CASE **study**

Rehabilitating cocoa production in Vanuatu

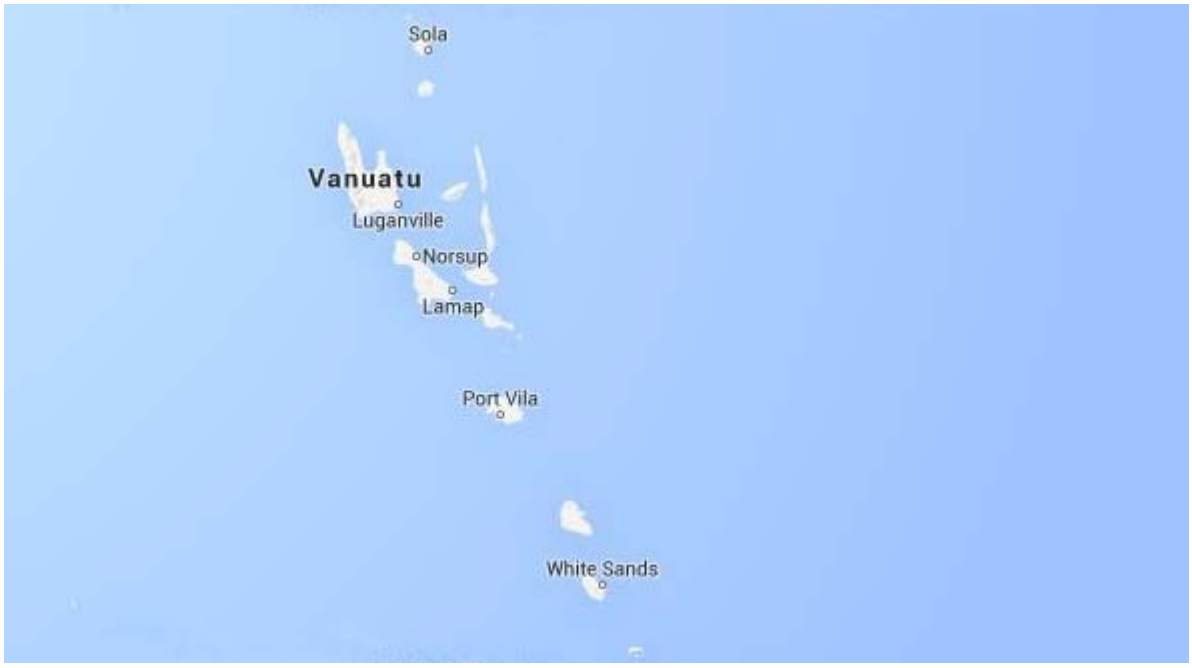
summary

In Vanuatu, a decade of low world cocoa prices has led to many smallholder farmers neglecting their cocoa trees, resulting in infestation by black pod disease and rats, with catastrophic yield losses. Attempts by the government and other development organisations to encourage improved cocoa management, undertaken since the early 2000s, have had little impact, with few farmers ready to dedicate additional time to cocoa production. As a result, despite such programmes, cocoa yields have continued to fall, even while prices for cocoa on world markets have begun to rise.

In 2011, an ACIAR-funded project, involving the Secretariat of the Pacific Community (SPC), CABI and the Commonwealth Scientific and Industrial Research Organisation (CSIRO), investigated how labour constraints impacted on cocoa management. In a survey conducted by SPC, the most common reason preventing farmers from adopting recommended practices such as pruning and weeding was lack of time, due to competition from copra production (another cash crop), food production and village activities. Based on this information, an Integrated Pest and Disease Management (IPDM) programme was initiated by CABI and CSIRO to demonstrate that increased yields could be achieved by using straightforward and practical control methods.

One hundred and twenty farmers in 10 cocoa cooperatives were invited to participate in the project. Initially, a number of on-farm training sessions were carried out and farmers were taught about IPDM, which included the biology of black pod disease, rat behaviour and pruning, in order to increase their understanding of the pests and their management. Subsequently, a 12-month trial to test the practicality and efficacy of three different levels of IPDM was initiated; 72 of the original 120 farmers participated. These management techniques focused on pruning, removal of infected cocoa pods, rat control and plot sanitation.

In 2014, the project team returned to some of the villages where training had taken place and interviewed 18 farmers (17 had received either direct or indirect training; one had had no training). Of these, all but two had adopted either high level or medium level management within their cocoa plantations, and 14 had passed on their training to others in the community. Increases in cocoa yield varied: several farmers reported increases of 40-55%; six other farmers reported much bigger gains, ranging between 165% and 800%. Importantly, discussions indicated that the trained farmers were allocating more time to cocoa than previously and were regarding the crop as a valuable source of income, worthy of greater labour investment.



key highlights

- Results from a 12-month on-farm trial with 72 farmers found that effective IPDM offered up to 138% greater cocoa yield than current farmer practice.
- The same trial found that effective IPDM offered up to 50% improvement in returns to labour.
- Of 17 interviewed farmers who received cocoa management training, 15 were implementing either high or medium level management in their cocoa plantations 18 months later.
- The majority of these trained farmers had increased their annual cocoa yields following the training, with increases ranging from 40-800%.
- 14 farmers had shared their training with others in their community.
- 9 farmers were employing additional labour to help them manage their cocoa crop, and 14 were planning to increase their time spent on cocoa in the following year.

context

Vanuatu, a chain of some 80 islands to the north-east of Australia, is home to around 230,000 people, three-quarters of whom live in rural areas where agriculture is the main source of livelihood (Government of Vanuatu 2010). Most practise shifting cultivation, with only 13% of farming households using modern farming techniques such as application of fertilizer, pesticides or improved seeds (Government of Vanuatu 2008).

