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Awareness levels of rice growers about the harmful effects of agrochemicals on health and environment

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Abstract

This study assessed the awareness levels of rice farmers regarding the harmful effects of agrochemicals on health and the environment in the Chhattisgarh plains. A sample of 320 respondents from 8 blocks was surveyed in 2023-24. The findings showed that 45.00 per cent of respondents recognized agrochemical-induced allergies in humans, and 51.56 per cent identified behavioural changes in animals as a risk. The majority was aware of water contamination (75.00%) and soil contamination (80.94%) due to agrochemicals. In terms of pest management, 90.94 per cent recognized stem borer, 97.81 per cent knew about rice blast disease, and 97.81 per cent identified nut grass as a weed. Among IPM practices, the highest awareness was for deep summer ploughing (82.19%) and the removal of pest-infested plant parts (99.06%). For insecticides, 76.88 per cent were aware of Acephate 75% SP, and for herbicides, 90.31 per cent knew of Pendimethalin 30% EC. Carbendazim 50% WP was the most recognized fungicide (58.13%). The study also found 34.69 per cent awareness of cancer risks from pesticide misuse. Overall, 67.50 per cent of respondents had medium awareness of IPM practices.

Keywords: X-band frequency range, substituted li ferrite, magnetostatic and spin waves, microstrip array antenna

Introduction

Agriculture plays a crucial role in the economy of India, with rice cultivation being a key activity in the Chhattisgarh plains. The extensive use of agrochemicals, including pesticides and fertilizers, has raised concerns over their adverse effects on human health, the environment, and soil quality. While agrochemicals can boost productivity, their misuse or overuse poses significant risks, including contamination of water, soil degradation, and health issues such as allergies and cancer. Despite these risks, many farmers remain unaware of the potential hazards associated with agrochemicals. This study aims to assess the awareness levels of rice farmers in the Chhattisgarh plains regarding the harmful effects of agrochemicals on health and the environment. The findings will provide insights into the current awareness among farmers and identify areas for improvement, with the goal of promoting safer agricultural practices and sustainable farming in the region.

Material and Methods

The present study was carried out in the Chhattisgarh Plains of Chhattisgarh state during the years 2022-23 and 2023-24. Chhattisgarh state is comprised of 33 districts. From each of the selected districts, sixteen representative blocks were chosen: Arang and Dharisawa from Raipur district, Durg and Patan from Durg district, Kota and Takhatpur from Bilaspur district, Dhamtari and Kurud from Dhamtari district, Mahasamund and Bagbahra from Mahasamund district, Gariyaband and Fingeshwar from Gariyaband district,

Bemetara and Saja from Bemetara district, and Mungeli and Patharia from Mungeli district. From each selected block, two representative villages were chosen randomly (Total: 16 x 2 = 32). Thus, a total of 32 villages were selected for the study. Data were collected through personal interviews using a well-prepared, structured, and pretested interview schedule. The collected data were tabulated and analyzed using appropriate statistical tools and methods.

Results and Discussion

Awareness about hazardous effect of agro-chemicals

The findings of Table 1 Provide a detailed overview of the respondent's awareness levels concerning the hazardous effects of agro-chemicals on humans, animals, water bodies, and soil. The results indicate varying levels of awareness across different categories of hazards.

Hazardous effects on humans, the majority of respondents (45.00%), were aware of the effects of agro-chemicals causing allergies and sensitivities. This was followed by 32.50 per cent of respondents who recognized the carcinogenic potential of these chemicals. Environmental impacts were acknowledged by 25.94 per cent of respondents; while toxicity was noted by only 7.50 per cent. Awareness of reproductive and developmental issues was the lowest, with only 9.38 per cent of respondents recognizing these effects.

Hazardous Effects on Animals In the context of animals, the data shows that the highest awareness was regarding behavioral changes, with 51.56 per cent of the respondents

recognizing this hazard. This was followed by awareness of long-term health issues (19.38%) and acute poisoning (13.44%) awareness of reduced habitat and bioaccumulation

was notably lower, with each category recognized by only 7.50 per cent of respondents.

Table 1: Distribution of the respondents according to their awareness about hazardous effect of agro-chemicals

SL. No	Categories	Awareness			
		Hazardous effect of agro-chemicals			
		Aware		Not aware	
		F	%	F	%
I. Human					
1.	Toxicity	24	7.50	296	92.50
2.	Residue exposure	38	11.88	282	88.13
3.	Carcinogenicity	104	32.50	216	67.50
4.	Reproductive and developmental issues	30	9.38	290	90.63
5.	Environmental impact	83	25.94	237	74.06
6.	Allergies and sensitivities	144	45.00	176	55.00
II. Animals					
1.	Acute poisoning	43	13.44	277	86.56
2.	Long-term health issues	62	19.38	258	80.63
3.	Ecological disruption	31	9.69	289	90.31
4.	Bioaccumulation	17	5.31	303	94.69
5.	Reduced habitat	24	7.50	296	92.50
6.	Behavioral changes	165	51.56	155	48.44
III. Water bodies					
1.	Water contamination	197	61.56	123	38.44
2.	Eutrophication	154	48.13	166	51.88
3.	Toxicity to aquatic life	213	66.56	107	33.44
4.	Bioaccumulation	42	13.13	278	86.88
5.	Disruption of ecosystem balance	51	15.94	269	84.06
6.	Drinking water contamination	240	75.00	80	25.00
IV. Soil					
1.	Soil degradation	223	69.69	97	30.31
2.	Soil contamination	259	80.94	61	19.06
3.	Resistance development	61	19.06	259	80.94
4.	Biodiversity loss	133	41.56	187	58.44
5.	Residue build up	49	15.31	271	84.69

