IPM Technologies - An Impact Assessment

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1. Introduction

Situations of conflict between ecological and economic compulsions might be traced back to the earliest human settlements but today the need for sustainable agriculture is more pronounced than ever.

The everemphasis on the use of chemical pesticides and their indiscriminate use by the farmers leads to excessive chemicalisation of agriculture with multitude of consequences viz. development of resistance to pesticides in the target pest species, resurgence of pests, secondary pest outbreaks, residues in food, feed, fodder etc. and above all environmental pollution.

Integrated Pest Management (IPM) is an important component of sustainable agriculture. IPM as applied in agriculture is the use of the most effective, economical, safest, ecologically sustainable and sociologically acceptable combination of physical, chemical and biological methods to limit the harmful effects of crop pests.

It is not a pest control without chemicals, or biological control. In fact IPM is based on the optimization, not maximization of chemical pesticides. The IPM approach encompasses all available control techniques to contain and combat pest infestation with the aim of lessening the pesticide load in the environment.

1.1. Researchable Issues

Cotton as an important commercial crop is grown extensively in Tamil Nadu especially in the districts of Coimbatore, Salem, Periyar and Southern districts. The pest problem in Coimbatore needs to be equally addressed with an eco-friendly approach, for which, IPM fits the bill. This study was undertaken to identify indigenous IPM technologies practiced by the farmers in cotton farming and their extent of adoption, and also to evaluate the effectiveness of IPM training programme and other communication sources. The objective of the research study were as follows:

- To identify the indigenous IPM technologies practiced by the farmers in cotton farming and their extent of adoption.
- To evaluate the effectiveness of IPM training programme organized by various research and extension institutions in the study area.
- To study the role of communication sources in the adoption process of the IPM technologies.
- To build up a model for coordinating the various training institutions for the research and dissemination of IPM technologies.

2. Methodology

Ex-post facto design was used with case study as a method. The district of coimbatore in Tamilnadu popularly known as "Manchester of South India" owing to its abundant cotton production with majority

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of the farmers cultivating cotton. A sample of 30 cases of cotton growing farmers who were trained by either CICR, TNAU, or Department of Agriculture of IPM practices in cotton was taken. Data were collected by personal interview, non-participant observation and structured questionnaire. Data thus collected were analyzed using appropriate statistical tools.

3. Result and Discussion

From the study, seven indigenous IPM practices were found to be followed by the selected farmers in the study area. They were delinting the cotton seed with cow dung, seed treatment with red earth, spray mix of sugar and neem oil, application of neem kernels with Vasambu, growing marigold as fence crop, cultivating corriander as intercrop and digging small trenches to collect and destroy bollwarm caterpillars (Table 1).

Table 1 Extent of Knowledge and Adoption of Indigenous IPM Technology Among Farmers

Technology	Knowledge	Adoption	n.= 30* % ge of adoption corresponding to knowledge
Delinting with cowdung	21 (70.00)	1(3.3)	4.76
Seed treatment with red earth	3 (10.00)	3 (10.00)	100.00
Spray mix of sugar and neem oil	5	5	100.00
Application of neem kernals with Vasambhu	1 (3.33)	1 (3.33)	100.00
Growing marigold as fence crop	4	3	75.00
Growing coriander as intercrop	12(40.00)	7 (23.33)	58.33
Digging small trenches to collect and destroy bollworm catepillars	8 (26.67)	2 (66.67)	25.00

Figures in parentheses indicate respective percentage to the total farmers; * Multiple responses

The effectiveness of IPM training was assessed on the basis of the knowledge of the farmers on the dysfunctional consequences of the pesticides, knowledge and adoption of trained IPM technologies among the farmers and the impact of IPM training on the pesticide application as well as yield (Table 2).

Table 2 Knowledge of Farmers on Dysfunctional Consequences of the Intensive Use of Pesticides

Dysfunctional consequences of pesticides	Responses n= 30*	Z value
Development of resistance in the insect pest population	24 (80.00)	10.96 **
Development of resurgence of insect pests	16 (53.33)	5.82**
Elimination of natural enemies	6(20.00)	2.74**
Innocuous pests assume the status of major pests	18(60.00)	3.33**
Degradation of the environ. leading to loss of ecological security	9(30.00)	3.58**
Deposition of pesticide residues in the product of cotton	3 (10.00)	1.82

Figures in parentheses were percentage; * Multiple responses, ** Significant at 0.01 level of probability

Among the dysfunctional consequences, more than 50 per cent of the farmers had the knowledge on the development of resistance in insect post population, development of resurgence of insect pests, innocuous pest assuming the status of major pests. Degradation of the environment leading to the loss of ecological security was known to only 30 per cent of them. Only 10 per cent of the selected farmers knew about the dysfunctional consequences of deposition of pesticide residues in the product of cotton. The IPM training's had significant impact on the knowledge and adoption of all the trained IPM technologies in the study area except for adjusting the sowing period and the application of bio-control agents.

The impact of IPM training on the reduction in pesticide sprays and improvement in yield was found to be significant in the study area.

From the analysis of cases, it was found that the training module adopted by CICR had the most desirable effect. The selected farmers of all four villages invariably endorsed the on farm training method. In on campus training, only the better educated and upper social strata farmers utilize opportunities to attend such training. On farming training facilitates the farmers to get clarified their practical doubts about the skills to use IPM technologies Ling term training makes possible for the initially hesitant farmers to give their consent for the training after convinced with the utilitarian effects of the IPM technologies in fields of the trained farmers.