Cocoa is Vanuatu's fifth most important export product, and is a source of income for over 25% of households in the country (Government of Vanuatu 2008). However, production began to fall in the mid-1990s, owing to high incidence of pests and diseases associated with poor crop management. The Vanuatu Department for Agriculture and Rural Development identified that in some cocoa producing areas, up to 80% of cocoa pods were being damaged before harvest by rats and black pod disease (caused by the pathogen *Phytophthora palmivora*). The situation was heightened by a decade of low world cocoa prices, which led smallholder farmers across the South Pacific Islands to neglect their cocoa trees.

Control of black pod disease is most effectively achieved by pruning, particularly the removal of non-productive branches at the beginning of the season, followed by 'sanitary' pruning to remove diseased branches on a periodic basis. Between 2002 and 2012, a number of initiatives were implemented in Vanuatu to support farmers in adopting cocoa management techniques. Over the same period, however, cocoa production continued to decline, with a 2011 assessment finding that black pod was still causing pre-harvest losses equivalent to 57% of total production (SPC 2011a). Surveys in the main cocoa producing areas suggested that while farmers knew about pest and disease control and its importance for improving yields, the various training programmes had had little impact in terms of farming practice (SPC 2011b; SPC 2011c).

On Malekula, one of Vanuatu's major cocoa-producing islands, a household survey was carried out by SPC in 2011 to investigate the poor rates of adoption of improved farming practices (SPC 2011b). The most common reason cited by farmers was lack of time, due to competition from copra production (another cash crop), food production and village activities. This led the Australian Centre for International Agricultural Research (ACIAR) to launch a new programme, led by SPC in partnership with CABI and CSIRO, to investigate barriers to adoption in cocoa management, and in particular how farmers' ability to commit labour to cocoa production impacted on yields.

what did we do?

In carrying out this study, farmers were trained to set up three research plots where different management techniques were employed, representing low, medium and high levels of management. Under low management (Plot 1), farmers continued with the standard practice of simply removing ripe pods. Medium level management (Plot 2) involved pruning of diseased branches, rat management and removal of pods affected by black pod, while the high level management (Plot 3) included structural pruning (to reduce tree size and increase light infiltration), sanitary pruning, weeding, rat control and general plot sanitation. The three-plot trial began in July 2011; of the 120 farmers originally invited to participate, 72 from seven cocoa cooperatives marked out the three adjacent plots within their cocoa plantations.

The trial produced some interesting information, both about the yields that could be obtained by improved management and the returns to labour that farmers could achieve. At 4.26kg per month, average yields of dry cocoa beans from the 25 trees in Plot 3 far exceeded the 1.79kg achieved on Plot 1 and the 2.69kg from Plot 2. In addition, analysis of cocoa yields relative to labour inputs showed investment of time in high level management gave 50% greater returns to labour compared to low level management, and 38% compared to medium level. Given these greater returns to labour, and the level of training provided to numerous farmers dating back to the early 2000s, this raised the question of why more farmers had not adopted the approach. Information generated from the 12-month trial enabled CABI and CSIRO to identify the most effective IPDM techniques for dissemination to farmers.

SPC, CABI and CSIRO held training sessions with 10 cocoa cooperatives on the islands of Malekula and Epi during 2011-12. A further two groups on Malekula and one group on Efate were trained in 2013. Each training group consisted of 12 farmers, dubbed the 12 ‘apostles’, who were charged with sharing their new knowledge with others in the community. Training content included the biology of black pod disease and its spread, plus methods of prevention, as well as rat biology and control techniques. Farmers were also trained in tree pruning and sanitation techniques.

Typically, machetes (large knives) are used by cocoa farmers in Vanuatu as an all-purpose fieldwork tool. Under the project, task-specific tools such as pruning saws, secateurs and loppers were provided to cooperatives to allow farmers to investigate if use of these alternatives enabled them to cope more effectively with an increased workload. Similarly, rat bait and rat traps were provided to cooperatives to trial their effectiveness in rat control.

The participatory training approach employed hands-on demonstrations and easy-to-follow instructions for the different techniques involved in cocoa management. Recommended practices included the removal of all infected pods regardless of size in order to reduce disease spread, and extensive structural pruning. This made it easier for farmers to see and remove diseased pods and to harvest disease-free pods. Extension workers employed by three major cocoa networks on the islands - the Vanuatu Organic Cocoa Growers Association (VOCGA), the Cocoa Growers Association (CGA) and the Alternative Commodities Trade in Vanuatu (ACTIV) - were also trained in plantation sanitation, rat management, selection of high quality planting materials and cocoa processing.

