Photo: Author

Working together while experimenting with pest management has given women more confidence.

Integrated pest control for empowering women farmers

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Kemiri is a village in Kepanjen subdistrict, Malang, East Java, Indonesia. Farmers cultivate corn, soya beans, peanuts and vegetables, but their main crop is rice. However, rice productivity in Kemiri has not been constant recently, fluctuating with the seasons and the weather. In the past two years, pests and diseases have caused serious damage to rice in June and July. The main pest is white rice stemborer (*Scirpophaga innotata*). In the first rice growing season there were two infestations, at the vegetative and reproductive stages. To control infestations during the vegetative phase, farmers applied additional urea to induce growth, but the plants died, and the farmers replanted the fields. Infestations of rice stemborers occurred in almost every paddy field: between March and May there was an average decrease in rice yields from 6.5 tons/ha to 4.5 tons/ha. Efforts by the farmers, including spraying pesticides and applying extra urea, proved fruitless. This condition persisted for two years.

Although 65 percent of the inhabitants of Kemiri are farmers, they do not rely totally on farming to make a living. The village is close to the subdistrict capital, Malang, so many (mostly male) farmers also work in the city. They do whatever work they can get, earning money as building labourers, street vendors, or school guards. After they have planted rice they go off and come back at harvest time, which means that the male farmers do not pay much attention to the state of their rice crops. Not many farmers' children are interested in farming, either. So only the women who remain in the village take care of the rice fields.

Farmers learn about integrated pest control

Puzzled by the damage to their paddy fields caused by rice stemborers, five women farmers turned up at the agriculture extension office in Malang. At that time, LPKP Malang, a local NGO, along with several agriculture extension workers from the local agriculture extension office, were setting up a demonstration plot to experiment with different rice growing systems. The five women farmers then asked the NGO and the local agriculture extension worker to help them solve their problems.

Integrated pest control activities in Kemiri began with a field survey and preliminary analysis of the damage caused by stemborers. After that it was agreed that this problem would be discussed at weekly meetings in the paddy fields. Over the weeks, the number of farmers getting together to discuss how to deal with the stemborers grew from 5 to 20. As Lisriani and Atun, two farmers who attended these meetings, said, "We now know that the pesticides we've been using don't help at all; in fact they make matters worse. We always thought of pesticides as medicines for plants, but the integrated pest control activities have show us that pesticides are in fact toxic, not only for the pests, but for us, too."

A different topic is discussed every week, all of which have helped farmers grow healthy rice plants. Discussions have centered around pests and their natural predators, insect decomposers, how to produce healthy seeds, how pesticides affect pests and natural predators, how to perform analyses of agroecosystems, and also around the strategies for controlling rice stemborers without the use of pesticides. Every week, the farmers look at how to control the incidence of stemborers, grow healthy crops, improve soil fertility, make organic fertilizer, and how to manage water in the paddy fields.

Local experiments

"At the beginning we could not understand why the extension workers couldn't just give us a straight answer to the problems we were having with stemborers, and instead asked us to do an experiment. We just wanted a quick answer," said Jumiati, a group member. But after it was explained that pesticides were not the answer to rice stemborers, the farmers' realised the need to look for local-specific alternatives.

Experiments were done by the women's group on two demonstration plots of 1000 m^2. This land is lent to the group by one farmer member, so that all participants can practise and learn together. It is free of charge. The seeds and fertilizers were provided by the local NGO in co-operation with the farmers. The rice was sold and the money made was kept by the group. It is used to pay for trainings, and materials needed for meetings or exercises.

Each demonstration plot was planted with the same rice. The difference was in the way they were treated: one was treated with urea and other fertilizers in doses recommended by the agriculture extension office, and sprayed with pesticides; the other plot was treated using the integrated pest control approach, with applications of organic fertilizer (*bokashi*). It was also drained of water, and not sprayed with pesticides. The integrated pest control approach involved: using healthy seed, protecting and developing natural predators (natural control by creating a balanced field ecosystem) and weekly monitoring.

