

Market-driven extension services: targeted interventions to increase coffee productivity and improve quality among Papua New Guinea smallholder farmers

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ABSTRACT

Coffee extension approaches have been evolving over the years since large-scale production began in the 1950s in Papua New Guinea. Various approaches have been tried including Training and Visit, Coffee Management Divisions, Coffee Training Points and Farmer Demand Driven Extension to disseminate technologies and communicate coffee information. However, these approaches have had limited success with no significant improvement to the industry. Therefore, alternative approaches for extension services must be identified so that extension support to smallholder farmers results in enhanced productivity and improved coffee quality. This study establishes that the entry points for extension services are grower groups and value chain partnerships.

KEYWORDS: market-driven, sustainable, extension services

INTRODUCTION

Agricultural extension encompasses the diagnosis of farmers' farming constraints and opportunities, information transfer, feedback from farmers and development of linkages (Farrington 1995). It is a functional approach to a two-way communication of information to improve farm productivity and the income of farmers (Sengere 2007; Sitapai 2012). Declining financial support for government extension services has necessitated private sector and civil society organisations (CSOs) to undertake extension (Kidd et al. 2000). Today, the private sector and CSOs are providing some targeted training and extension services to partly plug the extension gap caused by the contraction in government extension (Farrington 1995; Kidd et al. 2000).

Smallholder coffee farmers in Papua New Guinea (PNG) account for 85% of total national production. Smallholders supply the 'price-driven' wet markets and are unable to participate in 'value-driven' markets because most of their product is of low quality and inconsistent in supply (Murray-Prior 2011). Coffee extension services in PNG have emphasised production and thus farmers' focus has been on quantity rather than on quality, a situation exacerbated by indirect supply chain linkages that result in weak price signals for quality (Sengere et al. 2019). Additionally, government funded extension strategies were not aligned to long-term goals to continuously support programs like grower group mobilisation and their sustainability, so these groups could operate as social enterprises in their communities.

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BACKGROUND

Pre-independence, the colonial administration was responsible for extension services for the agriculture sector, including coffee. In the 1950s and 1960s, the central government provided extension services until the late 1970s when they were devolved to the provincial governments which led to a general decline in extension services (Fleming and Antony 1993; Sitapai 2012). Currently, extension services are provided by the commodity institutions and various tiers of governments (Sitapai 2012). The lack of a comprehensive and integrated plan for extension services and the fragmentation of extension services amongst different tiers of government also undermined the effectiveness of extension.

When the coffee leaf rust (CLR) was detected in 1987 in the PNG Highlands, the Coffee Development Agency (CDA), a parastatal agency was created to combat the spread of CLR (Fleming and Antony 1993). A massive coffee rehabilitation program was mobilised with financial support from the government and donor agencies. These interventions included stationing extension officers in all coffee growing districts, training, field days, radio awareness and farmer advisory services. Many smallholders benefited directly from this aid. CDA's presence and contact with farmers were a testimony that remains to this day and farmers now continue to revere CDA's accomplishments. Farmers' appreciation of CDA's efforts was because of the regular contact CDA staff had with coffee farmers. However, the focus of CDA was to maintain coffee production and minimal emphasis was placed on quality improvement.

The Coffee Industry Board (CIB) and Coffee Research Institute (CRI) were established prior to CDA. CIB was created in 1964 (as Coffee Marketing Board) to regulate the coffee industry and CRI in 1986 to conduct coffee research activities. The coffee entities were amalgamated

in 1991 through an Act of Parliament to form the Coffee Industry Corporation (CIC).

Downsizing of extension staff levels

The merging of CDA with other coffee agencies to create CIC in 1991 and subsequent restructures of the CIC significantly reduced the number of extension officers (Table 1). Major restructures of CIC in 1997 and 2002 saw very large reductions in staffing, including extension personnel (CIC 1997; CIC 2008a), resulting in very high ratios of farmers to extension officers (CIC 2008b; Sitapai 2012; Murray-Prior and Padarath 2013). Moreover, extension funding mostly caters for the salaries of extension officers and little remains to execute effective extension services (Sitapai 2012). The shortage of extension officers has meant that the adoption of available extension information and new technologies has been weak among smallholders (Mauro et al. 2010).

