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Assessing and extending schemes to enhance the profitability of the PNG coffee industry via price premiums for quality

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2 Executive summary

With the demise of the coffee estates, there is a widely held perception that the quality of PNG coffee has fallen and, as a result, the price of PNG coffee has declined relative to the world price.

Three major overarching issues currently constrain the potential quality of the coffee produced in PNG: (1) the poor state of the roads and transport infrastructure; (2) lawlessness; and (3) the insecurity of land ownership and tenure. This project does not address these issues, rather it's focus is on identification of smallholder strategies for improving coffee quality at the community level.

To improve the quality of the coffee produced by smallholder coffee growers, three broad strategies are available: (1) encourage the sale of red ripe cherry direct to the wet mills; (2) the adoption of standardised processing systems at the village level; and (3) pursue accreditation under Fairtrade, Rainforest Alliance, Organic and/or Utz Certified.

It is evident that parchment is purchased at a significant discount to cherry, reflecting the lack of control and the variability that is inherent within smallholder parchment. On a per kg parchment equivalent basis, the sale of cherry results not only in a 34% price premium, but significantly less work and costs for the growers. There are savings in processing and transport costs and there is less likelihood of product deterioration through poor and inappropriate storage in the home (smoke damage and moisture) and less risk of theft.

Where smallholder coffee farmers are unable to sell cherry to wet mills, standardised processing systems must be introduced at the village level. However, price incentives will only be achieved where smallholders are able to achieve a parallel increase in scale. This is best achieved through the formation of collaborative marketing groups which transact directly with traders and exporters. The success of these collaborative marketing groups will demand that the groups have some sustainable competitive advantage, they are well managed and appropriately led. Groups which are based around traditional family or haus lines will have the greatest chance of being sustainable in the long term.

Given that much of the coffee in PNG is grown with minimal inputs and very much in sympathy with the environment, there are opportunities for smallholders to pursue accreditation under Fairtrade and Organic. However, growers must be mobilised into collaborative marketing groups and linked directly to an exporter who is willing to assist.

With PNG coffee growers receiving more than 70% of the FOB (Lae) price, there is little evidence to support the premise that smallholder coffee growers in PNG are subject to exploitation by downstream market intermediaries. Furthermore, there is no evidence to suggest that grower-direct marketing will provide higher returns to growers. Quite to the contrary, given the small volumes and the risks associated with managing exchange rates, the price differentials and the inherent risk that the product may fail to meet the customer’s specifications, smallholder coffee growers do not have the expertise to perform these activities any more efficiently than the existing traders and exporters.

To improve the linkages between smallholder coffee growers and the exporters, training is required in budgeting, agronomy and rehabilitation, processing and marketing. With a greater understanding of the market dynamics, risk management and the costs associated with export, relationships between smallholder growers and their respective exporters will improve. Structured tastings with growers will provide a means to demonstrate how the major faults associated with the production of parchment influence the taste. Workshops to assist grower groups in the maintenance of pulpers and the adoption of standardised processing systems must be delivered.

In the delivery of the training, the Participatory Rural Appraisal and Planning Process (PRAP) model should be utilised with the inclusion of a Personal Viability Training (PVT)

module to facilitate more enduring relationships within the community and to raise self awareness.

3 Background

PNG currently produces around 1 million bags of coffee. Coffee is the second most important agricultural export crop in PNG. The coffee industry earns an average of K 340 million per year, which is 43% of agricultural exports, 10% of all exports and 5% of the nations GDP. More than 397,000 rural households cultivate coffee and over 2.5 million people depend upon coffee for their major source of income.

For the highly populated Highlands region, coffee is the principal source of cash income. Income earned from coffee has become increasingly important due to the increasing costs of basic consumer goods such as rice, tinned fish, soap and cooking oil. With the increasing cost of these goods, people either have to earn more or to spend less. Even more pressing for coffee growers are the rising costs of school fees and other services which they must now pay for under the user-pay policies introduced by government. Unfortunately, an increasing number of young people are unable to continue their education because their parents cannot afford the high fees set by the institutions. This has led to many associated social problems such as migration to urban areas, the growth of squatter settlements and lawlessness.

In PNG, coffee is produced by three groups: smallholders, block-holders and plantations. Over the past ten years, the contribution to total production by the latter two groups (often called the estate sector) has fallen to around 165,000 bags (9,900 tonnes) or 15% of total production. Smallholders on the other hand are responsible for 85% of total production (935,000 bags or 56,100 tonnes). The decline in the estate sector, which was largely responsible for establishing PNG's reputation in the market as a producer and supplier of some of the finest coffee in the world, has resulted in a perception among the buyers that the quality of PNG coffee has fallen and as a result the price of PNG coffee has fallen relative to the world price.

The smallholder sector generally produces fair average quality coffee (Y grade), which is consistently discounted against the New York "C" price. The main complaint from buyers is the inconsistency in quality from season-to-season and from shipment-to-shipment. In response to market needs, in 2002, the Coffee Industry Corporation (CIC) implemented an Eight Point Plan to improve the overall quality of PNG coffee. However, one of the major obstacles was the failure of the current marketing system to give the right price signals to growers in terms of different prices for different qualities of parchment. The situation is further aggravated by poor production practices, poor on-farm processing and the marketing system itself, where the majority of smallholders sell their parchment to roadside buyers at various buying points along the main roads. As there is much variation in the quantity and the quality of the coffee sold to these roadside buyers and both parties frequently engage in opportunistic trading, there is little incentive to produce better quality coffee.

Furthermore, the domestic market is highly concentrated and vertically integrated, with only three companies accounting for over 61% of the coffee exported. With little variation in the factory door price between exporters, there is a perception that price collusion may be widely practised. More recently, CIC introduced a new grade for green coffee called Premium Smallholder Coffee (PSC), in recognition of the fact that some smallholder growers were producing coffee that was superior to the traditional Y grade. However, as many mills do not discriminate on the quality of parchment, they categorise all green beans produced from smallholder parchment as Y1 grade and sell the green bean to exporters. Exporters are aware that a sizeable proportion of the Y1 grade they purchase from processors is superior to the Y1 specified in the export standard, so they have re-processed the Y1 grade into PSC and Y1 grades and sold these coffees separately at different prices. Over the past 5 years, PSC has sold at an average premium of 47 toea per kilogram over Y1 grade. This premium has been realised by the exporters and has not been reflected in the prices received by processors and the mills.

In an effort to improve quality and to provide growers with better prices, a number of collaborative marketing programs have been introduced by both the private sector and CIC. One such program introduced by Kongo Coffee Ltd, a private company based in Simbu Province, provides an extension service through which growers in surrounding areas receive training on how to produce better quality parchment. When these growers bring their parchment to the factory, the company assesses the quality and pays accordingly. The company then processes the coffee separately and ships the superior quality coffee to a number of specialty coffee buyers in Japan and elsewhere. In this way, growers who meet the desired quality standards receive better prices than their counterparts. However, the net benefits to growers have yet to be quantified.

Another program has been introduced by PNG Coffee Exports Ltd (PNGCE), the largest coffee exporter in PNG. PNGCE operates both wet and dry processing mills in Goroka. The company has made an arrangement with growers to buy their coffee as cherry which it then processes into parchment through its wet factory. The parchment is processed separately into green bean, which is then sold to overseas buyers in the specialty market including Starbucks. Growers participating in this program are believed to be receiving better prices, but again, the overall benefits have not been independently verified.

There are other schemes that have been operating in the industry for a few years now. For instance, there are wet factory operators who pay growers “green bean equivalent” prices on cherry; there are also mills that pay green bean equivalent prices on parchment. There are other growers who get their parchment coffee processed into green bean in one of the mills, then export the green bean to overseas buyers through licensed exporters. Other growers have had their production areas certified as organic. Other growers have formed marketing groups and registered themselves with the Fairtrade Organization. All of these efforts are aimed at providing growers with a better return, but CIC is uncertain to what extent the growers are actually benefiting in terms of better prices.

As the future of the PNG coffee industry is very much dependent on the smallholder sector, the price benefits to growers participating in these various marketing schemes needs to be quantified. There is a need to know to what extent the growers themselves are benefiting and the extent to which improvements in quality are impacting on their livelihood. There is also a need for greater transparency to identify the extent to which the initiators of these schemes are benefiting and whether indeed the benefits are being shared equitably.

If there is to be any significant improvement in the quality of PNG smallholder coffee, there is a subsequent need to replicate these collaborative production and marketing arrangements in other coffee producing regions. It therefore becomes important to identify the variables that facilitate the formation and on-going development of these collaborative marketing arrangements, and indeed, not only their adoption, but the various factors that may bring about their demise and dissolution. Thus, a study of the prevailing marketing system is necessary to identify the factors that prevent market intermediaries from rewarding growers for producing superior quality coffee and to make appropriate recommendations.

3.1 Project context

In commodity markets, while prices are determined primarily by supply and demand, customers are generally prepared to pay a price premium for quality. Quality is a customer determination based upon the customer’s actual experience with the product measured against the customer’s stated requirements (Feigenbaum 1991). Quality means not only providing customers with products that consistently meet their specifications, but quality also encompasses the way a supplier goes about meeting the needs of their customers, providing the product on time, in the quantity required, correctly packaged and correctly invoiced.

Quality can thus be conceptualised on two different levels (Batt 2006). Technical quality describes the customer's specifications. This is a physical description of the product in terms of its size, shape, colour, freedom from pests and diseases, purity and maturity or freshness. Functional quality describes the way a supplier goes about delivering the product to the customer. While this means being able to deliver the product when the customer wants it, consistently and reliably, by implication it may also involve many inter-related activities such as production scheduling, storage and warehousing, transport and logistics, ordering and invoicing.

In the food industry, three additional quality dimensions are becoming increasingly important: food safety, sustainability of production, and producer welfare and equity. In response to the increasing threat of litigation and a further fall in consumer confidence, global retailers and food processors often require their suppliers to implement various quality management systems at all stages of the supply chain. This can only be achieved after buyers have moved away from the traditional means of purchasing towards more collaborative long-term relationships with preferred suppliers.

Firms are establishing relationships with their suppliers because it enables them to be more efficient and to be more cost effective. Through developing long-term relationships, buyers can achieve cost savings through reduced search and evaluation costs, reduced transaction costs and the learning effects and relationship specific scale economies. For suppliers, long-term relationships provide many benefits including: improved access to market and more reliable market information; improved access to a more reliable supply of production inputs; improved product quality and performance; and a higher level of technical interaction and technical assistance. Through becoming closer to customers and better understanding and satisfying customers needs, suppliers can achieve greater customer loyalty and higher repeat sales. Buyers become less sensitive to competition and suppliers may benefit from higher prices.

Furthermore, given that increasing consolidation and aggregation in most agricultural supply chains is resulting in a rapid reduction in the number of potential buyers, the new institutional economics approach (Williamson 1979, 1985) supports greater collaboration and coordination among all participants in the supply chain. Greater alignment between firms may lead not only to the realisation of the economies of scale from better utilisation of fixed assets but an improved bargaining position and improved competitiveness.

At the farm level, cooperatives have been established to enable growers to do collectively what they cannot achieve alone: to alter the competitive structure of the market. While growers often establish cooperatives as a means of diverting more of the profit extracted by the market intermediaries to themselves, the greatest opportunity for cooperatives lies not in diverting profits, but in reducing costs (Murray-Prior 2007).

However, there is increasing evidence that most cooperatives fail. Without first seeking to improve the physical infrastructure, the flow of market information, technical advice and capital, or to introduce appropriate pricing policies or quality standards, there is not only a greater chance of failure, but a greater possibility that any benefits derived from collaborative marketing arrangements will be disproportionately allocated to those actors who have the most power. With little or no access to education, most small growers are unable to participate meaningfully in any collaborative marketing organization (Lele 1981).