In total, 247 farmers were trained during the project, through 23 training sessions at 14 sites. The approach of having lead, ‘apostle’ farmers proved very successful, with a few highly committed individuals spreading the IPDM practices to large numbers of fellow farmers. One lead farmer on Epi trained more than 120 people, including 50 women. On his own farm, he increased the number of managed trees from 2000 to 8000 and his yields increased fivefold. Another lead farmer from Lorlow, South West Bay, South Malekula trained more than 20 farmers in seven villages; a third, from Lembinwan, South West Bay, worked with 30 farmers, training the men in pruning techniques and the women in weeding.

what impact was achieved?

In 2014, the project team returned to a number of locations where training had taken place around 18 months previously, in order to meet with farmers. They found that while many cooperatives were no longer functioning very effectively, some having disbanded, farmers who had decided to implement the new cocoa management strategies were seeing the benefits. During their visit, 18 farmers were interviewed, including 13 who had been trained by CABI and CSIRO, four who had been trained by 'apostles', and one who had had no training. Of the 18, seven were continuing to carry out a high level of cocoa management, nine were carrying out a medium level of management, and only two were carrying out the lowest level.

While the survey findings do not provide conclusive evidence from all who received training, they do offer useful insights into the effectiveness of CABI and CSIRO's work. All of the surveyed farmers who had received training were found to have good knowledge of techniques to manage black pod disease and rats. Indeed, farmers had found that pruning for black pod actually helped to control rats, by opening up the canopy and allowing more sunlight to reach the ground, making it less favourable for the rodents. The farmers had a good understanding of other pests and diseases affecting cocoa, although some were unclear on how black pod was spread. They also found good evidence of how the training had been spread within the communities. At one location, up to 80% of farmers (not just those who received training) were conducting some level of pruning and weeding activity.

All the trained farmers reported a greater number of healthier and larger cocoa pods after implementation of the management techniques. Yield increases of 40-55% were reported by a few farmers, compared to previous years or to trees that were receiving lower levels of management. One farmer reported an 800% increase in yield, from one sack previously to nine sacks, through high level management of 300 trees. Another farmer implementing high level management on 8000 trees reported a 410% increase in yields. Under a medium level of management, one farmer reported 235% greater yield from 1000 trees.

While farmers confirmed that pruning and weeding reduced black pod and rat damage, they also noted the extra effort that such practices required, which in some cases limited the number of trees receiving the higher levels of management. Thus, while all nine farmers implementing medium management were doing so for all their trees, only three of the seven farmers practising high level

management were able to do the same. Encouragingly though, the remaining four were planning to increase the proportion of trees under high level management in the following year, indicating that cocoa had become a crop that was worthy of greater investment. In addition, nine farmers indicated that they had taken on additional labour to help them manage their cocoa crop, again showing a commitment to cocoa production as a significant source of income.

Overall, discussions with those who received IPDM training indicated a wide range of positive outcomes. These included increased understanding and awareness of the importance of pests and diseases and how to manage them, greater appreciation of cocoa as an economic opportunity and a crop worth investing in, and improved technical skills in IPDM. The participatory training, and subsequent sharing of lessons by participating farmers, had clearly contributed to increased adoption of better cocoa management and a greater allocation of time compared to other crops, as merited by the higher rewards to labour that cocoa offered. Fifteen of the 18 farmers interviewed said that they were interested in further training.

next steps

With market prices for cocoa forecast to rise during the next decade, the time is ripe for a significant rehabilitation effort in the region, including the scaling out of the training approach to other islands in the Pacific. However, in the case of Vanuatu, the damage inflicted on cocoa plantations by Tropical Cyclone Pam in March 2015 inevitably means that basic rebuilding of villages and food gardens will take priority. Despite the potential for improvements in cocoa production, it may be some time before Vanuatu is ready to build on this experience. Nevertheless, the successful training approach described above, and the lessons learned from it, do provide a valuable model for improving production in cocoa, which deserves to be expanded and developed when the time is right.

Finding a way to overcome the challenges of communication in Vanuatu – brought sharply into focus in the wake of Tropical Cyclone Pam - may be an important component in any scaling up of the training approach. In this context, given the geographical remoteness of Vanuatu's many islands, the potential of mobile phones as a tool for delivering livelihoods-related information, and for expanding the cocoa training approach, should be investigated. This could include health and agricultural information, with potential specific focus on the use of mobile technology as a means to improve the dissemination of integrated pest and disease management practices. According to the CIA World Factbook, mobile phone ownership in Vanuatu stood at 26,000 in 2007 (the most recent figure available), representing over 10% of the population. Assuming that the numbers have grown since then, development of mobile-based extension services, as found in a number of developing countries, could be a valuable way forward for production of cocoa and other crops.

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