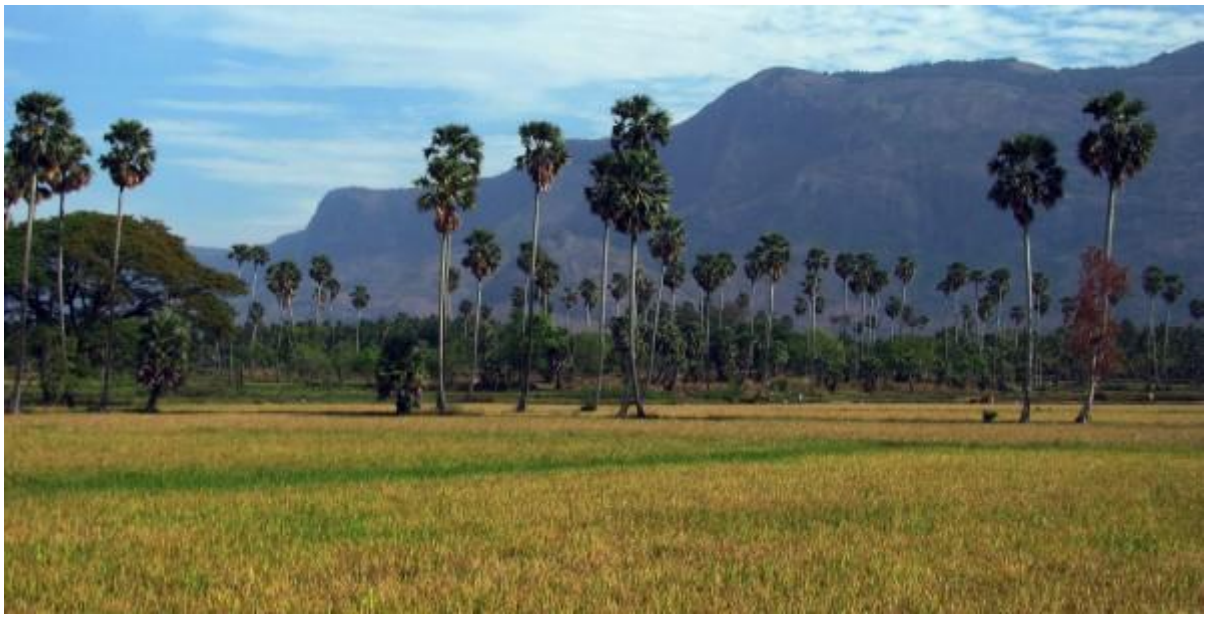
Good Practices 15: May 2016

SAYING NO TO PESTICIDES

Integrated pest management (IPM), which evolved in the 1970s is a concept that unifies different pest management techniques. The goal of IPM is to achieve economic crop production in an eco-friendly manner. The practice of IPM requires sensitive intervention and substantial collaboration between farmers, extension personnel and plant protection professionals. Dr Madhu Subramanian, an entomologist with Kerala Agricultural University, shares his experience in promoting IPM in paddy in Kerala.

THE CONTEXT

Kerala, the southernmost state of India, is known as 'Gods own country' for its natural splendour and scenic beauty. A characteristic feature of the state's lush green landscape, until not so long ago, was the verdant paddy fields that stretched as far as eyes could see. However, over the last four decades the rice fields have been disappearing at an alarming rate and presently occupies a mere 30 per cent of the 7.2 lakh ha they covered in 1970s. A host of factors such as increasing cost of inputs, labour scarcity and price fluctuations have all contributed to the present debacle. The Palakkad district remains one of the last bastions for paddy in Kerala. However, here too, rice cultivation is plagued by pest and disease problems leading to increasing cost of cultivation and reduced yields.



The Vadakkenchery Panchayat of the district has traditionally grown paddy as the principal crop. Around 1500 farmers grow rice in an area of 718 ha, predominantly during the second crop season (September-January). High yielding varieties such as Jyothi and Uma have replaced most of the earlier varieties. The cost of cultivation is high, owing to the extensive

use of chemical fertilisers and pesticides. Insecticides like quinalphos, chlorpyrifos, lamda cyhalothrin, and cypermethrin are used indiscriminately regardless of pest incidence. Such unscientific use of plant protection chemicals have rendered the cultivation non-profitable and over the course of time pushed farmers into a vicious debt trap.