4 Objectives

This research project's longer term aim is to improve economic returns to PNG smallholder coffee producers and the industry through delivering a more consistent and higher quality product. This project contributed to this through the following intermediate objectives:

Objective 1: To describe innovative collaborative collection, pricing and processing schemes that seek to achieve superior quality coffee

- to review those collection, pricing and processing schemes that are resulting in superior quality coffee
- to identify the quality assurance systems currently operating in the PNG coffee industry
- to conduct detailed face-to-face interviews with selected growers engaged in coffee collection, pricing and processing schemes to identify the:
  - activities undertaken by actors in the supply chain
  - ability of actors in the supply chain to meet the needs of downstream market intermediaries
  - quality assurance systems currently in use
  - extent to which cherry picking and post-harvest handling techniques that lead to better quality are adequately specified
  - marketing margins
  - payment of price differentials for quality
  - explore the nature of the relationships between actors and the extent to which actors are dependent on downstream market intermediaries
  - explore the availability of alternative marketing and distribution mechanisms
- to develop in-depth case studies of selected collection, pricing and processing schemes that lead to superior quality coffee and enhanced returns to smallholder coffee producers

Objective 2: To identify and expand understanding of the factors influencing the adoption and on-going success of those innovative schemes and strategies for the successful expansion of these schemes

- to identify factors influencing the adoption of collaborative marketing and quality assurance schemes and mechanisms that enhance quality
- to identify impediments to the adoption of QA systems
- to identify the constraints and impediments among all participants towards improving the performance of collaborative collection pricing and processing schemes
- to monitor and analyse the operation of selected chains
- to evaluate relationships within the grower groups and chain

Objective 3. To support, promote and facilitate the extension and replication of successful schemes within the PNG coffee industry

- to introduce and train CIC staff and selected industry participants in the appropriate knowledge and skills necessary to facilitate the adoption of QA systems
- to source and develop (including from other projects and agencies) pilot program materials and processes
- to support the expansion of participating coffee collection pricing and processing schemes through the development, testing, delivery, evaluation and modification of the pilot programs
- to develop new economics and marketing modules in response to the needs of grower groups as their marketing horizon expands
- to identify and document on-going improvements in quality among the collaborative collection pricing and processing schemes
- to facilitate linkages between the exporters, grower groups and the CIC

Objective 4. To communicate and disseminate the project results and activities

- to promote and disseminate all activities and outcomes of the project through:
  - the development of a website
  - newspaper and newsletter articles
  - conduct radio and television interviews
- to conduct an implementation workshop to facilitate industry ownership and participation in the project. This workshop would contribute to the development of a climate for industry change
- to communicate outcomes of Participatory Rural Appraisal and Planning (PRAP) and training to chain leaders
- to conduct a research forum to:
  - extend the findings of the project
  - develop a plan for replicating successful collaborative collection pricing and processing schemes with CIC and other donor agency programs
  - promote project activities

5 Methodology

This was a collaborative project between Curtin University of Technology in Perth, Western Australia; the CIC - the Economics Section (in Goroka) and Farm Training and Extension (in Aiyura) and the PNG coffee industry - through the many smallholder growers, grower groups, processors, traders and exporters who participated.

The project commenced in April 2005 for a duration of two years. However, after 18 months, the project was extended for another twelve months. Given the social unrest generally associated with the general elections in PNG, the project was deferred for six months and thus concluded in September 2008.

Objective 1. To describe innovative collaborative collection pricing and processing schemes that seek to achieve superior quality coffee

This initial research phase of the project sought to review those collaborative collection pricing and processing schemes that produce superior quality coffee.

From the initial scoping study conducted in November 2004, five alternative collection pricing and processing schemes were identified including:

- PNG Coffee Exports Ltd
- Carpenters (Sigri coffee)
- Sihereni Coffee Ltd.
- Stretpasin kopi
- Kongo Coffee Ltd

The scheme operated by Lahamenegu and PNG Coffee Exports Ltd is an integrated operation wholly owned and managed by Volcafe. Traditionally operating as a dry factory to process the parchment purchased from growers, grower cooperatives and roadside vendors, Lahamenegu has diversified into the purchasing and processing of cherry in order to produce superior quality green bean. This has enabled PNG Coffee Exports to enter the specialty market and to negotiate a supply contract with Starbucks. Currently, Lahamenegu is purchasing cherry from some 120 registered coffee growers including blockholders and smallholders. As a part of the service they offer to registered growers, Lahamenegu have employed an agronomist to provide technical support and, with the permission of the grower, Lahamenegu may withhold a proportion of the grower's income to provide a source of cash to meet anticipated future demands.

Sigri is perhaps the most well known plantation and brand in the PNG coffee industry. Owned and operated by the W.R. Carpenters Group, Sigri are purchasing greater volumes of cherry from adjacent block-holders who may choose to either remain independent or to enter into long-term management contracts. The increasing cost of managing their own plantations and the insecurity associated with land tenure has encouraged the shift towards external sourcing. Sigri provides an excellent example of the nuclear estate model.

Sihereni is an abandoned plantation that is currently being rehabilitated by David Oromarie. In order to support the parallel development of adjacent smallholders and to broker a truce between two waring clans, Sihereni are developing a new 20 hectare plantation with financial support from Monpi Coffee Exports. Monpi is currently owned by ECom Trading, one of the world's foremost commodity traders. Sihereni is currently purchasing cherry from the smallholders and provides another example of a nuclear estate.

Ruts kopi is a smallholder grower cooperative based on the need for trust and honesty in transactions. Incorporated in April 2001, Ruts kopi was established as a result of grower

frustration and the need to improve the quality of the parchment produced to improve returns to smallholder coffee producers. Collectively, with over 2,000 hectares of coffee production, Ruts kopi has the potential to become of the largest coffee producers in PNG. Ruts kopi is one of several grower groups financially supported by an EU-Stabex project (Stretpasin kopi). Stabex aims to develop an alternative marketing arrangement which will assist groups of smallholder coffee growers to process their parchment into green bean, which is subsequently sold to local exporters through direct negotiation.

Kongo Coffee is the leading producer of specialty coffee in Chimbu Province. While purchasing both cherry and parchment, Kongo prefers to assist smallholder coffee growers to produce the best quality parchment, which when processed, is incorporated into its Elimbari brand. Through a number of extension officers and agents in the villages, smallholder coffee producers are trained in the harvesting, pulping, fermenting, washing and drying of coffee. To assist smallholder growers, Kongo prefers to invest in pulpers and small scale fermenters at the village or household level, thereby providing maximum returns to those growers who follow the prescribed processes. At their discretion, Kongo may also advance credit to growers to purchase inputs or to provide funds for personal or household expenditure (school fees). Over 300 households are believed to be currently involved and while more growers want to be involved, Kongo does not have the market to accommodate the additional product.

However, despite numerous attempts to encourage their participation in the project, both PNG Coffee Exports and Kongo Coffee withdrew for reasons of commercial confidentiality and were replaced by Highland Arabicas, three Coffee Credit Guarantee Scheme (CCGS) groups and Coffee Connections.

Highland Arabicas, owned and operated by Paul Pora, is yet another example of a nuclear estate operating in the Western Highlands. Paul Pora owns a large plantation (Madan) as well as managing and helping with the management of other plantations for local owners. Because ownership in some cases is currently disputed, Highland Arabicas must negotiate with many independent owners to retain the plantations as a viable concern.

The Coffee Credit Guarantee Scheme (CCGS) was established in 1997 by the CIC under the Smallholder Agricultural Credit Scheme. The scheme was initiated by the CIC as a means of providing capital to the 400,000 smallholder coffee producers in PNG, who, without sufficient collateral, security and equity, are unable to borrow from the banks. To facilitate the repayment of loans, those coffee producers who borrowed from the CCGS were placed into clusters at either the village level or on the basis of clans. Although the credit provision component of this scheme has ceased, under Phase Two, CIC established a growers marketing cooperative to process the loan growers' coffee into green bean. Exporters are then asked to tender for the green bean, which is sold to that exporter who offers the highest price. The project worked with two clusters in the Eastern Highlands and one cluster in Chimbu Province.

While Coffee Connections is one of the smaller exporters, accounting for just 0.5% of PNG exports, Coffee Connections is the largest exporter of organic coffee and the second largest Fairtrade exporter. In the last quarter of 2005, Coffee Connections achieved the highest average prices for both A grade (K9.72 per kg) and Y grade coffee (K7.59 per kg). Coffee Connections operate through a grower cooperative which establishes direct links with family clusters at an individual village level. At the village level, inspectors communicate directly with family clusters to ensure that organic production principles are practiced and to ensure that family members follow the prescribed production practices to ensure a desirable outturn of high quality parchment.

To evaluate the extent to which these alternative collaborative collection pricing and processing schemes are able to produce superior quality coffee and to deliver higher prices to growers, in-depth personal interviews were conducted with coffee buyers, traders, processors and the grower groups themselves.

After initial discussions and consultation with industry and the CIC, a comprehensive survey instrument was developed, translated and pilot tested, before being administered to each of the collaborative marketing groups (Appendix 1).

The questionnaire sought to obtain information on:

- the size of the coffee garden
- importance of coffee in the household budget
- proportion of coffee sold as parchment and/or cherry
- to whom the coffee was sold
- the average prices received
- price incentives (if any) for quality
- what growers think their coffee buyers want
- extent to which growers believe they can meet coffee buyers requirements
- constraints and impediments in meeting customers needs
- extent to which different buyers were able to meet the growers needs
- measures of social capital in both the community and the collaborative collection pricing and processing group

Despite the anticipated lack of on-farm records, given the seasonal nature of the harvest period and the importance coffee plays in the household budget, growers were expected to be able to recall with a high degree of accuracy, the average prices paid by traders and processors for the cherry, parchment or green bean they produced. However, assessing the quality of the product retrospectively and thus being able to establish any significant price-quality relationship will prove more difficult. The only meaningful way in which this could be established was to ask growers to rate their own ability to meet perceived quality standards and to identify the major constraints that prevented them from doing so.

Over the duration of the project, as discussions were held with grower groups, traders and exporters, and the mills who processed the smallholder growers cherry or parchment, a comprehensive case study for each of the collaborative collection pricing and processing schemes was developed.

Objective 2. To identify and expand understanding of the factors influencing the adoption and on-going success of those innovative schemes and strategies for the successful expansion of these schemes

This component of the research project sought to identify the various benefits, constraints and impediments to the adoption of collaborative collection pricing and processing schemes. While some of the information required was collected from the questionnaire administered under Objective One, additional information was gained from in-depth interviews with Farm Training and Extension staff employed by the CIC and the private sector, traders and exporters (especially those dealing with collaborative marketing groups), other NGO's (including the Melanesian Research Institute) and an extensive review of the literature.

At the farm level, in order to monitor and to evaluate the performance of the selected chains, it was proposed that both Farm Training and Extension staff and Grower Liaison Officers from the regional offices in Goroka, Kundiawa and Mt Hagen regularly interact with the groups. In part, this would be achieved as an integral component of the Participatory Rural Appraisal and Planning Process (PRAP) utilised by the CIC for the delivery of training programs to grower groups. Relationships both within the group and the nature of the groups' relationships with downstream market intermediaries would be regularly evaluated.

Given the inherent variability in coffee prices on the New York "C", a database was established in Excel where the FOB prices (Lae) for Y1 green bean were recorded. Such prices were readily available for all grades and all shipments, because, under the terms of their export license, exporters are required to submit a copy of their invoice to the CIC. However, as this information is aggregated by CIC, and is commercial in confidence, it was not possible to identify individual companies or their customers.

Data was entered on a weekly basis on each occasion that the project team visited PNG. Additional price information was sought from the traders and mills on the prevailing prices paid for both cherry and Y1 parchment. Initially, this information was collected informally, but part way through the project, CIC instituted a more formal mechanism by which both wet mill and dry mill operators were required to submit prices on a weekly basis.

Using information obtained from The Papua New Guinea Coffee Handbook and mill operators, the conversion from cherry to parchment and parchment to green bean were derived, thereby enabling an FOB (Lae), cherry and parchment price to be calculated in green bean equivalent terms. However, these prices did not include the costs of transport, processing, blending and storage. It was also assumed in the conversion from parchment to green bean that mill operators had purchased Y1 parchment. However, anecdotal evidence collected from mill operators suggested that in the best case scenario, recovery rates averaged 81%, but where the parchment was wet or contained an excessive amount of foreign material, the conversion rates could fall to as low as 68%.

By comparing the prevailing prices at the factory door with those theoretically available in Lae, it was possible to derive the proportion of the FOB price paid to growers. It was also possible to show: (i) the difference in the net returns growers received by selling cherry versus parchment as either a green bean equivalent or parchment equivalent price: (ii) the extent to which the prevailing factory door cherry and parchment prices co-varied with the price of Other Mild Arabicas on the NYC; and (iii) how the prevailing discount for Y1 co-varied with the price of Other Mild Arabicas on the NYC. However, the main reason for implementing this data base was to show that any improvement in the price received by growers was due to an improvement in the quality of the coffee produced, rather than to an increase in the world price. Similarly, should prices in the world market fall, while this should not detract from the need to improve the quality of the coffee produced by smallholder coffee producers, the lack of any price incentive could dissuade growers from investing in their coffee gardens or the processing of their parchment.

