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RESEARCH ARTICLE

A SURVEY ON KNOWLEDGE, ATTITUDE AND PRACTICES OF FARMERS ON MANAGEMENT OF RODENT PESTS

***Sudha Rani, D., Ch V Narasimha Rao and Y Suryanarayana**

All India Network Project on Rodent Control, Andhra Pradesh Rice Research Institute and Regional Agricultural Research Station, Maruteru-534122, West Godavari, Andhra Pradesh, India

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ABSTRACT

A survey on Knowledge, Attitude and Practices (KAP) of 200 farmers on rodent pests and their management was conducted in West Godavari district of Andhra Pradesh, using a structured questionnaire to study the population ecology of rodents, their extent of damage and the various management practices commonly adopted by farmers to control them. The information on this survey is useful to formulate and design the Integrated Rodent Management (IRM) strategies or modules for effective rodent control. Farmers considered rodents as the main biological production constraint in paddy cultivation and estimated that they cause on an average of 10-15% yield losses in every season. Most of the farmers believe that, poison baiting could effectively control rodents, but majority of them were unaware of the dosages of rodenticide ingredients and also unaware of usage of bait stations as the effective rodent control practices. The survey revealed that, most of the farmers are with moderate level of knowledge (68 %) and practices (76 %) and also majority of them were categorized as secondary adopters (81%) basing on the analysis of farmers knowledge, practices and attitude attributes relating to rodent management respectively. A lack of proper knowledge in adopting current recommended rodent management practices and lack of farmer's community approach appeared to be the main constraint in rodent management. Hence, to make the farmers as innovators with high levels of knowledge and skills in practices relating to rodent control, there is an urgent need of organizing training programmes to farmers and pesticide dealers. Field demonstrations, farmer's interactions and developing united action among the farmers is essential for planning effective rodent control in larger stretches of land.

INTRODUCTION

Rodents are one of the most important non insect pests of agricultural crops. Many Rodent species damage various crops throughout the crop growth period and there by causes significant yield losses. Among the field crops, rice is one of the most vulnerable crops to rodents. In rice production, rodents cause 0.44 to 60 percent tiller damage which accounts for 5-10 % of total grain yield losses in pre harvested rice (Parshad *et al*., 2007). In addition to tiller damage they also hoard ripened panicles inside their burrows. The rodent outbreaks are more common in rice growing delta areas of Andhra Pradesh and sometimes crop suffers even 80-100 percent tiller damage (Rangareddy, 1994). The Godavari delta of Andhra Pradesh state in southern India is considered as a part of the 'Rice bowl of India' with rice being the integral component of agricultural activities in this region (Gururaj *et al*., 2004).

****Corresponding author: Sudha Rani, D.,***
All India Network Project on Rodent Control, Andhra Pradesh Rice Research Institute and Regional Agricultural Research Station, Maruteru-534122, West Godavari, Andhra Pradesh, India.

The cropping pattern mostly adopted in this region is rice-rice-pulses/fallow with two rice cropping patterns in *Kharif* (June/July to November/December) and *Rabi* (December to April) seasons. The farmers choose various management practices that can meet their objectives, based on their knowledge, belief and attitude on any pest damage and control. Recommendations based on existing farmer practices also would increase the likelihood of farmer's adoption (Palis *et al*., 2008).

So, an understanding of the factors that affect the farmer's knowledge, attitude and practices (KAP) is essential for designing effective management strategies or modifying the existing ones for optimum benefit (Litsinger *et al*., 1980; Escalada, 1985; Sivakumar *et al*., 1997 and Gururaj *et al*., 2004). The KAP studies are highly focused evaluations that measure changes in human knowledge, attitudes and practices in response to a specific intervention, usually outreach, demonstration or education. These studies relating to social surveys may cover a wide range of social values and activities, gathering important data pertaining to the factors influencing the problem and its management.

Hence, the present survey was conducted in West Godavari region of Andhra Pradesh to analyze the farmer's knowledge, attitude and practices (KAP) on rodent pests and their management. This information aids in developing Integrated Rodent Management (IRM) strategies.

