Food and Agriculture Organization of the United Nations

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Phasing out Highly Hazardous Pesticides is possible!

Farmer experiences in growing coffee without endosulfan

This leaflet aims to inform policy makers about successful farmer experiences in managing coffee pests without the insecticide endosulfan. It demonstrates that phasing out of **Highly Hazardous Pesticides** (HHPs) in favour of safe and cost-effective alternatives is entirely possible - on large estates and small family farms. The findings also serve as useful generic lessons for governments, farmers and other stakeholders on how to improve chemicals management and promote sustainable agriculture in the context of the Basel, Rotterdam and Stockholm (BRS) conventions.

Key findings

Control of the Coffee Berry Borer pest without endosulfan is perfectly feasible: Farmers confirm that effective pest control is possible without using endosulfan, across a range of farm sizes, climate zones, coffee production systems, farmer ages and educational levels. Many have been able to avoid, or greatly reduce, the use of HHPs in general.

Effective management relies on ecologically-based IPM strategies: Monitoring pest population levels and combining two or more Integrated Pest Management (IPM) methods, including biological controls where possible, are key elements for success.

"Getting good control of this pest is all about well trained staff, continuous monitoring, good picking practices, field hygiene, and applying biological products. Our groves are very low in incidence now and we've been reducing insecticide use every year" - Mrs Marlen Sánchez, farm management team, La Lila estate (55ha), Colombia

