The ten key principles guiding the development of the CIC-Curtin-ACIAR extension package of modules for training farmer groups and cadet extension officers

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ABSTRACT

This paper discusses the ten key principles that guided the development of the CIC-Curtin-ACIAR farmer training package consisting of a set of modules covering coffee production, harvesting, processing, marketing and financial management. These principles recognise: 1) PNG's smallholder coffee producers practise a low-input production strategy using mainly family labour; 2) women play an important role in coffee, especially in harvesting and processing; 3) most households maintain a range of livelihoods in addition to coffee; 4) coffee households are a diverse group with different needs and motivations to produce coffee; 5) agroforestry practices can generate significant ecosystem services that can improve the sustainability of coffee production; 6) simple nutrient recycling strategies can improve the nutrient capital of coffee gardens; 7) Coffee Berry Borer cannot be eradicated and farmers must learn to live with this pest and minimise its impacts; 8) given the limited resources for extension, farmer groups are the basic unit for extension training; 9) linking of farmer groups to exporters can generate considerable mutual benefits such as private sector extension and creating a price signal for quality; and 10) coffee extension material must be compliant with the main certification standards to increase potential price premiums to farmers.

KEYWORDS: low-input farming; smallholders; women; livelihoods; agroforestry; coffee berry borer; agricultural extension

INTRODUCTION

Coffee is the most important export cash crop in highlands PNG and is the primary source of income for over 400,000 smallholder farmers and their families who produce 85% of PNG's coffee (Sengere et al. 2019). Previous research into the coffee industry in PNG has reported that smallholder coffee production and incomes have stagnated since the 1980s and are well below potential levels. Primary constraints on smallholder coffee production such as poor market accessibility, high transport costs, limited access to credit, stands of senile coffee trees, land tenure disputes and law and order problems have been identified as contributing factors (Collett 2008; Uniquest 2013; Sengere 2016).

Although high level structural constraints have considerable effect on smallholder productivity there are also many constraints on smallholders at the household and community levels that are often overlooked as factors limiting coffee production. For example, researchers, extension officers and the private sector have identified considerable scope to improve smallholder

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productivity, coffee quality and incomes through improved maintenance of coffee gardens, more selective harvesting of coffee cherry, better post-harvest processing, and marketing using simple techniques. To strengthen the coffee industry, exporters/processors are moving towards developing reliable coffee sourcing chains to smallholder coffee farmers by forming farmer groups, developing in-house extension and beginning a range of coffee certification options for access to new market opportunities. This parallels the CIC's more efficient approach to extension by working with farmer groups rather than with individual farmers.

This extension package, described in detail by Tilden et al. (in this issue), draws on many sources of information including ACIAR research by CIC and their partners, CIC extension officers, NARI partners, smallholder men and women who participated in research projects, private sector organisations (e.g. Monpi, NGHCE and Lahamenegu Coffee Factory), NGOs (e.g. CARE International and AAK), international research findings, and previous CIC extension materials, especially the material coordinated and developed by Leo Aroga.

Importantly, the modules have been informed by long-term research on the socioeconomics of coffee production, primarily through two ASEM ACIAR projects:

- ASEM/2016/100: Improving Livelihoods of Smallholder Coffee Communities in Papua New Guinea
- ASEM/2008/036: Improving Livelihoods of Smallholder Families through Increased Productivity of Coffee-based Farming Systems in the Highlands of PNG

Other ACIAR projects that have been drawn upon for the development of the modules include:

- ASEM/2014/054: Identifying opportunities and constraints for rural women's engagement in small-scale agricultural enterprises in Papua New Guinea
- HORT/2018/194: Protecting the coffee industry from coffee berry borer in Papua New Guinea and Australia
- ASEM/2004/017: Assessment and improvement of quality management during postharvest processing and storage of coffee in Papua New Guinea
- ASEM/2004/042: Assessing and extending schemes to enhance the profitability of the PNG coffee industry via price premiums for quality

Farm families themselves contributed to this research through a process of 'co-production' of knowledge in which problems were identified by farmers and their families and potential solutions developed in collaboration with them.

The modules comprising the package were planned using an adult coffee curriculum mapping process by CIC. This was mapped out with an appreciation that CIC could apply to the National Training Council for endorsement of the package, and formally register a coffee training school. The package of modules should be viewed as a 'living' document that allows room for further curriculum development as new information and research findings become available.

