

## Experiences with health and environmental risks of using endosulfan and issues in distribution, handling and product stewardship

Many of the farmers, farm managers and technical support staff interviewed in Colombia and Central America drew attention to the hazards of endosulfan and the risks involved in its distribution and handling at retail and farm levels. Over 70% of farmers were well aware of health and environmental hazards of endosulfan, from their previous experience and/or those of other farmers in their area. A third of farmers recounted or knew of poisoning incidents involving coffee insecticides, mainly with endosulfan. Table 1 summarises their descriptions and gives their personal recommendations to other farmers on how to avoid causing harm to others.

From the interviews, it became clear that fear of poisoning workers is an important personal motivation for several farmers to reduce or avoid pesticide use. 32% of farmers/farm managers expressly stated this concern, including small, medium and large farms.

**Table 1. Farmers’ knowledge of poisoning incidents and their recommendations to avoid harm**

<p><b>Colombia</b></p> <p>Farmer A (small farm) poisoned himself spraying malathion 20 years ago and has not used personally pesticides since in his coffee groves. He has only hired a worker to spray once against CBB in the last 15 years. Values cultural controls as an effective method to control borer without needing to use poisons harmful to the environment and personal health.</p> <p>Farmer B (small farm) has seen people poisoned using ‘strong chemicals’ e.g. endosulfan, chlorpyrifos.</p> <p>Farm manager (large farm F) used to run his own endosulfan spraying business but decided to stop after seeing the huge damage it did to wildlife and humans. Witnessed several poisoning incidents, including some of his workers in the spray team.</p>	<p><b>Recommendations:</b></p> <p>Only use permitted chemicals in badly affected spots if you really need to and take very good care to handle properly, to protect yourself and wildlife.</p> <p>Using powerful chemicals is the way to kill yourself! Pick your ripe berries every 15 days and that way you don’t kill animals or harm yourself.</p> <p>Stop using endosulfan now! With strong chemicals you’re threatening your own health and others and killing lots of animals. You can manage CBB without endosulfan, there is no need to use it any more.</p>
<p><b>Central America</b></p> <p>Farmer A (medium farm, Nicaragua) aware of worker poisoning cases on some large farms in his area which regularly spray endosulfan. Has never used endosulfan on his farm and would never do so, because it’s too dangerous. Banning endosulfan would be very good because it is too harmful, not just in immediate effects,</p>	<p><b>Recommendations:</b></p> <p>Use cultural controls rather than endosulfan. Farm owners should pay a little more money to do good CBB control practices, rather than affecting the health of the poor workers or risking harming their family.</p>

<p>sometimes fatal, but long-term damage too. Workers who spend considerable time spraying complain of permanent headaches. Even with protective clothing, endosulfan can penetrate open skin pores in any exposed spot.</p> <p>Farm manager (large farm J, El Salvador) has seen workers elsewhere poisoned from endosulfan. It can be fatal if exposure is all over the body. Workers can easily get splashed when handling pesticides and it's very hard work to carry heavy spray tanks and suffocating to wear protective kit.</p> <p>Farmer L (medium farm, Nicaragua) neighbouring farms using endosulfan had poisoning incidents and their workers had to be rushed to hospital for stomach pumping. He's only used endosulfan once, some years ago, and will never use again, as much because of the health risks as because it's prohibited by Fairtrade. Endosulfan can remain in the beans and pose a risk to the consumer.</p> <p>Farmer M (small-medium, Nicaragua) aware of poisoning cases locally with endosulfan, especially when people weren't using full protective kit. He used to apply it in the past but it's very risky for the people handling it. He now speaks at farmer meetings to promote trapping as a safer and more effective method.</p>	<p>Use methanol traps instead of endosulfan. They carry no risk for the workers handling them and trapping is quicker, cheaper and safer!</p> <p>Stop using high risk products like endosulfan! Use safer methods like trapping and cultural controls to avoid health risks to your workers or their families. If you're a small farmer, you risk poisoning yourself.</p> <p>Start using the methanol traps because they're cheaper than chemicals and the best method I've found so far. You won't run any risk for your workers or yourself.</p>
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**Information from occupational health team, Health Secretariat, Risaralda Dept., Colombia**

The project interviewed the occupational health nurse in charge of the team which runs the pesticide risk awareness training programme in Risaralda Dept. This programme was set up specifically to address serious issues of occupational and accidental poisonings, after major incidents, including fatalities among coffee farmers, in Balboa district in 1994.

The Secretariat's toxicological vigilance team receives reports of poisonings every week, from a variety of pesticides and crops. Some are suicide attempts, as well as accidental or occupational cases, but reports only include those cases that end up in hospital or health clinics. A departmental stakeholders' committee for pesticide health meets monthly to plan and assess the various outreach activities and review the incidence data. In each of Risaralda's 14 municipalities, they have set up a local pesticide committee, meeting every 2 months, and its members collaborate with the Secretariat to identify key local problems and organise educational work with farmers, schools and agricultural co-ops. The team also visits retail stores selling pesticides to advise on safety precautions, check on their practices and issue certificates of acceptable sanitary practices (separate from the official licensing of pesticide retailers by Colombia's regulatory body for chemicals). The Secretariat will liaise with the regulatory agency if serious deficiencies are found in pesticide handling or sale.