*Data are based on multiple responses

Hazardous Effects on Water Bodies the highest level of awareness concerning the hazardous effects of agro-chemicals on water bodies was related to drinking water contamination, recognized by (75.00), of respondents. This was followed by toxicity to aquatic life 66.56 per cent and water contamination (61.56%). Eutrophication was acknowledged by 48.13 per cent of respondents. However, awareness was much lower for disruption of ecosystem balance (15.94%) and bioaccumulation (13.13%),

Hazardous Effects on Soil Regarding soil, the highest awareness was observed for soil contamination, with (80.94%), of respondents recognizing this hazard. This was followed by soil degradation (69.69%) and biodiversity loss (41.56%). Awareness of resistance development and residue build-up was significantly lower, with 19.06 per cent and 15.31 per cent of respondents, respectively, acknowledging these hazards.

Table 2: Distribution of the respondents according to their overall awareness about hazardous effect of agro-chemicals, (N=320)

SL. No.	Categories	Frequency	Percentage
1.	Low (Up to 7 score)	35	10.94
2.	Medium (7 to 11 Score)	180	56.25
3.	High (Above 11 score)	105	32.81
Mean = 10, SD = 2.10			

Table 2, Distribution of the respondents according to their overall awareness about hazardous effect of agro-chemicals majority of the respondents (56.25%) had medium level of awareness regarding the hazardous effects of agro-chemicals. Followed by 32.81 per cent of respondent's high level of awareness, while a smaller group 10.94 per cent has low level of awareness.

Awareness towards insect-pest, diseases and weeds

The awareness of respondents regarding insect pests of rice in the study area is presented in Table 3 the data reveals that the majority of respondents (90.94%) of respondents are aware of the stem borer, making it the most recognized pest. This is followed closely by the brown plant hopper at (89.69%) and the green leaf hopper at 81.25 per cent, awareness of the leaf folder stands at (74.38%) while the

case worm is recognized by 58.44 per cent of respondents. In contrast, lower awareness levels are observed for the

grasshopper (53.75%), ear head bug/stink bug (51.56%), army worm/cut worm (42.81%), and gall midge (38.75%).

Table 3: Distribution of respondents according to their awareness towards insect- pest, diseases and weeds management of rice crop

SL. No	Categories	Scientific name	Awareness			
			Aware		Not aware	
			F	%	F	%
I. Insects						
1.	Case worm	<i>Nymphula depunctalis</i>	187	58.44	133	41.56
2.	Leaf folder	<i>Cnaphalocrosis medinalis</i>	238	74.38	82	25.63
3.	Gall midge	<i>Orseolia oryzae</i>	124	38.75	196	61.25
4.	Grasshopper	<i>Hieroglyphus banian</i>	172	53.75	148	46.25
5.	Green leaf hopper	<i>Nephotettix virescens</i>	260	81.25	60	18.75
6.	Brown plant hopper	<i>Nilaparvata lugens</i>	287	89.69	33	10.31
7.	Stem borer	<i>Scirpophaga incertulas</i>	291	90.94	29	9.06
8.	Ear head bug /stink bug	<i>Leptocoris acuta</i>	165	51.56	155	48.44
9.	Army worm / cut worm	<i>Spodoptera mauritia</i>	137	42.81	183	57.19
II. Diseases						
1.	Bacterial leaf blight	<i>Xanthomonas oryzae</i> pv. <i>Oryzae</i>	278	86.88	42	13.13
2.	Brown spot	<i>Helminthosporium oryzae</i>	252	78.75	68	21.25
3.	Blast of rice	<i>Pyricularia oryzae</i>	313	97.81	7	2.19
4.	Sheath blight	<i>Rhizoctonia solani</i>	294	91.88	26	8.13
5.	Khaira disease	Zn deficiency	237	74.06	83	25.94
III. Common weeds						
1.	Nut grass	<i>Cyperus rotundus</i>	313	97.81	7	2.19
2.	White heads	<i>Eclipta prostrata</i>	274	85.63	46	14.38
3.	Snake weed	<i>Euphorbia hirta</i>	268	83.75	52	16.25
4.	Doob grass	<i>Cynodon dactylon</i>	308	96.25	12	3.75
5.	Jungle rice	<i>Echinochloa colona</i>	303	94.69	17	5.31

*Data are based on multiple responses

In case of diseases the data shows that the blast of rice is the most recognized disease, with (97.81%) of respondents aware of it. Sheath blight follows closely with 91.88 per cent awareness, and bacterial leaf blight is known by 86.88 per cent of respondents. Brown spot has an awareness level of (78.75%) while Khaira disease is recognized by 74.06 per cent of respondents

Similarly awareness of respondents about rice crop weeds. Nut grass is the most recognized weed, with (97.81%), awareness followed by doob grass (96.25%), Jungle rice (94.69%), White heads (85.63%), and Snake weed (83.75%). These findings find supported from Ashappa (2014) [1].