Table 1: Extension staff numbers since 1987.

Year	Extension staff	Source
1987	*800	Biosi Gunure (pers. comm., 16/06/15.)
1998	53	**CRAC Report 2000
2000	144	CRAC Report 2000
2003	36	CRI Annual Report 2003
2005	53	CRAC Report 2005
2015	36	CIC Records

**CDA also had 1,000 casual extension assistants. Gunure was the pioneer general manager for CDA.*

***CRAC - Coffee Research Advisory Committee*

COFFEE EXTENSION APPROACHES IN PNG

Since 1987, the coffee industry pursued three main coffee extension methods to provide training and extension services to the coffee industry (Table 2). The adoption and implementation of the approaches coincided with evolving circumstances in the local coffee industry.

Table 2: Extension approaches deployed in the coffee industry since 1987.

Period	Entity	Extension approach	Target farmer size
1987-1990	CDA	Training and visit	Individual farmers
1991-1997	Extension Services Division, CIC	Coffee Management Division	3,000
1998-2001	Extension Services Division, CIC	Central Training Point	1,000
2003-now	Research & Grower Services Division, CIC	Demand – driven extension	20 -100

Source: CIC 2005

Training and visit (T&V)

The T&V approach was promoted and up-scaled by the World Bank from 1975 to 1995. However, this approach had minimal impact because it was not financially sustainable which undermined its effectiveness (Anderson and Feder 2004). The T&V extension approach has been critiqued for poor responsiveness of farmers, for lacking feedback mechanisms, and for being rigid and costly (Farrington 1995).

Prior to and during the life of CDA, coffee extension services employed the T&V approach. After the formation of CIC in 1991, it continued to apply the T&V approach with other coffee production targeted-incentive projects such as farmer training, nursery establishment, model gardens, rehabilitation, model drying beds and collective marketing. After the creation of the Extension Services Division (ESD), CIC deployed the coffee management divisions (CMDs) which were larger extension units than central training points (CTP) where farmers were brought in to receive training and extension services. In 2002, the CIC had 70 CMDs and 34 CTPs. CMDs were established depending on accessibility, prevalence of CLR and a population of about 3,000 coffee farmers. The CMDs were equipped with resident extension officers, nurseries and training facilities like classrooms and audio equipment. The CTPs were smaller than CMBs. Establishment criteria for CTP included CIC receiving a pro-active response

from coffee growers desiring CIC services; a request from farmers to cultivate coffee as a cash crop; a nominal cash flow within the village or area; minimum level of economic activities in the community; the availability of land for potential coffee cultivation; and a resident smallholder population of about 1,000.

Farmer demand-driven extension

After another restructure of CIC in 2003, the farmer demand-driven extension (FDDE) approach was adopted which required farmers to work in groups with training delivered to these groups (Api et al. 2009). The CIC was able to mobilise over 300 grower groups around the country using the participatory rural appraisal planning (PRAP) tool (see Api et al. 2009; Curry et al. 2017). The PRAP tool was employed to assist farmers identify their production constraints with trainings organised to address these constraints. Many farmers benefited from training and extension services they had received that they had identified in the PRAP exercises. A total 13,211 farmers were trained (Murray-Prior and Padarath 2013). Many of the groups that were formed using the FDDE's PRAP method have since disbanded (Table 3). The PRAP methodology was costly, with slow and cumbersome administrative and financial processes severely hampering its effectiveness (see Api et al. 2009; Murray-Prior and Padarath 2013; Curry et al. 2017).

Table 3: Past and present coffee industry-based incentive projects.