THE INTERVENTION

It was in such a backdrop that the Vadakkencherry Krishibhavan (under the State Department of Agriculture), in collaboration with the All India Co-ordinated Research Project on Biological Control of Crop Pests & Weeds (AICRP on BCCP &W) under Kerala Agricultural University and Agricultural Technology Management Agency (ATMA of the Department of Agriculture), launched an initiative in 2015-16 for popularisation of IPM for rice. An area of 10 ha at Anakkappara padasekharam was selected as the site for the intervention.

Anakkappara Padasekharam

The primary objective of the programme was to reduce the consumption of chemical pesticides through adoption of sustainable IPM practices. The technology package included the following:

- Seed treatment with *Pseudomonas flourescens* @ 10g/kg of seeds
- Release of *Trichogramma japonicum* and *T. chilonis* @ 1 lakh/ha from 20 days after transplanting. Five releases were made at 10 days interval.
- Need-based application of *Pseudomomas* @ 2% against foliar diseases.
- Need-based application of neem based pesticides

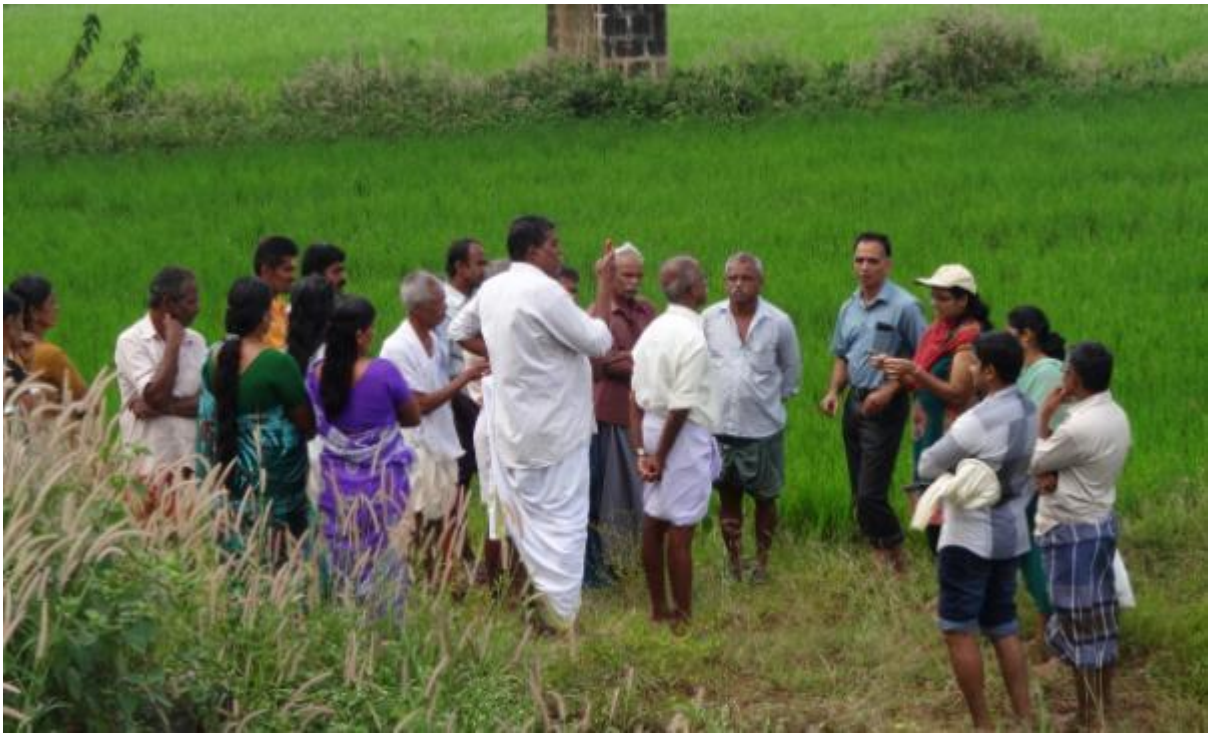
GOOD PRACTICES

Selection of farmers

Twenty two farmers of the Padasekharam covering a contiguous area of 10 ha were identified and were formed into a Farmer Field School (FFS) after ascertaining their willingness to follow BIPM (Bio-intensive integrated pest management) practices.