MATERIALS AND METHODS

A farmer's survey was carried out in West Godavari district of Andhra Pradesh during 2010-11 on the knowledge, attitude and practices (KAP) of farmers on rodent pests and their management. The knowledge possessed by the community refers to the understanding of the topic, attitude refers to the feeling towards the subject as well as any preconceived ideas they possess and practices refers to the ways in which they utilize their knowledge and attitude for the management. The present survey is an attempt to study, understand, judge and analyze the farmer's knowledge, attitude and skills in practices of rodent management which are most essential for designing IRM strategies.

A total of 200 farmers in Eluru, Tadepalligudem, Nalagerla, Chintalapudi, Peravali, Penugonda, Penumantra, Palakol, Bhimavaram, Undi and Narasapuram Mandals of West Godavari were randomly selected from nearly 45 villages. Farmers were interviewed individually by a structured questionnaire in local language (Telugu) by Scientists of AINP on Rodent Control, Andhra Pradesh Rice Research Institute and Regional Agricultural Research Station, Maruteru, West Godavari.

The questionnaire was prepared basing on previous questionnaires relating to rodent pest management that were developed by Sang *et al*., 2003, Sudarmaji *et al*., 2003, Makundi *et al*., 2005 and Brown *et al*., 2008. The questionnaire consists of three sections viz., knowledge, attitude and practices (KAP) adopted by farmers on rodent pests and their management. A total of 27 statements (questions) were prepared to analyze the KAP of farmers on rodent management and the statements (attributes) scoring a four point likeret scale for their responses was recorded (Table 1). Depending on response scores, farmers level of knowledge and practices were categorized as low, moderate and high (Table 2.) and farmer's attitudes were categorized as innovators, primary adopters, secondary adopters and laggards (Table 3). The data collected were appropriately coded using the spreadsheet programme EXCEL, cross tabulation and frequency distribution (Mean) were employed for data analysis.

RESULTS AND DISCUSSION

The farmer's survey in West Godavari district of Andhra Pradesh revealed the information that, farming is the main occupation for 84.7 % of the people with a mean age of 46.6 years. The average farm holding size is 4.7 acres. Most of the farmers, opined that rodents are one of the main biological constraint in paddy cultivation, since it is a detrimental pest causing an average of 10-15% yield losses every season and thereby increasing the cost of cultivation.

Table 1. Questionnaire for KAP analysis of farmers on rodent pests and their management

Name of the farmer: Age: Acreage:		Name of the Village: Mandal: District:		
Attributes		Response with score in Parenthesis		
a.	**Knowledge**			
1	Rats made damage	No(1);	Less(2);	Moderate(3); More(4)
2	Rats make damage in	Fields (3);	Houses (3);	Both (4);
3	Rats move more in	Day time (1);	Night time (3);	Evenings (4);
4	Rats transmit diseases	Yes (4);	No (1);	Do not know(1)
5	Rats damage is more by	Big Rats (4);	Small Rats (2);	Both (2);
6	Rats are controlled by	Cats (2); Poison baits (2);	Traps (2); Mixing all (4)	Catching (2);
7	Rats can be killed effectively by	Acute Poisons (3);	Anticoagulants (4)	
8	Awareness on dosage	Aware (4);	Unaware (2)	
9	Do you know about bait stations	Yes (4);	No (1)	
10	Do you know about bait materials	Yes (4);	No (1)	
b.	**Attitude**			
11	Rats can be controlled	Yes (4);	No (1)	
12	Rats can be effectively controlled by	Cats (2); Poison baits (2).	Traps (2); Using different methods (4);	Catching (2);
13	Rat control is to be done by	Farmers(4);	Government (0)	
14	Rat control is done after	Training (3); Demonstrations (2); T V Advertisement (4)	Looking at Others (2); Pesticide retailers advise (4); Radio broadcast (4)	Village meetings (2); Reading News paper (2);
15	Using traps is	Effective (4)	Ineffective (0)	
16	Will you purchase Rat poison	Yes (4);	No (1);	Take from others (3)
17	Do you use poison baits if effective	Yes (4);	No (1);	
18	Do you purchase them	Yes (4);	No (0);	Take from others (3)
c.	**Practices**			
19	Rats are killed by	Catching(2) ; Poison baits(2) ;	Cats (2) ; Combinations(4)	Traps(2) ;
20	Poison used	Acute (3);	Chronic (4)	
21	How it is applied	Loose (2);	Packed (3);	Bait stations (4)
22	Place of application	Field bunds (1);	Rat holes (3);	Bait stations (4)
23	Time of application	Morning (1);	Midday (1);	Evening(4); Night (1)
24	Dead Rats are	Thrown out (1);	Buried (4)	
25	Rats in traps are	Released outside (0);	Killed (4)	
26	Safety precautions	Taken (4);	Not taken (1)	
27	Poison obtained from	Others (2);	Purchased (4)	