PRINCIPLES GUIDING THE CONTENT OF THE TRAINING PACKAGE

To improve extension and tailor it to the realities of smallholder production in the PNG highlands, ten principles emerged from the research which guided the content and the level of resources that smallholders would need to invest to improve their production and livelihoods. Each of the ten principles is discussed below:

1. Recognition that low-input production strategies are pursued by the vast majority of smallholder coffee growers

In PNG, as in many other countries, agricultural extension strategies have been premised on the assumption that smallholder farmers were in a transition from low-input farming practices (low levels of technology and few or no external inputs) to high input, capital-intensive farming methods using high levels of external inputs, reminiscent of plantation style production. Consequently, most extension training material available worldwide, including in PNG, is based on high-input production methods, more in keeping with capital intensive plantation production, using high levels of technology or mechanisation, formal credit and relying on a paid workforce.

Attempts to shift farmers to high input farming have been largely unsuccessful in many countries, including PNG, because a whole range of socio-cultural and economic factors make such transitions difficult for the communities involved. Because traditional low-input farming methods are so ingrained, socially and culturally, it means that a great deal of extension training based on high input farming has had little impact because it was unable to accommodate the low-input production strategy practised by the vast majority of smallholders across all export and domestic crops for sale or home consumption.

The low-input system is characterised by:

- low-cost production with inputs of fertiliser, pesticides, and herbicides considerably below plantation rates of inputs
- the use of simple processing techniques
- little or no use of formal sector credit
- a heavy reliance on family labour with minimal use of hired labour

Thus, there is a need for extension training materials for CIC, private sector organisations and non-government organisations (NGO), to be more closely aligned with the low-input production strategy. The training package acknowledges and accepts that low-input production is the dominant production strategy of coffee smallholders, and therefore extension efforts must accommodate this reality.

2. Women play a central role in coffee production

Women play a central role in coffee production, particularly harvesting, and to date their role has largely been ignored in agricultural extension. Matilda Hamago's JAF-sponsored thesis identified the male bias in training and the difficulties of targeting women in extension when so few female extension officers are employed in the industry (Hamago 2021; see also Hamago, this issue).

Women's contribution to coffee production has declined in recent decades because of what they perceive as underpayment of their labour in coffee. Many women now prefer to invest their labour in livelihood activities like food gardening for marketing because they have more control over the income earned. However, when women are paid adequately for their labour in coffee they can contribute much to coffee production, especially to harvesting and processing which is particularly important for control of CBB.

The extension materials in these modules seek to enhance women's engagement and participation in coffee on a fair and equitable basis in ways that benefit women and their families.

3. Smallholder farmers pursue a range of livelihoods in addition to coffee

There has been a tendency in research and extension to examine smallholder coffee production in isolation of the broader livelihood and socio-cultural strategies that coffee households pursue.

For example, most research into the coffee industry has neglected to consider the interactions between coffee, food crops and broader livelihood strategies, and what motivates or constrains smallholders to invest time and labour in coffee production. Furthermore, little consideration has been given to the environmental, social, cultural and gendered context of coffee production (Figure 1).

Figure 1. Smallholder Farming Livelihood System

In addition to socio-cultural reasons, smallholders pursue low-input production strategies because most of them maintain a diverse range of livelihoods, including subsistence production. This means smallholders are often reluctant or unwilling to commit a large amount of time and labour to any one livelihood activity such as export crop production as it often means trading off time in other activities such as customary activities or subsistence gardening, which are highly valued by both men and women.

4. Coffee farmers are not all the same

There are major social, economic and demographic differences between farmers and farm families which affect their motivation and capacity to produce and market coffee. The more important dimensions of these differences include:

- remote and accessible locations
- younger and older farmers
- male and female farmers
- educated and poorly educated farmers
- households with someone in formal sector employment and those without
- households with dependents and those without (including ill and incapacitated family members)

Their extension needs are very different as are their incentives to produce coffee. For example, the modules also have 'farmer notes' in Tok Pisin which are beneficial for farmers with minimal formal education.

5. The adoption of agroforestry principles will enhance ecosystem services and generate other benefits for farmers and their families

It is becoming clear to researchers that many of the traditional farming techniques of Papua New Guineans were highly sustainable, providing stable production through time, without a dependence on costly external inputs. Traditional farming methods are often based on agroforestry principles, which are becoming increasingly recognised throughout the world as contributing to the resilience of farming systems, especially in the context of climate change. Agroforestry has been practised successfully in PNG for thousands of years, and some of the key principles contributing to sustainable low-input systems of coffee production are emphasised throughout the modules.

