

AGROECOLOGY CASE STUDY



*Hand spun yarn from women spinning associations;
A farmer applying food spray on his cotton crop;
Ladybird beetle on a cotton leaf;
Farmers during cotton agro-ecosystem analysis.*

Cotton farmers do better with IPM in Arba Minch, Ethiopia

Introduction

In Southern Ethiopia, cotton is grown by smallholder as well as large commercial farmers. The crop, however, suffers attacks by a wide range of pests such as bollworms (*Helicoverpa spp.*) and sucking pests. The growers have to manage these pests effectively if they are to increase yields and profits.

Both the smallholder and commercial cotton farmers rely on synthetic insecticides to control pests throughout the growing season. Farmers use different types of pesticides including organophosphates, carbamates and organochlorins (MoA, 2013). The negative impacts of synthetic pesticides on human and environmental health underlie growing concerns over the unsustainability of long-term reliance on these

chemicals. These risks are aggravated by the limited knowledge of cotton farmers on the responsible use of pesticides and the lack of appropriate and easily accessible alternatives (Amera and Abate, 2008; Williamson, 2011). Unless alternative pest management options are introduced to the farmers, dependence on synthetic pesticides will only aggravate the loss of biodiversity and damage to ecosystem and human health.

There have been some positive results in the development of alternative pest management options in cotton production (Mensah et al., 2013) such as the use of beneficial insects. This has attracted the attention of farmers and government departments.

IPM Comes to Arba Minch

The town of Arba Minch (505 km south of Addis Ababa) is the administrative centre for the Gamogofa Zone in the Southern Nations Nationalities and Peoples Region (SNNPR) of Ethiopia. The area is the second largest cotton growing region in the country after the Amhara Region (MoA, 2004). Smallholder and state cotton farms are located on the western side of two important lakes in Arba Minch, Lakes Abaya and Chamo. The Arba Minch area is also rich in biodiversity with 37 species of mammals and 188 species of birds in its Nechisar National Park, located between the two lakes. There are also many species of fresh water fish found in both lakes (EWNHS, 1996). The lakes were, however, being polluted by agrochemicals applied by small aircraft to the cotton grown in the area.

An Integrated Pest Management Farmer Field School (IPM-FFS) on cotton was first introduced to the area by FAO in 2006 and lasted for only one year. Since then, PAN-Ethiopia has been following up the trained farmers. In 2013, PAN-Ethiopia got a 3-year project to upscale and expand the cotton IPM-FFS in Arba Minch Zuria and Mirab Abaya districts of Gamogofa zone to engage smallholder cotton farmers in a more sustainable way of producing cotton. The project was started on January 2013 and will end in December 2015. However, scaling up of the project for 3-5 years is undergoing. The project involved more than 2,000 smallholder farmers in nine villages (Shelle Mella, Chano Mille, Zeyse Elgo, Kolla

Shelle, Kolla Shara, Genta Kanchama, Faragossa, Kolla Mulato and Kolla Barena) in the Zone. Various alternative pest management methods were introduced including a new technique called food spray, which had been invented in Australia and trialed in Benin.



Beat sheet counting

“Pests should be called ‘farmers’ enemies’ because they damage our crops, and natural enemies (beneficial insects) should be called ‘farmers’ friends’ because they protect our field from farmers’ enemies.” **Menza Maile, a cotton farmer in Chano Mille**

The Process

The main intervention method used to implement the project was to train smallholder cotton farmers, large commercial farm plant protection experts, and local agricultural extension agents on IPM via FFS. Demonstration plots were set up in each of the project sites for the farmers to use as IPM-FFS learning sites so that they could replicate what they had learnt from the training. The IPM-FFS sessions were given in each of the project sites once a week for three hours. The main topics covered include: pesticide health monitoring, preparation and application of food sprays, pest and beneficial insect scouting, agronomic practices, and recording of information about the farm, activities conducted and decisions made during the FFS sessions.



A leader farmer presenting group records during FFS; Farmers’ drawings of beneficial insects, pests, and cotton plants.

Farmer Field Schools (FFS):

A farmer field school is a group-based learning methodology involving a group of smallholder farmers who live in the same village and share the same ecological settings and socio-economic situations. FFS are schools in the farm (schools without walls) used to train farmers about plant protection and agronomic practices which will help them increase their crop production. They also improve the decision-making capacity of farming communities and stimulate the use of local innovation and indigenous knowledge in sustainable agriculture. FFS employ a process of self-discovery and participatory learning where all of the farmers participate in the agro-ecosystem data collection. The main purpose of FFS is to provide an opportunity for farmers to develop the habit of learning by doing.