Photo © PAN UK

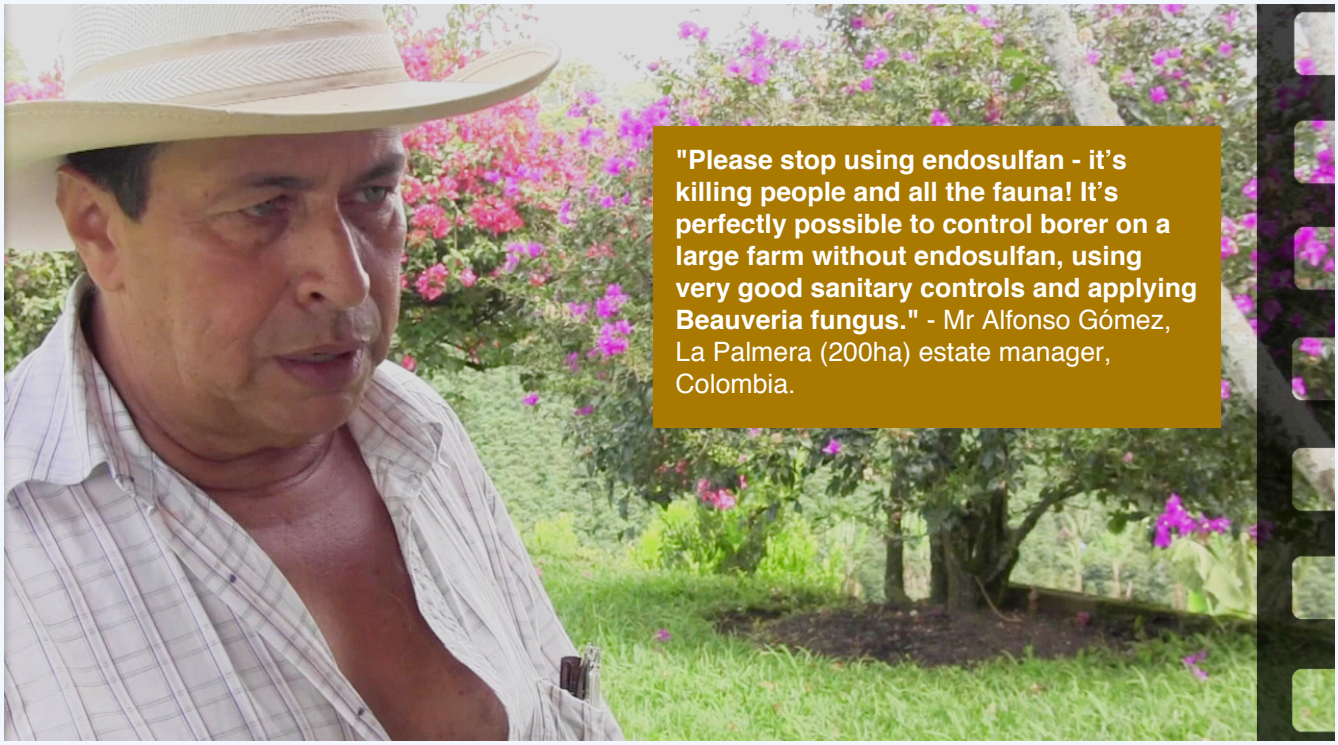


Photo © PAN UK

Non-chemical alternatives are not necessarily more expensive: Farmers' costs and labour data show that IPM methods can be similar or cheaper than endosulfan application. Investment in safer alternatives delivers good coffee quality and benefits from higher prices, healthier farm workers and environmental protection.

HHP alternatives need not simply be other pesticides

Coffee production is a major part of the economy for over 50 producer countries, with 8.2 million tons grown in 2012. Over 80% of this is exported, at a value of US$ 23.4 billion. Coffee growing provides a livelihood for around 25 million farmers, mainly smallholders in tropical regions, farming in highly biodiverse landscapes but often enduring conditions of poverty[1].

When the persistent organochlorine insecticide endosulfan was added to the Rotterdam Convention subject to the Prior Informed Consent (PIC) procedure and the Stockholm Convention targeted to global phase-out, concerns about alternatives to this widely used pesticide were voiced, especially in the coffee and cotton sectors. Substitution with other chemicals was quickly recognised as an unsatisfactory option, given that many of the possible substitutes are hazardous or even have POPs characteristics[2]. The international community agreed that ecosystem-based approaches to pest control are the preferred option[3].

In the case of coffee, there is a wealth of relevant experience to learn from. Several private sustainability standards, such as Fairtrade and Rainforest Alliance, have prohibited the use of endosulfan since 2011 or earlier and certified farmers in their schemes need to comply with this requirement. These farmers have therefore had to adapt to manage coffee pests without this insecticide, mainly used against the Coffee Berry Borer beetle, which can cause serious losses in coffee quality and yields. Research institutes and farmer-led organisations, such as the Colombian Coffee Growers Federation, have developed practical IPM tools for this pest. Together, they have improved practices

Box A: *Growing Coffee without Endosulfan*

This project collected information on the IPM methods used on 21 certified farms in Colombia, Nicaragua and El Salvador to understand how endosulfan use can be avoided in a range of farm contexts.

The project was conducted by **Pesticide Action Network UK** www.pan-uk.org in collaboration with coffee partner **4C Association** www.4c-coffeeassociation.org, the **Food and Agriculture Organization of the United Nations** (FAO) www.fao.org, the **Sustainable Coffee Program, powered by IDH** www.sustainablecoffeeprogram.com, and the **ISEAL Alliance** www.isealalliance.org.

and learnt valuable lessons for guiding those farmers still using endosulfan to change to safer alternatives. One clear lesson is that implementing the BRS Conventions helps to **reduce** harm to human health and the environment and its associated economic burden caused by hazardous pesticides.

Empowering farmers with Integrated Pest Management know-how

The **Growing Coffee without Endosulfan** project (see Box A) interviewed farmers, estate managers and technical advisors in different agroclimatic zones and coffee production systems. The following sections summarise the most useful methods farmers reported in using alternatives to endosulfan.

Understanding and monitoring the pest

The borer is a very complicated pest which spends much of its life inside the coffee bean, out of reach of chemical or biological insecticides. Its population levels, economic

Farmers can learn to assess CBB levels in their coffee plots, with simple training, field calendars, monitoring notebooks and follow-up, like Mr Nevardo Restrepo in Colombia. © PAN UK

Selective removal of early ripening berries attacked by the borer, by Mrs Maritza Colindres on her 2.8ha farm, Nicaragua. © PAN UK

damage and control costs vary widely from year to year and in different regions. A good IPM programme needs fine-tuning to each farm's particular situation.