Projects	Achievements	Problems	Opportunities
Partnerships with provincial governments	<ul style="list-style-type: none"> Partnership through memorandum of agreements (MOAs) with coffee-producing provinces, districts, CSOs and resource companies to develop coffee industry in respective areas and regions. 	<ul style="list-style-type: none"> Lack of regular monitoring and evaluation of MOAs has rendered many not fully achieving their objectives. Some MOAs are under political influences. 	<ul style="list-style-type: none"> Regularly monitor and review of MOAs will lead to effective delivery of MOA intents. Avoid political projects.
Nursery	<ul style="list-style-type: none"> Nursery projects have always been part of many coffee industry programs which began during the CDA days. 	<ul style="list-style-type: none"> Significant amounts of seedlings were raised but distribution and actual planting remains poor. 	<ul style="list-style-type: none"> Use of schools and grower groups are sustainable to deliver nursery projects.
Credit scheme	<ul style="list-style-type: none"> In 1996, the government appropriated K2.8 million to the coffee subsector and since then 1,285 coffee farmers received loans totalling K1.2 million. 	<ul style="list-style-type: none"> Fund manager (Agriculture Bank) diverted K1.6 million so loan ceased. 56% of farmers did not repay the loan. Poor record keeping. 	<ul style="list-style-type: none"> Provide credit services through partnerships or grower groups. Improve institutional monitoring and reviews.
Freight scheme	<ul style="list-style-type: none"> 1999-2015: the scheme freighted 3,709 t gb worth K12.8 million. The total cost was K5.4 million while K7.4 million was earned by remote coffee farmers. 	<ul style="list-style-type: none"> Funds were misapplied and a few officers were reprimanded. Poor record keeping. Poor leadership in grower groups. 	<ul style="list-style-type: none"> Provide incentive projects through partnerships and grower groups. Improve institutional monitoring and reviews.
Grower group mobilisation	<ul style="list-style-type: none"> 13,211 farmers were trained in PRAP. 2005-2012: PRAP was conducted on 160 groups and 51% of these groups received training. 	<ul style="list-style-type: none"> Expensive approach. Only covered 1% of farmers. 'New' priorities diverted the focus away from grower groups. 	<ul style="list-style-type: none"> Aligned to long-term plans. Facilitate and promote partnerships among grower groups and chain leaders.
Village coffee rehabilitation	<ul style="list-style-type: none"> In 2009, 6,329 smallholders' gardens (1,989 ha), 11 blocks and seven plantations were rehabilitated (312 ha). Established 60 nurseries with a capacity to produce 10,500 seedlings. 	<ul style="list-style-type: none"> Project money expended on items that had no relevance to improving coffee production. Poor record keeping tools acquired at inflated costs. Approach was unsustainable and costly. 	<ul style="list-style-type: none"> Improve institutional audit, monitoring and reviews of similar projects in the future. Re-align activities and implement this project through cohesive groups.

Groups as a tool for development

Alternative approaches to providing extension services are required as present projects are disjointed and are not aligned to long-term institutional goals. This paper argues that the entry points for extension services should be through grower groups working in partnership with chain leaders. Three methods in which such training and extension services can be provided are chain leader and lead partner-led extension services, with CIC facilitating these partnership arrangements (Figure 1).

impact. Some of CIC's projects have not performed to expectations because they have not taken account of market demands, including market access.

Under partnership arrangements, chain leaders and lead partners cooperate in tripartite arrangements to provide extension and support services to growers and grower groups. The pluralistic or multi-agency approach combines the strengths of collaborators to effectively deliver extension services to farmers (Singh et al. 2014).

