EFFECT OF IPM-FARMER FIELD SCHOOL ON FARMERS' INSECT KNOWLEDGE AND CONTROL PRACTICES: A CASE STUDY

TRUONG THI NGOC CHI, TRAN QUANG TUYEN,
LISA L. PRICE[1] AND MAHABUB M. HOSAIN[1]

ABSTRACT

A survey of 99 farmers revealed that all non-trained farmers and most of IPM trained farmers (93% males and 88% females) used insecticides because they all perceived insecticide as an effective pest control method. However, training significantly reduced insecticide use. More trained (54% males and 37% females) than non-trained farmers (7% males and 10% females) did not spray insecticides during 0-40 days after sowing (DAS). Lesser percentage of trained (23% males and 25% females) than non-trained farmers (50% males and 32% females) sprayed insecticides for insect prevention during 40 DAS. Training significantly increased the use of non-chemical control measures as water management and small duck predators. Consequently, training significantly reduced expenditure for insecticide use. Training significantly increased farmers' consultations with extension technicians. Trained farmers (76% males and 50% females) often consulted technicians while non-trained farmers (64% males and 84% females) never consulted them. Gender significantly affected pest management knowledge. Males' correct answers were higher than females'. Education and training positively significantly affected farmers' knowledge score.

Key words: IPM, insecticide, farmer, training

INTRODUCTION

The intensive cropping to increase rice production in Vietnam has resulted in the high chemical inputs. This has produced negative impact on human health and the environment. An alternative way to deal with insect pest problem that reduces pesticide inputs is known as integrated pest management (IPM). Though this approach of controlling pest was introduced to Vietnam more than five years ago, poor pest management practices still exist among farmers.

Enhancing environment literacy is one of the goals of IPM-FFS (Integrated Pest Management-Farmer Field School). IPM-FFS encourages farmers not to spray insecticides unless pest thresholds reach a damaging level. This is an informal learning situation where the "classroom" is the farmers' own field, and the "content" to be learned comprises the interrelated components of that field. It also teaches farmers knowledge on insecticides that cause the resurgence of insects (FAO-IPM, 1993: p.4). It makes farmers understand how to grow a healthy crop with less dependence on chemical inputs by the use of other pest management measures. The indicators of FFS success include the knowledge gain among trained farmers and corresponding change in practices. IPM-FFS intends to impart scientific knowledge to farmers.

[1] International Rice Research Institute, Los Banos, Laguna, Philippines

However, the acquisition of such knowledge depends on the social conditions such as access to training and gender.

This study has two main objectives: 1) compare the pest management knowledge and control practices between IPM-trained and non-trained farmers; and 2) compare the differences of knowledge between male and female farmers.

MATERIALS AND METHODS

Data sources: In 1997, a survey was conducted in Thoi Long village, Omon District of Can Tho province. The data were gathered through personal interviews of 99 rice farmers. Of the 173 trained farmers, 30 males were randomly selected and a complete enumeration of 8 females was included. Of 61 non-trained farmers randomly selected, 30 were male and 31 were female. The structured questionnaire was used to gather information of household socio-economic characteristics, and pest control practices.

Pest management knowledge was measured by using the closed-ended questionnaire. This comprised 12 questions with 5 choices and 43 questions with 3 choices. The questions were classified into three knowledge domains: (1) entomological knowledge which involves the identification and understanding of the roles of natural enemy and major rice insect; (2) insect-plant interaction knowledge; and (3) insecticide knowledge.

Analysis: A set of key answers were used as indicator to evaluate farmers' knowledge. Farmer' knowledge score was calculated by using the formula developed by Romney et al. (1986: p.319) as shown in the following:

Knowledge score $D = \dfrac{(RQnxn) - 1}{(n - 1)}$

Where, RQ_n is the percentage of right answers for questions with n choices

Descriptive statistics such as percentages and means were used to summarize the data. A multiple regression analysis was employed to determine the factor affecting the farmers' knowledge score and control practices.

RESULTS AND DISCUSSION

Socio-economic profile of the farmers

Table 1 indicates that trained farmers had higher educational level (7 years for males, 9 years for females) than non-trained farmers (6 years for males, 4 years females). The family size of 99 respondents was 6.3. The average years in farming was 18. The mean land size was one hectare/household. Land was predominantly owned by males (86%). Only 9 percent of females owned land.