### Poisoning incidence trends and challenges

In general, the team has documented a considerable reduction in endosulfan poisonings over the years, demonstrating that their training and awareness work has helped greatly to reduce occupational poisonings. Nowadays 67% of cases registered are self-inflicted. Activities with school students are especially useful, as they will influence their parents at home. However, endosulfan poisonings continue and numerous incidents have been reported currently from endosulfan products Endopac and Portionil which come in illegally from Ecuador and Venezuela. These incidents are mostly among tomato producers who are using these smuggled products. Coffee farmers are now very well aware about endosulfan hazards and know that they shouldn't be using it at all. With the recent announcement of an endosulfan ban in Ecuador and maybe Venezuela too, the team hopes these endosulfan poisoning incidents will drop.

There have been occupational health cases with chlorpyrifos products, now used instead of endosulfan in coffee, and some suicide attempts too. The team is worried by a recent rise in glyphosate poisoning incidents but they suspect that these may actually be caused by illegally used endosulfan products, because the symptoms are those of organochlorine poisonings. It could be that unscrupulous farm managers are telling their workers that they're only spraying glyphosate!

### Wildlife poisonings and environmental risks

Endosulfan-related harm to wildlife and the environment is another concern. Almost a quarter (23%) of farmers/farm managers reported having seen dead animals in coffee groves after spraying endosulfan, while 18% mentioned other environmental impacts or hazards (Table 2).

**Table 2. Farmers' reports of wildlife poisonings and other environmental damage by endosulfan**

Wildlife poisonings	
<p><b>Colombia</b></p> <p>Farmer A (small farm) has seen birds, spiders and snakes killed 2-3 hours after spraying of endosulfan on other farms.</p> <p>Farmer B (small farm) has seen small birds and other small animals killed by strong chemicals on other farms. He refuses to use poisons on his Rainforest-certified farm because he encourages as much wildlife as possible.</p> <p>Farm manager (large farm J) observed birds, snakes or small animals killed every time after endosulfan spraying in his former job as sprayer business owner. His concern about conserving wildlife was a major reason why he changed jobs and he is now experimenting with non-chemical methods on this farm.</p>	<p><b>Central America</b></p> <p>Farmer A (medium farm, Nicaragua) recounted an incident of all the fish in a farmer's fish pond killed from knapsack spraying of endosulfan nearby on a large farm.</p>

<p>Farmer I (medium farm) has seen birds and bees and small animals affected by insecticide application on other farms. He decided not to apply any on his farm and developed his CBB management strategy based on ecological and cultural methods.</p>	
<p><b>Other environmental risks or impacts</b></p>	
<p><b>Colombia</b></p> <p>Farmer A (small farm) aware that endosulfan on nearby farms can harm natural <i>Beauveria</i> levels in non-sprayed groves.</p> <p>Farmer C (medium farm) has found higher levels of naturally-occurring <i>Beauveria</i> and other natural enemies of CBB and other coffee pests where no endosulfan is used. He chooses to avoid pesticide use if at all possible and certainly none for CBB control. His ecologically balanced system (mixed cropping of coffee with plantain, with mulch and ground-covering vegetation and zero insecticide use) suffers no damage from leafminers or other pests, which are often a problem in renewed plots managed conventionally.</p>	<p><b>Central America</b></p> <p>Farmer C (small farm, Nicaragua) aware that endosulfan applications tend to kill off useful soil microorganisms important for plant nutrition.</p> <p>Farmer I (large farm, El Salvador, which does use endosulfan) aware that endosulfan kills parasitic wasps released for CBB control.</p>

**Issues of pesticide sale, handling, disposal and product stewardship**

**Reducing reliance on endosulfan and other Highly Hazardous Pesticides**

The interviews with farmers and technical support organisations reveal how important the role of farmer organisations and those supporting them have been in implementing a change away from endosulfan use. Producer co-operatives, research institutes and support organisations working with certified farmers and smallholders have carried out awareness campaigns about endosulfan prohibition and its risks for farm family health and the environment and promoted IPM alternatives. One small farmer in Nicaragua highlighted how farmer organisations really make a difference in changing practice away from endosulfan use, in combination with the requirements of the certified markets (i.e. via Fairtrade and other sustainability standards). She considers that the remaining challenge for endosulfan phase out lies with those farmers not belonging to any organisation and who place little importance on what methods they use.

The certified farmers met were all aware of national bans and/or prohibition by their particular certified standard(s). Awareness-raising by support organisations and farmer co-ops has translated into positive support from farmers for bans on highly hazardous pesticides and their approval of the global ban on endosulfan. One Nicaraguan farmer wondered why his country has yet to ban it if the human health hazards are so obvious.