Farmer Field School

The Farmer Field School met at 8.30 am every Monday morning, along with the Krishibhavan team as well as AICRP scientists. The entire group then went through the fields



An FFS Session in Progress

to assess the crop situation. The information gathered from the field was shared and discussed to decide on the future course of action. Such critical analyses of the field situation every week helped the famers take appropriate decision on management practices.

Pest surveillance

Integrated pest management relies heavily on information regarding the weather, the crop phenology, the pest and natural enemy populations etc., for decision making. Such information was collected through a continuous process of information gathering from fixed plots as well as through roving surveys.

Pest surveillance

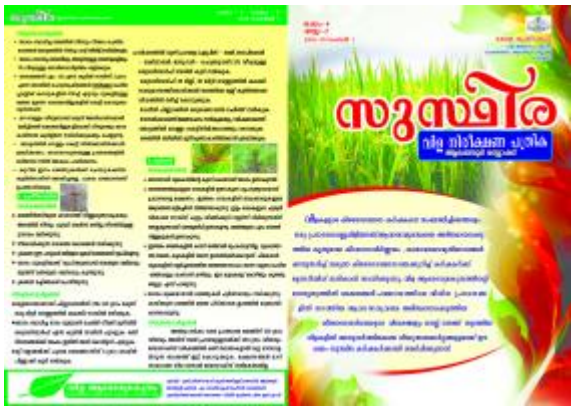
Fixed plots are small representative units of a field (sample) from where information regarding crop growth (phase, number of tillers, number of panicles etc.), pest infestation (pest species, numbers, extent of damage etc.) and natural enemy population (species, number etc.) are documented on a regular basis. Small plots of one square metre were

marked out at random amidst the crop stand as fixed plots. A minimum of five such plots were selected for each field.

Roving surveys involve walking through a designated path and gathering the above information at random. Generally the survey paths followed a diagonal transect across the field.

Pest Forecasting:

The information received from fixed plot as well as rapid roving surveys along with the information on crop phenology and weather parameters served as inputs for pest forecasting.



The crop health advisory

Dissemination of Pest Advisories

In order to enable other farmers also to benefit from the pest forecasts, advisories based on the pest forecasts were prepared and disseminated through local newspapers at fortnightly intervals.

THE IMPACT

The IPM initiative proved to be a resounding success in terms of the objectives the programme had set for itself. The farmers obtained higher yields, achieved significant reduction in cost of production and developed a better understanding of IPM concepts and practices which augurs well not only for the farmers but also for the society at large. The positive outcome of the IPM programme are summarised below.

1. Increased yields

The farmers of the Padasekharam who practiced IPM obtained an average yield of 7770 kg/ha whereas the average yield from non-IPM fields was only 5950 kg/ha. Thus the farmers practicing IPM received approximately 31 per cent more yield than that of the non IPM farmers.

2. Reduced pesticide consumption

The farmers who adopted integrated pest management practices could totally avoid the customary 4-5 rounds of insecticide sprays which alone led to a saving of Rs 4000-5000 per hectare.

3. Conservation of natural enemies

One of the major outcomes of the programme is the appreciation of the role of natural enemies in controlling pests. By the end of the season, farmers learnt not only to identify

natural enemies and pests they also learnt how to calculate PD ratio (Pest : Defender Ratio) and its relevance before adopting management strategies.

THE LEARNING

The IPM programme in Vadakkenchery panchayat is a unique experience on several counts. For one, it has witnessed the coming together of all the stakeholders, namely, the State Department of Agriculture, the AICRP on BCCP & W and the farmers on a single platform without which, a complex mesh of technologies like IPM can neither be initiated nor sustained.

