Impact Assessment of Integrated Pest Management modules validated for Brinjal, Paddy, Pigeon pea and Cauliflower

Niranjan Das, B.P. Giri and A.B. Das[1]

Abstract

Impact assessment of IPM modules validated by KVK, Boudh, Odisha during 2009-2012 revealed that the technologies are being adopted by the farmers at variable rate over time. The highest adoption rate (45%) was observed in IPM module for management of fruit and shoot borer infestation in brinjal, with horizontal expansion of 115 ha additional area over four years. Lower adoption rate (20%) was observed for the IPM module for management of pod borer in pigeon pea. The IPM modules for management of stem borer in paddy and tobacco caterpillar in cauliflower were adopted by 25% and 30% respondents respectively. Among the biological constraints, non-availability of pheromone trap, lure and bio agents rank first with frequency of 80% followed by delay/difficulty in input availability (76%). The other deterrents observed under this category are non-availability of neem oil/cake, inadequate supply and poor quality of inputs. Among technological impediments are non-availability of skilled labour which ranks first (75%) followed by lack of trained extension personnel for follow-up action. High cost of labour is the major socio economic constraint (90%) followed by lack of credit facility (82%) for adoption of these technologies. For successful adoption of these modules in a sustainable manner it is essential to address these constraints in a time bound manner and system paradigm mode.

Assessment and refinement of technology through farmer participatory on farm research is one of the main activities of Krishi Vigyan Kendras (KVK) established by the Indian Council of Agricultural Research (ICAR), New Delhi. KVK, Boudh which was established during 2005 under the administrative control of Orissa University of Agriculture and Technology (OUAT), Bhubaneswar has been accomplishing this assignment in a systematic manner. A good number of technologies including some IPM modules have been assessed/ refined and disseminated through various extension programmes to address insect pest problems of different crops. However, no action has yet been taken up to assess the impact of these technologies. Therefore, this study was undertaken to assess the impact of four Integrated Pest Management modules tested/validated during 2009-2012 on the production system.

[1] Krishi Vigyan Kendra, Boudh, Odisha, India

Materials and Methods

The impact study was conducted during 2014-15 in 10 adopted villages by Krishi Vigyan Kendra, Boudh, Odisha, of about four IPM modules assessed/validated during 2009-2012 for brinjal, paddy, pigeon pea and cauliflower through the mandatory On Farm Testing (OFT) programme after being approved by the Zonal Project Directorate, Zone-VII (ICAR), Jabalpur. This was based on individual interactions as well as Focused Group Discussion (FGD) of 100 farmers (25 for each module) exposed to these IPM technologies previously under the direct supervision of Krishi Vigyan Kendra, Boudh. As per the standard procedure, the modules after successful validation had been disseminated among the farming community through large scale demonstration in succeeding years with almost identical results. The impact of these IPM modules on respective crop production system was analyzed on the basis of probed questions to the practicing farmers and extension functionaries of the locality. The adaptability of these modules was assessed by scoring their adaptation rate and continuity. Constraints in adoption were recorded and categorized into different groups. The problems experienced by the respondents were recorded and their frequency was found out for easy inference. The extent of horizontal spread of these technologies over the years was also estimated, to determine their sustainability and social implications.

Results and Discussion

Validation of the technologies

The comparative performance of the IPM modules against the traditional farmers' practices indicated very good results in terms of insect-pest management (Table 1). IPM module for brinjal fruit and shoot borer including application of neem cake @ 250kg/ha + alternate spraying of Triazophos 0.2% & neem oil 0.5% resulted in 23.81% enhancement of brinjal yield over farmer's practice of spraying of Malathion or Endosulphan @ 1-2 ml/lit water once or twice during flowering. A net profit of Rs.44,700.00 was obtained from this technology with B:C ratio of 2.4 against Rs.33,600.00 from farmer's practice. Similarly, IPM module comprising application of Cartap hydrochloride @ 20kg/ha & release of *Trichogramma japonicum* @ 50,000/ha twice at monthly intervals resulted in net profit of Rs.17,800.00 as against Rs.12,600.00 from farmers practice of spraying of Monocrotophus once or twice @ 2ml/lit of water for stem borer of summer paddy. The module resulted in 37.6% increased yield with B:C ratio 1.9.The IPM module consisting of installation of Pheromone trap @ 20nos/ha, application of Bt @ 1kg/ha and Cypermethrin 10 EC @ 1 lit/ha alternatively enhanced the yield of pigeon pea by 50% with net profit of Rs 24,162/- per hectare, controlling the pod borer infestation. On the other hand the same module exhibited 22.74 %