Many of the farmers recommended other coffee farmers to avoid the need for too much chemical control and to only use insecticides for CBB as a last resort. One medium farmer

from Colombia urged everyone to take the same conscientious decision as he has done to not use hazardous pesticides. Many Colombian coffee farmers, including three of those interviewed, are using chlorpyrifos as a replacement for endosulfan. Producer co-ops explained that they want to phase this use out too as it is also a risky pesticide.

**Pesticide retail and advice issues:** Traditional agricultural suppliers, such as the small stores found in many towns in coffee-growing areas, are an important source of advice but as one small farmer in Nicaragua explained “*Agricultural supply stores never tell you about traps or biopesticides or cultural controls- they only say “We’ve got these chemicals for borer”*”. If El Salvador and Nicaragua decide to withdraw their national approvals for endosulfan, farmers interviewed are sceptical how well such a ban would be enforced. One asked how farmers can be sure that stores will not continue to sell endosulfan but under another name.

Endosulfan is very widely available in Central America. In Nicaragua it is restricted for use in coffee only yet 2 of 3 agricultural supply stores we visited in July 2013 offered to sell us endosulfan ‘*for lots of pests on a range of crops*’. There seems to be very little monitoring or enforcement of national restrictions on endosulfan use. In El Salvador the government announced in August 2013 a decision to ban endosulfan, along with some other HHPs, due to concerns about rising pesticide-related ill health. Technical support organisations interviewed deplored the ready availability of endosulfan, often sold in contravention of national restrictions on use, and of customary dependency on this insecticide by much of the country’s coffee sector.

Endosulfan has been banned in Colombia for some years, however, there is some illegal cross-border entry of unauthorised or mislabelled products. Producer co-ops interviewed are confident that none of their members will even think about buying these contraband products, but poorer farmers, who are not in any farmer organisation, may be tempted.

**An example of good pesticide supply and advice:** Risaralda Coffeegrowers’ co-op in Colombia explained how they have dealt with the issue of endosulfan and other pesticides prohibited by Fairtrade. The co-op owns 15 local supply stores throughout Risaralda Department, selling agrochemicals and other farm supplies to members and unaffiliated farmers. When the Fairtrade Labelling Organisation (FLO) introduced its list of prohibited pesticides in 2005, the co-op decided to withdraw from its stores all products containing these FLO-prohibited substances, even those that were legitimate under Colombian regulations, such as monocrotophos. This voluntary withdrawal helped to raise co-op members’ awareness about the hazards of these substances. The Risaralda co-op stores explained to farmers asking for these products that they were now prohibited by Fairtrade and so farmers understood that if the co-op was no longer selling them it was because they were very dangerous. Staff also explained which former products were associated with health concerns, such as cancer.

This awareness-raising has helped to encourage uptake of safer alternatives and the co-op stores now sell replacement chemicals which can be used by certified farmers and biological products like *Beauveria* biopesticide. Risaralda and other producers’ co-ops which provide

supplies also help to regulate the local marketing of pesticides to some extent, as they can offer a small discount on price, from their bulk purchasing, while small dealers who travel to the villages often charge heavy mark-ups and may not be selling solely authorised or appropriate products. In general, insecticide use for CBB control is now very low in Risaralda, despite being a zone with favourable climate for the pest. This success is thanks to the awareness-raising work by the co-op and local FNC extension service on problem pesticides, training on IPM methods for CBB and their active promotion of biological products, along with that of *Beauveria* manufacturers and some of the larger reputable agricultural supply companies.

**Pesticide disposal problems:** Several farmers and producer co-operatives in Colombia expressed frustration about how to deal with small quantities of left-over and now expired endosulfan or other insecticides. The agrochemical industry-funded pesticide container collection scheme in Colombia ('*Campo Limpio*') does a reasonably good job on containers but it will not collect expired pesticides or opened containers of products no longer permitted in use. So farmers have no choice but to keep these on their farm, causing problems for them in terms of compliance with the pesticide storage requirements of certification standards (such as Fairtrade and Rainforest Alliance). This seems a particular problem for certified farmers who have to obey the prohibitions on specific active ingredients set by the standard.

The Risaralda Health Secretariat confirmed the legal obstacle in Colombia around elimination of small amounts of toxic liquids. If the toxicological vigilance team tries to decommission or collect any expired or opened containers from farms or stores, then legally they will be seen as the generator of this toxic waste and responsible for its disposal, when there is nowhere to get rid of it. The same situation applies to the police and therefore nobody in relevant public bodies can do anything to help solve the problem at farm level.

Supporting proper disposal of pesticides banned under the Stockholm Convention should be a higher priority for FAO and relevant UN agencies and national regulatory authorities. Certification standards are helping to implement the FAO/WHO Highly Hazardous Pesticide initiative by prohibiting or restricting certain HHPs in their supply chains but farmers and producer organisations need more help from regulators and the agrochemical industry to make sure that expired and opened products which they can no longer use are collected and disposed of safely. Collection schemes that don't transfer the full cost to farmers and in which chemical manufacturers shoulder their financial responsibility for lifecycle management are a specific recommendation from farmers and organisations interviewed.