

Adoption of IPM in Indian Agriculture

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SUMMARY

In the realm of plant protection, Integrated Pest Management (IPM) is the most extensively used policy in India. For the long-term management of insect pests in many agricultural crops, IPM tactics have been developed. The injudicious use of pesticides and after effects are the main reason to develop the IPM programme at worldwide level. IPM strategies adopted in Indian agriculture include development of IPM technologies, development of biopesticides, semiochemical and refuge crops, push-pull strategies and biological control is helpful for the farmers to manage the insect pests of crops.

INTRODUCTION

The term “Integrated Pest Management” was used for the first time by Smith and Van dan Bosch (1967). Food and Agricultural Organization (FAO, 1967) defined IPM as “a pest management system, that, in the context of associated environment and population dynamics of the pest species, utilizes all suitable techniques and methods in as compatible a manner as possible and maintains pest populations at levels below those causing economic injury”. In India, before the introduction of pesticides, pests control was mainly depended on traditional practices like cultural and mechanical method. In 1968, green revolution introduced in India on new concept, the use of agrochemicals (fertilizers and pesticides), use of high yielding varieties was largely adopted by Indian agriculture. Most of the entomologist, agriculture policy maker, extension worker has suggested the use of pesticides is effective to control the insect pests. After some times, the pesticides gave negative impact on environment as well as on human health. The awareness about negative impact of pesticides were brought by Rachel Carson in her book “Silent Spring” in 1962, then many plant protectionists started to implement the IPM programme strategies. In India, among the pesticides (the use of insecticides) started increasing during pre-green revolution era to green revolution era. The consumption of pesticides was maximum in the different states of green revolution areas such as Punjab, Haryana, Andhra Pradesh, some parts of Uttar Pradesh and highest consumption (50 %) reported in cotton crops. The indiscriminate use of pesticides is the main reason to adopt the IPM programs in India.

Development and adoption of IPM programs

In India, the research on IPM was started in 1974–75 under the Operational Research Projects (ORP) with major concern on IPM of cotton and rice. In 1980, the Government of India (GOI) reintroduced their own plant protection strategies to control insect pests. FAO started inter country program in 1980 and India also become one of the member country of this programme and resulted in minimized pesticides usage and maximizing the productivity of agriculture crops. The IPM strategies maximized the population of natural enemy *i.e.*, three fold. IPM was first used in the mid-1990s by several state agriculture departments. *From 1993, the scenario of IPM programmes introduction in India viz.,* In 1993, the FAO launched an inter-country programme for IPM in rice crops and Regional Program on IPM of cotton by CABI in 1993. The DPPQ&S, GOI, which is the key agency for administering IPM programmes, increased its efforts and adopted the FFS model for training farmers through its 26 CIPMCs in 1994 (presently there are 31 CIPMCs); conducted season long trainings for IPM-extension workers since 1994 to promote IPM (Bambawale *et al.*, 2004). Insecticide Resistance Management based IPM programme by the Central Institute for Cotton Research (CICR), Nagpur in 2002; FAO-European Union IPM programme for cotton in 2000; NATP for IPM in 2000 (Peshin *et al.*, 2007); ADB-CABI and DPPQ&S, GOI, In the year 2000, the Government of India launched the Cotton Technology Mission (Barik *et al.*, 2002). Pest monitoring was completed in 10.20 million hectares, while bio-control chemicals were

discharged in 7.79 million hectares in 2006–2007, according to CIPMC centres. During the same time period, 10562 IPM-FFS were implemented, with 318246 farmers and 43301 extension officials receiving training (DPPQ&S). The IPM-FFS programme was created for CIPMCs to implement in partnership with state agriculture departments (India's principal extension agency) and with technical assistance from state agricultural institutions (Barik *et al.*, 2002). Overall, after the IPM training intervention was removed, there was no recorded evidence of the acceptance and impact of various IPM programmes in India. The broad adoption of IPM methods by farmers is critical to the success of various IPM initiatives, and for that reason, a "IPM Innovation System Approach" for coordination of research, extension, farmers, public sector, and commercial sector must be established.

Constraints: -the main constraints were

- Lack of information, a lack of expertise, the laborious and sophisticated form of IPM processes, and the unavailability of IPM inputs and instruments.
- Small farm size, lack of knowledge about modern pest control tactics, extension services, engagement of IPM specialists, and community participation were all mentioned as important obstacles by farmers.
- Eco-friendly management practices lacks Government support
- On case of severe infection, very limited alternatives available against pesticides
- There seemed to be no synchronization among state agricultural institutes and CIPMCs (Peshin and Kalra, 2000).
- These organizations execute their own IPM initiatives independently or in tandem, and they may serve the same hamlet one after the other (Peshin, 2009).
- Leadership, coordination, management of human and financial resources, and the assessment process of these programmes all have a negative impact on IPM activities.

For better adoption IPM programme, activities need to be addressed:

- Effective training programs on IPM practices for benefits of farmers
- Impart better knowledge in pest management in an integrated manner at farm level
- To know the pest status, crops must be monitored at their vulnerable stages
- Linking monitoring data to weather based advisory system for development an effective management programme
- Periodic surveillance of insect pests and disease
- Resistance varieties to biotic stress need to be identified
- Augmentation of natural enemies through various effective agronomic practices
- Use of bio-rationales and indigenous technology
- Encourage community involvement
- Development of village basis IPM programme
- Pesticide should be used as a last option
- Central Government should manage, coordinates, and draws a roadmap for IPM implementation.

CONCLUSION

The biggest difficulty in assessing the acceptance and performance of IPM initiatives across the world is that the low success rate in comparison to pesticide use. Most nations are focusing on small landholder farmers, and while they may have had some success in increasing output and reducing pesticide usage, IPM initiatives are not being embraced by big landholders or even communities. In both the developed and developing worlds, the development and implementation of IPM programmes is gradual. Pesticides are still the major tactic of many IPM initiatives. Farmers' "real-world" barriers must be addressed in order to design ways to overcome IPM research and extension initiatives.

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