Table 1. Performance of IPM modules tested by KVK, Boudh, Odisha during 2009-2012

Insect Pest	Validated IPM module	Farmers Practice	Yield (q/ha)			Net profit (Rs/ha)			B:C ratio	
			Farmers practice	IPM module	% increase	Farmers practice	IPM module	% increase	Farmers practice	IPM module
Fruit & shoot borer in brinjal	Application of neem cake @ 250kg/ha + alternate spraying of Triazophos 0.2% & neem oil 0.5%	Indiscriminate spraying of pesticides	168.0	208.0	23.81	33,600	44,700	33.04	1,9	2.4
Stem borer in paddy	Application of Cartap hydrochloride @ 20kg/ha & release of ***Trichogramma japonicum*** @ 50,000/ha twice at monthly interval	Spraying of Monocrotophus @0.2%	30.6	42.2	37.91	12,600	17,800	41.26	1.6	1.9
Pod borer in pigeon pea	Installation of Pheromone trap @ 20nos/ha, application of Bt @ 1kg/ha & Cypermethria 10 EC @ 1 lit/ha alternatively.	Spraying of Monocrotophus @0.2%	7.2	10.8	50.0	11,800	24,162	104.76	1.7	1.9
Tobacco-caterpillar in cauliflower	Installation of Pheromone trap @ 20/ha, alternate application of Bt @ 1kg/ha &Cypermethria 10 EC @ 1 Lit/ha	Spraying of Trazophus @0.2%	151.3	185.7	22.74	42,080	60,726	44.31	2.0	2.6

enhancement of yield in cauliflower for managing the tobacco caterpillar infestation successfully against the traditional practice of need based spraying of Triozaphus @ 2ml/lit of water.

Impact of the Technologies

Impact assessment of these IPM technologies after four years of validation revealed that the technologies are being adopted by the farmers at variable rate (Table 2).

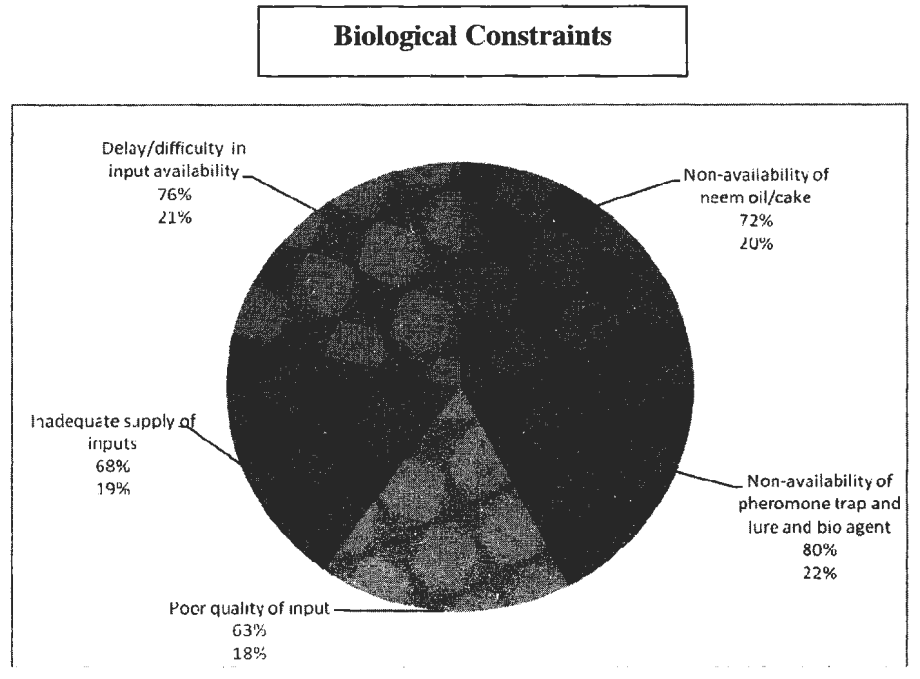
Table 2. Impact of IPM modules tested during 2009-2012 by KVK, Boudh