Farmers' insect control practices

Table 2 shows that all the non-trained males and females used insecticide and most of trained farmers (93% trained males and 88% females) used insecticide. Trained males used small ducks (43%) and water management (37%) as well.

Table 1. Socio-demographic profile of the farmers (N= 99)

Characteristics		Male (n=60)		Female (n=39)		Total (n=99)
		Non-trained (n=30)	Trained (n=30)	Non-trained (n=31)	Trained (n=8)	
Age (years old)		46	46	40	41	43
Education (years in school)		6	7	4	9	6.5
Family size		5.4	6.4	5.5	8	6.3
No. of years in farming		20.8	22.3	17.2	12	18
Land size (ha)		1.1	1.0	0.73	1.0	1.0
Land ownership (%):	Wife	0	0	26	13	9
	Husband	97	93	71	74	86
	Grand Parents	3	7	3	13	5
Household income		21.4	22.8	21.1	20.6	21.5
Insecticide expenditure in dry season		248.0	161.0	311.7	152.5	218.3
Insecticide expenditure in wet season		173.2	124.0	218.5	91.3	151.8

Note: Insecticide use expenditure: thousand dong/ha; Income: million dong/year

Table 2. Farmers' insect control practices (%)

Item		Male (n=60)		Female (n=39)		Total (n=99)
		Non-trained	Trained	Non-trained	Trained	
Control methods*						
Apply insecticide		100	93	100	88	97
Baits		3	10	3	13	6
Water management		13	37	6	75	23
Small ducks		7	43	6	13	18
No. of sprays during 0-40 DAS						
0		7	54	10	37	24
1		40	33	19	37	32
2		30	7	39	0	23
≥ 3		23	6	32	26	21
Mean		1.73	0.70	2.23	1.30	1.32
Purpose in spraying*						
Control purpose	0-40 DAS	43	23	55	38	
	41-60 DAS	53	47	61	25	
	>60 DAS	20	20	13	13	
Prevent purpose	0-40 DAS	50	23	32	25	
	41-60 DAS	30	27	23	13	
	>60 DAS	17	10	6	0	
Consultation of technicians						
Very often		3	17	0	13	7
Often		33	76	16	50	42
Never		64	7	84	37	51
Total		100	100	100	100	100

*Note: * Multiple responses; DAS: days after sowing*

Table 3. Farmers' knowledge level

Knowledge level	Male (n=60)		Female (n=39)		Total (%)
	Non-trained (%)	Trained (%)	Non-trained (%)	Traine d (%)	
Entomological knowledge					
Low	70	10	84	50	55
Medium	27	37	10	25	24
High	3	53	6	25	21
Insect-plant interaction knowledge					
Low	13	10	23	37	17
Medium	30	33	45	37	36
High	57	57	32	26	47
Insecticide knowledge					
Low	73	17	84	63	59
Medium	24	47	13	25	27
High	3	36	3	12	14

Farmers' knowledge of insect pest management

Farmers' knowledge level were classified into high, medium and low knowledge score. Low knowledge level was to knowledge score of ≤ 35%, medium knowledge level with 35-65% and high knowledge level with > 65%. Table 3 shows that trained farmers had higher knowledge level than non-trained farmers and male farmers had higher knowledge level than female farmers.

Factors affecting farmers' insect pest management knowledge

Multiple regression analysis was used to determine the factors affecting farmers' insect pest management knowledge. Gender, education and training are the main factors affecting significantly farmers' knowledge (Table 4).
Gender positively and significantly explained farmers total knowledge score and entomological knowledge. Male farmers in this study had higher knowledge score than female farmers.

Gender strongly influenced the difference of knowledge absorption under the same conditions of exposure to the IPM-FFS (among trained male and female farmers) and the same conditions of culture (among non-trained male and female farmers). Traditionally, gender is socially constructed. Man or husband is seen as economic provider of the family and he involves in the public sphere, outside the home. On the other hand, women or wife is seen as housewife or house keeper. She involves in domestic work. The "domestic" and "public" provide the structural framework to identify the place of male and female in psychological, cultural, social and economic dimensions of human life (Rosaldo and Lamphere, 1976). These explanation is accounted for the persistence of gender gap. Women do more home work than men, which limits their time and attention to training. In Viet Nam (UNDP, 1995), there is a fairly strict concept of the division of labor between men and women. This concept also contributes to less attention of women to learning new knowledge even if they participated in the course. The women' s strong belief of their dependence on the husbands and responsibility in the domestic sphere inhibit themselves to access information as well as new knowledge learning. The information on technology in the training course is considered as public sphere. Hence, men will access it.. This explained the lower absorption of knowledge by rural women than men.