Pest monitoring via regular field observation is an important step in effective borer management. To cost-effectively control the beetle and minimise damage to coffee beans, farmers need to assess:

(a) Are my borer levels high enough to warrant extra control?
(b) Where are the borer 'hotspots' in my coffee groves?
(c) When are the critical periods for controlling the pest in my plots?
(d) Can I reach the beetles if I spray now?

Large farms in Colombia, where this pest will attack berries year-round, have found that careful monitoring of each field every 2-4 weeks helps keep track of borer trends, identify potential outbreaks and assess whether control actions have worked properly. Example: Agrovarsovia Farms in Colombia now employ a full-time Coffee Berry Borer supervisor to monitor across their five estates and coordinate control activities.

Photo © PAN UK

Mr Guillermo Londoño in Colombia targets biopesticide applications to the ground under borer 'hotspot' trees, to control beetles emerging from fallen berries. Combined with intensive sanitary controls, regular grove renewal and a more diverse cropping system, he has managed the pest with zero insecticide use for over 10 years on his 25ha farm. © PAN UK

Cultural controls form the backbone of good borer management

The starting point for managing this pest is good cultural controls. These field hygiene measures involve:

(a) sanitary picking of any bored berries or early maturing berries before harvest

(b) collecting fallen berries and dried berries left on trees after the main picking season.

These practices are essential to reduce the amount of pest breeding sites and reduce population levels in the following season.

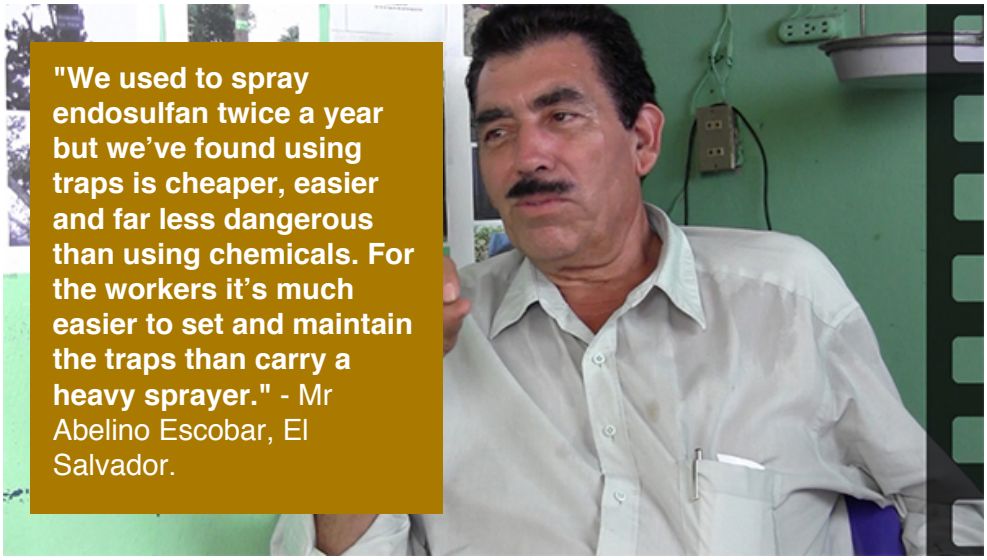
On large estates, field hygiene needs careful planning and supervision. Farms aiming to replace chemical use with more intensive cultural controls and biological products find it is best to have dedicated, trained workers for these tasks. Large and small scale farmers alike point out that no chemical, biological or trapping methods will work well without proper field sanitation.

Using biological controls

Several biological pesticides are available for this pest, based on the naturally occurring, insect-specific fungus *Beauveria bassiana*. Biopesticides can be useful as part of an IPM strategy **IF** a good quality product is applied with care and at the right time. Costs reported are similar to, or slightly more expensive, than insecticide spraying. Farmer training on how to store, apply and evaluate Beauveria biopesticides is very important for effective use.