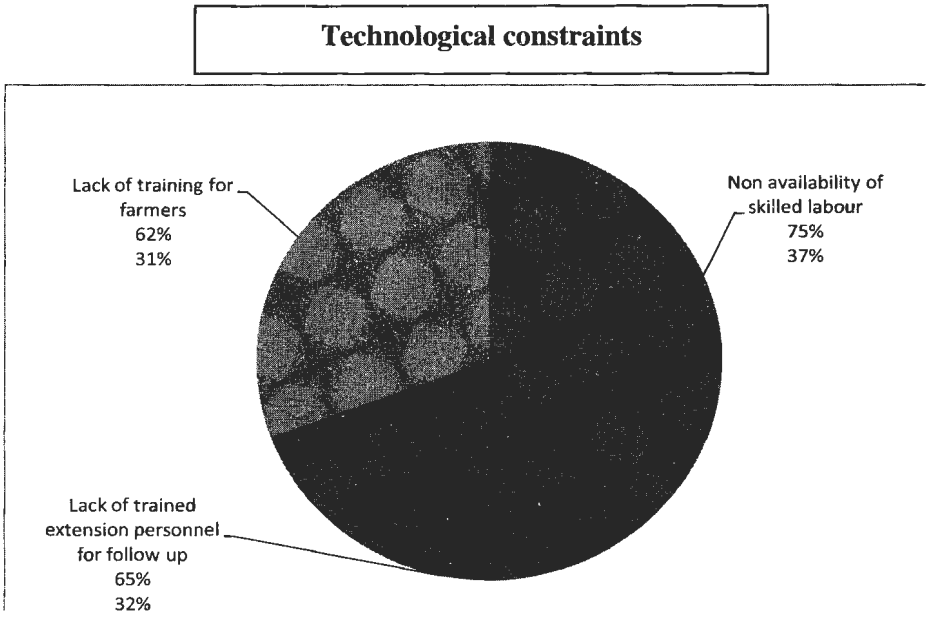
Insect pest problems	Technologies tested/demonstrated	Adaptability of technology	Horizontal spread
Fruit & shoot borer in brinjal	Application of neem cake @ 250kg/ha + alternate spraying of Triazophos 0.2% & neem oil 0.5%	45%	115 ha
Stem borer in paddy	Application of Cartap hydrochloride @ 20kg/ha & release of *T.japonicum* @ 50,000/ha twice at monthly interval	25%	75 ha
Pod borer in pigeon pea	Installation of Pheromone trap @ 20nos/ha, application of Bt @ 1kg/ha & Cypermethrin 10 EC @ 1 lit/ha alternatively	20%	45 ha
Tobacco-caterpillar in cauliflower	Installation of Pheromone trap @ 20/ha, alternate application of Bt @ 1kg/ha &Cypermethrin 10 EC @ 1 Lit/ha	30%	55 ha