Table 4: Distribution of the respondents according to their overall awareness towards insect- pest, disease & weed, (N=320)

SL. No.	Categories	Frequency	Percentage
1.	Low (Up to 23 score)	59	18.44
2.	Medium (24 to 33 Score)	192	60.00
3.	High (Above 33 score)	69	21.56
Mean = 28.40, SD = 5.31			

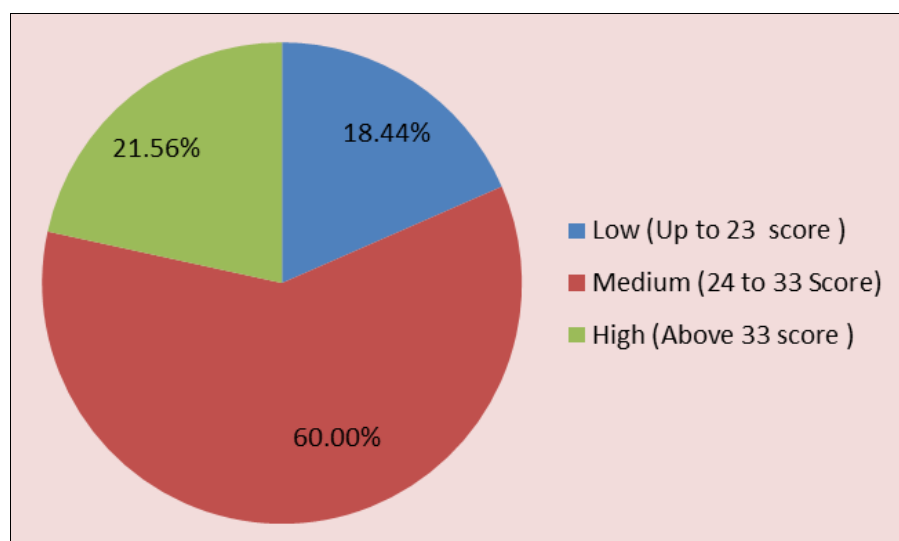


Fig 1: Distribution of the respondents according to their overall awareness towards insect- pest, disease & weed

Table 4 the finding reveals that that the majority of respondents (60%) had a medium level of awareness regarding insects-pest, disease and weeds. Followed by (21.56%) of respondent's low level of awareness, while a smaller group (18.44%) had high level of awareness.

Awareness towards IPM practices

Table 5. Distribution of the respondents according to their awareness towards cultural practices in IPM The awareness of respondents regarding cultural practices in IPM Table 5. The data reveals that the highest awareness among respondents was observed for deep summer ploughing, with (82.19%) recognizing its importance in IPM. This is closely followed by timely sowing, acknowledged by 79.06 per cent of respondents, and trimming of bunds, with 75.00 per cent

awareness. Interculture operations/weeding were recognized by 71.25 per cent of respondents, while 63.44 per cent were aware of the need for field cleaning to manage pests. Awareness about seed treatment for plant protection stood at 61.56 per cent and cultural operations like Biasi were known to 58.13 per cent of respondents. Timely transplanting was recognized by 54.06 per cent of respondents whereas crop rotation was noted by 47.50 per cent Awareness regarding water management was lower, with 38.13 per cent of respondents recognizing its role in IPM. Proper plant spacing (PP X RR) was acknowledged by 24.38 per cent, and the use of improved varieties for controlling insect pests had the lowest awareness, with only 20.00 per cent of respondents recognizing its significance.

Table 5: Distribution of the respondents according to their awareness towards cultural practices in IPM

SL. No	Cultural practices	Awareness			
		Aware		Not aware	
		F	%	F	%
1.	Deep summer ploughing	263	82.19	57	17.81
2.	Awareness about field cleaning	203	63.44	117	36.56
3.	Awareness towards improved varieties to control of insect-pest	64	20.00	256	80.00
4.	Seed treatment for plant protection	197	61.56	123	38.44
5.	Trimming of bunds	240	75.00	80	25.00
6.	Timely sowing	253	79.06	67	20.94
7.	Timely transplanting	173	54.06	147	45.94
8.	Water management	122	38.13	198	61.88
9.	Cultural operation (Biasi)	186	58.13	134	41.88
10.	Plant spacing (PP X RR)	78	24.38	242	75.63
11.	Crop rotation	152	47.50	168	52.50
12.	Interculture operations / weeding	228	71.25	92	28.75