Objective 3. To support, promote and facilitate the extension and replication of successful schemes within the PNG coffee industry

Having identified those innovative collaborative collection pricing and processing schemes that deliver superior quality coffee and provide commensurate rewards to participants in the supply chain, the project sought to support these schemes in their efforts to improve quality and their on-going development.

In an action-learning environment, pilot programs were delivered to all participants in the selected schemes to address the needs identified under Objectives 1 and 2. As one of the major reasons for conflict in supply chains is the lack of awareness, especially among the growers, training was expected to emerge as a major constraint in delivering superior quality coffee. Even among those successful collaborative collection, pricing and processing schemes identified, training was expected to be important to facilitate communication, to improve relationships, facilitate improvements in the quality of the coffee produced and to enable the schemes to adequately document and expand their quality assurance systems.

Following a major restructure of research, development and extension functions in 2002, CIC’s research and extension functions were merged to improve the flow of information between researchers and extension workers. This was accompanied by a significant shift in the means by which extension and training was delivered to smallholder growers. With

support from the Department of Agriculture and Livestock (DAL), CIC moved from the Training and Visit model (promoted by the World Bank) to adopt the Smallholder Support Services Pilot Project (SSSPP) model (promoted by the Asian Development Bank) **Error! Bookmark not defined.**which recognised the need for greater participation from smallholder growers.

Furthermore, the SSSPP promoted the contracting out of extension services to designated service providers, thereby making the delivery of extension and training more efficient, flexible and cost effective. Rather than being the sole deliverers of extension and training services to the coffee industry, CIC extension staff became managers and facilitators in the delivery of extension services.

At the core of this approach is the Participatory Rural Appraisal and Planning Process (PRAP) which is used to assess growers needs and enhance ownership and commitment. The primary objective of the PRAP process is to ensure that the community is actively involved in the process and will make use of the results. This is achieved in several ways: (1) the request for a PRAP must come from a grower community; (2) CIC staff first appraise the community to ensure the community meets certain criteria (i.e. twenty or more genuine coffee growers, free from tribal fights and land disputes, and the group is sustainable); and (3) the group is willing to contribute towards the cost of service delivery. Having passed this preliminary assessment, a visit is made to the site to collect some preliminary data and to set a date to conduct the PRAP. This is followed by a period of planning and preparation for the visit.

PRAP's can be conducted by CIC staff, DAL staff, service providers or a combination of these people and involves any member of the community who wishes to participate. The aim is to identify community problems and plan solutions with the active participation of community members. This incorporates a description and analysis of the community; identification of problems and potential solutions; and the design and programming of activities for project implementation.

The PRAP process involves 12 stages including:

- History profile. An historical profile is constructed for the village from memories of past key events, their dates and their impact
- Seasonal/activity calendar. Different farming activities along the crop cycle, other crops, weather and social activities are discussed in gender groups to develop a seasonal/activity calendar
- Venn diagram. A Venn diagram showing the institutional relationships between the community and internal or external organizations such as CIC, Council President, banks, exporters and churches is developed. These are placed on a chart with three circles representing the closeness of the relationships between the organisation and the community
- Village map. A village map is drawn and discussed with the community to indicate common features including crops, farming areas, roads, trade stores, schools, rivers, swamps and mountains
- Transect walk. This is a transverse cut or ‘walk through’ the community to identify, describe and analyse technical and production related aspects in terms of farming practices, landscape, soil types, water source, animals and vegetation
- Problem identification and listing. A facilitator leads a brainstorming session with community members to identify those problems that may have negative or positive implications for the community or crop. Problems are listed as strengths and weaknesses and whether they are internal or external. Internal problems are those which the community could solve using their own resources, while external problems require outside assistance

- Problem sorting. Internal problems are left for the groups to solve while the external problems are clarified in preparation for ranking by the group
- Problem ranking. External problems are then voted on and prioritized according to their perceived importance using stones or seeds for voting. Problems are ranked according to the number of votes they receive
- SWOC analysis. A Strengths, Weaknesses, Opportunities and Constraints analysis is conducted on each of the priority problems selected and their solutions
- Documentation. Each of the sessions is documented and a report prepared by the facilitators associated with the sessions
- Action plan. An action plan is then prepared by the PRAP facilitators, which contains the objectives, activities, budgets and responsibilities to deal with the issues raised in the PRAP process
- Terms of reference. Finally, terms of reference are developed specifying activities and other requirements that form the basis for advertising and selecting service providers

From the PRAP's conducted with the selected collaborative collection pricing and processing schemes, six pilot training programs were identified and developed. Farm Training and Extension staff at Aiyura undertook a comprehensive review of the literature to prepare four training modules on nursery production, agronomy and crop husbandry, harvesting and processing, and pest and disease control. Using the price information prepared under Objective Two and pre-existing material, the Economist assigned to the project developed the marketing and quality training module in consultation with the project team. Rather than to prepare specific material on basic bookkeeping and financial planning, a pre-existing generic training program was utilised. Extensive discussions were then held with the service provider and DAL to improve the material.

As an integral component of the PRAP process, Farm Training and Extension staff are required to independently audit the performance of the Service Providers engaged to deliver the prescribed training modules. In undertaking this process, growers were consulted with regard not only to the delivery of the prescribed material, but also the content and the extent to which the training had proved useful. This was evaluated through the delivery of both a pre-training and post-training questionnaire which also provided useful measures for evaluating the impact of the project (Appendix 2).

At the farm level, as quality product can only be produced if everyone is aware of how the various activities that they undertake impact on the quality produced, both men and women were encouraged to participate and contribute equally in the training program.

While quality is based upon the customer’s actual experience with the product, measured against their requirements and expectations, the adoption of a quality culture depends on people. To provide that leadership, a 3 day introductory course on quality management was provided to the CIC and all personnel directly involved in the delivery of the pilot programs. This aspect of the project was delivered by a quality consultant.

A second more interactive workshop was then undertaken with participants from the selected collaborative collection pricing and processing schemes to provide an opportunity for growers, traders, processors and exporters to interact in a supportive environment. From this workshop, a generic HACCP-based quality management system was developed which was subsequently verified by in-depth meetings with growers, processors and exporters.

Where required, the project was to build and facilitate linkages between the grower groups and downstream market intermediaries. However, at project inception, directly or indirectly, each of the selected pilot groups was linked to an exporter.

Objective 4. To communicate and disseminate the project results and activities

In launching this project, some possible resistance was anticipated from traders, processors and exporters as in the past, grower direct marketing had been supported.. As the success of this project depended upon fostering and improving relationships between all participants in the supply chain, a one day implementation workshop was conducted in Goroka in July 2005. The workshop provided;

- an overview of the project objectives
- business-to-business marketing concepts
- supply chain management
- quality assurance
- the role for collaborative marketing groups.

Towards the conclusion of the project, it was proposed that a second workshop be conducted to extend the findings of the project to industry, communicate the outcomes of the PRAP to chain leaders and to develop a plan for replicating successful collaborative coffee collection, pricing and processing schemes. With many development agencies searching for suitable projects in which to invest, a research forum was seen to provide the means by which CIC could potentially attract donor funds.

To specifically promote this project, articles of interest were drafted and submitted to the CIC Training and Information unit for dissemination towards the conclusion of each visit. At every opportunity, informal discussions were conducted with members of the CIC Board, processors, traders and exporters, to both advise and verify the research findings as the project progressed. Similarly, towards the conclusion of every visit, an informal briefing with the CEO, the Manager of Industry Affairs and the Special Projects Officer was conducted to advise progress.

Liaison with the two other ACIAR coffee projects: ASEM/2004/017 Assessment an improvement of quality management during the postharvest processing and storage of coffee in PNG and ASEM/2004/047 Sustainable management of coffee green scale in PNG was maintained through the manager of the ACIAR coffee projects and participation in a number of research symposia both in Australia and PNG.

6 Achievements against activities and outputs/milestones

Objective 1: To describe innovative collaborative collection pricing and processing schemes that seek to achieve superior quality coffee

no.	Activity	outputs/ milestones	completion date	Comments
1.1	Conduct face-to-face interviews	Review of current coffee collection, pricing and processing schemes	February 07	
1.2	Data analysis	Review of quality assurance systems for the PNG coffee industry		
1.3	Case study analysis of schemes	Document case studies of alternative collaborative collection, pricing and processing schemes	September 08	

Review of current coffee collection, pricing and processing schemes

In September 2005, after initial discussions with industry and the CIC, a comprehensive questionnaire was developed, translated and pilot tested in late November. A total of 54 coffee growers were interviewed from each of the eight groups (Table 1).

Table 1: Number of growers interviewed from participating collaborative marketing groups

	N
Ruts kopi	10
Kabiyufa – Eastern Highlands CCGS	10
Coffee Connections	7
Sihereni	7
Fimito – Eastern Highlands CCGS	6
Midema - Chimbu CCGS	5
Highland Arabicas	5
Sigri	4
No of respondents	54

From the survey results, it was apparent that the majority of respondents were smallholder coffee growers, for 53% of the growers cultivated less than 2 hectares of coffee. However, given the planting distances recommended by the CRI (PNG Coffee Handbook), which recommends 2667 trees per hectare, it is evident that the majority of growers are engaged in mixed cropping enterprises, presumably cultivating sweet potatoes and other vegetable crops for both household consumption and sale.

Table 2: Size of participating growers' coffee gardens and number of coffee trees per grower

Area of coffee garden	N	Number of coffee trees	N
Less than 1 ha	15	Less than 2600	14
1.1 ha to 2.0 ha	10	2601-5000	6
Greater than 2 ha	22	More than 5001	7
No of respondents	47		27

It was no surprise to find that for some 83% of the growers surveyed, coffee contributed around 50% of their household income (Table 3).

Table 3: Proportion of household income derived from the sale of coffee

	N
Very little	6
Almost half	30
More than half	14
Most	3
No of respondents	53

Over one half of the growers surveyed (57%) sold all their coffee as parchment, whereas less than 10% sold all their coffee as cherry (Table 4).

Table 4: Proportion of respondents coffee sold as cherry and/or parchment

	N
All parchment	31
Mostly parchment	2
About the same	3
Mostly cherry	13
All cherry	5
No of respondents	54

The main reasons given for producing parchment were the ease of transport, the capacity to store the parchment and thus the ability to sell the parchment at a later time to meet both household expenses and social obligations (Table 5).

Conversely, the main reasons given for selling cherry were that it was less expensive to produce, it achieved a higher price, it demanded less labour, the grower did not have a suitable pulper and/or wet mill, and the lack of infrastructure, which included running water and/or electricity to pulp the cherry. However, in selling cherry, the critical considerations were close proximity to the wet mill and road access. Without either of these, growers had no option other than to produce parchment.

For those growers selling cherry, transport was not a major consideration, for many of the wet mill operators despatched their own trucks or employed agents to collect the cherry from the roadside.

Table 5: Reasons given why respondents' sell coffee in these proportions

	Number of growers		
	Cherry	Both	Parchment
Less expensive	7		
Close proximity	4		
No pulper or wet mill	4		
Good price	3		
Less labour	2		
Lack of infrastructure	1		
Lack of water	1		
Saves time	1		
Meet immediate needs		2	
Easy to transport			18
Easy to store			16
Sell later		1	9
Linked to a coffee project			2
Number of respondents	18	3	33

While no growers sold cherry through grower cooperatives, for the participating growers who produced parchment, selling through grower cooperatives was the principal means of sale. This is not surprising, given that five of the groups studied were collaborative marketing groups supported either by the CIC or private entities (Table 6).

Table 6: Means of selling coffee among surveyed groups

	Number of growers	
	Cherry	Parchment
Other growers	5	1
Grower cooperatives	-	34
Roadside buyers	12	19
Wet factory	19	-
Dry factory	-	19

Nevertheless, over one third of the growers surveyed sold parchment through roadside traders, indicative of both the dualism of the coffee supply chain in PNG and the dependence on roadside buyers as a quick and ready form of cash.

For those growers selling cherry in 2006, selling direct to other growers provided the highest cash returns (95 toea/kg)(Table 7).

