FYM @ 10 t/ha to improve plant growth and resistance against insect pests	0	0	146	52.14	134	47.85
4.	Application of NPK fertilizers (Urea) at a time to the field or in different time interval in respect to crop growth	82	29.28	148	52.85	50	17.85
5.	Use Urea as top dressing at tillering and penicle initiation stage	78	27.85	142	50.71	60	21.42
6.	Broadcasting of the nursery bed with Carbofuran 3G @ 3g / sq.m at least 5-7 days before uprooting the seedlings.	100	35.71	110	39.28	70	25
7.	Practice of seedling root dip treatment by dipping seedling root in 1ml chloropyrifos 20EC in 1L water for 12 hours prior to transplanting or dipping the seedling roots only for 3hrs in a mixture solution of 1ml chloropyrifos in 1 litre water+ 1%urea(10g/litre of water)	66	23.57	122	43.57	92	32.85
8.	Practice collection of egg masses and clipping of leaves	222	79.28	51	18.21	7	2.5
9.	Use of pheromone lure ‘Scirpolure’ in the pheromone trap to attract rice stem borer	36	12.85	86	30.71	158	56.42
10.	Use of bird perches for predatory birds against insect pests of rice	252	90.0	28	10.00	0	0.00
11.	Application of <i>Trichogramma</i> as a biocontrol agent against rice stem borer and rice leaf folder	36	12.85	51	18.21	194	69.28
12.	Release of <i>Trichogramma</i> in 6 different times at 10 days interval starting from 30-35 DAT .	32	11.42	33	11.78	215	76.78
13.	Seed treatment with carbendazim /mancozed/captan@2.5g/kg seed/litre water by soaking directly in fungicidal suspension for 24 hours	18	6.42	128	45.71	134	47.85
14.	Use of light trapsto reduce infestation of major insect pests of rice	179	63.92	81	28.92	20	7.14
15.	Use of azolla or other bio-fertilizers to the rice fields	118	42.14	56	20.00	106	37.85
16.	Recommended seedlings (3seedlings/ hill) at the time of transplanting	184	65.71	68	24.28	28	10.00
17.	Recommended spacing @20x15cm at the time of transplanting	78	27.85	136	48.57	66	23.57
18.	Practice of weeding operation in rice fields	182	65.00	68	24.28	30	10.71
19.	Spraying of botanicals (<i>Neem</i> products) against insect pests	154	55.00	38	13.57	88	31.42
20.	Use of biopesticides (<i>Beauveria bassiana</i> , <i>Pseudomonas</i> etc) against sucking pests and diseases	18	6.42	116	41.42	146	52.14

knowledge on pattern of release of *Trichogramma* in paddy field. "Seed treatment with carbendazim/mancozed/captan @2.5g/kg seed/lit water by soaking directly in fungicidal suspension for 24 hours" against diseases of paddy was not known to 47.85 per cent of the respondents followed by 45.71 per cent knew it to a lesser extent and 6.42 per cent knew it fully. Almost two-third of the total respondents (63.92%) knew about "Use of light traps to attract adult insects with a view to reduce infestation of major insect pests of rice" followed by 28.92 per cent of the respondents knew about its use to a lesser extent and 7.14 per cent did not know about the practice. Majority of the respondents (42.14%) had great extent of knowledge on "Use of azolla or other bio-fertilizers to the rice fields" followed by 37.85 per cent did not know about it and 20.00 per cent knew it to a lesser extent. Around two-third of the total respondents (65.71%) knew about "Recommended seedlings (3 seedlings/hill) at the time of transplanting" followed by 24.28 per cent knew it to a lesser extent and 10.00 did not know about the number of seedlings to be included per hill at the time of transplanting. "Recommended spacing of rice @ 20 x 15 cm at the time of transplanting" was known to a lesser extent by 48.57 per cent of the respondents followed by 27.85 per cent knew it to a great extent and 23.57 per cent of the respondents did not know about it. A large majority of the respondents (65.00%) had great extent of knowledge on "Practice of weeding operation in rice fields" followed by 24.28 per cent knew it to a lesser extent and 10.71 per cent of the total respondents reported not having knowledge on it. "Spraying of botanicals (*Neem* products) against insect pests" is one of the eco-friendly pest management practices which was known to more than half (55.00%) of the respondents. However, this practice was not known to more than one third of the respondents (31.42%) and 13.57 per cent knew it to a lesser extent. "Use of bio pesticides (*Beauveria bassiana*, *Pseudomonas* etc.) against sucking pests and diseases" is also another

important eco-friendly pest management practice which was not known to more than half (52.14%) of the respondents and 41.42 per cent knew it partially. Only 6.42 per cent of the respondents were found to have great knowledge on use of bio pesticides.

Conclusion:

Integrated Pest Management is always considered as favourable and environment friendly pest management technology in the farmers field which integrates cultural, mechanical, biological and chemical practices of pest control methods. The knowledge of the farmers is an important criterion so as to analyse the adoption of IPM practices. Though the farmers are given lot of trainings by various departments, it was found that knowledge level of the farmers on IPM was moderate followed by low and only few per cent of the respondents had high level of knowledge regard IPM in paddy. Therefore, It could be concluded that to bring out more knowledgeable farmers, the extension scientists, researchers, farmers and all the stakeholders should work together to bring out more potential knowledgeable farmers that can help in making wide spreading of IPM technology in the farmers field.

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REFERENCES

Escalada, M.M. and Heong, K.L. (1993). Communication and implementation of change in crop protection. In: *Crop protection and sustainable agriculture*. Chichester, UK: Wiley. pp. 191-202.

WEBLIOGRAPHY

Hoyt, B. (2008). Integrated pest management (IPM) and food production, Retrieved 2 June, 2015 from <http://www.epa.gov/pesticides/food/ipm.htm>.

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