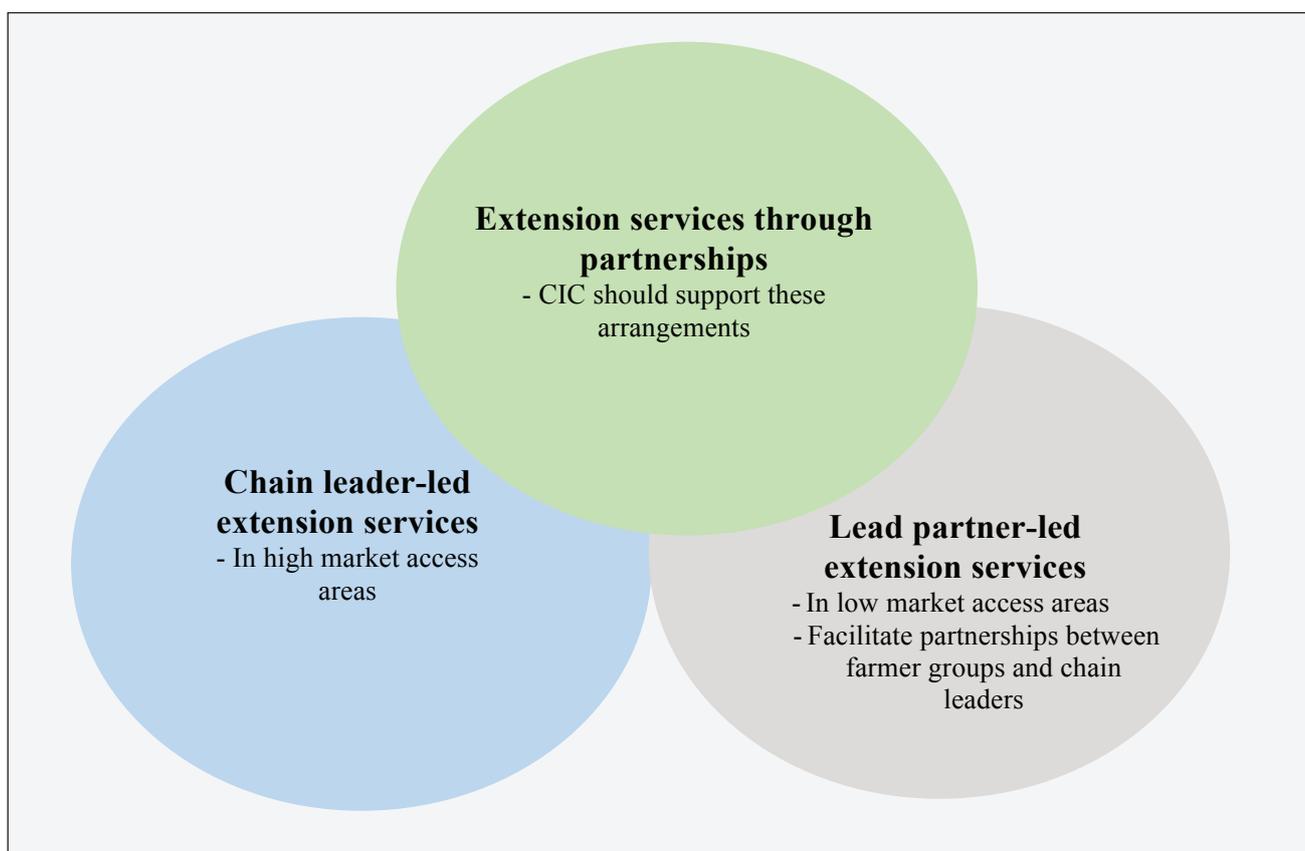


Figure 1: Pluralistic approaches to delivery extension services.

The services provided by chain leaders are driven by market imperatives, especially in high market access areas. However, interventions that CIC currently perceives as vital are not, in many cases, consistent with market demands. For instance, the focus of extension on coffee quantity and the produce being inconsistent leads to price discounts for smallholders. This concurs with Poulton et al. (2010) who observed that while farmers can possess technical knowledge of production, without market linkages, extension services have little value and, consequently,

Lead partners such as CIC, CSOs and different tiers of governments can lead in providing coffee extension services for farmers and farmer groups. This extension approach is important in low market access areas where coffee is the only significant source of cash income, and where chain leaders find it more difficult to operate. In high market access areas, lead partners must assist in facilitating linkages between farmers and chain leaders so that these relationships are driven by market imperatives.

In collective action, additional benefits can be realised where extension information can be communicated to many farmers and diffusion occurs among member farmers. In interviews with coffee farmers from the Neknasi Coffee Growers Cooperative from Morobe Province, farmers acknowledged that their farming knowledge and skills improved through collective action (Sengere 2016). For example, when relatives in the Wain area assisted farmers in coffee farming activities, the farmers recognised that relatives carried out quality work because they had also received training from collaborative partners such

to farmers (Sengere 2016). If CIC programs were conveyed through groups or partnerships, these interventions can grow social capital thereby enhancing the sustainability of groups (Figure 2). For example, if projects such as village coffee rehabilitation and coffee nurseries were delivered through grower groups, it would build the production capacity of farmers and grower groups with the supply of farm tools and nursery materials. Channelling support services through groups has bolstered institutional and governance systems which have also improved the sustainability of grower groups.