Table 7: Average price paid to secure cherry by each market intermediary

	Toea/kg
Other growers	95
Cooperatives	-
Roadside traders	68
Wet mills	85

Those growers selling cherry to their neighbours were more often the smaller growers. Anecdotal evidence would suggest that many of the larger growers to whom the cherry was sold were registered growers under one of the many schemes operated by traders and exporters to supply the specialty market, and in particular, Starbucks. Under their generic quality assurance program Café Practices, Starbucks required all their suppliers to be registered as a means of providing traceability, thus providing a means of verifying that the social and environment conditions had been met. As various incentives were

payable to the exporter, and in turn, a proportion of which was transferable to growers, depending on the level of registration achieved, it would be in the growers best interest to sell as much cherry as possible.

There was a marked difference in the average price paid between the wet mills and the roadside traders. While wet mills were found to pay a higher average price (85 toea/kg), because of the issues associated with security, growers were seldom paid in cash. Instead, they were paid either by cheque or the funds were electronically transferred to a nominated bank account. On the other hand, the roadside traders, acting as a buying agent for a wet mill, paid cash on acceptance.

While anecdotal evidence suggests that many of the roadside traders are often financed directly by a wet mill, it was evident that the roadside traders were less likely to reject cherry that did not meet the buyers' specifications (Table 8).

Table 8: Extent to which different market intermediaries reject the growers' cherry

	Number of growers	
	Yes	**No**
Other growers	1	1
Cooperatives	-	-
Roadside traders	3	7
Wet mills	7	5

The failure of the roadside traders to adequately reward growers for harvesting good quality cherry (red and ripe) was no doubt one of the main reasons for CIC to recently institute a ban on the sale of cherry except to licensed traders. As high cherry prices have encouraged cherry theft, strip picking usually results in a variable mix of both red and green cherries being offered for sale. While it is generally accepted that up to 4% green cherries will have little impact on the cup quality of the coffee produced, any more than this will be detrimental to cup quality.

However, it was also apparent that many of the wet mills were compromising quality by failing to accept only red ripe cherry. While many of the smaller wet mills are paying cherry prices commensurate with the specialty coffee market in order to secure supply, by purchasing inferior quality cherry, they are more likely to achieve PSC prices (at best) or Y1. Consequently, the long-term financial viability of these mills is highly questionable.

These findings were largely supported by a subsequent analysis of the relationships that existed between those smallholder coffee growers selling cherry and the roadside traders and wet mills with whom they transacted (Table 9). Roadside traders not only took all of the cherry the grower offered for sale, but also paid cash on acceptance. Given the ease with which the transaction could be executed and the variable quality of the cherry accepted by the roadside traders, growers considered that they had been adequately rewarded for their efforts. However, the roadside traders did not offer the best price, nor could they be trusted. Roadside traders seldom kept their promise and most were perceived to be dishonest. Most smallholder coffee growers had no desire to maintain their relationship with roadside traders: business was largely opportunistic and there was little evidence of any close personal friendship between smallholder coffee growers and roadside traders.

Table 9: Relationships among cherry suppliers and buyers1

	Means		
	1	**2**	**3**
Able to take all my harvested coffee	2.77	3.00	2.87
Provides me with a fair price for effort	2.66	3.00	2.75
Pays cash on delivery	2.58	3.00	2.81
Rewards me for good quality	2.34	2.69	2.81
Financially strong	1.62	2.23	2.31
Has a good business reputation	1.51	2.00	2.25
Provides technical information/advice	1.57	1.92	2.31
Provides market/price information	1.60	2.00	1.69
Picks up my coffee	1.47	1.15	1.87
Willing to meet immediate cash needs	1.48	1.00	1.75
Is geographically close to me	1.47	1.07	2.00
Gives the best price	1.47	1.07	1.75
Have a close personal friendship	1.45	1.00	1.68
Trust each other	1.45	1.00	1.50
My buyer is honest	1.51	1.07	1.68
Buyer considers my best interests	1.26	1.31	1.62
Buyer keeps his promise	1.33	1.00	1.81
I want to continue to transact with this buyer	1.62	1.00	1.56

Where 1 is what the grower wants from their buyer and the mean is measured on a three point scale where 1 is "not important", 2 is "neutral" and 3 is "important". Where 2 is what the grower gets from roadside cherry buyers 3 is what the grower gets from the wet factories and the mean is measured on a three point scale where 1 is "not well", 2 is "neutral" and 3 is "very well"

For those growers producing cherry, to the maximum extent possible, growers sought to sell directly to the wet factory, for they paid a higher price. As an increasing number of wet mills were sending out their own trucks to collect the cherry from smallholder growers, even although the majority of growers selling directly to wet factories had the capacity to deliver their own cherry, there was no need. Given the need to process the cherry on the same day of harvest, by necessity, the wet mills were perceived to be geographically closer to the grower.

For most smallholder coffee growers, the wet mills were perceived to be more honest and trustworthy. There was not only a greater desire to maintain the relationship, but there was also evidence of a close personal relationship. Nevertheless, anecdotal evidence suggests that in PNG, such relationships only last for as long as the mill is able to pay the highest price. For the wet mills, this is problematic, for even although they are more willing to extend credit, to meet immediate cash needs and to provide technical advice to the growers, this provides no guarantee of their capacity to secure the crop at harvest.

As a result, many of the wet mills were instituting mechanisms to voluntarily withhold a proportion of the growers' returns to meet anticipated household expenses (school fees), farm expenses (fertilisers, chemicals and labour) and unforeseen social obligations.

For those smallholder coffee growers producing and selling parchment, during 2006, cooperatives were observed to pay the highest average price (K 4.43/kg)(Table 10).

[1] *The small number of responses precludes any sophisticated statistical analysis. Hence any interpretation in the difference between mean scores can only be undertaken within context and supported by anecdotal evidence*

Table 10: Average price paid to secure parchment by each market intermediary

	Kina/kg
Other growers	2.00
Cooperatives	4.43
Roadside traders	2.82
Dry mills	3.39

However, some caution must be exercised in the interpretation of these results. Whereas most parchment sold by smallholder growers is sold as Y grade, that parchment which is produced by growers who are certified Organic and/or Fairtrade, and which, by necessity, must be sold through cooperatives, will be sold in the specialty market at much higher prices. This, in part, is reflected by the considerable variation in the prices reported by growers, ranging from K 3.80 - 5.33 per kg.

Furthermore and with particular regard to the CCGS groups, additional premiums are provided to growers after the collective processing and marketing of the green bean. For the traders and exporters, purchasing green bean will reduce many of the uncertainties and the costs associated with processing parchment. At this time, it is not possible to ascertain how much of the premium received by growers can be attributed to the superior quality of the parchment produced and the capacity, through collaboration, to deliver larger volumes of parchment reliably and consistently, and the benefits that are derived from the collective processing and marketing of the parchment.

However, from the growers' perspective, cooperatives were more likely than other market intermediaries to pay incentives for superior quality parchment (Table 11).

Table 11: Extent to which different market intermediaries pay different prices for different quality parchment

	Number of growers	
	Yes	No
Other growers		1
Cooperatives	17	6
Roadside traders	9	10
Dry mills	9	8

Nevertheless, from an analysis of the processing practices undertaken by those growers supplying parchment to cooperative marketing groups, there is still an urgent need to standardise processing practices for:

- 7 growers (30%) ferment for 24 hrs; 1 (4%) for 36 hrs; 13 (56%) for 48 hrs and 2 (9%) for 73 hours
- 13 growers (56%) wash only one time; 7 (30%) wash two times and 3 (13%) wash three times
- 5 growers dry the parchment until the husk cracks (24%); 10 until the bean is green inside (48%); 2 until the bean is black in appearance (9%) and 4 until the husk is brown (19%)
- 21 (91%) hand sort prior to selling the parchment.

More so, growers use a variety of means to ferment, wash and store the parchment.

For those smallholders producing and selling parchment to the roadside traders, it is hard to understand, on the basis of the evidence presented, why smallholder coffee growers would want to deal with roadside traders at all (Table 12). Roadside traders seldom rewarded the growers for producing superior quality parchment, they seldom offered the best price and most were perceived to be dishonest and untrustworthy. Nevertheless, they were perceived to offer the grower a fair reward for their effort and most were able to pay cash on delivery.

Table 12: Relationships among parchment suppliers and buyers[2]

	Means			
	1	**2**	**3**	**4**
Able to take all my harvested coffee	2.77	2.50	2.61	2.72
Provides me with a fair price for effort	2.66	2.70	2.64	2.12
Pays cash on delivery	2.58	2.30	2.52	2.18
Rewards me for good quality	2.34	1.70	2.00	2.00
Financially strong	1.62	1.30	1.23	1.33
Has a good business reputation	1.51	1.30	1.26	1.79
Provides technical information/advice	1.57	1.20	1.26	1.45
Provides market/price information	1.60	1.30	2.11	1.67
Picks up my coffee	1.47	1.50	2.11	1.24
Willing to meet immediate cash needs	1.48	1.00	1.97	1.18
Is geographically close to me	1.47	1.33	1.64	1.18
Gives the best price	1.47	1.20	1.14	1.54
Have a close personal friendship	1.45	1.20	1.26	1.21
Trust each other	1.45	1.10	1.29	1.12
My buyer is honest	1.51	1.10	2.11	1.57
Buyer considers my best interests	1.26	1.20	2.00	1.12
Buyer keeps his promise	1.33	1.10	1.82	1.94
I want to continue to transact with this buyer	1.62	1.10	1.59	1.53

Where 1 is what the grower wants from their buyer and the mean is measured on a three point scale where 1 is "not important", 2 is "neutral" and 3 is "important". Where 2 is what the grower gets from roadside parchment buyers 3 is what the grower gets from cooperative marketing groups 4 is what the grower gets from the dry factories and the mean is measured on a three point scale where 1 is "not well", 2 is "neutral" and 3 is "very well".

For smallholder coffee growers selling through collaborative marketing groups, the benefits of selling through collaborative grower groups were abundantly clear. Collaborative marketing groups were perceived to be more honest and to operate in the growers best interests. Collaborative grower groups generally picked up all the growers' coffee and they were the most willing to provide market information.

However, collaborative grower groups did not always provide the best price nor were they perceived to have the best reputation. Anecdotal evidence suggests that one of the main reasons for this is the need for the collaborative groups to retain the coffee until such time as they had sufficient to process and to fill a container. In the highly volatile coffee market, the group is therefore unable to take advantage of any upward movement in price. While collaborative marketing groups were perceived to have a poor reputation, such is no doubt a carry over from the numerous failures of cooperative marketing structures in the past.

In transacting with the dry mills, the majority of smallholders perceived them to be opportunistic. While the dry mills could take all the growers' coffee, there was some doubt as to whether they had been adequately rewarded. There was, within the trading relationship, an inherent element of distrust, suggesting that growers often believed that the dry mills did not pay them the appropriate price for the quality of the parchment submitted. Because of the security risk, dry mills seldom paid the growers in cash: rather, they were paid by cheque, which required the growers to visit the bank to access their funds. There was also an element of doubt with regard to the financial strength of many dry mills and thus their ability to secure sufficient working capital to purchase parchment.

[2] *The small number of responses precludes any sophisticated statistical analysis. Hence any interpretation in the difference between mean scores can only be undertaken within context and supported by anecdotal evidence*

Nevertheless, as the dry mills generally paid the highest price, growers were more likely to transact with them only for as long as they were able to pay the highest price.

Regrettably the sample sizes were too small to reveal any significant difference between the eight collaborative marketing schemes examined.

Review of quality assurance systems for the PNG coffee industry

In the PNG coffee industry, quality is determined at three levels.

For those growers selling cherry direct to processors, quality is assessed on the basis of colour and maturity: ripe red cherries are preferred. Both green cherry and over ripe cherry will impart undesirable characteristics into the cup profile.

For parchment, quality is evaluated on the basis of colour, odour, moisture content, freedom from defects and trash (Table 13).

Table 13: Parchment standards enforced by the CIC

	Colour/Appearance	Silverskin/Green bean	Defects/Foreign matter
Class 1 Premium	A very pale and even colour Substantially free from defect	Clean and translucent silverskin Clear jade to olive coloured green bean	Up to 12 defects per 100g No foreign matter
Class 2 Good	An even colour Few defects	Clean and translucent silverskin Clear jade to olive coloured green bean	Up to 70 defects per 100g
Class 3 FAQ	An uneven and mixed colour	A dirty and discoloured silverskin hard to remove Yellow green to brownish green bean colour	Up to 35 defects per 100g Substantially free from foreign matter
Class 4 Reject	Discoloured and dirty Excessive defect and foreign matter	Very dirty and discoloured silverskin hard to remove Very uneven coloured green bean	More than 70 defects per 100g Some foreign matter

In order to meet the standard, parchment coffee must satisfy all the criteria. For example, if there are more than 12 defects per 100 grams, the parchment will be classified as Class 2, even if the parchment is of Class 1 colour and silverskin standard.

