



Natural pest management in Zimbabwe

The Zimbabwean Eco-lab has an innovative way of tackling farmer participatory training in pest management. ZIP Research operates from the ECO-lab and is concerned with training the Farmer Field Workers (FFWs) selected by farmers' groups.

Sam L.J. Page

Since independence in 1980, communal farmers in Zimbabwe have been persuaded to use increasing amounts of fertiliser and pesticides on crops such as maize and cotton and on their horticultural produce. As a result, pests are becoming resistant and soils are growing more acidic and infertile. The use of toxic and expensive inputs has brought health and money problems to many farmers and their families.

In order to counter this trend, a small NGO known as ZIP Research has recently been set up to offer safe and sustainable alternatives to synthetic fertilisers and pesticides. ZIP Research operates from the Eco-lab, a purpose-built, fully equipped laboratory built from NORAD funds (Norwegian development aid). It is situated in the Fambidzanan Permaculture Centre, 20 kilometers west of Harare. One section of the Eco-lab is devoted to research into the indigenous natural enemies of common pests, while the other is dedicated to training Farmer Field Workers (FFW) in Natural

Pest Management (NPM) and organic farming methods. NPM is concerned with developing farming systems that manage pests naturally, that is without synthetic pesticides. NPM strategies rely on farmers' knowledge and try to minimise the need for interventions.

Farmer Participatory Training in NPM

Training provided by ZIP Research has borrowed the 'learning through experimentation' approach of FAO Farmer Field Schools. However, ZIP Research training is less 'top-down', in that training is given mainly to farmers rather than extension workers. There are three reasons for this. First, farmers are highly motivated because they depend on farming for their survival. Second, farmers are mainly women whereas extension workers are generally men. Third, training farmers directly ensures that the knowledge stays within the community. If an extension worker received specialised training, he or she might be tempted to look for a more lucrative job elsewhere. ZIP Research trains in NPM and its approach is holistic and agro-ecosystem oriented. This means that the farmers who participate can eliminate all synthetic pesticides from their farming system and are then able to apply for organic certification in order to receive a premium for their produce.

Each training programme is 'tailor-made' for a particular group of participants and proceeds from the demands of their agro-ecological zones and cropping systems.

Training is only offered to farmers who are actively seeking help to reduce their pesticide use. It forms part of a project which is designed to eliminate all pesticides from the farming system, promote environmental awareness, and lead to improved incomes through the sale of organic produce either on the local or overseas market. In some cases, local extension officers are also trained in NPM and organic farming methods, so they can help provide follow-up support to Farmer Field Workers (FFWs) and act as a buffer between farmers and overzealous pesticide sales representatives.

Training at the Eco-lab

Farmers select FFWs from their own communities. The FFWs spend four weeks at the Eco-lab, where they learn relevant facts about soil science, insect life cycles, pest-predator relations, disease transmission and development, and the way natural and synthetic pesticides work, through a series of in-field and 'jam-jar' experiments.

These FFWs also learn about the value of indigenous seed, exchange ideas on traditional grain storage techniques, discuss ways of designing simple experiments, and learn the importance of maintaining diversity and soil fertility through mixed cropping, composting, green manuring and crop rotation. For the purposes of organic certification, the FFWs are introduced to mapping, record keeping and the regulations laid down by the International Federation of Organic Agriculture

Movements (IFOAM). Farmer exchange visits and market survey opportunities are also arranged, and games and songs are used to consolidate the learning process.

This training is carried out in a spirit of 'sharing ideas' and the FFWs learn techniques which enable them to become keen observers and innovators in both a scientific and creative way. The extended training period also allows time for friendships to develop between the FFWs. This ensures that the participants work as a team and skills are shared.

ZIP Research decides whether trainees will make suitable FFWs. This final assessment is not based on academic achievements, but on a candidate's motivation, outgoing nature, and his or her ability to empathise with other farmers in their community. Ideal FFWs are married, and therefore have access to their own land. The composition of the group reflects the age, gender and level of poverty of the farmers in their community.

