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Impact evaluation of the Integrated Management of the Coffee Berry Borer (CBB) project

Executive Summary of final report

Background

1. In March 2009, the Common Fund for Commodities (CFC) commissioned an Impact Evaluation of a CFC/ICO project on the Integrated Management of the Coffee Berry Borer which was implemented from 1998 to 2002. The final report and relevant material is available on the ICO website at www.ico.org/projects/02-p.htm.

2. The evaluation was carried out between May and August 2009 by two consultants (Mr Pablo Dubois and Mr Gerrit van de Klashorst), who presented a summary of the preliminary report contained in document ICC-103-4 to the Council at its 103rd Session. The final Executive Summary of the impact evaluation is now attached and a copy of the full report is available on request from the Secretariat.

Action

The Council is requested to note this document.

IMPACT EVALUATION OF THE INTEGRATED MANAGEMENT OF THE COFFEE BERRY BORER (CBB) PROJECT (CFC/ICO/02)

EXECUTIVE SUMMARY

1. The specific objective of the evaluation is to assess the development impact of the above project and the extent to which the project's objectives and targets have been achieved. This should include an assessment of the lessons that can be drawn from the project and its implementation to serve as a guide for future projects financed by the Common Fund. The evaluation was conducted by independent consultants, one of which carried out a fact-finding mission to three of the original project countries (Colombia, Guatemala and Jamaica) and to three other countries (Brazil, Ethiopia and Indonesia). This Summary includes sections covering the main findings including impact assessment, lessons learned and major recommendations.

The project

2. Implemented between April 1998 and May 2002 in seven countries: Colombia, Ecuador, Guatemala, Honduras, India, Jamaica and Mexico, the Project was executed by CABI Bioscience with the technical assistance of PROMECAFE[1] in Central America. The central objective of the project was to benefit coffee producers through improved yields and coffee quality by controlling the CBB. It comprised the following components:

- Improvement and testing of mass rearing and delivery systems for natural enemies (pathogens and parasitoids) to combat the CBB;
- Provision of natural enemies to participating countries;
- Integration of biological control technologies and other methods for cultural and chemical control to develop Integrated Pest Management (IPM) systems;
- Dissemination of IPM technology/information and associated training to participating and other countries.

MAIN FINDINGS

Impact of the project by component

3. The evaluation found that in general the project had a positive impact, particularly in disseminating information on the nature of IPM using the very successful Farmers' Participatory Method. The outcome was increased take up of improved cultural practices which significantly reduced losses that otherwise would have arisen from CBB infestation. On the other hand, in spite of the weight given to this component in the project, the

[1] *Regional Program for the Development and Modernization of the Coffee Industry in Central America, Panama, the Dominican Republic and Jamaica.*

successful use of biological control was disappointing, since this technology proved to be insufficiently developed to be adopted easily by farmers. Nevertheless some cases of success were found and indicate that further efforts here, particularly in view of technical advances in mass-rearing technologies, should be continued. The comments below apply to the principal project components.

Improvement and testing of mass rearing and delivery systems for natural enemies[2] (pathogens and parasitoids) to combat the CBB

4. The evaluation concluded that considerable advances had been made in the mass-rearing of biological control agents, although means for their practical application did not become available within the project time period. However, these were at too early a stage of development to be taken up by farmers. This is particularly the case with parasitoid wasps, although some positive results have been achieved with *Cephalonomia stephanoderis* in Guatemala. Technology for cost-effective automated mass-rearing of parasitoids only became available at the end of the project and requires substantial investment, which was not forthcoming at the time of the worldwide coffee price crisis of 2000-2004. In the case of the fungus *Beauveria bassiana,* during and after the project some of the difficulties in its cultivation and application were overcome, and at the present day it is much more commonly used than before.