All defects have the same value and are defined as follows: coffee parchment beans, which are not normal in physical appearance, which includes beans damaged by nature, insects or during processing (Table 14).

Table 14: Parchment defect schedule for the PNG coffee industry

Two (2) defects are presented by	1 large stone (stone retained by screen of 8.0 mm diameter)
	1 large stick (twig approx. 3 cm in length)
One (1) defect is represented by	1 pod (dried fruit of the coffee trees)
	1 medium stone (through screen 8.0 mm but retained on 4.7 mm)
	1 medium stick (twig approx. 1.5 cm in length)
	3 small stones (3 x stones or diameter less than 4.75 mm)
	3 small sticks (3 x sticks or twig approx. 0.5 cm or less)
	1 full black (bean of greater than half of it is part black)
	1 full sour (cream to light brown-reddish colour internally)
	5 shells (malformed bean presenting a cavity)
	5 broken (fragment of a coffee bean to half a bean)
	5 partly black (5 beans – less than half of it is part black)
	5 partly sour (5 beans – less than half of it is part sour)
	5 floaters (white in colour and very light in weight)
	5 white beans (discoloured old beans)

	2 parchment (bean entirely/partially enclosed in the endocarp)
	2 hull or husk pericarp of the dried coffee fruit
	5 immature beans

Foreign matter is defined as any substance not derived from the coffee cherry. Any parchment containing foreign matter is immediately downgraded to Class 3.

Moisture is treated separately using the standard teeth and rubbing method (Table 15).

Table 15: Moisture content of parchment

	Moisture	Measure
Machine	9-11%	Very hard. No teeth marks
1	11-15%	Hard only slight marks with teeth
2	15-20%	Soft black appearance. Easy mark with teeth
3	20-30%	Very soft black. Crushes with teeth

For green bean, export standards are enforced by the CIC which govern the size, colour, odour and the level of defects (Table 16).

Y1 is defined as having a maximum defect level of 70 defects per kg.

Y2 has a maximum defect level of 150 defects per kg. Any green bean consignment with a defect count of more than 150 will be downgraded to T grade

T grade is defined as Arabica coffee beans that do not conform to the standards prescribed for any other grades.

However, in recognising that these standards relate only to the physical characteristics of the bean, prior to export, CIC (in Lae) cup a sample of the coffee. Experienced liquorers identify and report on the faults associated with harvesting, fermenting, washing and drying.

Table 16: PNG Arabica green bean specifications

Grade	Bean size (screen)	Uniformity	Total defect equivalent	Raw bean colour	Odour
AA	> 18	Good	Up to 10	Bluish green	Clean
A	> 17	Good	Up to 10	Bluish green	Clean
AB	50% > 16 50% > 17	Good	Up to 10	Greenish	Clean
B	> 19	Good	Up to 20	Greenish	Clean
C	> 15	Good	Up to 20	Greenish	Clean
PB	11 - 14	Good	Up to 10	Greenish	Clean
PSC	Mixed	Good	Up to 40	Greenish	Clean
X	Mixed	Uniform	Up to 30	Greenish	Clean
Y1	Mixed	Mixed	Up to 70	Greenish/grey	Some fruitiness
Y2	Mixed	Mixed	Up to 150	Faded green	Acceptable
Y3	Mixed	Mixed	No more than 3% defects	Green to yellow	No foul or foreign odour
T	Mixed	Mixed	More than 3% defects	Green to yellow	No foul or foreign odour

Cupping is perhaps the most critical component of the quality control process, but by its very nature, it is also one of the most subjective. At the factory door, processors have indicated that where cooperative grower groups can supply no less than 10 bags (30 bags in the case of one large exporter), a sample of the parchment will be dehusked, roasted and tasted. For the traders and exporters, while this process effectively removes much of the risk associated with the purchase of parchment, it does enable them to allocate selected parcels of parchment (or green bean) to specific customers. Where buyers can

be identified who are willing to pay for superior quality parchment and collaborative marketing groups are able to maintain the quality and continuity of supply, traders and exporters are in a better position to reward smallholder growers for producing superior quality coffee.

Coffee which has been purchased from smallholder growers and processed as cherry by a registered wet mill is permitted to use the grades available to the plantations (AA, A, AB, B, C, PB and X), whereas parchment purchased from smallholders may only be classified as PSC, Y1-3 or T grade.

While each of the world's major coffee buyers may institute their own quality standards, the most commercially significant system currently operating in PNG is CAFE Practices. Introduced by Starbucks, CAFE Practices seeks to reward preferred suppliers who can demonstrate that the coffee has been sourced from growers who produce the coffee in an environmentally sustainable manner (Appendix 3). In addition to the standards which specify the characteristics of the bean, permitted defect levels and the cup quality, producers must meet strict controls on the use of shade, land management practices, chemical and fertiliser application, water use and pollution, conservation and biodiversity. In addition, processors and traders must ensure that growers have been treated fairly and equitably and have the right to collectively bargain. Additional conditions must also be met with regard to worker welfare (including the use of child labour) and minimising the impact of processing on the environment.

For those businesses fortunate enough to meet the rigorous standards established by Starbucks, accreditation provides significant financial benefits, not only in higher prices, but it may also provide a means of securing working capital in an industry which most financial institutions are reluctant to enter.

Significant price premiums are also available from those segments of the market that pursue accreditation under Organic and Fairtrade (Table 17).

Table 17: Price differentials for different qualities of PNG coffee in green bean equivalent

Grade	Differential (US c/lb)	% export (value)
A, AA	26	9.0
X	12	15.0
Organic	19	1.8
Fair Trade		0.9
PSC	- 3	2.5
Y1	- 13	48.0
Y3	- 69	3.0

However, only two companies in PNG are currently registered for Fairtrade, although some 6 exporters claim to be selling organic coffee. In the 2007 calendar year, certified Organic and Fairtrade coffee accounted for 3% of PNG green bean exports, with 26% classified as Organic, 57% as Fairtrade-Organic and 17% as Fairtrade.

While there is much debate about the extent to which the market for both Organic and Fairtrade will continue to increase, there is an opportunity for many PNG producers and exporters to target this premium market. However, unless the quality of the coffee delivered meets customer's specifications, appealing to consumer's environmental or social conscience through eco-labelling or Fairtrade will ultimately fail.

Over the duration of the project, the review of prevailing quality systems in the PNG coffee industry widened, due to the very dynamic nature of markets and the desire by traders and exporters to obtain some differential advantage. One of the exporters achieved certification under the Common Code for the Coffee Community (4C) and another was being directed to consider Utz Certified. While Rainforest Alliance and Bird Friendly coffee are alternative schemes, no coffee company in PNG has yet been certified.

Document case studies

The key reason for using case studies was to understand the factors influencing the adoption and on-going success of collaborative collection pricing and processing schemes and to explore alternative strategies for the successful expansion of these schemes. The individual case studies were chosen to represent a range of alternatives: (1) grower groups supplying cherry to a central wet mill linked to an exporter; (2) grower groups supported by an outside agency (in this case CIC) and organised as a cooperative using village level wet processing and sale through an exporter; and (3) grower groups organised as a cooperative and linked to an exporter to supply accredited coffee to the Organic/Fairtrade market.

Subsidiary objectives for using the case study schemes were:

- to communicate and disseminate the project results and activities
- to provide a participatory mechanism through the PRAP process to assess grower needs relating to processing and marketing of their product
- to provide a mechanism to deliver and evaluate training to growers
- to help overcome some of the misconceptions about the processing and marketing of coffee and the role of processors and exporters
- to provide a mechanism to observe and evaluate the chances of collaborative grower groups surviving either as informal groups or as cooperatives
- to provide evidence about successful collaborative collection pricing and processing schemes within the PNG coffee industry.

Evidence from these schemes was collected from:

- on-going interviews with processors and exporters from the schemes
- on-going interviews with grower group leaders from the schemes
- statistics collected by the CIC on prices for various classes of cherry, parchment and green bean
- the PRAPs conducted by CIC with the groups
- CIC and service providers who delivered training to growers
- pre and post-training surveys of participants.

This evidence was collated and used to develop case study descriptions of each scheme which:

- described the characteristics of each chain
- evaluated each of the grower groups in terms of their organisation, social capital, understanding of coffee processing and marketing and responses to training
- described and evaluated the schemes including their pricing mechanisms, prices received and quality control processes
- evaluated the relationships between actors in the chain, including growers, processors and exporters
- evaluated the factors influencing the on-going change and success of each group (Appendix 4).

While the mainstream Y grade coffee market in PNG is highly competitive and efficient in that it quickly adjusts to world prices and provides smallholders with a fair proportion of the export price, it is not able to reward smallholders for producing better quality coffee. Rather, the system tends to have the opposite effect, because smallholders who produce

poor quality coffee often receive the same price as smallholders producing superior quality coffee.

Although it is possible to improve quality in this system through education, the inherent problems remain. Y grade coffee is sold at a discount to the NYC because of poor processing at the village level which leads to inconsistent product quality. A number of alternative chains have attempted to overcome this problem by delivering to the specialty market and/or accredited Organic and Fairtrade markets. The alternative chains studied include:

- specialty cherry chains. These consist of centralised wet mills owned by plantations and exporters that purchase smallholder and block-holder cherry to produce specialty coffee (3 case studies)
- Fairtrade/Organic chains. In this instance, exporters have established relationships with smallholder cooperative groups to deliver to the Organic and Fairtrade market (1 case study)
- smallholder cooperative groups producing premium smallholder coffee (PSC). These cooperative groups have been organised and trained by an outside agency (in this case the CIC). Parchment is produced using village-level processing, but bulked up and processed through a dry mill for sale to exporters (4 case studies).

The first two of these options directly target the specialty market to achieve higher prices, while the third attempts to improve price by overcoming the inconsistent quality and small quantity constraints.

Specialty cherry chains

Centralised wet mill chains involve a relationship between the owners of a large wet factory (who may or may not have a plantation) and block-holders and smallholders who supply cherry to the wet factory (Figure 1). Farms supplying these chains tend to be larger than most smallholder farms. They are not organised in groups and either deliver their cherry directly to the factory, an agent of the factory, or the factory arranges to pick up the cherry from the roadside. These centralised chains can only operate where smallholders have road access to the wet mills. This is normally within a radius of 20 to 30 kilometres depending on whether the road is trafficable to trucks.

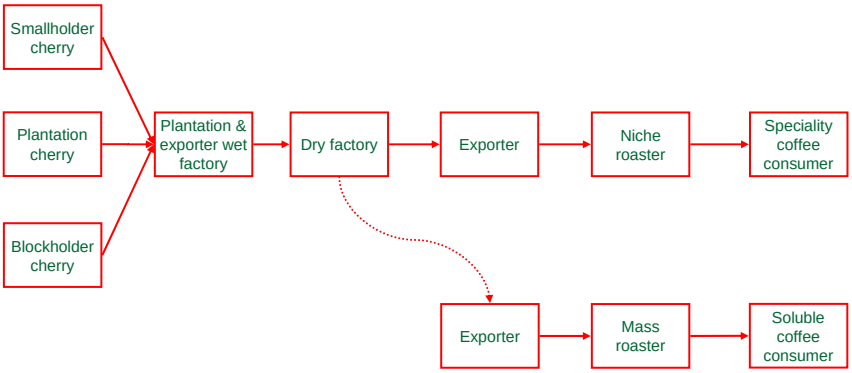


Figure 1: Specialised cherry chains

Organisation of chain

The chain leader is the owner of the wet factory. The focus of these chains is to process the cherry in a controlled, standardised manner to produce plantation style coffees that are sold into the specialty market. This focus distinguishes them from some wet mills that buy cherry, but for various reasons do not produce green bean suitable for the specialty market.

Some chains have an integrated operation that includes a dry mill and an exporting arm, while others use third parties as dry processors and exporters. Chain leaders provide some services to their suppliers, although these are not extensive. The most common is to provide transport to pick the cherry up from more remote suppliers or those who lack transport. Normally, growers are not charged for this service. Some chain leaders provide limited credit, technical advice or provide fertilisers and chemicals at cost, although these services are not part of a formal arrangement. Some chains purchase cherry for cash, while others provide an account that growers can draw on or leave to meet future demands for cash.