*Data are based on multiple responses

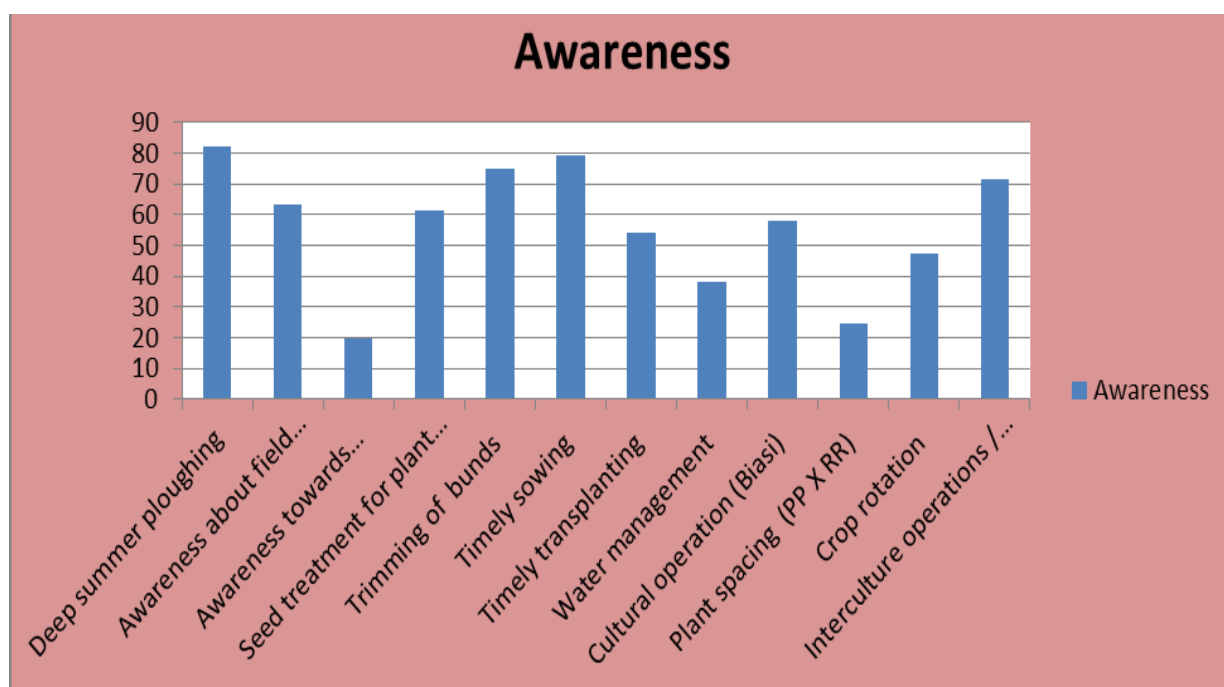


Fig 2: Distribution of the respondents according to their awareness towards cultural practices in IPM

These findings suggest that while some practices are well-known and widely adopted, others require more focused extension efforts to enhance their recognition and implementation among rice growers.

The awareness of respondents regarding mechanical practices in IPM Table 6 the highest awareness among respondents was observed for the removal and destruction of insect pest-infested plant parts, with (99.06%)

recognizing its importance. This is followed by the use of the coir rope method, acknowledged by (83.44%) of respondents, and the manual destruction of insects by hand, with 72.50 per cent awareness. The trapping of pests by net was recognized by 55.31 per cent of respondents, while awareness about the use of light traps stood at 40.00 per cent, awareness regarding the use of sticky traps was

notably lower, with 13.13 per cent of respondents recognizing their importance, and pheromone traps had the lowest awareness, with only 6.88 per cent of respondents. Notably, none of the respondents (0.00%) were aware of the practice of collecting egg masses and larvae and placing them in a bamboo cage.

Table 6: Distribution of the respondents according to their awareness towards mechanical practices in IPM

SL. No	Mechanical practices	Awareness			
		Aware		Not aware	
		F	%	F	%
1.	Use of coir rope method	267	83.44	53	16.50
2.	Destroyed insects by hand	232	72.50	88	27.50
3.	Removal and destruction of insect pest infested plant parts	317	99.06	3	0.94
4.	Collection of egg masses and larvae and their placement in bamboo cage	0	0.00	320	100.00
5.	Trapping of pests by net	177	55.31	143	44.69
6.	Light trap	128	40.00	192	60.00
7.	Sticky trap	42	13.13	278	86.88
8.	Pheromone trap	22	6.88	298	93.13