The integrated pest control activities were all done during a single rice growing season (3 - 4 months), from raising seedlings and land preparation, planting and maintenance, through to harvesting and harvest analysis. During this period, the farmers learned how to grow healthy plants, and understood that healthy plants are more resistant to pests and disease. They learned the difference between pests and natural predators, and about the food chains in a rice paddy ecosystem. They found that this can be used as a control strategy because pest outbreaks are caused by an imbalance in the ecosystem. They learned about the impact of pesticides on the environment, and that their residues are consumed by humans.

Weekly monitoring taught the farmers how to make simple, routine observations of the condition of the paddy agroecosystem, so that data from these observations could be used to formulate recommendations and action plans. The experiments each season varied according to the problems that the farmers were having and wanted to solve. These ranged from cultivation techniques to high yield rice varieties, the effects of pesticides on the environment, or water management (see for example Table 1).

Lessons learned

Farmers learned that pesticides are poisonous and that not all insects are bad for the crop. They saw that increased applications of fertilizers are not good for the soil. These experiments were done in cooperation between farmers, extensionists, NGO staff and university researchers. During the experiments, farmers' initial knowledge was taken into account, and any remaining questions that they had were explained and answered. As a result of this process, after 4 or 5 planting seasons, farmers are already expert enough to share their knowledge with other farmers. They are also "brave" enough to do other experiments on their own land. Farmers usually share such new knowledge and innovations through exchange visits or field days organised by extension or NGO staff. This enables other farmers to experiment and see if the method/innovation is compatible with their situation.

From the results of applying an integrated pest management approach over the past two years, the women farmers have learned several valuable lessons:

- The farmers are the experts on their own land. They are the ones who are able to explain why pests cause damage, how that damage manifests itself, and what action needs to be taken;
- The learning process has boosted the farmers' self-confidence. They trust the information which they have obtained from their field meetings and are happy to share it with other farmers. Atun and Lisriana, for example, have been on exchange study visits, and acted as resource people at many extension forums;
- The use of chemical pesticides and fertilizers is decreasing. This is particularly obvious at the farmer level. They have begun to shift from intensively cropped systems to ecologically cropped systems, slowly reducing the chemical use and gradually introducing semi-organic farming (no pesticides, no chemical fertilizers). Production is increasing with the introduction of new varieties;
- Having a simple monitoring system helps the farmers in building on their knowledge.

The activities of the women's integrated pest control group in Kemiri continue. These activities are becoming more interesting because the farmers are now able to enjoy their results: rice production has risen to 6.5 - 7 ton/ha. Income from the sale of rice has increased for two reasons: they spend less on buying pesticides, and use less seed (10kg/ha instead of 50kg/ha), another practice they learnt about during their meetings.

Gradually, this group is starting to develop organic farming by using rice cultivation techniques that do not use chemical pesticides and fertilizers, using the integrated pest control approach. In the long run, the integrated pest control approach provides a technical solution, empowers women and contributes to more sustainable and secure livelihoods for farmers. ■

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Table 1. Results of experimenting with zero pesticide techniques for controlling rice stemborers

	Propagation	Vegetative phase	Generative phase	Post harvest
Control strategy	- Collecting egg cases - Releasing parasitoids such as *Trichogramma* sp. in the seed beds - Using high-yield rice varieties	- Collecting egg cases - Propagating natural predators such as spiders - Developing lamp traps - Drying out the field (2-3 days) - Adding organic fertilizer (to induce growth of panicles)	- Propagating spiders - Developing lamp traps	- Burning rice plant stumps - Immediate soil management and flooding
Focus topics to support learning	- Getting to know pests and their natural predators - Effects of pesticides on natural predators in the seedling beds - Hatching of rice stem borer egg cases	- Getting to know pests and their natural predators - Effects of fertilizer on panicle growth - Effects of pesticides on spiders - Effectiveness of lamp traps	- Effects of pesticides on spiders - Effectiveness of lamp traps	- Survey of the status of rice stem borer in rice plant stumps post harvest