Table. 2 Categorization of farmers based on level of knowledge and practices

Score percent	Category
Less than 50 percent	Low
50-80 percent	Moderate
More than 80 percent	High

Table 3. Categorization of farmers based on level of attitude

Score percent	Category
More than 90	Innovators
80-90	Primary adopters
40-80	Secondary adopters
Less than 40	Laggards

Farmer's Knowledge

Farmer's knowledge was analyzed by different attributes and their responses were scored. Farmer's gave a mixed response for rodent control practices adopted by them. Only 20% of the farmers have the knowledge of using all the control measures *viz*., traps, catching and poison baits. Sixty percent of the farmers opined that, poison baiting is the best whereas 10% of the farmers responded for traps as the best and another 10% for catching the rodents as the best rodent control practices (Fig 1).

Table 4. Farmer's response to knowledge attributes relating to rodent pests and their management

Knowledge attributes	Percent response of farmers in parenthesis			
Rats made damage	No (0);	Less (10);	Moderate(40);	More (50)
Rats make damage in	Fields (60);	Houses (10);	Both (30);	
Rats move more in	Day time (0);	Night time (70);	Evenings (30);	
Rats transmit diseases	Yes (10);	No (30);	Do not know(60)	
Rats damage is more by	Big Rats (50);	Small Rats (10);	Both (40);	
Rats are controlled by	Cats (0);	Traps (10);	Catching (10);	
	Poison baits (60);	Mixing all (20)		
Rats can be killed effectively by	Acute Poisons (70);	Anticoagulants (30)		
Awareness on dosage	Aware (20);	Unaware (80)		
Do you know about bait stations	Yes (20);	No (80)		
Do you know about bait materials	Yes (60);	No (40)		