*Data are based on multiple responses

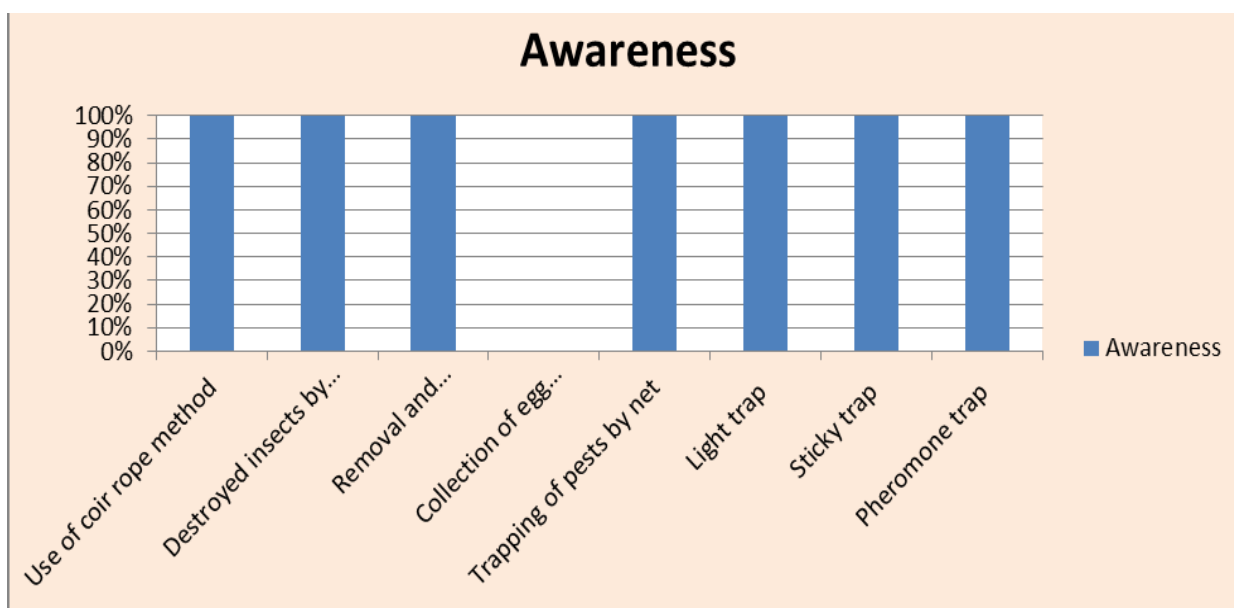


Fig 3: Distribution of the respondents according to their awareness towards mechanical practices in IPM

Table 6 highlights the awareness of respondents concerning biological practices in Integrated Pest Management (IPM) for rice crops, specifying the biological agents and the insects they target. The highest level of awareness was observed for dragonflies, with (19.69%) of respondents recognizing their role in controlling harmful insects. This is followed by the conservation of natural enemies such as spiders, known to (15.31%) of respondents for their effectiveness against green leaf hoppers and caterpillars. Awareness about parasitoids (*Trichogramma*), used against stem borers and leaf folders, was reported by (5.63%) of respondents. The knowledge of predators like ladybird beetles, which target brown plant hoppers and green leaf hoppers, was noted by 4.06 per cent of respondents. Similarly, awareness of *Beauveria bassiana* for controlling

leaf folders was recorded at 4.38 per cent, while *Bacillus thuringiensis* targeting leaf folders had the lowest awareness at (1.88%)

These findings reveal a varied level of awareness among respondents regarding the biological practices in IPM, with significant potential for increasing understanding and implementation of these methods for more effective pest management.

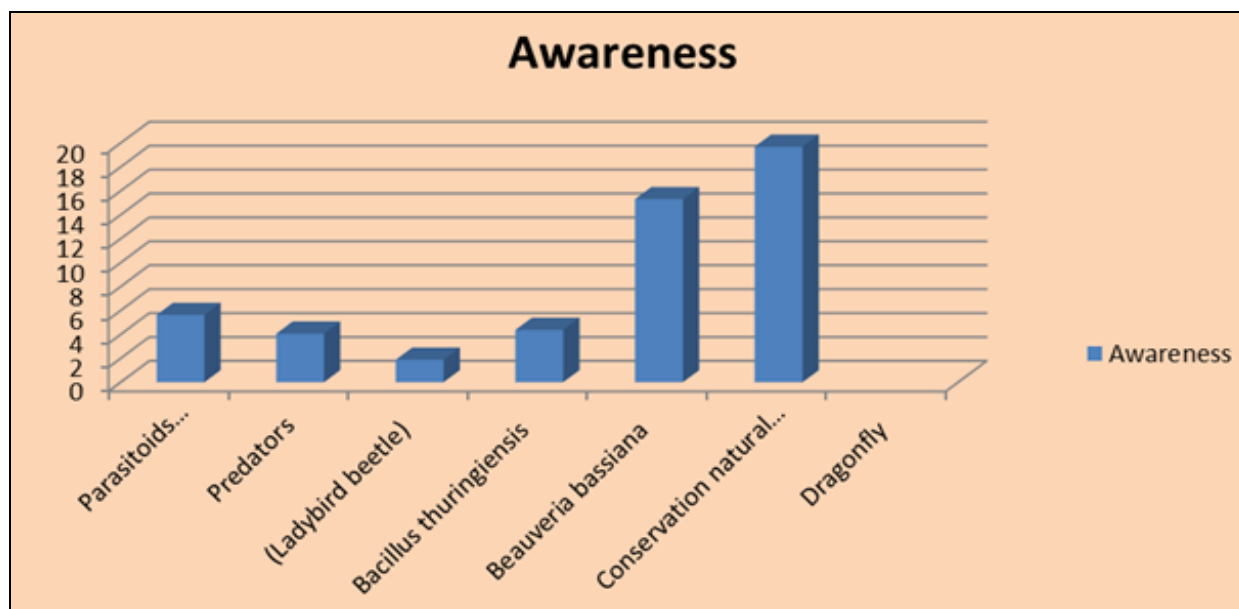
These findings reveal a varied level of awareness among respondents regarding the biological practices in IPM, indicating significant potential for increasing understanding and implementation of these methods to achieve more effective pest management.