Price and quality control

Centralised wet mills follow two strategies to meet the standards required by the specialty market. The first strategy is to buy large volumes of ripe red cherry and process it to the standards of the PNG plantation sector. Green bean produced in this manner sells at plantation prices because it has consistent physical and taste characteristics. The second strategy is to seek accreditation to specialty coffee schemes. Currently, the most important of these is the Starbucks Café Practices program. Some chains in PNG have already obtained preferred supplier status and are seeking to obtain strategic supplier status. These accreditations provide premiums for green bean, which are necessary if the chains are to continue paying premium prices for cherry.

Prices received by growers selling cherry are considerably higher than the prices received by growers selling parchment. In addition, sellers of cherry do not incur the costs of processing and therefore have an additional advantage. The cherry market has become highly competitive and competition appears to be increasing as the number of chains involved in buying cherry increases.

During the main production months for 2004-2008, the price of cherry averaged 113 toea/kg parchment equivalent, or 34% more than the price paid for Y1 grade parchment (derived from Weekly CIC price reports). This difference varies from season to season depending on the world price and domestic seasonal factors. For example, in 2006, with high world prices and low production in PNG, fierce competition increased the premium to around 130 toea per kg parchment equivalent or around 38%. When converted to an FOB green bean price, this equates to a premium over Y1 grade of approximately USD 0.23. During the same period, Y1 grade green bean averaged USD 0.13 per pound below the NYC. This means growers are receiving a price that is at a premium to the NYC and about equivalent to the average for plantation X grade. They receive this without having to wet process or in many cases deliver the coffee, which reduces their costs further.

At this stage, none of the chains have adopted accredited QA schemes, apart from Café Practices. There are few economic drivers for the chains to adopt QA schemes as coffee has few human health hazards and apart from Starbucks, few buyers are offering premiums for adopting them or imposing penalties for not adopting. Consequently, most of the quality programs used by the chains are based on Good Manufacturing Practices such as inspection before purchase, pulping on the same day of purchase, continuous monitoring of fermentation and so on. Each chain has variations on these practices and additional practices depending on the market they are targeting.

Relationships between the actors in the chain

The chain leaders for cherry chains are mostly export companies or their subsidiaries, which are owned by overseas coffee companies, although an increasing number of the smaller operations are owned and managed by indigenous PNG highlanders. Overseas owned operations are mostly managed by people who are culturally different from smallholder coffee growers. Consequently, many smallholders perceive exporters as part of the problem rather than part of the solution to low coffee prices. Therefore, an initial constraint in establishing a trusting relationship within the cherry chains is the historical level of distrust between smallholders and processors/exporters.

Because of the commercial nature of cherry buying, many cherry chains do not establish strong relationships between the smallholder sellers and the company buyers of cherry. This is reflected in the lower levels of trust between smallholders and their cherry buyers. Sometimes this is combined with resentment at the lack of recognition or appreciation shown by buyers to their suppliers. In one case the relationship broke down, possibly because of competition from another buyer. Levels of trust range from poor to reasonable, generally reflecting the perceptions and reality of the various companies interest in establishing more than a business relationship with their suppliers. However, growers generally sell to the buyer offering the highest price.

In addition, smallholders tend to sell their cherry to the wet factory as individuals. Very few formal groups exist of smallholder cherry sellers. In this project, groups were established in an attempt to see if this would lead to sustainable results and to deliver training. As might be expected, the level of social capital within these groups was lower than for the other chains.

Factors influencing on-going change and success

Statistics on the quantities of cherry sold to centralised processing mills are difficult to obtain because of commercial confidentiality, but discussions with processors indicate that the quantities processed in this manner are expanding and have the potential to expand further. The factors influencing on-going change and success include an increasing demand for quality assured coffee, increases in cherry theft, and the poor condition of the roads and lawlessness.

Recently there has been an increase in cherry theft. There are two main causes for this: higher prices for coffee and an increase in cherry buying including the appearance of many roadside cherry buyers. Stolen cherry is generally of poor quality, for it contains a higher percentage of under and over-ripe cherry. Processors buying poor quality cherry will find it difficult to achieve a premium in the specialty market, which will inevitably squeeze their margins. More recently, the CIC has introduced a cherry buying ban, except to registered buyers, which appears to be reducing this problem.

The poor condition of secondary roads and to a lesser extent roadside theft limits the expansion of the centralised processing sector. PNG produces most of its coffee in areas that are not accessible by trucks. To achieve premium quality, cherry must be delivered to the mill for processing on the same day it is harvested. Because of the poor condition of the roads, this generally limits cherry collection to areas within 20-30 kilometres of the wet mill.

Another problem for some plantation-based chains is the sometimes precarious nature of land tenure, both for the owner of the plantation and when land disputes occur between suppliers or surrounding villages. This can affect both the plantations survival as an on-going concern and the consistent supply of cherry to its wet mill.

Fairtrade and organic chains

In the 2007/2008 coffee year, Fairtrade and Organic coffee accounted for 3% of PNG coffee exports. This reflects a gradual increase over time, for Fairtrade and Organic coffee accounted for 0.5% of exports at the beginning of the decade. Prices achieved are

equivalent to plantation grade coffee. However, only a few trading companies export Fairtrade and Organic coffee, and only one company specialises in Fairtrade and Organic coffee. This exporter operates through grower cooperatives which have established direct links with family clusters at an individual village level in remote areas. The company buys parchment from registered Organic and Fairtrade growers who are members of the cooperatives. In this respect, this is an example of a strategic alliance between an exporter and a cooperative, although the company provides considerable support to the cooperatives (Figure 2).

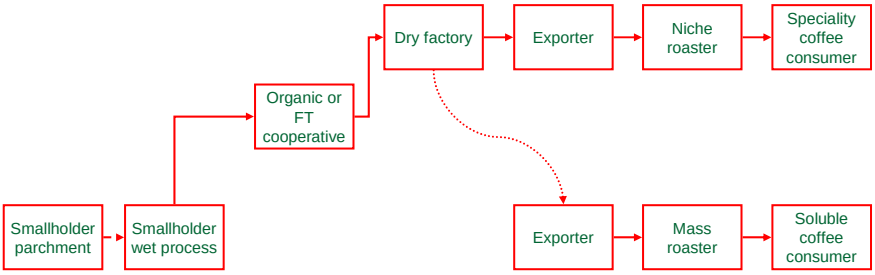


Figure 2: Fairtrade and organic chains

This chain initially focussed on organic coffee and is accredited under NASAA. More recently, it has increased its focus on the Fairtrade market and achieved dual certification. Most of its suppliers are remote and consequently have to produce parchment in smallholder wet factories. This means the smallholder coffee is Y grade, although considerable effort is put into standardising wet processing procedures at the farm level and hand sorting the green bean. Dry processing is contracted out.

Organisation of chain

The chain operates through grower cooperatives which establish direct links with family clusters at an individual village level. Some 3,000 growers are members of the cooperatives, mobilised into 300-400 family units. They employ 12 representatives from the cooperatives who each look after operations in 3-5 villages. Each village in turn is comprised of around 20 family units from 10-12 households.

Each supplier has a registration card. At the village level, inspectors communicate directly with family clusters to ensure that Fairtrade/Organic production principles are practiced and to ensure that family members follow the prescribed production practices to ensure high quality parchment. This approach provides full traceability and reduces the costs of auditing.

Cooperatives and members must be registered for certification. The company has facilitated the establishment and running of these cooperatives. For certification, the clusters and the cooperative must be democratically run and provide evidence that they are. The company organises the visits by the inspectors for both Organic and Fairtrade certification and covers the costs of certification. Inspection for registration occurs annually with costs of AUD 500 per day plus airfares and accommodation. Because of the remoteness and the number of growers involved this takes considerable effort. Achieving Fairtrade certification takes from 3-6 months while Organic certification takes 2-3 years. The major effort is in establishing the cooperatives, with local leadership being critical to this. The company has also established depots, with employed depot managers, to which cooperative members bring their coffee. Registered growers must present their registration card at the depot for payment.

A major issue for the company is the collection of the coffee. Many of the roads are so bad that in many cases, 4-wheel drive vehicles or 4-wheel drive tractors and trailers provide the only means of bringing in the coffee. These are owned and operated by the company. They also have to make repairs to the roads so their vehicles can use them and they provide support to the villages through helping to build and maintain schools and medical centres. The other option is to fly the coffee out.

Price and quality control

Fairtrade and Organic coffee sells at a premium above the PNG Y grade parchment price. Fairtrade has also established a minimum price when coffee prices are low. This is currently set at USD 1.21 per pound. When prices are below this level (for example around USD 0.60-0.80 per pound at the beginning of this decade) growers received a considerable premium. When prices are above this level, registered growers achieve a Fairtrade premium of USD 0.15 per pound. Of this, USD 0.05 goes to the growers, the remaining USD 0.10 covers the additional costs, but discretionary payments may then be made to growers as a reward for better quality. Organic coffee adds a further USD 0.15 per pound premium, providing a total premium of USD 0.30 per pound for both Fairtrade and Organic coffee. However, there are additional costs associated with Fairtrade and Organic coffee including hand sorting green bean, assisting the cooperatives and so on.

Quality assurance is focussed on the requirements for Fairtrade and Organic certification for which there are annual inspections. Depot managers and inspectors at the collection points have a role in monitoring and checking that growers are meeting Organic standards and parchment quality standards. There is still a requirement to achieve quality parchment for Fairtrade and Organic coffee so extension activities are being conducted. In addition all green coffee is hand sorted.

Relationships between the actors in the chain

While the evidence about the relationships between actors in this chain are somewhat contradictory (see Appendix 4), this could be due to growers distinguishing between their relationship with the cooperative and their relationship with their exporter. They appear at one level to believe they get higher prices from their cooperative, but still mistrust their exporter and believe they should be getting a greater return. However, they probably trust their exporter more than they trust other processors/exporters. The Fairtrade/Organic grower group studied as part of this project appeared to have higher levels of social capital and trust in their group than the other groups studied.

Factors influencing on-going change and success

There is considerable synergy between the requirements for Fairtrade and Organic certification, although at present, different agencies and certifiers are required for each. Both require the establishment of cooperatives and traceability systems to operate with smallholder coffee growers. Much of the coffee in PNG would theoretically qualify as Organic and Fairtrade providing growers could be organised to achieve certification. Remote growers use little or no chemicals and coffee is grown in sustainable multi-cropping systems. Consequently, there is scope for considerable expansion of these systems. PNG is also a relatively small player in the world market and would be unlikely to crowd the market for these products.

In the case of Fairtrade and Organic systems, improved price is an important driver for remote coffee growers to be involved. However, a major constraint is the need for growers to be involved with cooperatives to be eligible. Most grower cooperatives in PNG fail and the skills and leadership needed to run a cooperative effectively are not always available. Considerable time, costs and support are required to establish and maintain the group. Leadership is critical and needs to come from the growers themselves rather than be imposed from outside. The costs associated with certification are an additional problem for smallholder coffee growers. Organic certification takes 3 years of continuous effort. Throughout this period, the costs for auditing and inspection must be met even although no premiums are being received. While Fairtrade certification can theoretically occur within around 3 months, the preliminary work required to establish an effective cooperative and to have processes in place to achieve certification means considerably more time is required.

Most smallholders do not have the financial resources, human capital or social cohesion to deal successfully with these issues. Consequently, the support of an outside agency is

required for a considerable time to achieve these ends. At present, the most likely source of support is from a committed exporter with the appropriate cultural understanding and patience. However, the exporter and growers need to develop a considerable level of trust for the relationship to be successful and exporters may not be keen to invest the time and effort required to achieve certification with a grower group given the probability that the growers may sell their parchment elsewhere. Accordingly, any rapid expansion of these systems is unlikely and growers and exporters who move too fast will probably fail.

Another possibility is for an NGO or church group to undertake the work of organising the cooperatives and link them to a Fairtrade/Organic registered exporter. The advantage of this approach is that it expands the amount of coffee potentially available for certification and could decrease some of the problems of trust that arise between smallholder growers and exporters and processors.

Another issue Fairtrade and Organic chains must address is the need for consistent appearance and taste. Organic and Fairtrade growers use similar processing systems to those used by producers for the mainstream Y grade coffee. An inherent problem with Y grade coffee is its variation in appearance and taste. Fairtrade and Organic customers are likely to complain about inconsistent quality and markets could be lost. However, higher prices do provide the means and the incentive to overcome these issues and existing chains are addressing them.