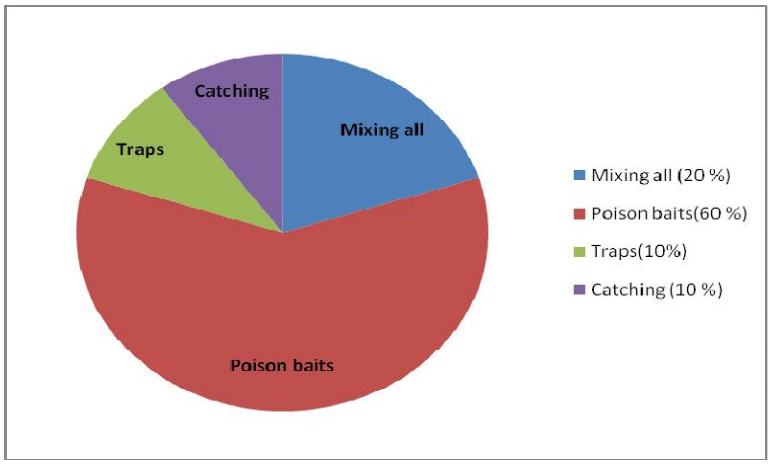

Fig 1. Farmer's knowledge relating to adoption of rodent control practices

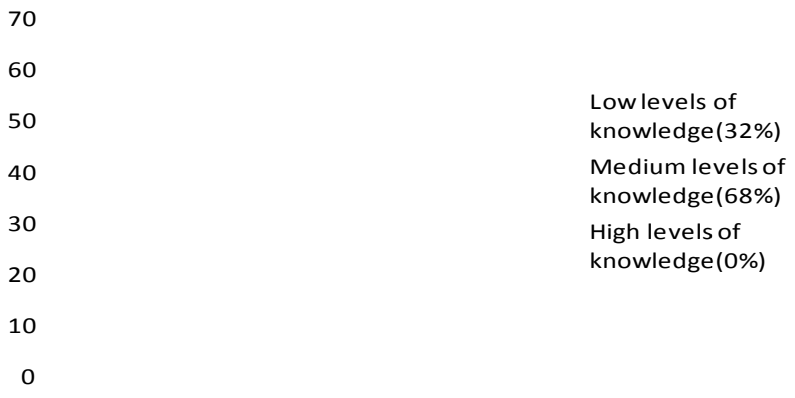

Fig 2. Percent level of farmer's knowledge on rodent pest management

Regarding knowledge on choice of rodenticides, 70% of the farmers expressed that acute poisons are the best and the other 30% opted that anticoagulants are the best rodenticide. Only 20% of the farmers were correctly aware of the dosage of poison bait ingredients whereas, 80 % of them were unaware of the dosage, which is the primary reason for showing the rodenticide ineffectiveness in the management (Table 4).

From this survey, it was revealed that majority of the farmers (68%) are with moderate level of knowledge on rodent pests and their management.

Farmer's Attitude

Farmer's attitudes was analyzed and judged based on their responses to eight statements. In response to initiation of the rodent control practices, 8% of the farmers initiated after

Table 5. Farmer's response to attitude attributes relating to rodent pests and their management

	Attitude attributes	Percent response of farmers in parenthesis		
1	Rats can be controlled	Yes (67);	No (33)	
2	Rats can be effectively controlled by	Cats (0); Poison baits (60).	Traps (10); Using different methods (20);	Catching (10);
3	Rat control is to be done by	Farmers(68);	Government (32)	
4	Rat control is done after	Reading News paper (8); Village meetings (12); Advertisement (4)	Training (14); Demonstrations (12); Radio broadcast (6)	Looking at Others (22); Pesticide retailers advise(22); T V
5	Using traps is	Effective (60)	Ineffective (40)	
6	Will you purchase Rat poison	Yes (30);	No (40);	Take from others (30)
7	Do you use poison baits if effective	Yes (20);	No (80);	
8	Do you purchase them	Yes (30);	No (80);	Take from others (10)

Table 6. Farmer's response to practice attributes relating to rodent pests and their management

Practice attributes	Percent response of farmers in parenthesis			
Rats are killed by	Catching(10) ; Poison baits (60) ;	Cats (0) ; Combinations(20)	Traps(10) ;	
Poison used	Acute (70);	Chronic (30)		
How it is applied	Loose (20);	Packed (70);	Bait stations (10)	
Place of application	Field bunds (10);	Rat holes (80);	Bait stations (10)	
Time of application	Morning (5);	Midday (5);	Evening (85)	Night (5)
Dead Rats are	Thrown out (20);	Buried (80)		
Rats in traps are	Released outside (0);	Killed (100)		
Safety precautions	Taken (20);	Not taken (80)		
Poison obtained from	Others (70);	Purchased (30)		