FFW-led Farmer Field Schools

On returning to their communities, the FFWs share their new knowledge and ways of learning with the ten farmers who originally selected them. At the same time they continue to receive support from ZIP

cycles. They also examine the efficacy of local natural pesticides, grain storage treatments and the comparative susceptibility of crop varieties to pests. ZIP Research's role during these Farmer Field Schools is to support the FFWs in their job as facilitators and to offer advice when asked to do so.

Donor support

The FFWs receive a small salary. This is provided initially by DANIDA, the donor, although in the long term these salaries will be paid for by the organic premium, which should be at least 20 percent above normal farm-gate prices. Expenses associated with training and providing follow-up support for the first two or three years must also be met by donors. These costs, however, appear well justified because results so far have been impressive.

At the moment ZIP Research has two projects. The first is being funded by DANIDA, and involves a collective of 60 farmers and 6 FFWs in Chinamhora. This group has just started to supply Harare with its first fresh organic vegetables. The collective grows tomatoes, peas and carrots in rotation with brassicas such as cabbage and alliums such as onion, in order to control root-knot nematodes and satisfy local consumer demand for these vegetables. They have discovered two native plant extracts, Mucherekesi (*Suartzia madagascariensis*), an effective fungicide, and Chowa (*Datura stramonium*), a good insecticide.



Experimenting in organic production

Research and from trained extension officers. The FFWs conduct regular Farmer Field Schools, ensure that individual farmers adhere to the agreed guidelines for organic production and certification, and write monthly reports.

During the Farmer Field Schools, the farmers' groups scout for pests and predators, discuss control strategies and carry out simple experiments on insect life

The farmers have also composed a number of songs, and these help illiterate members of the group to retain facts about such organic farming practices as composting, intercropping and rotation. The songs also seem to strengthen a dying tradition, the practice of singing together while tilling the land.

One FFW working in the cotton growing area of Mtoko has discovered a small ant which is predacious on stem-borers and bollworms but which is only active when there is an intercrop of indigenous cowpea to provide shade and nectar. The FFW also discovered a 'zebra' caterpillar that, astonishingly, seems to relish aphids!

The second project, supported by the SIDA EPOPA programme, is based in the Zambezi Valley in northwest Zimbabwe. Here, resettled farmers have cleared land that was once home to thousands of elephants, and now grow cotton and other crops. Many farmers are concerned about the environmental degradation triggered by this land clearance and the consequences of heavy pesticide use. They have started to experiment and grow cotton without pesticides.

ZIP Research has recently trained 30 FFWs to ensure that 330 farmers will be able to produce organic cotton in the coming season. A minimum of 15 tons of lint is required before spinning can begin. So far the new FFWs have greeted their training with enthusiasm, and have been spurred on by the achievements of the organic farmers in Chinamhora (they are planning to hold a singing competition next year!) However, opposition from the many multinational chemical companies which operate in the valley is anticipated.

Farmer-Participatory Research

Research conducted at the Eco-lab is designed to support on-going projects. Research topics are often initiated and carried out by FFWs and their farmers' groups, and results are shared amongst project members. This coming season farmers will be reporting on the incidence of predatory ants on intercropped and monocropped fields, and will be finding out which varieties of tomato perform best during the rainy season. Organic cotton growers will be observing the impact of strip-cropping sweet sorghum as a trap crop for the American bollworm, and assessing the suitability of different live fencing materials for encouraging insect predators.

Meanwhile, scientists at ZIP Research will explore the efficacy of the 'zebra' caterpillar and various other indigenous natural enemies such as parasitoid wasps, insect viruses and entomopathogenic nematodes. They also intend to come up with standards that can be used to measure the effectiveness and selectivity of the many plant-based insecticidal sprays used in farmers' experiments. In this way scientists and farmers can share the excitement of applied research.

Sam L. J. Page, ZIP Research, Box CY301, Causeway, Harare, Zimbabwe.

*ZIP Research is an independent scientific unit operating under the auspices of the Zimbabwe Institute of Permaculture.