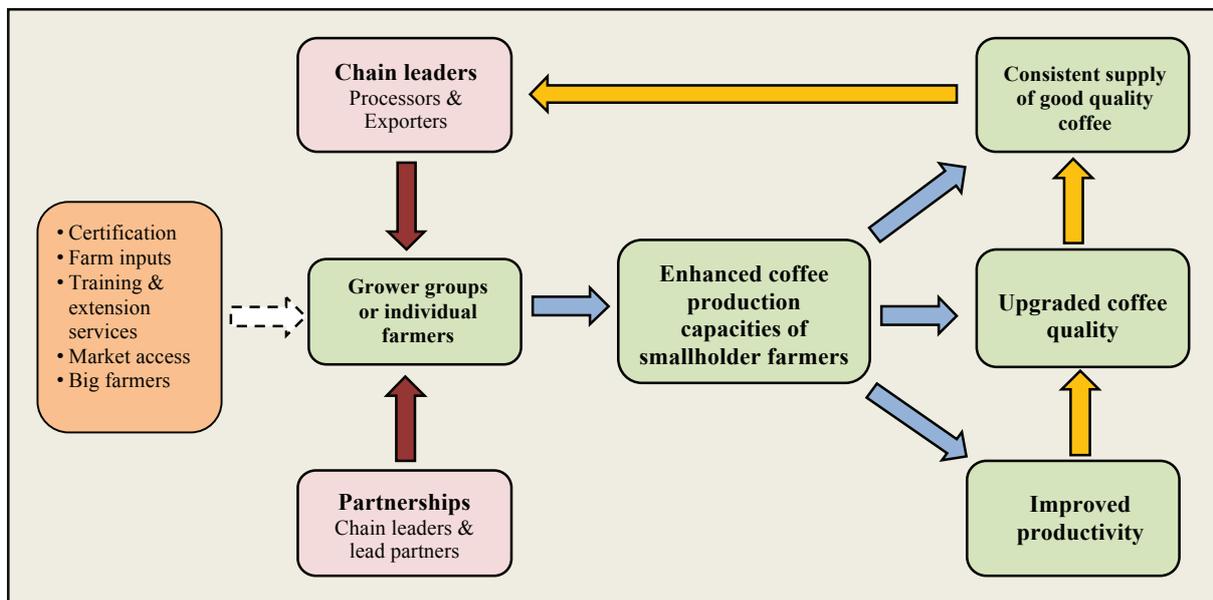


Figure 2: Extension pathways to improving coffee productivity and supply of consistent coffee quality.

as chain leaders and lead partners. Furthermore, smallholder members of grower groups can also assist in providing extension services to other farmers in their vicinity. However, when farmers engaged hired labour for harvesting and weeding (grass cutting) from outside the group, farmers had to advise them on how to perform specific farm activities.

Regular contact with the farmer group is critical to motivate farmers to work in their coffee gardens. Coffee farmers have reported that the lack of regular contact with key partners like CIC acts as a disincentive and undermines their motivation to produce coffee (Sengere et al. 2019). Farmers from the Neknasi group preferred CIC to make regular visits to them and provide institutional leadership by supporting and facilitating partners that are already providing extension services

Big coffee farmers

Big farmers with more than 3 ha are sometimes referred to in the literature as 'big men' farmers, business leaders, large holders, big peasants and *petit bourgeois* (Finney 1968; Donaldson and Good 1981; Finch 1991, Thompson 1991; Collett 1992; Stewart 1992). The early big men farmers were traditional leaders. They tended to be early adopters of newly introduced technologies like cash crops and pioneered attempts to establish businesses amongst the rural population. European planters and Australian colonial administration officers realised their influential role and supported big men to engage in commercial activities such as coffee cultivation and they became role models in their communities (Finney 1987, 1993; Finch 1991; Brown 1995). Big farmers were instrumental in disseminating coffee seedlings and communicating extension

information to other villagers in the early growth and expansion of the coffee industry. One big farmer, Enock Guhikive, had this to say about sharing coffee information:

I assist and advise village coffee farmers who have already expanded their coffee gardens. I also allow these villagers including my family members to use my farm tools and knapsacks (Sengere 2016)

Guhikive offered coffee extension services, cash and in-kind support to his extended family members and other villagers. The support offered by big farmers concurs with Finney's (1968) finding that early business leaders offered advice to their kinsmen about how to engage in entrepreneurial activities.