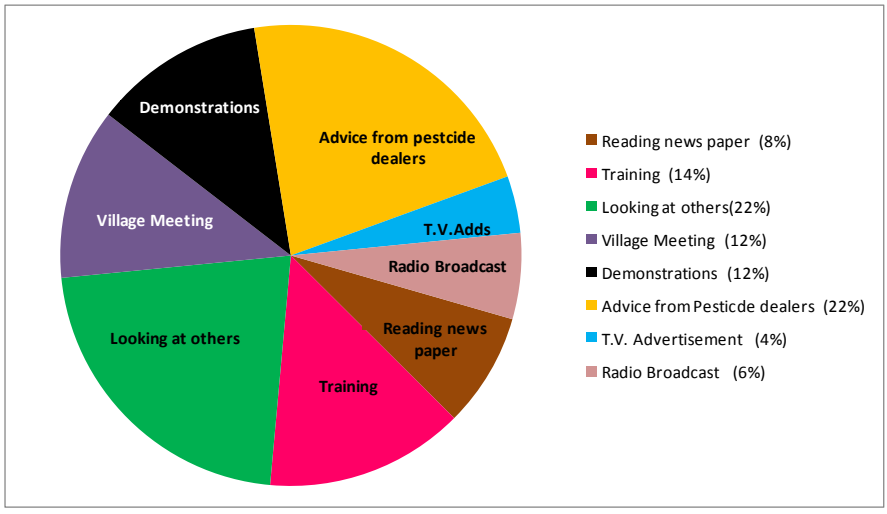

Fig 3. Farmer's attitude for initiating rodent control practices

Only 32 % of farmers have scored below fifty percent and 68 % of farmers have scored 50 to 80% regarding knowledge attributes relating to rodent pests and their management and hence, they were categorized as farmers with low and moderate levels of knowledge respectively. None of the farmers have scored above 80% (Fig 2).

reading news paper, 4% after training, 22% by looking at others, 12% based on village meeting, 12% after demonstrations, 22% on the advice of pesticide dealers, 4% following T.V. advertisement and 6% based on radio broad cast (Fig 3.)