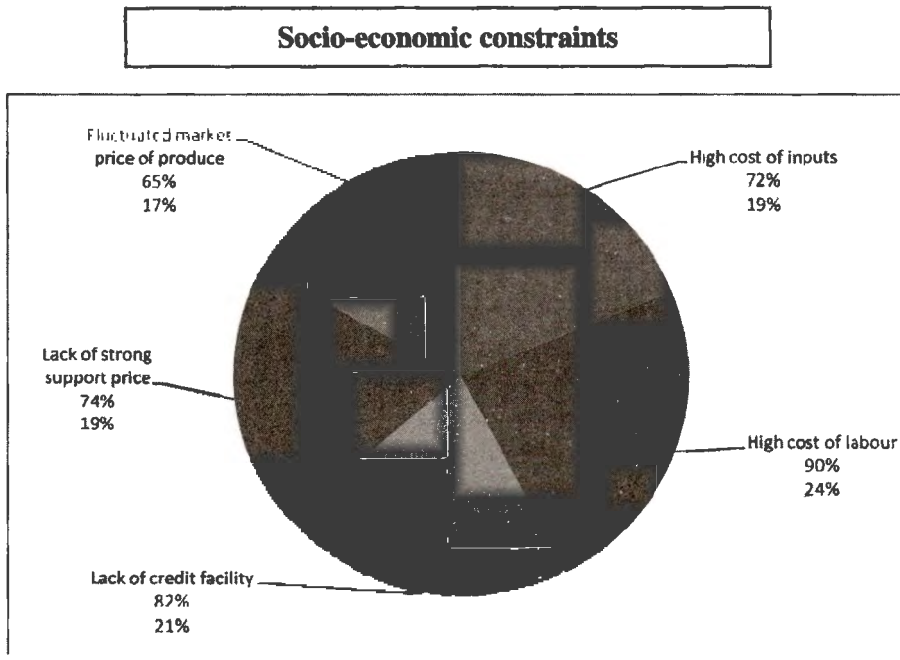
The highest adoption rate (45%) was observed for IPM module for management of fruit and shoot borer infestation in brinjal. This module was found to be extended horizontally to 115 ha more area in the district. On the other hand lower adoption rate (20%) was observed for the IPM module for management of pod borer infestation in pigeon pea. The IPM modules for management of stem borer in paddy and tobacco caterpillar in cauliflower were found to be adopted by 25% and 30% respondents, respectively.

The impediments identified for variable adoption of these technologies were broadly under three groups viz. Biological hindrances, Technological hindrances and Socio-economic hindrances (Fig. 1).

Fig.1.Constraints in adoption of IPM modules tested by KVK, Boudh







Among the biological constraints, non-availability of pheromone trap, lure and bio agent rank first with frequency of 80% followed by delay in input availability (76%). The other deterrents under this category with frequency more than 60% are non-availability of neem oil/cake (72%), inadequate supply of inputs (68%) and poor quality of inputs (63%). In technological category, non-availability of skilled labour ranks first (with frequency of 75%) followed by lack of trained extension personnel for follow up action. High cost of labour is the major socio economic constraint (frequency of 90%) followed by lack of credit facility (82%) for adoption of these technologies.

Thus, the study revealed that for successful adoption of these positive result oriented IPM technologies in a sustainable manner, it is highly essential to address these constraints in a timebound manner and system paradigm mode. Addressing these problems could certainly help in further adoption and expansion of these IPM modules. The findings of this study are in conformity of the findings of Bhardwaj and Sharma (2014). Tomar (2014) and Das (2015) have also reported similar results in impact assessment of plant protection technologies for management of insect pests and diseases in Madhya Pradesh and Angul district of Odisha respectively.

References

Bhardwaj, T. and J.P.Sharma (2014). Integrated Pest Management: Present status and constraints in implementation: A case study in a village of North India. Bio pesticides Int. 10:107-1011

Bhardwaj, T. and J.P.Sharma (2014). Validation of IPM Technologies: Problems and practices. Ann.Pl.Protec.Sci. 22:342-344.

Das,N.(2015).Impact assessment of Plant protection technologies validated/demonstrated by KVK, Angul (Odisha) during 2002-12.Ann.Pl.Protec.Sci. 23: KVK, Boudh. Annual Reports (2010-11 to 2013-14).

Tomar, S.P.S (2014). Impact Assesment of Plant protection technology for management of insect pests and diseases in Fruits, Vegetables and Spices. Ann.Pl.Protec.Sci. 22:34-38.