DISCUSSION

Extension and advisory services are critical to enhancing the skills and knowledge of smallholder coffee farmers to increase productivity and consistently produce quality coffee. Several approaches that can be used to deliver an effective extension services are through: a) lead partners; b) chain leaders; c) big farmers; and d) partnerships in which lead partners and chain leaders collaborate to administer extension services and training to farmers and members of grower groups. In the PNG coffee industry, the marked decline in farmer contact with extension personnel began following numerous staff retrenchments conducted since 1997 to reduce overhead costs in CIC. These have weakened extension services and reduced farmer contact.

A review of past extension services demonstrates that extension programs are rarely completed before there is a change of priorities resulting from management change. Although, CIC has a strategic plan (CIC 2008a; 2014), many institutional programs and projects have not been aligned with it. Also, when a 'new management team' embarks on new initiatives, planned or ongoing projects are set aside and new programs are implemented in haste without proper evaluation. The frequent changes to programs and projects indicate that most extension initiatives are short to

medium term and lack alignment with long-term institutional goals.

In the past, the T&V extension approach was designed to identify areas for expansion in smallholder cultivation of cash crops (Sitapai 2012). The switch of extension approach from T&V to FDDE in 2003 also affected contact with farmers (Api et al. 2009; Murray-Prior & Padarath 2013). The FDDE approach targets grower groups where large numbers of farmers are contacted and is therefore potentially cost-effective. Farmers in grower groups learn from each other and improve coffee productivity.

The big coffee farmers who were active in the early phase of coffee industry development are well-established coffee farmers located among smallholders and who therefore are well positioned to partner in extension efforts. These farmers perceive coffee as an enterprise for generating profit, and they also perform leadership roles in their communities. Big farmers invest more financial resources by acquiring land to plant coffee, intercrop coffee with other crops and make investments in small businesses, behaviours that are not typical of smallholders. With diminishing extension services from parastatal agencies, big farmers can partner to deliver coffee extension in their communities.

Most extension programs target production, and there is minimal emphasis placed on quality and the demands of coffee markets. In recent years, efforts have been made to promote coffee quality but the approaches seem disjointed. For instance, the National Coffee Cupping Competition was staged in 2014, 2015, 2016 and 2018. The top three winners in each of these events came from different groups. Past competition winners failed to appear in the top three in subsequent competitions. This suggests that grower groups are producing coffee of inconsistent quality. There is a need to develop sustainable groups that produce coffee quality consistently for targeted markets. However, when extension services begin to be influenced by market demands as is the case with some of the current chain leader-farmer/farmer group partnerships, the targeted extension efforts have resulted in increased production and

improved coffee quality from smallholders. The private sector through the chain leaders can play a significant role in driving the market-oriented extension services. Moreover, farmers have earned better prices by participating in these high-value markets, and it has motivated them to improve quality. In partnership arrangements, chain leaders consistently received a supply of high-quality coffee which encouraged them to support partner smallholders. If current extension services intended for farmers are dictated by the demands of differentiated markets, smallholder farmers will reap the benefits and respond positively.

CONCLUSION

The PNG coffee industry requires long-term and sustainable extension strategies to revitalise and sustain the industry. The FDDE has merits in that it targets grower groups and hard-working coffee farmers who cultivate coffee as a business enterprise. However, industry evolution has given rise to collaborations through partnerships among coffee value chain participants that are improving production and ensuring a consistent supply of quality coffee to meet the demands of specific coffee markets. In high market access areas, chain leaders have stepped up their efforts to collaborate with smallholder coffee farmers and grower groups through the purchase of cherry and parchment coffee.

Providing extension and support services through grower groups and partnerships can be sustainable. Moreover, regular extension and advisory visits to farmers and grower groups can psychologically motivate farmers to work in their coffee gardens. The closer collaborations will develop stronger institutional leadership and advance group governance systems.

The big farmers were instrumental as change agents in the early growth of the coffee industry and they remain active today. They have social networks, are influential, entrepreneurial and are located in the midst of smallholders; thus they can perform the role of extension agents or become focal points for development partners.

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