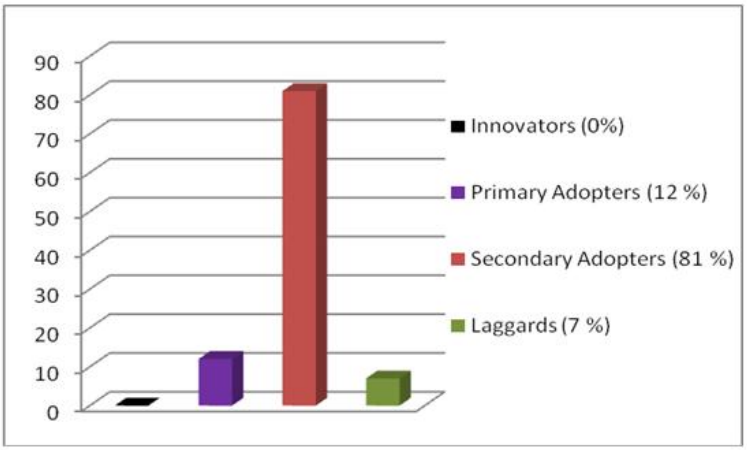

Fig 4. Percent levels of farmer's attitude on rodent pest management

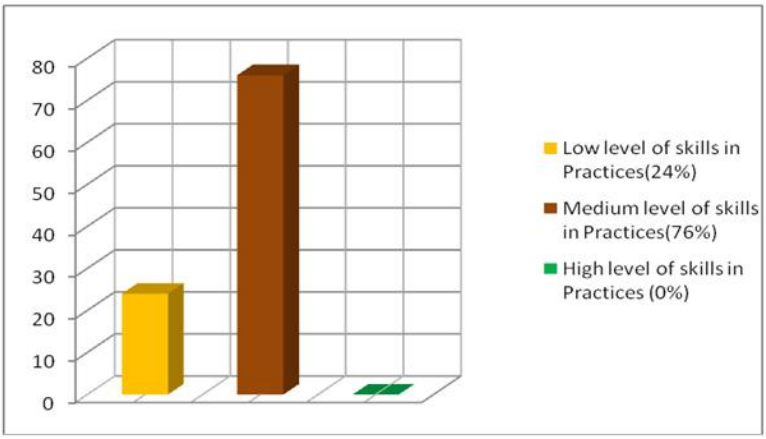

Fig 5. Percent levels of farmer's Practice on rodent pest management

Majority of the farmers (68%) attitude is that rat control should be adopted by the farmers alone, whereas 32% opined that Government has to involve actively in controlling rodents. Regarding purchasing rodent poison, only 30% were interested in purchasing, while 40% were not willing to purchase and 30% were interested to take from others (Table 5). On an average only 12% of the farmers were primary adopters scoring 80-90 % and 7% of the farmers were laggards scoring below 40 percent and majority of the farmers (81%) were secondary adopters scoring 40-80 % in levels of attitudes on rodent pests and their management. None of the farmers were innovators (Fig 4).

Farmer's Practices

The skills and practices of the farmers were judged by posing nine different questions relating to practices adopted by them in rodent pest management. It was observed that for the use of poison baits, 20% of the farmers were applying bait as loose while 70% of the farmers were applying in burrows (rat holes) and only 10% of the farmers were adopting bait stations for placing poison bait. Towards the maintenance of safety precautions, only 20% of the farmers were taking precautions while working with rodents but 80 % of the farmers were not adopting them. It was clearly judged that all the farmers (100 %) were killing the trapped rodents (Table 6).

From the overall responses of the farmers with respect to practices adopted by them in rodent pest management, it was observed that, 24% of the farmers are with low levels of skills and practices scoring below 50 % and majority of the farmers (76 %) were with moderate level of skills and practices in rodent management operations scoring 50-80 percent in the practice attributes pertaining to rodent management and none of the farmers were found with high level of skills and practices in rodent management (Fig 5). Similar KAP studies on rodent pests and management were made by (Joshi *et al*., 2000, at Ifugao, Philippines, Makundi *et al*., 2005) at Tanzania and Ethiopia, (Brown *et al*., 2008 at Myanmar and Alexander *et al*., 2011), at Luzon, Phillippines. From the present study it was emphasized that, most of the farmers opined the rodents as major biological constraint in paddy cultivation and cause on an average of 10-15% yield losses. This is in consistent with the findings of farmers KAP analysis on rodent management by Brown *et al*., 2008 at Myanmar who concluded that, farmers consider rodents as the major problem and estimated that they caused 13% yield loss. Majority of the farmers (68%) viewed that rodent management can be done effectively on community basis by working all the farmers together. (Shuyler, 1972; Morin *et al*., 2003 and Brown and Khamphoukeo, 2007) also stated that to gain as much benefit as possible in rodent management, the farmers should be encouraged to work together on a community scale.

In the present survey it was analyzed that most of the respondents (60 %) opined that use of poison baiting is best method of rodent control, which is similar to the survey finding of Makundi *et al*., 2005 at Tanzania and Ethiopia regions. Among the rodenticides choice, 70% of the farmers felt that acute poisons are more effective than the anticoagulants. This was due to quick action of acute poisons than less toxic chronic rodenticides (Alexander *et al*., 2011). Maximum respondents (80%) are unaware of the dosages of rodenticide ingredients and apply less than the recommended concentrations. As a consequence these rodenticides effectiveness is very limited on rodent control. The same findings were earlier reported by West *et al*., 1975, Buckle, 1999 and Hoque and Sanchez, 2008.

From the entire KAP survey it was analyzed that, most of the farmers of West Godavari district, Andhra Pradesh are with moderate level of knowledge and skills in practices and also majority of them are secondary adopters. Further, it was also emphasized from the present study, that there is no difference in farmer's knowledge, attitude and practices in response to the common attribute 'Adoption of rodent control practices'. Hence, guidance to farmers on sustainable and effective use of existing rodent control methods through training programmes to farmers and pesticide dealers is of utmost importance. Field demonstrations, farmer's interactions and promoting community actions is need of the hour to motivate the farmers and make them as innovators with high level of knowledge and practices in rodent pests and their management.

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