"We want to make sure that in five years' time every household in Vadekkenchey panchayat gets safe, pesticide free and locally produced food to eat"

- **Resmi Deepak, Agricultural Officer, Vadekkenchery Krishi Bhavan**

Secondly, sound ecology can also be sound economics. The increase in the yield and the reduction in cultivation were achieved not in spite of, but through the application of ecologically sound pest management principles. This realisation could be the driving force behind the increased adoption of IPM in the region in the coming years.

Farmer training in mass production of trichogramma wasps

That synergy unleashes energy was demonstrated once again in the Vadekkenchery experience. The conviction in IPM technology coupled with the frustration at the non-availability of quality natural enemies have led to some out-of-the-box thinking (Box 1). The result was a tricho card production unit of their own! The unit produced nearly 110 cc of tricho card in the first season and targets to produce the entire 2500 cc required in the panchayat during 2016.

Box 1: Adapting technology to local situations

The Vadekkenchery panchayat requires approximately 2500 cc of Tricho cards during the second crop season every year. This is hardly ever met owing to the huge gap between the demand and supply as less than half a dozen agencies are involved in Trichogramma production. This issue came up as the major contraint during discussions between the AICRP centre and the Krishibhavan. It was suggested that Tricho card production be taken up at farmers' level. The suggestion, when placed before the farmers, was enthusiastically accepted.

A group of four women and a male farmer got trained in tricho card production at the AICRP centre at KAU which guided them throughout the mass production programme. The production unit was started in a small rented room with twenty units. Challenges were galore. The refreshing aspect was that every time a challenge came up, it was solved through innovative solutions.

For instance, regulating the high temperature in the production facility was a vexing issue. An air conditioner was out of reach. However, the team came up with a low cost solution. A fan along with few wet towels did the job just as fine.

Yet another crisis erupted when the rice meal moth eggs had to be sterilized with a UV lamp. The UV lamp had to be placed in a separate chamber for safety reasons. A chamber was available. However, when the tube was procured (with some difficulty), it wouldn't fit into the chamber. The cardboard packing of an air conditioner proved to be a satisfactory solution. The chamber needed a movable lid of black colour. The answer was a black cloth!

This is not to suggest that technology was being trivialised. Indeed, the farmers are hopeful of having a fully functional facility by next year. It goes on to show that such was the enthusiasm of the farmers, even technological issues as listed above failed to dampen it.

"It also emphasises the fact that introduction of new technologies in complex systems such as agriculture often necessitate changes in several other dimensions. It also highlights the fact that the role of extension is much wider and goes beyond training farmers or disseminating information on new technologies. The role of extension is actually about upgradation of production systems, anticipating new demands, addressing these and providing hand-holding support to farmers" (Ravi and Muralidharan, 2015).

THE FUTURE

The IPM experience has unearthed lot of energy among the Department officials as well as farmers. The learnings from the outcome of this IPM of rice fields is spreading to other crops as well with banana and vegetable farmers also wanting to join the fray. Sale of insecticides has registered a 10-20 per cent drop this year in the pesticide outlets. On the other hand, sale of botanicals, pheromone traps, sticky traps and new generation eco-friendly pesticides are gradually increasing.

Mass production of other bio-pesticides is under active consideration. A bio-pharmacy is planned for an early launch next year. This could be a one-stop solution for the plant protection needs of farmers in the panchayat (right from diagnostics to products). The farmer groups will be responsible for the day–to-day running of the pharmacy, while the DoA will provide the financial and logistic support.

THE RECOGNITION

Smt Resmi Deepak, Agricultural Officer, Vadekkenchery Krishi Bhavan receiving the Best Agricultural Officer Award from Minister of Agriculture

Finally, in recognition of their tireless efforts to popularise IPM, the Vadekkenchery Krishi Bhavan was recognised as Jaiva Karshika Panchayat by the State Department of Agriculture, and the Agricultural Officer was nominated as the best agricultural officer in the state in the year 2015-16.

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