The importance of shade trees is highlighted in the modules. Shade trees not only improve the supply of soil nutrients (e.g. from shade tree leaf fall and nitrogen fixation) but may also save labour in weeding through weed suppression from shading and mulch, and provide a wide array of valuable resources such as firewood and timber, and a source of supplementary income (see Tilden et al. this issue).

Throughout the modules there is an emphasis on coffee farming methods that generate ecosystem services which in turn improve the sustainability of coffee production (ecosystem services being the benefits provided by the environment). Considered in these modules are low-cost, labour-efficient methods to diversify incomes, promote ecosystem services which enhance nutrient recycling, reduce the impact of pests and diseases, suppress weeds, and reduce the need for fertilisers, pesticides and herbicides.

6. Coffee farmers should make more efficient use of nutrients by adopting simple nutrient cycling strategies in their coffee gardens

A lot of nutrients are exported from coffee gardens in harvested cherry, weeding debris and prunings. Valuable nutrients can be returned to the coffee garden for reuse by the coffee trees through employing strategies that require little labour, but which maintain or improve nutrient capital. Throughout the modules, particularly the 'Soil fertility and nutrient maintenance' module, the monetary value of nutrients lost from the system is highlighted when farmers do not recycle organic wastes such as coffee pulp.

7. Coffee Berry Borer (CBB) is here to stay and farmers and other stakeholders must learn to live with the pest

CBB arrived in PNG in 2017, and since then it has devastated many coffee growing areas as it spreads throughout the highlands and other coffee growing areas of PNG. Eradication of the pest has proven impossible in other coffee growing countries. However, coffee production can continue successfully if basic CBB control measures are implemented.

There is no doubt CBB has created a challenging situation for the smallholder farmer, but the implementation of CBB sanitation strategies may improve coffee yields and quality in the long-term. As well as a module devoted to CBB management developed with Ian Newton, Jonah Aranka, Donna Chambers and Mark Kenny through ACIAR project HORT/2018/194, strategies designed to minimise the impact of this pest are incorporated throughout the training package.

8. Farmer groups are the basic unit for extension delivery

At the ratio of one CIC extension officer to over 60,000 farmers, it is not possible to service the extension needs of individual growers (Curry et al. 2017: 55). Overall, extension delivery has been insufficiently resourced and spread too thin to have any meaningful impact on coffee farmers' level of technical knowledge. However, by training farmer groups and by training private sector and NGO-employed extension officers, CIC will be able to leverage up its extension resources to service many more growers.

From 2004, CIC initiated the Farmer Demand Driven Extension program so that extension could be more aligned with farmers' needs. The program worked with farmer groups to identify farmer training needs. This was a valuable program on which the modules build.

9. Use the private sector wherever and whenever possible to create mutually beneficial relations between farmers and exporters

There has been little emphasis on linking farmer groups to markets or export companies to create a strong price signal for quality. In our research, farmers, processors and exporters and other industry players saw this as particularly important, especially given that group training and marketing have the potential to meet the growing traceability and quality demands of the expanding specialty coffee market.

If CIC were to draw on the resources of the private and non-government sectors to leverage up extension efforts in coffee, there would be many benefits for farmers and the industry such as:

- many more farmers and farmer groups receiving extension advice
- improved market access for growers
- access to private sector extension associated with certification
- access to credit from the private sector
- strengthened price signal for quality

10. Coffee extension materials must, as far as possible, be compliant with the main certification standards to create additional opportunities for farmers

Certification can generate significant benefits such as price premiums for farmers. The modules follow an extension approach that will facilitate the path to certification for smallholder groups.

CONCLUSION

The ten principles that guided the development of the modules making up the training package for farmer groups and cadet extension officers have at their core a 'whole farm' or smallholder-livelihood approach. This means that the modules take a holistic perspective to extension training which recognises that smallholder men and women pursue a range of livelihoods in addition to coffee and the needs and desires of farmers are not all the same. Rather than try to transform smallholder farming from low-input production using mainly family labour with few external inputs to high input farming with external inputs, the approach works within the reality of PNG farming. PNG smallholder families pursue diverse livelihoods, including subsistence, and highly valued socio-cultural activities that are an important component of life quality. Finally, implementation of the training package by many arms of the industry including CIC, the private sector and NGOs will help establish strong links between production and marketing which are necessary for the long-term sustainability of the PNG coffee industry.

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