Smallholder cooperative groups producing PSC coffee

Another approach to improving prices for growers is for smallholder cooperatives to improve the quality of their parchment, which they bulk up, contract to a dry mill for processing and then offer to exporters for sale. Their objectives are to obtain higher prices by improving parchment quality, having larger quantities of parchment for sale and to create competition for parchment processing. Two variations of this scheme were investigated, one supported by the CIC and the other by the EU funded ‘Stabex’ project.

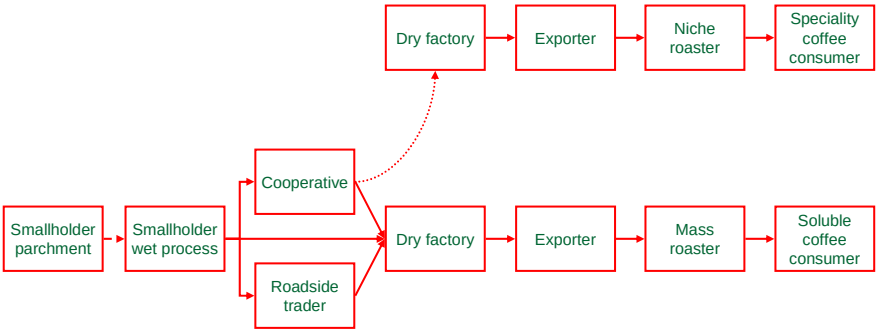


Figure 3: Smallholder cooperative chains

The CIC formed groups were composed of growers who received loans through the Coffee Credit Guarantee Scheme (CCGS). The CCGS was established by the CIC in 1997 under the Smallholder Agricultural Credit Scheme to provide capital to smallholder coffee producers who could not obtain loans from commercial banks because of insufficient capital, security and equity. Growers who received loans were placed into clusters at the village or clan level to facilitate repayment. However, many did not repay their loans in full. Under Phase Two, the CIC established a growers marketing cooperative to process parchment and sell it as green bean, with the hope of obtaining higher prices for the CCGS growers.

The group that was funded by the EU is following a similar approach to the CCGS groups. The EU program provided training, audited the books, looked for buyers (but it did not make the decision) and provided subsidies in the first few years for processing the parchment. However, this group was suspended from the EU program. The EU program later ceased without any obvious improvements or impacts that this project could identify.

Organisation of chains

Because the CIC takes a central role in the formation and support of the CCGS groups, there is no formal chain. The CIC organises the processing of grower groups' parchment through a commercial dry mill and its sale to an exporter. Both the dry mill and exporter can change from year to year. CIC is effectively acting as the chain leader. Growers process their own cherry and the parchment is delivered at a specified time to a number of designated collection points. The focus of these groups is to maximise their prices through a three-fold strategy: to improve the quality of their harvesting, wet processing and drying in order to produce better quality parchment; to have larger quantities of green bean available to sell to exporters to improve their bargaining power; and to cut out the roadside traders and market intermediaries. A similar situation existed for the EU group, although little coffee was processed by the group.

Price and quality control

CCGS groups generally deliver parchment to the cooperative three times per year, in April, July and October. CIC arranges for the processing of the coffee by a contracted dry mill, depending upon the costs of processing and then sells to an exporter based on the price offered for the green bean. Initially, CCGS growers appear to have received price premiums averaging 58 toea (USD 0.20) per kg of parchment (Kuglame [CIC], 2007, pers. com). This equates to a 17% increase in price with a range from 9-24%. Most of the coffee was sold as PSC, which is reflected in its price, but such coffee cannot be sold as a plantation grade. However, in 2005, problems arose when prices increased dramatically and market volatility increased. Because the cooperative accumulates the coffee, processes it and then sells it, normally in 2 to 3 loads a year, the coffee was not hedged during this time and hence growers were not protected against price fluctuations. In many instances, growers received lower prices than they would have if they had sold their parchment directly to dry processors.

These schemes produce coffee using village-level wet processing methods and hence problems remain with the consistency of quality and taste. There are no existing chain quality programs except for the focus on quality by group members and any systems implemented by the dry factory and exporter. Some growers are hand sorting cherry prior to pulping to remove green cherry, but not overripe cherry. Problems arise with the variation in cherry quality, wet processing methods and moisture levels of the parchment.

Because there are no formal linkages along the chain, there is no chain driver for the adoption of a QA system; rather this arrangement is an impediment to the adoption of such systems. Consequently, it is difficult for these schemes to produce coffee for the specialty market. The main driver for improving quality is the higher price growers receive from selling larger quantities of improved quality through the cooperative. The cooperative overcomes the problem for small growers of not being able to receive premiums for quality in the traditional selling system, which relies on roadside traders bulking up small quantities of highly variable coffee.

Relationships between the actors in the chain

Levels of social capital within each of the case study groups varied from below average to above average, reflecting the internal dynamics and environment of each group. Group cohesion is susceptible to both internal and external factors; one group experienced problems when two leaders from the group ran against each other in local council elections, which brought all activities of the group to a halt. Other factors such as disputes over land or stealing cherry can cause dissension.

Another problem for these cooperatives is that the price received from the cooperative and dry factories is very similar, which coincides with the current problem the cooperatives are experiencing in attracting parchment and the dissatisfaction of some members with the time taken to receive payment.

Factors influencing on-going change and success

Both these cooperative schemes use village-level processing methods to produce coffee. They inherently have problems with consistency of quality and taste because there are differences between growers in the quality of the cherry harvested, fermentation methods and times, and the moisture levels of the parchment. However, they can produce better quality coffee than the average smallholder and are rewarded for this. However, without the use of well run centralised wet mills, they are unlikely to be able to enter the specialty coffee market unless they can establish a niche market that is willing to pay a higher price for smallholder coffee. Such markets include Organic and Fairtrade markets.

A key constraint to the long-term success of these schemes is the long-term sustainability of the cooperative groups. Most cooperatives have failed in PNG. Relatively low levels of education among village growers and cultural issues generally lead to the failure of cooperatives due to a combination of conflict, poor management and corruption. One factor in favour of the CCGS scheme is that they initially established a price advantage for their members, although this has not always occurred and has not necessarily resulted in commitment as some growers try to obtain premiums in other ways.

These cooperative groups rely on support from the CIC and the EU, but further support from the CIC is unlikely and the EU project has folded. If all support was removed it is doubtful that these groups would continue in any effective manner. Consequently, replication is a problem. Ideally, CIC staff should be able to work with each group for a couple of years after which time they would be self-supporting, allowing staff to move on to other groups. However, the success rate has not been good and there is only limited opportunity to increase the numbers of growers participating through such schemes as they are currently structured.

Three possible alternatives are available to overcome some of these constraints. The first is for those groups that have access to a centralised wet mill to deliver cherry either as individuals or as a group. Essentially they become part of a centralised wet mill chain targeting the specialty market. Another solution is for a cooperative to build and operate their own wet mill that attains the processing standards achieved by commercial wet mills supplying coffee to the specialty market. This means meeting the standards outlined earlier for the centralised wet mills. Such an approach is popular with growers, but only a few wet mills in PNG manage to achieve this standard. The key constraints are: access to reliable power and water; the large capital outlay required to build a suitable wet mill; the on-going working capital required to maintain the mill at a suitable standard; finding and retaining a manager with the technical, financial and labour management skills required; and cohesive and effective leadership from the cooperative's board. In addition, the group would probably need support from a third party such as the CIC or an exporter and would benefit from developing a relationship with an exporter who could market their product into the specialty market. Only a small number of groups are likely to be able to meet these requirements and succeed by adopting this strategy.

Where the groups are too remote or do not have the capital resources and management expertise to establish and operate their own wet mill, the third alternative is for the group to target the Organic and Fairtrade market. In this case, they must first establish a relationship with an exporter who is willing to help them achieve Organic and Fairtrade certification. An additional advantage of this strategy is that the exporter may be able to facilitate and support the on-going management of the cooperative. As mentioned earlier, perhaps an NGO may be able to assist with this process.

6.1.1 Objective 2: To identify the factors influencing the adoption and on-going success of those innovative schemes

No.	Activity	outputs/ milestones	completion date	Comments
2.1	Conduct face-to-face interviews	Factors influencing the adoption of collaborative marketing and quality assurance schemes identified	June 2008	
2.2		Impediments towards the adoption of QA schemes identified		
2.3		Constraints and impediments towards improving the performance of collaborative collection pricing and processing schemes identified		
2.4	Monitor and analyse operations of selected chains	Reports on each groups activities by CIC Farm Training and Extension staff	June 2008	
2.5	Evaluate relationships within the grower groups and chain	Pre and post training survey completed	June 2008	

Quality impediments

From the grower surveys, the major barriers identified which prevented growers from improving quality were the lack of processing facilities, the lack of training and the lack of finance (Table 18).

Table 18: Barriers to improving quality

	N
Lack of processing facilities	19
Lack of training on harvesting and processing	12
Lack of finance	8
Unfavourable weather conditions	6
Lack of labour	4
Low market prices	4
Lack of extension services	3
Lack of pesticides and herbicides	3
No water supply	3
Lack of resources	3
Lack of infrastructure	3
Aging coffee trees	1

The lack of processing facilities largely related to the lack of pulpers and appropriate fermenting containers. However, at a community level, the lack of infrastructure included the lack of water and electricity and in some communities, the lack of appropriate roads to transport the parchment to dry factories. The lack of finance was evident at three levels: the individual level, the cooperative level and the community level. For individual growers, the lack of capital relates to the inability to purchase inputs (pesticides and herbicides, fertilisers and labour to rehabilitate the trees) and hand pulpers. At the cooperative level, the lack of finance prevents cooperatives from constructing and operating their own wet mills. Furthermore, one of the major financial constraints identified was the need for collaborative marketing groups to be able to pay the growers on delivery for either the cherry or parchment that was supplied. At the community level, the lack of finance related primarily to infrastructure.

At the individual farm level, a lack of labour impacts on the ability to harvest cherry at the correct stage of harvest. Without electricity and without water, growers are unable to pulp

cherry on the same day as harvest for they are often too tired after spending all day in the garden and in many instances, having to manually carry the cherry some distance.

Unfavourable weather conditions can make it difficult to sun dry the parchment. Enclosing wet coffee in the sails for extended periods of time can result in moulds and in the most severe case, phenolic coffee. For smallholder coffee growers, there are few alternatives, but larger wet mills can machine dry the coffee.

At an industry level, discussions with industry players identified three major variables that currently constrain both the production and the quality of the coffee produced in PNG: (1) the poor state of the roads and transport infrastructure; (2) lawlessness; and (3) insecurity of land ownership and tenure.

The poor state of the roads limits the capacity of smallholder coffee growers in remote areas to: (i) access wet mills and thus by default, the growers must produce parchment; (ii) even when parchment is produced, during the wet season, the roads are often impassable and hence: (a) the growers cannot get their coffee out; (b) the parchment must be stored for long periods of time in often substandard conditions with a commensurate reduction in quality; and (c) where it is possible to fly the coffee out, the costs of transport are substantial, thus reducing the potential return to the growers.

Lawlessness needs to be considered from the perspective of both cherry and parchment for the issues are vastly different. In the case of cherry, with the expansion of the specialty market, high cherry prices have encouraged theft from both smallholder coffee growers and the larger block-holders and plantations. Cherry theft most often results in strip picking, where both red and green cherries are mixed in the bag. When processed, any more than 4% green cherry is said to adversely influence the cup taste, introducing raw or grassy flavours. However, many roadside traders and wet mills continue to buy inferior quality cherry, thus providing a means for the disposal of elicit cherry.

Unless cherry theft can be curtailed, there is ample anecdotal evidence to demonstrate that growers at all levels (smallholders, block-holders and plantations) are reducing the level of investment in their coffee gardens. Replanting, pruning and weed control are simply not being undertaken, for growers fear that they will not recoup their investment.

In the case of parchment, theft by both individuals and organised gangs is not uncommon from the grower's property, drying beds, in transit, or from the processing factory.

However, the theft of green bean is more opportunistic and most often associated with accidents or roll-overs in transit.

Problems associated with land tenure are most often demonstrated by a failure to invest in the rehabilitation of coffee gardens on the basis that another tribe or clan may harvest the coffee and thus secure the benefits. However, at an individual level, tribal conflict may result in the complete destruction of coffee gardens.

Impediments to the adoption of collaborative marketing schemes

Objective Two also required the project to identify the major factors influencing the adoption of collaborative marketing and quality assurance schemes. From the survey results, the variables that were considered most important in the successful establishment of collaborative marketing groups were trust, commitment and leadership (Table 19).