The farmers' total knowledge, entomological knowledge and insecticide knowledge were positively and significantly affected by education and training. The positive association of education with the knowledge score indicates that education complements absorption and learning of additional knowledge from the training.

Factors affecting some control practices by farmers

Table 5 shows that training had highly significant and negative effect on the number of insecticide sprays during 0-40 DAS (days after sowing) and expenditure for insecticide use. It significantly reduced insecticide sprays for preventive purpose. Moreover, training increased the number of non-chemical control measures used by farmers and the level of technician consultation.

Land size had significant negative effect on the number of control methods. Those who have larger fields used less number of control methods. However, land size had positive significant effect on the purpose of spraying insect. The larger the land size, the more spraying for control purposes was.

CONCLUSIONS

The findings reveal that all non-trained farmers (male and female) used insecticides to control insect pests. A relatively large proportion of trained farmers (93% male and 88% female) used insecticides. However, training negatively and significantly affected the number of insecticide sprays before 40 days after sowing. In this study, more trained (54% male and 37% female) than non-trained farmers (7% male and 10% female) did not spray insecticide during the first 40 days. Training significantly affected the purpose of insecticide sprays. A smaller proportion of trained farmers (23% male and 25% female) than non-trained farmers (50% male and 32% female) sprayed insecticide for insect prevention during the first 40 days. Training positively and significantly affected the number of control methods used by farmers. To control insects, more trained farmers than non-trained farmers used non-chemical control measures such as water management and small ducks. Thus, trained farmers reduced insecticide use expenditure.

Training significantly affected the farmers' consultation with the extension technician. More trained (75% male and 50% female) than non-trained farmers (33% male and 16% female) consulted the extension technicians. A relatively large proportion of non-trained farmers (64% male and 84% female) never consulted an extension technician. More males than females often consulted the technician. Knowledge is significantly affected by gender. Male farmers showed higher knowledge than female farmers. Education and training strongly affected pest management knowledge. Trained farmers had higher knowledge than the non-trained farmers.

Table 4. Regression Analysis between farmers' knowledge and socio-economic actors, gender and training (N=99)

Variable	Total knowledge score for Insect pest management			Score of entomological knowledge		
	Estimate	Stand. Error	T value	Estimate	Stand. Error	T value
Gender	0.09*	0.04	2.15	0.11*	0.05	1.89
Age	0.002	0.002	1.10	0.01	0.002	1.17
Education	0.02*	0.007	2.53	0.03*	0.009	2.99
Years in farming	0.00	0.002	0.11	-0.001	0.003	-0.38
Household Size	-0.03	0.009	-0.44	-0.004	0.012	-0.37
Land size	0.05	0.0003	1.61	0.01	0.004	0.15
Household income	0.002	0.000	1.11	0.004	0.000	1.39
Training	0.18**	0.04	4.20	0.34**	0.05	5.53
Intercept	0.33	0.13	2.26	0.18	0.17	1.03
R^2	0.48			0.55		
Variable	**Score of insect-plant interaction knowledge**			**Score of insecticide knowledge**		
	Estimate	Stand. Error	T value	Estimate	Stand. error	T value
Gender	0.10	0.05	1.17	0.05	0.04	1.14
Age	0.00	0.002	0.14	0.001	0.002	0.44
Education	0.01	0.008	0.82	0.02*	0.007	2.86
Years in farming	0.002	0.003	0.85	-0.001	0.002	-0.42
Household Size	-0.004	0.01	-0.35	0.002	0.009	0.18
Land size	0.08*	0.0004	2.07	0.07	0.0003	1.19
Household income	0.001	0.000	0.58	0.002	0.000	0.79
Training	0.01	0.05	0.26	0.22**	0.04	4.75
Intercept	0.43	0.16	2.61	0.22	0.14	1.16
R^2	0.18			0.48		