Table 8, Distribution of the respondents according to their awareness towards Chemical practices in IPM.

Table 7: Distribution of the respondents according to their awareness towards biological practices in IPM

SL. No	Biological practices	Bio insect name	Against insect	Awareness			
				Aware		Not aware	
				F	%	F	%
1.	Parasitoids (<i>Trichogramma</i>)	T. Chilonis @1 lakh/ ha. Egg masses	Stem borer, Leaf folder	18	5.63	302	94.38
2.	Predators (Ladybird beetle)		Brown plant hopper, Green leaf hoppers	13	4.06	307	95.94
3.	<i>Bacillus thuringiensis</i>	Bactospeine ver Kursktai	Leaf folder	6	1.88	314	98.13
4.	<i>Beauveria bassiana</i>	Deltamethr in 2% WP	Leaf folder	14	4.38	306	95.63
5.	Conservation natural enemies like spiders		Green leaf hopper, Caterpillars	49	15.31	271	84.69
6.	Dragonfly		Harmful insects	63	19.69	257	80.31

*Data are based on multiple responses

**Fig 4:** Distribution of the respondents according to their awareness towards biological practices in IPM

The awareness of respondents regarding insecticide in IPM Table 8, The highest awareness among respondents was for Acephate 75% SP, with (76.88%) recognizing its use against stem borer, brown plant hoppers, and green leaf hoppers. This is followed by Fipronil 05% SC, known by 25.63 per cent of respondents for its effectiveness against stem borer, brown plant hopper, green leaf hopper, rice leafhopper, and rice gall midge. Deltamethrin 02.50% WP was recognized by 19.69 per cent of respondents for controlling aphids, thrips, and mites. Cartap hydrochloride 50% SP was acknowledged by 15.31 per cent of respondents for stem borer and leaf folder control. Awareness of Imidacloprid 17.8% SL for controlling brown plant hopper stood at 4.38 per cent while Chlorpyrifos 50% + Cypermethrin 5% EC for gall midge, stem borer, and leaf folder control was known by 5.63 per cent of respondents. Bifenthrin 10% WP was recognized by 4.06 per cent of respondents for stem borer, leaf folder, and green leaf hopper control, and the lowest awareness was noted for Profenophos 40% EC + Cypermethrin 4% EC, with only 1.88 per cent of respondents acknowledging its significance for leaf folder and panicle mite control.

The awareness of respondents regarding herbicides in IPM Table 8, The highest awareness among respondents was for Pendimethalin 30% EC, with (90.31%) recognizing its

effectiveness against *Echinochloa colonum*, *Eclipta Alba*, and *Cyperus difformis*. This is followed by Pretilachlore 50% EC, known by 70.00 per cent of respondents for controlling *Cyperus difformis*. Anilofos 24% + 2, 4-D ethyl Ester 32% EC was recognized by 67.81 per cent of respondents for managing broadleaf weeds. Bispyribac sodium 10% SC was acknowledged by 63.44 per cent of respondents for its effectiveness against *Cyperus difformis* and *Cyperus iria*. Anilofos 30% EC was recognized by 57.81 per cent of respondents for controlling *Echinochloa colonum*, *Cyperus difformis*, and *Eclipta Alba*. Butachlore 50% EC was noted by 55.31 per cent of respondents for its effectiveness against *Echinochloa colonum*, *Eleusine indica*, *Eclipta Alba*, and *Fimbristylis miliacea*. The lowest awareness was observed for Quinclorac 250g/l SC, with 48.13 per cent of respondents recognizing its use against *Echinochloa* spp. (Barnyard grass).

The awareness of respondents regarding seed treatment chemical fungicides in IPM Table 8, Carbendazim 50% WP, a fungicide, is the most recognized chemical among respondents, with (58.13%) aware of its effectiveness against Blast, Sheath Blight, and Brown Spot. In contrast, *Pseudomonas fluorescens* 0.5% WP is known by 38.75 per cent of respondents for its use in managing bacterial leaf blight and blast.

Table 8: Distribution of the respondents according to their awareness towards Chemical practices in IPM