Some large farms have successfully reduced or replaced chemical use with regular Beauveria applications plus improved cultural controls. They find

biological control as effective as insecticides such as chlorpyrifos, with the advantage that regular applications build up the background levels of the fungus and extend control.



"We used to spray endosulfan twice a year but we've found using traps is cheaper, easier and far less dangerous than using chemicals. For the workers it's much easier to set and maintain the traps than carry a heavy sprayer." - Mr Abelino Escobar, El Salvador.

Photo © PAN UK

Trapping using alcohol attractant

Female borers are attracted to alcohol-type odours which mimic those released by ripening coffee berries. Researchers have developed simple trapping methods using methanol/ethanol mixtures as the attractant, placed in a commercial or home-made plastic bottle trap containing soapy water. The trapped beetles fall in and drown. These traps can reduce attack rate on the new berries BUT only in regions, such as Central America, with a dry season when no developing berries are present for several weeks. This method is very easy to adopt on farms of any size, once farmers and workers understand how to manage the traps.

Box B: *Problems with relying on chemical controls alone*

Insecticides can be very effective **IF** a recommended product for the pest is applied correctly and at the right time to kill borers before they enter the bean. But it is not always easy to identify the precise time or to organise spray operations promptly. If rain occurs after spraying, a repeat application may be needed. Insecticides are not necessarily cheaper than other methods, especially if the full costs of spray equipment, maintenance, personal protective equipment and medical checks are considered.

Calendar-based spraying without pest monitoring may waste money on unnecessary or ineffective application. Carrying a 20 litre sprayer is hard and risky work when using hazardous pesticides, even with protective clothing. Farmers cited fear of poisoning themselves or their workers as their main reason to eliminate endosulfan.

"I only used endosulfan once. Besides being prohibited now by the co-operative, it's polluting and it's bad for your health - you could get a worker poisoned. We've had the experience with some neighbouring farms using endosulfan and the workers got poisoned, they had to be taken to hospital and given stomach rinses - a serious problem!" - Mr Bernardo López, 20 ha farm, Nicaragua.

Photo © PAN UK

Mr Abelino Escobar (with one of his home-made traps) manages the 96ha Belmont estate in El Salvador and began trapping in 2012. Results achieve excellent coffee quality and enabled the estate to gain Rainforest Alliance certification. © PAN UK

Methanol and ethanol are often not available for public retail due to their ingestion hazard so technical support organisations need to purchase these and then distribute individual attractant dispensers to client farmers. Bulk supplies must be stored out of reach of children or alcoholics. This system is working well as part of IPM programmes promoted by co-operatives and exporter groups, whose members have now eliminated endosulfan use.

How policymakers can support phase out of endosulfan and other HHPs

Learning from successful farmers' IPM experiences, including costs and benefits, gives national decision makers the confidence that banning endosulfan will not cause economic harm to farmers or coffee exports.

Promoting these experiences to national stakeholders builds practical and political support for phase out. Implementing the BRS Conventions works best when governments collaborate with producer organisations, the private sector and civil society.

Training and advice for farmers is essential to change practices. Farmer organisations, sustainability standards and research institutes play an essential role in replacing endosulfan with IPM methods, while avoiding a switch to other HHPs.

Setting agricultural development policies that favour ecologically-based farming encourages more farmers to adopt IPM methods. Governments can help farmers to access local and export markets, which reward higher quality food and safer pest management.

Fast-tracking or other regulatory support for less toxic products enables quicker registration and uptake of proven products for pests currently controlled with HHPs. Guidance exists for developing country regulators to set up robust but simple biopesticide registration systems.

To find out more

Visit the Growing Coffee without Endosulfan Project webpages to access the following materials:

- Set of 4 videos from farms interviewed (in English, Spanish, Portuguese and French languages);
- farm case studies;
- comparison of different IPM methods for coffee berry borer; and
- practical guidance and tips.

www.4c-coffeeassociation.org/resources?category=endosulfan-project

For more information, please contact:

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Rotterdam Convention Secretariat - pic@pic.int

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