There were several lacunae of the training as reiterated by the respondents. Presence of only one trainer at a village found it cumbersome to carry out the training to a desirable level on the cotton farmers. At least two trainers should be involved in two villages.

Slow rate of mobility on the part of the trainer due to the lack of appropriate vehicle which acted as hindrance to move into the interior part of the village to monitor early morning sprays. Absence of feed back and follow up resulted in the discontinuance of certain IPM practices especially bio-control method.

A combination of communication methods were found to bring desired impact in the diffusion of IPM practices. They included compact block result demonstration, field visits, radio-broadcasts, video films including television leaflets, folders, pamphlets and print media including popular articles (Table 3).

Table 3 Choice of Communication Methods Among Cotton Farmers for IPM Training

Vill.	Demo.	Field visits	Radio broadcast	Periodicals	Video films including T.V.	n. =30* Leaflets/folders/pamphlest
I	10 (100)	10(100)	4(40)	2(20)	2(20)	8(80)
II	10(100)	10(100)	6(60)	4(40)	3(30)	10(100)
III	5(500)	5(500)	3(60)	1(20)	2(40)	2(40)
IV	4(80)	5(100)	4(80)	4(80)	3(60)	4(80)
Total	29(96.67)	30(100)	17(56.67)	11(36.67)	10(33.33)	24(80.00)

* Multiple responses, Figures in parentheses indicate respective percentages.

More than 80 per cent of the respondents replied in affirmative when asked about the documentation of indigenous practices identified by the respondents. The following were indigenous practices identified by the respondents:

- Seed treatment with red earth.
- Application of organic manure at the early of cotton growth.
- Using crops like coriander as inter crops in black cotton soil areas.
- Summer ploughing to expose the egg masses to the scorching sun,
- Collection of fallen squareds and flowers and discarding them.
- Application of neem cake.
- Digging small trenches to collect and destroy the caterpillars of bollworms.
- Diluting sugar and neem oil in water and spraying on the next day
- Field sanitation and proper spacing between plants as well as rows.

Among the respondents 57 per cent were not satisfied with the existing 'research-extension' linkage. There existed a certain gap in the form of mutual misunderstanding or the fault of the system. It was suggested that the extension functionaries and the farmers should establish a close and viable relationship with sharing of pertinent information, problems, solutions and field level experience. This would enable the research to be on the intended direction and the diffusion of technology with desired results.

Feed back which was the crux of successful communication process was not really in built in the trainings. This needs to be improved.

Many of the Department of Agriculture personnel adopted a 'wait and watch' view with the introduction of FFS (Farmers Field School) which was of recent origin. They stressed that the IPM training imparted through FFS should focus mainly on minimizing the indiscriminate use of pesticides and promoting the beneficial insects in the field. The neglected areas of feed back and follow up need to be promptly taken up, for which most of the personnel felt the dearth of time. They admitted that the avoidable bureaucratic procedures were a hindrance to effective technology delivery, monitoring and feedback. They were fed up with frequent routinised and unimaginative meetings which proved to be unproductive in the long run. They desired more time for technology testing, diffusion, post-facto evaluation, monitoring and follow up . As many as 91 per cent termed IPM technologies as useful not only for a sustainable production but also for mitigating the pest problem cotton, particularly in cotton belt of Coimbatore.

4. Conclusion

There is always a distorted view of IPM as pest control without chemicals or biological control. Infact IPM is based on the optimization, not maximization of chemical pesticides. Cotton is the most important fiber crop in India constituting almost 75 per cent of the total fiber utilized in the textile industry. The indiscriminate use of pesticides, instead of meeting the demands of the farmers to increase the productivity resulted in undesirable ecological changes. The government efforts to popularize and transfer the IPM technologies include opening up of 30 central IPM centers conducting

IPM demonstrations and organizing training for state extension functionaries and farmers are a positive step in this direction.

The present study aimed to study the impact of IPM technologies. The impact of IPM trainings on the reduction in pesticide sprays and improvement in yield was found to be significant in the area. Training module adopted by CICR had the most desirable effect. A combination of communication methods were found to bring desired impact in the diffusion of IPM practices.

5. Bibliography

Gopalan, M. (1995). Integrated pest management in cotton and constraints in adoption, *Training on IPM in Cotton*, Department of Entomology, Agricultural College, Madurai, pp 1-6.

Hareesha , N. (1994). Awareness and attitude of farmers and extension personnel towards the ill effects of agricultural chemicals. *Unpublished. M. Sc. (Ag.) Thesis*, UAS, Bangalore.

Jayaraj (1996). Biological control and integrated pest management. *Seventh C. P. Alexander* Memorial Lecture, Department of Zoology, University of Delhi, pp 1-7.

Santha, Govind. (1993). IPM in *rice achievement and opportunities*, TNAU Coimbatore.

Selvaraj, G (1990). Effectiveness of video teaching on farmers affective, cognitive and psychomotor behaviour. *Unpublished Ph. D. Thesis*, TNAU Coimbatore.

Swaminthan, M.S. (1994). Ecological farming need to change course. *The Hindu Survey of Agrculture*, 1994, pp 9-11.