SL. No	Categories	Trade Name	Against insect	Awareness			
				Aware		Not aware	
				F	%	F	%
I. Insecticides							
1.	Chlorpyrifos 50% + Cypermethrin 5% EC	505 Trysil Boss 505	Gall midge, Stem borer, Leaf folder	294	91.88	26	8.13
2.	Bifenthrin 10% WP	Talstar	Stem borer, Leaf folder, Green leaf hopper	212	66.25	108	33.75
3.	Profenophos 40% EC + Cypermethrin 4% EC	Rocket	Leaf folder, Penicle mite	234	73.13	86	26.88
4.	Imidacloprid 17.8% SL	Kohinor, Admire	Brown plant hopper	156	48.75	164	51.25
5.	Cartap hydrochloride 50% SP		Stem borer, Leaf folder	137	42.81	183	57.19
6.	Deltamethrin 02.50% WP	Savir	Aphids, Thrips, Mites,	103	32.19	217	67.81
7.	Acephate 75% SP	Kitron	Stem borer, brown, plant hoppers, green leaf hopper	246	76.88	74	23.13
8.	Fipronil 05% SC	Fax SC	Stem borer, brown plant hopper, green leaf hopper, rice leafhopper, rice gall midge	82	25.63	238	74.38
II. Herbicides							
1.	Pendimethalin 30% EC	Stomp, Dhanutop	<i>Echinochloa colonum</i> , <i>Eclipta alba</i> , <i>Cyperus difformis</i>	289	90.31	31	9.69
2.	Bispyribac sodium 10% SC	Nominee gold	<i>Cyperus difformis</i> , <i>Cyperus iria</i>	203	63.44	117	36.56
3.	Pretilachlore 50% EC	Preagle plus	<i>Cyperus difformis</i>	224	70.00	96	30.00
4.	Butachlore 50% EC	Hunter	<i>Echinochloa colonum</i> , <i>Eleusine indica</i> , <i>Eclipta alba</i> , <i>Fimbristylis miliacea</i> ,	177	55.31	143	44.69
5.	Anilofos 30% EC	Anilogaurd	<i>Echinochloa colonum</i> , <i>Cyperus difformis</i> , <i>Eclipta alba</i>	185	57.81	135	42.19
6.	Anilofos 24% +2,4-D ethyl Ester 32% EC	Weedmar, super	Broad leaf weeds	217	67.81	103	32.19
7.	Quinclorac 250g/l SC	Rice star	<i>Echinochloa spp.</i> (Barnyard grass),	154	48.13	166	51.88
	Chemical practices	Trade name	Against weeds				
III. Seed treatment chemical fungicide							
1.	Carbendazim /fungicide 50% WP	Dhanustin	Blast, Sheath blight, Brown spot	186	58.13	134	41.88
2.	Pseudomonas fluorescens 0.5% WP	Pseudocare	Bacterial leaf blight, Blast	124	38.75	196	61.25
IV. Effects caused by indiscriminate use of pesticides and insecticides							
1.	Asthma			85	26.56	235	73.44
2.	Cancers			111	34.69	209	65.31
3.	Immunotoxicity			58	10.63	262	81.88
4.	Diabetes type 2			36	4.06	284	88.75
5.	Contact dermatitis like skin allergic			136	6.56	184	57.50

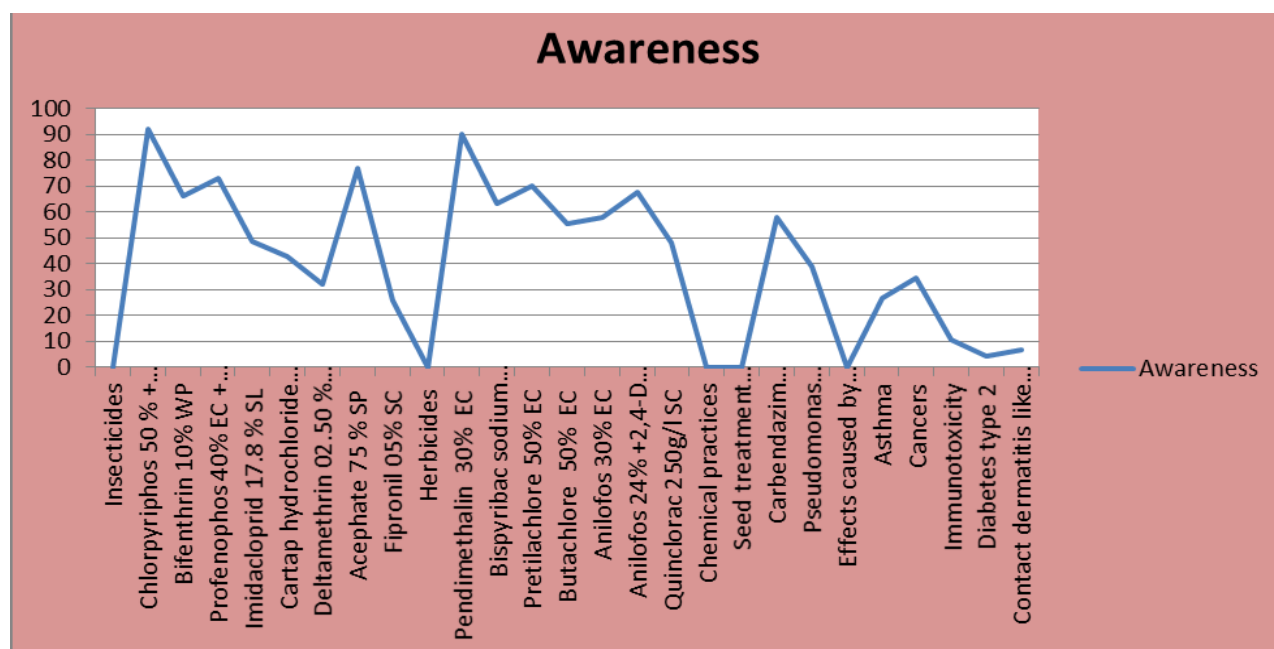
*Data are based on multiple responses

* EC = AI + solvent + emulsifier = EC

* WP = carrier + wetting agent = WP (wetttable powder)