Provision of natural enemies to participating countries

5. After successful rearing, the natural enemies were transferred to participating project countries. Cultures were then established there, and the biological control agents (natural enemies) were subsequently released in the field to combat the CBB during the project period. After the project terminated this was not vigorously continued in most project countries, although Colombia and Jamaica are continuing to rear parasitoids for research. The field mission found that the only country where *Cephalonomia stephanoderis* is continually mass-reared was Guatemala, where over 50 larger farmers are financing and using Rural Rearing Facilities (RRFs). They have been releasing *C. stephanoderis* for over 12 years now. The combination of cultural control with release of *C. stephanoderis* is proving more effective for CBB control than either of these methods singly.

Integration of biological control technologies and other methods for cultural and chemical control to develop IPM systems[3]

6. This was investigated through Farmers Participatory Research with varying degrees of success in the different project countries. However where correctly used it proved of outstanding value. Although biological control lagged behind, there seems to have been a

[2] *Natural enemies are specific natural agents that are introduced to combat the pest – in this case the CBB.*
[3] *IPM or Integrated Pest Management is the use of one or several compatible control methods to combat a pest species. These can be cultural methods, biological methods and as a last resort synthetic pesticides.*

substantially improved awareness of the benefits of IPM and in many cases the successful use in particular of improved cultural control methods such as 're-re'. Re-re (for *recolección* and *repase*) is the most common cultural control (it encompasses the complete removal of all ripe and over-ripe berries from the trees and the ground after the harvest and during the inter-harvest period, thus reducing vital sources of re-infestation by the CBB). The results in avoiding losses have been highly positive, according to Colombian officials, who estimated a benefit in excess of US $200 million a year in the last year of the project compared to the first year, a result that could substantially be derived from the project[4].

Dissemination of IPM technology/information and associated training to participating and other countries

7. Although not emphasized in the final project reports, there has been a large number of officially published documents produced by the project, which are useful for other countries wishing to use the techniques and methods developed during the project. Moreover the dissemination process has been assisted through the successful use in many cases of the Farmers' Participatory Method (FPM) for extension.

Impact assessment by category of beneficiaries

8. In view of the time (seven years) since the completion of the project, the large number of relevant factors and unavailability of data, it proved in many areas to be quite difficult to establish meaningful quantitative indicators. Nevertheless enough material was obtained to allow a reasonable vision of the project's impact in the three countries studied.

- *Overall economic and social impact*

  The project had a favourable economic and social impact through the introduction of IPM and FPM. For instance in Colombia the project is credited with **benefits of over US$200 million a year** in reduced losses due to CBB infestation. However it should be noted that there was a marked preponderance of improved cultural practices in the IPM mix and many obstacles to successful implementation arose from the coffee price crisis of 2000 to 2004, which caused farm prices to drop some 50 per cent in many countries. Moreover the crisis also reduced funds available to coffee institutions which were essential to introduce biological control methods. On the other hand improved cultural practices could more easily be seen as an extension of normal farm management and thus easy to adopt as well as effective. This was particularly the case where coffee growers had strong institutional support, such as in Colombia. The point was made specifically for

[4] *However improvements may also derive from other factors such as work undertaken prior to the project and occurrence of climate conditions less suitable for the CBB. For instance 1997/98 is classed as a bad year, thus giving a high initial reference point for infestation.*

Guatemala that the favourable impact of IPM measures, albeit continued on a very small scale and on certain estates able to absorb temporary losses, was largely nullified by their abandonment during the crisis although they have now been restarted in several areas with success. In most project countries when successfully introduced the **Farmers' Participatory Method (FPM)** for extension has had **an important social impact** in motivating and getting coffee farmers to work together.

- *Impact on farmers*

  On the basis of the figures given above farmers in **Colombia** may have **benefited by up to US$163 million** from the project by the time it terminated with subsequent continued gains from reduced incidence of CBB. In **Guatemala** the introduction of IPM **reduced CBB infestation by nearly 70 per cent** where implemented although the use of IPM was severely reduced during the period of the coffee price crisis and its resumption is uneven. In **Jamaica** the introduction of IPM has made available potential alternatives to chemical control, which will need to be phased out in the longer term.

