

# IPM & PLANT SCIENCE INDUSTRIES IN INDIA

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**P**lant Science Industries (PSI) are business enterprises working for profit. Return on investment is essential for growth and survival and this drive is stronger in the private rather than public sector, as there is no one to bail out the former for any loss. Industries always look for opportunities to increase their turnovers and profits. Integrated Pest Management (IPM) has provided a good opportunity for growth and sustenance of plant science industries.

## IPM's Evolution

IPM was first referred to as Integrated Control by Stern *et al.*, in 1959 as, "Applied pest control which combines and integrates biological and chemical control." Over the years IPM has evolved to encompass every factor and activity that influences not only the pests but also all living beings and the environment.

Of late, the definition of IPM given by

the FAO International Code of Conduct on the Distribution and Use of Pesticides is the most widely accepted. It reads, "IPM is a system that, in the context of the associated environment and the population dynamics of the pest species, utilises all suitable techniques and methods in as compatible manner as possible and maintains the pest populations at levels below those causing economically unacceptable damage or loss."

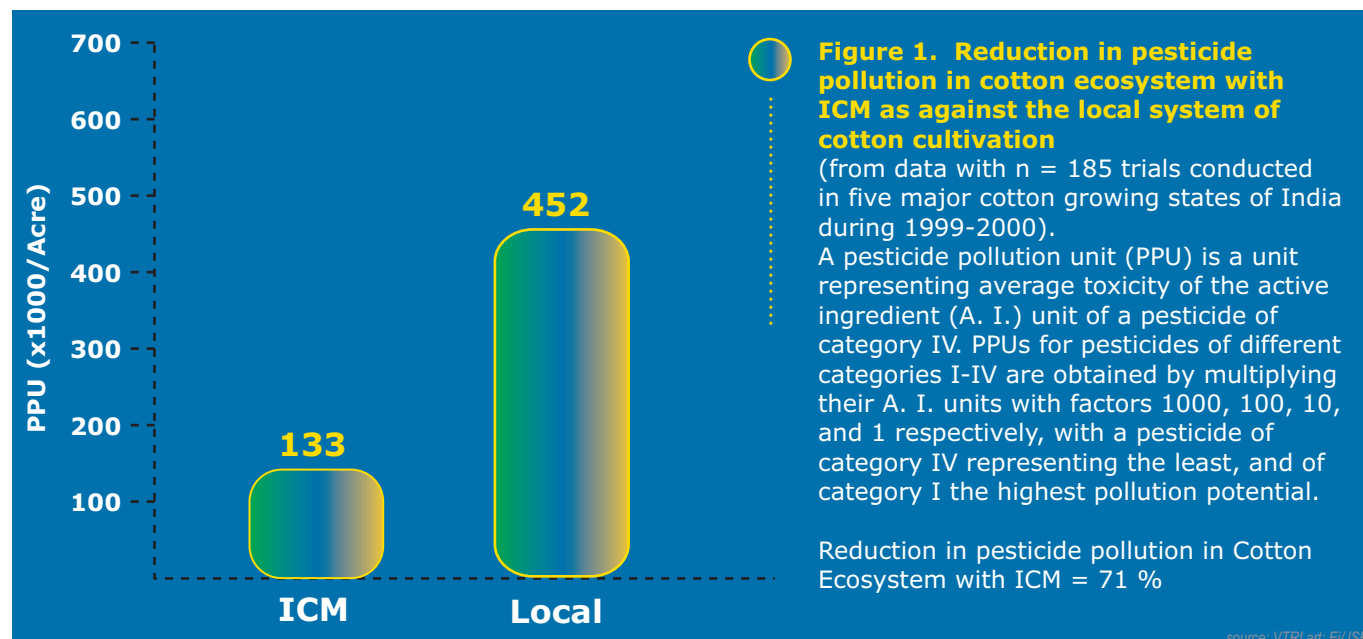
In reality, IPM is a design and decision making process for structuring ecosystems to minimise pest damage and coping better with unavoidable pest problems. While IPM changes as information, conditions and technologies change, the criteria for judging its effectiveness – productivity, stability, sustainability, and equity – do not. People out in the fields, with sound knowledge of pests and diseases, crops and cropping systems and the environment are important for the implementation and success of IPM.

## PSIs & IPM

Plant Science Industries played an important role in the evolution of IPM from the 1950s, when reports on pests developing resistance to pesticides and pesticide residues in food and feedstuffs started appearing. They offered new chemicals to tackle pest resistance and also worked on addressing the problems of safety of non-target organisms and the environment. Industries have contributed much to IPM by their technological innovations and by offering services to educate and train extension workers and farmers.