* SC = soluble concentrate / powder

* SL = soluble concentrate / powder

**Fig 5:** Distribution of the respondents according to their awareness towards Chemical practices in IPM

The findings indicate that rice growers in the study area have a moderate level of awareness regarding the chemical practices in IPM for disease control. Carbendazim 50% WP is more widely recognized compared to *Pseudomonas fluorescens* 0.5% WP, suggesting that efforts to promote the latter could help in enhancing its adoption. To improve disease management in rice crops, extension services should focus on increasing awareness and education about the effective use of *Pseudomonas fluorescens* alongside Carbendazim.

The awareness of respondents regarding Effects caused by indiscriminate use of pesticides and insecticides, the highest level of awareness is observed for cancers, with (34.69%) of

respondents recognizing this hazard. Asthma follows, with 26.56 per cent of respondents aware of its connection to pesticide and insecticide use. Contact dermatitis and skin allergies are known by 20.00 per cent of respondents. Immunotoxicity is recognized by 10.63 per cent of respondents, while awareness of diabetes type 2 is the lowest at 4.06 per cent

Table 9 the finding reveals that the majority of respondents per cent had a medium level of awareness regarding overall awareness towards IPM practices for insect-pest management in rice crop followed by 17.50 per cent of respondent's with a low level of awareness, while a smaller group 15.00 per cent had a high level of awareness

Table 9: Distribution of the respondents according to their overall awareness towards IPM practices for insect-pest management in rice crop, (N=320)

SL. No.	Categories	Frequency	Percentage
1.	Low (Up to 52 score)	56	17.50
2.	Medium (53 to 63 Score)	216	67.50
3.	High (Above 63 score)	48	15.00
Mean = 57.79, SD = 5.60			

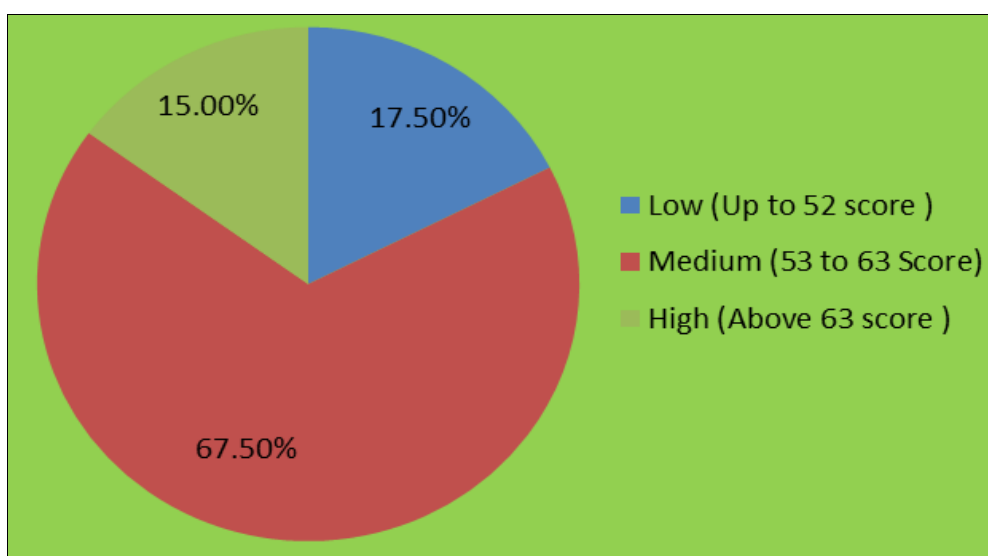


Fig 6: Distribution of the respondents according to their overall awareness towards IPM practices for insect-pest management in rice crop.

Conclusion

The findings indicate that 45% of respondents were aware of the allergic and sensitivity effects of agrochemicals on humans. For animals, 51.56% recognized behavioral changes as a hazard. Regarding water bodies, 75% were aware of drinking water contamination, while 80.94% recognized soil contamination as a major issue. On pest management, 90.94% of respondents were aware of the stem borer, while 97.81% recognized rice blast as the most common disease and Nut grass as the most recognized weed. Awareness of cultural practices in IPM was highest for deep summer ploughing (82.19%), while mechanical practices were most recognized for the removal of pest-infested plant parts (99.06%). Among biological agents, 19.69% were aware of dragonflies in pest control. The most recognized insecticide was Acephate 75% SP (76.88%), while 90.31% were aware of Pendimethalin 30% EC as an herbicide. Carbendazim 50% WP was the most recognized fungicide (58.13%). The most recognized effect of indiscriminate pesticide use was cancer (34.69%). Overall, 67.50% of respondents had a medium level of awareness

regarding IPM practices for insect-pest management in rice crops.

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