Smallholder cotton farmers in the project areas were selected with the help of the local agriculture officers to participate in the IPM-FFS training sessions. The selected farmers in each village were first put into groups of five, with one being the lead farmer. The FFS sessions were facilitated by PAN-Ethiopia's field agents with full support from the zone plant health clinic. Training sessions covered topics from land preparation to

harvesting so that the farmers could be trained in all stages of the cotton life-cycle.

The farmers learnt techniques like insect scouting and how to make food sprays. Insect scouting is carried out using the beat sheet counting method. Beat sheet counting is done by placing a white sheet on the ground beside a selection of plants. The cotton plants are lightly beaten so that insects will fall onto the white sheet. The pests and natural enemies that fall on the sheet or fly during the beating are counted and recorded. Beat sheet counting of pests and natural enemies has to be done in the morning from 8.00 to 10.00 a.m. because this is when insects are less active and can easily be found on the cotton leaves. Following the results of the scouting, a decision regarding whether to apply food sprays is made. Food spray treatment were applied whenever the ratio of natural enemies to pests was below 1:2. Food spray is a supplementary spray applied to cotton farms to attract and conserve natural enemies into the sprayed field. The components of which are locally available, low cost and non-toxic including brewer's yeast, Neem seed extract and maize. It is environmentally friendly which doesn't have an impacts on human health and the wider biodiversity.

Gains from the Project

The project has resulted in several significant benefits for the communities involved.

Farmers can identify pests and beneficial insects

The farmers involved in the IPM-FFS training are now able to identify the main pests and beneficial insects. They also know which natural enemies feed on which type of pests. This enables them to make better decisions when they see insects in their cotton fields. Previously, farmers assumed that all insects on their crops were pests. Now they know how natural enemies help to maintain balance in their fields.

Farmers have stopped using pesticides for cotton production

The awareness of cotton producer farmers about the importance of sustainable cotton production and the negative human health and environmental impacts of pesticides has been raised via the training and demonstration sessions. The perception of farmers towards insects has changed as they now have an understanding of which insects attack their crops. They also do insect scouting and monitor the ratio between pest and natural enemy populations. They use food sprays if the ratio goes higher than the acceptable level. Food sprays are used to attract natural enemies to the field before it is infested by pests. The natural enemies eat the pests at different stages of their life-cycles. Hence, the farmers have now stopped using toxic pesticides for cotton production and some are moving towards organic cotton certification.

Organic cotton producer cooperative established

Organizing farmers in cooperatives and linking them to better markets was one of the aims of PAN-Ethiopia. With support from the zonal cooperatives and marketing department, a cooperative was established in Shelle Mella called "Shelle Mella Organic Cotton Producers Association". Members of the cooperative produce organic cotton and are in the process of getting international organic certification. This will help them to market their produce more effectively both nationally and internationally.

Better incomes

PAN-Ethiopia conducted a baseline survey on conventional cotton producers in January 2013 before the IPM-FFS project started. The yield per hectare of seed cotton for conventional smallholder cotton growers was 8-10 quintals per hectare. After one year of IPM intervention, the yield of the IPM-FFS farmers was 18-23 quintals per hectare for the 2013 cropping while the seed cotton yield for the 2014 production season for IPM-FFS farmers was 30-36 quintals per hectare, more than triple that of the baseline.

Cotton marketing had been a challenge for the farmers as they were getting low prices from the local middlemen (brokers). The price of seed cotton was 10 Ethiopian Birr (ETB) per kg in 2013, but it increased to 16 ETB per kg in 2014. This price increment was because of the establishment of the cooperative mentioned above. It helped the farmers get organized and avoid the interference of the middlemen.

Women farmers organised

As hand spinning is one of the common ways to make traditional cloths in Ethiopia, PAN-Ethiopia organized women cotton farmers in the project sites of Shelle Mella, Chano Mille and Faragossa into women cotton-spinning associations. These associations are now linked to local traditional cloth weaving micro-enterprises so that they can easily sell their hand-spun yarn through them. This was an essential step forward for women farmers to generate their own income.



Hand spinning, women spinners association

Moving Ahead

The project was implemented with local stakeholders, national and regional agricultural offices, and other NGOs. Government agricultural extension agents, plant protection experts and agriculture office experts were involved in all the IPM-FFS trainings and food spray preparations and applications. The involvement of local stakeholders, especially agricultural extension agents working at the grassroots level with farmers, has been vital in expanding the technology and practices to other new areas.

The organic cotton producer farmers' cooperative and women spinning associations are important value chain outlets which provide sustainable incomes for the farmers. At the same time, farmers have reduced their production costs by avoiding the use of synthetic pesticides which were expensive compared to the food sprays. These gains represent important pillars for the sustainability of IPM-FFS in the area.

References

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