Table 5: Regression analysis between control practices and socio-economic factors, gender and training

Variable	No. of sprays during 0-40 DAS			Purpose of spray during 0-40 DAS			Insecticide use expenditure (dry season)		
	Estimate	Stand Error	T value	Estimate	Stand. error	T value	Estimate	Stand. error	T value
Gender	0.58	0.29	1.97	0.20	0.18	1.13	34.51	36.5	0.94
Age	-0.01	0.01	0.43	0.00	0.01	0.10	1.38	1.8	0.76
Education	-0.07	0.05	-1.47	-0.02	0.03	-0.59	-5.18	5.9	-0.87
Household Size	-0.10	0.06	-1.61	0.01	0.04	0.20	-4.30	7.6	-0.56
Land size (ha)	0.48	0.28	1.71	0.37*	0.18	2.09	-7.79	35.3	-0.22
Household income	-0.02	0.00	-1.32	-0.01	0.00	0.76	0.20	0.00	0.14
Training	-0.7*	0.30	-2.38	-0.5**	0.18	-2.97	-106*	36.9	-2.87
Intercept	2.69	0.79	3.4	1.12	0.49	2.28	314.8	98.7	3.2
R^2	0.27			0.20			0.21		

Note: Unit of income: million dong/year; Unit of insecticide use expenditure = thousand dong/ha
***= significant at 0.01; * = significant at 0.05*

Table 5. (continued)

Variable	No. of control methods used			Consult technician		
	Estimat	Stand. error	T Value	Estimat	St.and rror	T value
Gender	-0.03	0.14	-0.26	0.31	0.20	1.61
Age	0.01	0.01	0.92	0.00	0.01	0.32
Education	0.03	0.02	1.14	0.04	0.03	1.25
Household Size	-0.04	0.03	-1.43	0.01	0.04	1.17
Land size (ha)	-0.30*	0.14	-2.05	0.10	0.19	0.51
Household income	0.01	0.00	1.80	0.01	0.00	0.50
Training	0.06**	0.15	3.98	0.87**	0.02	4.39
Intercept	1.17	0.40	2.92	3.89	0.53	7.32
R^2	0.29			0.36		

References

FAO-IPM 1993 IPM Farmer Training: The Indonesian Case. Booklet issued by FAO-IPM Secretariate, Yogykarta pp. 1-94

UNDP 1995 Vietnam Through the Lens of Gender: An Empirical Analysis using Household Survey Data. The Abstract. Hanoi, Vietnam pp. 3-12

Romney A K, C W Susan and H B William 1986 Culture as Consensus: A Theory of Culture and Informant Accuracy. American Anthropologist 88, p. 313-337

TÓM TẮT

Ảnh hưởng của lớp IPM-FFS đến phương pháp và kiến thức phòng trừ sâu hại lúa của nông dân

Kết quả phỏng vấn 99 nông dân ở Ô Môn, Cần Thơ cho thấy rằng tất cả nông dân không học IPM và hầu hết nông đã học IPM (93% nam và 88% nữ) dùng thuốc trừ sâu cho ruộng lúa vì họ nghĩ rằng thuốc là biện pháp phòng trừ hữu hiệu nhất. Tuy nhiên, chương trình tập huấn IPM đã làm giảm việc dùng thuốc một cách có ý nghĩa. Số nông dân đã học IPM không phun thuốc trừ sâu sớm cao hơn nông dân không học lớp IPM và ít phun để ngừa sự xuất hiện của sâu hơn nông dân không học IPM. Thay vào đó, họ dùng các biện pháp khác để trừ sâu như là quản lý nước, thả vịt con vào ruộng. Vì vậy, họ giảm được chi phí mua thuốc và phun thuốc trừ sâu. Sự tham dự lớp tập huấn cũng gia tăng sự tiếp xúc của nông dân với cán bộ kỹ thuật một cách có ý nghĩa và nam nông dân thường tiếp xúc nhiều hơn nữ nông dân. Kiến thức về phòng trừ sâu hại tổng hợp khác nhau giữa nam và nữ nông dân. Nam tỏ ra có kiến thức cao hơn và số câu trả lời đúng của nam cao hơn nữ. Trình độ văn hoá và sự tham dự lớp tập huấn của nông dân tương quan thuận với kiến thức của nông dân.