## I. Technological Innovations

Industries thrive on technological innovations as keys to competitive edge and better performance. It is this drive that makes them produce the best products possible to satisfy consumers. The upgrading of IPM that we have seen over the years has arisen because of this. Some important initiatives that have worked in shaping IPM



**Table 1. Average yields and costs of cultivation of cotton grown according to ICM and Local packages in different states of India, VRTI/EXCEL, 1998-2001.**

STATES	No. Trials	Yield		Cultivation Cost		Pest Control Cost	
		Kg/Acre		Rs/Acre		Rs/Acre	
		ICM	Local	ICM	Local	ICM	Local
Punjab	59	566	488	5091	5128	2261(8)	2576(10)
Haryana	78	627	532	5215	5213	1478(5)	1660(7)
Rajasthan	81	683	527	4229	3892	1177(6)	1168(7)
Gujarat	86	1005	892	8716	9230	1858(10)	2427(13)
Maharashtra	63	544	458	2369	2279	928(4)	1157(6)
Orissa	12	874	787	7989	8376	1184(9)	2287(13)
A. Pradesh	67	643	504	5687	5977	1664(8)	2516(12)
Karnataka	8	794	700	10116	10707	4376(11)	5715(6)
Tamil Nadu	4	193	176	2450	2570	1300 (6)	1700(7)
<b>MEAN SCORE</b>	-	<b>659</b>	<b>563</b>	<b>5762</b>	<b>5930</b>	<b>1803(7)</b>	<b>2357(10)</b>

**Yield benefit with ICM = 87 kg/Acre • Reduction in cost of cultivation with ICM = Rs. 168/Acre •  
• Reduction in no.of sprays with ICM = 3 sprays •**

include producing new enhanced formulations, producing bio-products and bio-pesticides, breeding new pest resistant varieties, and changing the way the pesticides are applied.

## II. Services

PSIs work with their national associations to serve their customers. In India for example, there are three associations namely – the Indian Crop Protection Association (ICPA) [a member of CropLife Asia], the Pesticide Association of India (PAI), and the Pesticide Manufacturers and Formulators Association of India (PAFAI). All of these associations liaise with pesticide regulatory and law enforcement authorities for improving plant protection. With the impetus provided by both national and international policy-making, all three associations have embraced IPM.

### ICPA Strategies

The strategic working objectives of ICPA are;

- Safe and judicious use of pesticides.
- Integrated Pest Management.
- Environmental Protection.
- Intellectual Property Rights.
- Common code of conduct for members.
- Communications with all stake holders in plant protection

All of the above strategies are implemented through farmer training and education programs, field demonstrations and trials, research and development, seminars, workshops, and meetings etc. The results of these activities have been very encouraging. The results of ICM trials conducted by one of the companies in cotton are given in Figure 1 (left) and Table 1 (above).

## Outcome

The efforts of PSIs, governmental and non-governmental institutions in relation to IPM have been very positive. Pesticide consumption in India declined from 80,000 metric tonnes in 1994-95 to 54,135 tonnes in 1999-2000. Farmers have realised the importance of IPM and ICM for sustaining and improving crop production. They have started distinguishing quality chemicals from spurious ones and realise the importance of services from industries. Knowledge has increased at all levels. Industries see IPM and ICM as opportunities to apply the best of their technologies and efforts to serve farmers, farming communities and people at large, and also to weed out unscrupulous elements among them.

## Next Steps

Despite the progress made, there are concerns regarding the decline in crop productivity and the increase in cost of cultivation *vis-à-vis* degradation of natural resources, contamination of food, feed and the environment. Strategic changes to remedy these trends are paramount.

### I. From IPM to ICM

IPM by conception and design takes a narrow view and approach to increasing crop production and productivity by addressing only the pest problem. It often is identified with a specific group of professionals – mostly entomologists, pathologists and those involved in plant protection. Often, IPM fails to excite others working on other modes of improving crop production. Even farmers who do not know or understand IPM fully have apprehensions about IPM as their interest in productivity whether it comes from an improved variety, irrigation and/or plant protection.

This ideological and conceptual division has seemingly isolated people working in agriculture – with some talking IPM, some INM (Integrated Nutrient Management), some LWM (Land and Water Management) and still others on some new concepts, thus causing mass confusion. Thus, a broad and holistic approach of Integrated Crop Management (ICM) is very essential.

### II. Avoiding relating pesticide usage with increased crop production

In many workshops and meetings, references are often made to the amount of pesticide usage in Japan, USA, Germany etc. compared to India to drive home the point that Indian crop productivity is low because of low pesticide application. This sends the wrong message and oversimplifies the causes of low crop yields in India.

### III. Weeding out Unscrupulous Elements

In the pesticide trade in India, about 30 % products are known to be fake or counterfeits. These need to be identified and all unscrupulous elements involved in this trade need to be seriously dealt with as they have been playing with the lives of farmers who use pesticides with faith and hope.

### IV. Qualified Distributors & Dealers

A minimum academic qualification – a degree in agriculture or diploma in plant protection should be required for a person involved/interested in selling pesticides and other agri-inputs. With a requisite qualification, distributors and dealers are likely to have strong moral and ethical obligations to help and serve farmers. This is very important for the success and spread of IPM and ICM technologies in India.