- *Impact on extension services*

  In the three project countries visited by the Mission, the Extension agents were well versed in IPM techniques communicated by the project, and commonly transferred these to farmers. However, the top-down approach for extension was still prevalent, which is less effective in empowering the farmers compared with the participative model.

- *Impact on research institutions*

  In **Colombia** the project has contributed significantly to the efforts of CENICAFE in combating the CBB. After the project ended, research has continued in areas such as CBB behaviour, trapping/monitoring by 'alcohol traps', and the use of *Beauveria***.** The use of parasitoid wasps has not taken off largely because of high cost and lack of donor support, and cultures of three wasp species have been transferred to private enterprise. In **Guatemala** the project has given support to biocontrol with *Cephalonomia* and could be seen as instrumental in maintaining the momentum of this work as well as stimulating interest and work on *Beauveria*, which is presently being accelerated. Research efforts in **Jamaica** have continued after the project, albeit in a different form. Recent work has emphasized trapping and cultural control methods and the economics thereof, but data analysis has not yet been finalized and published. A maintenance culture of two parasitoid species is kept.

- *Impact on coffee sector profitability*

  In **Colombia** the IPM emphasis is on cultural practices easily integrated with normal coffee tree maintenance. Costs of CBB IPM are estimated at an affordable 6 per cent of total costs. At normal or high price levels **IPM enhances profitability** in view of the improvements achievable in both quantity and quality. In **Guatemala** IPM costs based on the use of two or three components are estimated at 295 Quetzals/ha equivalent to US$35.80, which is not high. With a potential reduction in infestation of up to 70 per cent **profitability is increased.** By facilitating a greater choice of control options the project has enhanced **potential** profitability in **Jamaica** although growers are at present seemingly slow to relinquish the use of endosulfan.

Lessons learned

9. The evaluation identified the following main lessons:

- The design of the project was complex, in terms of the wide range of activities and the number of countries involved, which probably made project management more difficult.
- The economic malaise in coffee from 2000 to 2004 greatly reduced the interest of coffee farmers in investing in their farming systems, which had a significant impact on the project.
- While farmers developed a stronger understanding of the IPM concept during the project, it could be useful to separate out the individual contribution of each component to the reduction of pest populations. When coffee prices are low farmers could then choose the component(s) with the most impact if economic resources become scarce.
- Poor money management skills of farmers and lack of access to financial services have had a negative impact on the use of necessary management practices for coffee farms. This element was not sufficiently addressed in the original project. The development of a basic easy-to-apply economic model to help farmers choose the optimal IPM component mix would be very useful.
- Work with farmers should be focused on small coffee producers because they are facing more difficulties with CBB management. In the future much effort needs to be made towards community strengthening, learning and empowerment with emphasis on participatory methods such as Farmers' Field Schools.
- Cultural control is sustainable, effective and environmentally sound, but the cost of labour (and its availability) make its use difficult to maintain under adverse market conditions where labour costs are high and coffee market prices are low.

- IPM strategies as implemented in this project should help to develop organic coffee production in these countries.
- The existence of an inter-country structural working party or group on CBB IPM would have enhanced the project's sustainability.

Recommendations

10. The following are the principal recommendations arising from the evaluation:

(a) Farmers' participatory methods should be central to any further projects to be conducted.
(b) Continued but carefully focused testing of biological control agents in the field should be encouraged.
(c) CBB Monitoring systems can be established by using locally produced 'alcohol traps'.
(d) Priority should be given, within an IPM framework, to minimizing the use of chemicals for CBB control.
(e) Small farmers in Central American countries that have not participated in the original project could benefit from its results and the advances that have been made since.
(f) Farmers in certain parts of Indonesia need to be organized in farmers' groups and be empowered to understand and apply sound IPM techniques against CBB.
(g) Greater price incentives to farmers for quality need to be adopted.
(h) Future initiatives, such as new projects, should assess the possible impact of climate change in areas where such initiatives are proposed.
(i) The formation of an international consultative group or working party on CBB research should be encouraged. A number of priority research topics are identified.