

Changing Pest Scenario in Crops and Importance of Non Pesticidal Management in the Present Agrarian Crisis

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There is a world wide opinion that the chemical pesticides have failed to give desired results in the management of crop pests. The pesticides have done more damage to ecosystem than benefit, even though the consumption of pesticides is very low in India (450g/ha) as compared to USA (1500 g/ha) Japan (1000g/ha) and Europe (1900g/ha). The production of pesticides in India presently is 90000 MT, worth of 20 billion rupees with growth rate of 2 to 5% (CSA2004). The indiscriminate use of pesticides has led to the contamination of air, soil, water, elimination of beneficial insects, pesticide residues in agricultural products and also insects of agriculture, veterinary and public health importance have developed resistance to pesticides.

The concept of integrated Pest Management (IPM) was developed in response to these negative implications of intensive chemical pest control. Initially, IPM concentrated on the development and introduction of spraying on thresholds levels. Later non-chemical control methods were integrated with limited and selective pesticide use. Modern IPM is based on ecosystem management. Yield losses are kept within economically acceptable margins by creating ecological conditions that suppress the development of pests. Researchers working with a wide range of crops around the world proved the technical feasibility of IPM and important successes were achieved in the field. But until the 1980 the challenge of large-scale implementation in developing countries, where small –scale farmers (70%) account for the bulk of agricultural production, appeared to be insurmountable. The general belief was that IPM was too complicated for illiterate farmers and that more search was needed before effective IPM techniques could be introduced. Attempts to introduce IPM therefore focused on

the development of simple techniques and standardized package that extension staff could instruct farmers to apply. This system did not work well, mainly because the large variation in field situations was not consistent with standard instructions that had often been developed at test plots of research stations. Generally, farmers did not understand the logic behind the instructions they received and were not able to adjust them to their specific situations. **Gradually it became clear that an important bottle-neck for IPM implementation was the centralized formulation of IPM instructions, a top-down extension system and lack of motivation resulting from farmers' lack of involvement.** However, the NGO involvement had demonstrated that Non- Formal Education methods could assist farmers to understand the ecosystem of their fields and to take crop management decisions based on their own insights as NGOs are involved in community based work.

In spite of the above consumption pattern of pesticides there are several documented examples of alternate pest management approaches available in rural Indian villages that have led to sustainable crop production. These are both traditional crop protection practices (indigenous pest management systems) developed by farmers using traditional knowledge and local resources and modern IPM systems developed by researchers for sustainable food production. Despite of many scientific advances, it is still arguable whether ecological principles have nothing but intelligent pest management which aims to use scouting to monitor the pest density that warrants spraying, when they cross economic viability (Economic Threshold Levels). But the present IPM is pesticide based with low or no component of bio-intensive models. The NPM components practices in the NGO network emphasizes on the withdrawal of pesticides, allowing the beneficial fauna to recover and attain a more desirable level of biodiversity to re-establish itself within agro-ecosystems.

The Indigenous knowledge (IK) is an important source of information about local farming system, their skills in adopting new ideas to the local conditions. The IK can be defined as indigenous innovation as those solutions that farmers have tried through their own genius without invoking help from outside institutions, individuals or agencies. In this process, individual farmers as well as community has shown great interest to try out various combination of inputs available locally or drawn from nearby villages. These innovations have been carried forward from one generation to another as a family technology. In fact most of the IK, pass through considerable adoption, upgradation, validation and modification over a time. With the success of RHC (*Amsecta sp*) during 1898-1993 with Non Pesticidal Management , the Centre for World Solidarity has identified traditional technologies followed by resource poor farmers of A.P., Maharashtra and Karnataka by bench mark survey and through Participatory Rural Appraisal. These traditional technologies were demonstrated to farmers through a network of NGOs on Sustainable Pest Management of cotton under CWS moved to CSA since 2004 to 2007

Components for Success for Non Pesticidal Management

- To Address global warming and climate changes on ecosystem of pests
- The NPM technology requires people to work collectively for the best results - one or two isolated attempts will not be optimal.
- Since the cost of crop protection through pesticides for most crops is upto 30-40% of the total cost of cultivation, if you reduce the use of pesticides, it is a great profit for the farmers.
- Deep summer ploughing is very important . this not only destroys the initial stages of a pest, but takes care of water and moisture conservation.
- Weeding is very important for a crop and this has to be timely.
- Quality of seed used is also a very critical parameter and farmers should be careful about the seed they use.

- Applying organic manures and matter in the soil is very useful -while this takes care of building soil structure and adding fertility, it also helps in moisture retention; chemical fertilizers are usually though add to the yields and are applied judiciously. These in turn increase the pest incidence on the crop.
- Starting to spray pesticides as soon as one spots one or two pests is a wrong approach -a farmer should be able to assess whether pests are above or below a particular threshold level before resorting to some mechanism to control them.
- Natural enemies should be allowed to develop in the fields by keeping it free from spraying.
- Store around 40 to 50 kilos of neem seed in the season.
- 5% of the neem Kernel Suspension is best for NPM
- 3% neem oil is good for sucking pests.
- Neem cake application to the soil is good . it not only controls pests but also adds nitrogen to soil.
- Chilli-garlic extract can be prepared at home and does not cost much and very good for leaf eating insects
- Cow urine and dung extract has both pest repellent qualities as well as growth abilities.
- NPV extracts can also be produced in the village.
- Village level production of NPM inputs as income generating activity

Key Issues and Challenges of NPM

Although participatory NPM programmes have achieved impressive results, there remain many challenges and opportunities to expand and consolidate these programmes and to further improve policies.

- Establish and /or further develop national NPM programmes that make participatory NPM training available to larger number of farmers.

- Further improve the involvement of women by incorporating explicit gender strategies at all stages of project development;
- Improve the policy environment for NPM through political will at State and National level.
- Reform crop protection research and extension schemes so that they give more support to farmers initiatives in NPM
- Enhance coordination and cooperation among governments and NGOs
- Integrate participatory NPM into policies on sustainable agriculture and link to other developments, such as watershed management, community forestry and banks for credit to NPM inputs

Conclusions

- Pesticides have often become the dominant factor to pest problems resulting from agricultural intensification. Such reliance on pesticides have proven increasingly unsustainable. Much of current pesticide use is unnecessary, unsafe, counter-productive and economically unjustifiable and destabilizes agricultural production. In addition, pesticide use generally has a range of negative effects on human health and the environment. Indiscriminate uses of pesticides encourage unsustainable agriculture.
- Non Pesticidal Mangement (NPM) is an approach to crop protection based on pest and parasite population dynamics which maintains natural equilibrium and reduces the risk of damage by pests. NPM is regarded as the most effective option for large scale sustainable agriculture.
- The effective introduction of NPM requires a conducive policy environment that does not encourage use of pesticides. NPM is applicable to different cropping systems and wide variety of crops. It contributes community development and helps to enhance the position of women
- **Incorporate NPM in ongoing or future projects/programmes on agriculture, rural development, community development and poverty alleviation etc.**
- It is suggested to encourage the use of NPM terminology in all pest management programmes/ projects (National and International)