Table 19: Things were most important in the successful establishment of cooperative groups

	N
Trust	11
Commitment	9
Leadership	7
Confidence	5
Cooperation	5
Help with loan	4

From an examination of the responses under Objective One, it is evident that both trust and commitment will prove problematic in the PNG coffee industry. Anecdotal evidence suggests that coffee growers will sell to whoever offers the highest price. This will make it very difficult to hold groups together, especially in a volatile market.

The leadership qualities of one or more individuals have been recognised in most if not all of the collaborative marketing groups. In each of the CCGS groups, there is a core group of growers who for various reasons have assumed a leadership role. In two of the schemes under investigation, leadership is derived from ownership. In another group, the capacity to lead is derived from personal relationships established over several decades.

While the project has yet to identify the various sources of power upon which the leaders draw, the impact of an absentee leader has already been observed in one group. This is an issue that will demand further exploration, not only to understand how and why some people become leaders, but more so to provide the groups with a mechanism whereby alternative leaders may be trained to ensure the groups are sustainable.

Forming collaborative marketing groups is one thing: holding them together for any length of time is another. From the survey, growers indicated that the main things that would hold the group together included Christian principles, a willingness to cooperate, good management, a good price and transparency in all business transactions (Table 20).

Table 20: Things that are most important in holding cooperative groups together

	N
Christian principles	10
Cooperation	10
Good management	9
Good price	8
Transparent	7
Agreement/consensus	5

In PNG, the majority of collaborative marketing groups will struggle to secure a higher price, given that they are, in reality, producing only a superior Y grade parchment. At most, they might achieve a USD 0.05-0.07 per pound premium. However, by pursuing Organic and/or Fairtrade certification, there is the possibility of elevating the coffee produced by smallholder growers into the specialty coffee market, where premiums of +USD 0.25 per pound may be realised.

Although the project sought to encourage more collaborative marketing groups to pursue accreditation, the project team is acutely aware of both the lead time (up to three years for Organic certification) and the need for a financially secure business partner to underwrite the process, for smallholder coffee growers in PNG do not make long-term investments without appropriate incentives.

Not unexpectedly, the major reasons that were foreseen to bring about the demise of collaborative marketing groups included too much politics, a lack of trust, a lack of confidence, no cooperation and poor management (Table 21).

Table 21: Things that are most likely to cause a cooperative group to fail

	N
Too much politics	13
Lack of trust	10
Lack of confidence	9
No cooperation	7
Poor management	5

Monitor and analyse operations of selected chains

Under the PRAP process utilised by the CIC Farm Training and Extension, no fewer than three formal reports were prepared. The first of these is a report on the PRAP process itself which identifies:

- those growers who participated in the exercise
- an introduction and expectations
- a Venn diagram of the groups relationships with other actors and institutions
- an historical profile
- a transect walk
- seasonal activity calendar
- SWOC analysis
- problem sorting and ranking
- group action plan

The second report is prepared for the purposes of engendering support from the CIC to deliver the training and the recruitment of the service providers who will be engaged to deliver the training. In considerable detail, the Terms of Reference provide;

- an implementation plan
- a proposed training program, which describes the content of the various training modules to be delivered, when they will be delivered and for how long each module will run - both in terms of formal delivery within the classroom, in the field and any subsequent follow-ups with the group
- a budget

The third report is completed at the conclusion of the training. Written in consultation with the grower group leaders, this report evaluates both the content and the ability of the Service Provider(s) to adequately convey the training material to the group.

CIC Farm Training and Extension staff also met periodically with each group, most often on or about the time that each training module concluded, for in most instances, a different Service Provider was engaged to deliver each of the training modules.

These meetings provided Farm Training and Extension staff with an opportunity to evaluate the operations of each group and to address any impediments which may have been forthcoming.

Evaluate relationships within the grower groups and chain

Relationships between the growers within the group and between the growers and the various market intermediaries with whom they transacted were evaluated, in part, by an analysis of the pre-training and post-training questionnaires.

Using the independent t-test, at p = 0.05, while it was apparent that after training the groups had instigated some means by which sub standard quality coffee could be rejected, the dynamics within the groups was of major concern (Table 22).

Table 22. Means of growers responses to the way in which their collaborative group operates pre and post training

	Pre	Post	p
The group meets regularly	2.48	2.66	0.279
Everyone in the group has an equal opportunity to speak	3.09	3.25	0.369
Everyone in the group is committed to producing good quality coffee	3.32	3.32	0.980
When a group member delivers sub standard coffee it is rejected	2.58	1.93	0.000
Everyone knows how much product each group member has contributed	2.96	2.66	0.150
Selling coffee through the group results in higher prices	3.06	3.10	0.878
Everyone in the group is treated fairly	3.26	3.33	0.656
Everyone within the group is respected	3.32	3.28	0.788
I trust the group leader	3.32	3.16	0.404
I trust the other group members	3.03	2.81	0.172
Group members readily accept responsibility for their actions	3.01	2.66	0.032
Group members deliver on their promises	2.82	2.35	0.004
Conflict is quickly resolved within the group	3.13	2.57	0.001
Group members belong to the same church	2.76	2.36	0.095
Group members belong to the same clan	2.45	2.07	0.048
Group members belong to the same family	1.74	1.17	0.000
People in my village or community can be trusted	2.80	2.07	0.000
People in my village or community are likely to steal cherry from my trees	2.15	2.02	0.545
Processors and exporters give me a fair price for my coffee	2.13	1.93	0.247

Where 1 is I disagree a lot, 2 is I disagree, 3 is I agree, 4 is I agree a lot.

Group members, it seemed, were taking less responsibility for their actions and many were failing to deliver on their promises. Given what appeared to be an increasing ethnic diversity within the groups, trust within the community and to a lesser extent, trust within the group was perceived to be declining. As the groups became increasingly less able to accommodate conflict within the group, many of the groups were destined to fail as soon as support was withdrawn.

Post-training, it was observed that growers had a much better idea of the activities performed by traders and exporters (Table 23). However, despite the fact that each of the groups were linked directly or indirectly to an exporter, with the exception of those growers selling cherry direct to wet factories, there was no marked improvement in the level of trust between growers and their exporters (Table 24)

Table 23: Activities that growers' believe traders and exporters undertake pre-training and post-training

	N	
	Pre	Post
Buy and sell coffee	13	36
Grade coffee		1
Arrange markets	1	6
Process coffee	5	7
Negotiate price	2	
Transport	11	1
No idea	29	

Table 24: Mean of the extent to which growers trust downstream market intermediaries for both cherry and parchment, pre-training and post-training

	Cherry		Parchment	
	Pre	Post	Pre	Post
Other growers	1.74	1.25	1.44	1.10
Grower cooperatives	1.94	1.22	2.76	2.41
Roadside buyers	2.57	2.36	1.70	2.12
Wet/Dry factory	2.73	3.24	2.90	2.28

Where 1 is not at all, 2 is not much, 3 is a little, 4 is a lot.

For those growers producing parchment, while trust in their collaborative marketing group and traders and exporters declined, smallholder coffee growers were found to be more trusting of the roadside parchment buyers. With a greater understanding of the way in which prices are determined in the international market, perhaps now, many growers understood the reasons for the volatility in the roadside price.

6.1.2 Objective 3: To support, promote and facilitate the extension and replication of successful schemes within the PNG coffee industry

no.	Activity	Outputs/ Milestones	Completion date	Comments
3.1	QA training workshop	CIC staff and selected industry participants trained in QA principles	February 2006	
	Generic QA system	Document experiences with implementing QA systems	July 2006	
3.2	Source and develop pilot program materials	Pilot program materials developed	June 2007	
3.3	To support the expansion of participating coffee collection pricing and processing schemes through delivering, testing evaluating and modifying the pilot training programs	Pilot programs delivered, tested, evaluated and modified where required	August 2008	
3.4	To develop new economics and marketing modules in response to the needs of grower groups as their marketing horizon expands	New economics and marketing modules developed		
3.5	To identify and document improvements in quality among the collaborative collection pricing and processing schemes	On-going improvements in quality documented		
3.6	To facilitate linkages between the exporters, grower groups and the CIC	Linkages established	On-going	

Quality training

Under Objective Three, an introductory two day seminar on the principles of quality management was delivered to the CIC on February 13 and 14, 2006.

A total of 19 CIC staff attended the seminar including quality inspectors, extension officers and economists. Based on a formal assessment, the seminar was very well received (Table 25).

Table 25: Quality assurance training course evaluation
CIC, Goroka, PNG, 13-14 February 2006

	1	2	3	4	5	NA
Extremely useful Not useful						
Overall course rating	8	8	2			1
	Too fast				Bored	
Rate of instruction	2	14	2	1		
	Too complex				Too basic	
Content	2	13	4			
	Excellent				Very poor	
Method & style of presentation	10	8	1			
	Excellent				Very poor	
Course materials	5	14				

Participants expressed the greatest satisfaction with understanding how HACCP could be used to identify problems in the processing chain and how HACCP could be used to enable producers and exporters to better satisfy customers needs. The coffee inspectors particularly found the contrast between quality control and quality assurance most enlightening and indeed challenging.

While most participants (8) indicated that there was nothing that they disliked about the course, the major complaint was the speed of delivery: the seminar was too short. Not unexpectedly, it was suggested that the concept of HACCP will prove challenging for the CIC to adopt, for it represented a significant departure from the traditional role of inspecting poor quality out (quality control) to facilitating and assisting industry to build quality in (quality assurance).

Two additional half day information sessions were presented to industry leaders in Goroka (February 15) and Mt Hagen (February 17). With the exception of those processors and exporters who wished to sell to Starbucks, or were currently supplying Organic or Fairtrade coffee, there was no perceived need to seek formal accreditation under any quality assurance system. Quite simply, the market for Y grade coffee did not currently require its suppliers to be certified.

There was also some doubt expressed, given the predominance of smallholder growers in the PNG coffee industry, as to whether: (1) it would be possible, even in the long-term, to improve the quality of PNG coffee; and (2) whether there was a market for superior quality Y grade coffee. There was a perception that PNG coffee occupied a certain price position in the market. Efforts to improve quality might well result in roasters purchasing a lower priced substitute for their blends, thereby reducing the demand for PNG coffee. Such a position is not without foundation, for unless the exporter has entered into a forward contract with a customer who demands a superior quality product and is prepared to pay for it, growers will not receive any price incentive for quality. Furthermore, as commodity prices are determined primarily by supply and demand, a sudden or anticipated reduction in world supply may see prices rapidly increase, irrespective of quality.

While the costs of compliance and annual audits were also perceived to be a constraint, especially for the small growers, it was apparent that most participants failed to grasp the potential benefits that might accrue to their business from the successful implementation of quality assurance systems.

Development of a generic HACCP plan

In April 2006, a two day HACCP training course was conducted for the collaborative marketing schemes participating in this project. Grower representatives from the CCGS programs in the Eastern Highlands (5) and Chimbu (2) attended, with four representatives from CIC and the grower liaison officer from Monpi Coffee Exports.

Arising from that workshop, a generic HACCP plan was developed for the PNG coffee industry (Figure 4)(Appendix 5). Although the plan commenced at the pre-planting stage, this proved problematic, for most growers had already planted coffee and would only plant coffee on land that they owned, irrespective of its suitability.

In undertaking the analysis at the grower level, the only food safety issue to emerge (CCP) was the possibility of growers using inappropriate chemicals at inappropriate rates of application and that coffee potentially finding its way into the system. Fortunately, the likelihood of this occurring is very low, for the majority of coffee growers do not use chemicals to control pests or disease. Nevertheless, a number of potential issues were raised with regard to the use and storage of chemicals: in particular, herbicides.

Not unexpectedly a number of critical quality points (CQP) emerged in the farm level processing of cherry:

- harvest
- delays in the transport of cherry to the wet mill
- the processing of cherry contaminated with sticks, leaves, stones and animal faeces
- fermenting

A number of quality points (QP) were identified including:

- pulping
- drying
- storing

Each of these processes, if not performed correctly, has the potential to downgrade the quality of the parchment produced by smallholder coffee growers. As many of these faults emerge only in the cup, growers recognised the need for quality assurance training so that they, in their collaborative marketing groups, could be assured that all participating growers were following the prescribed practices. In particular, growers learnt of the importance of pulping the cherry on the same day of harvest or the need, if they were unable to process it, to store the cherry under water overnight.

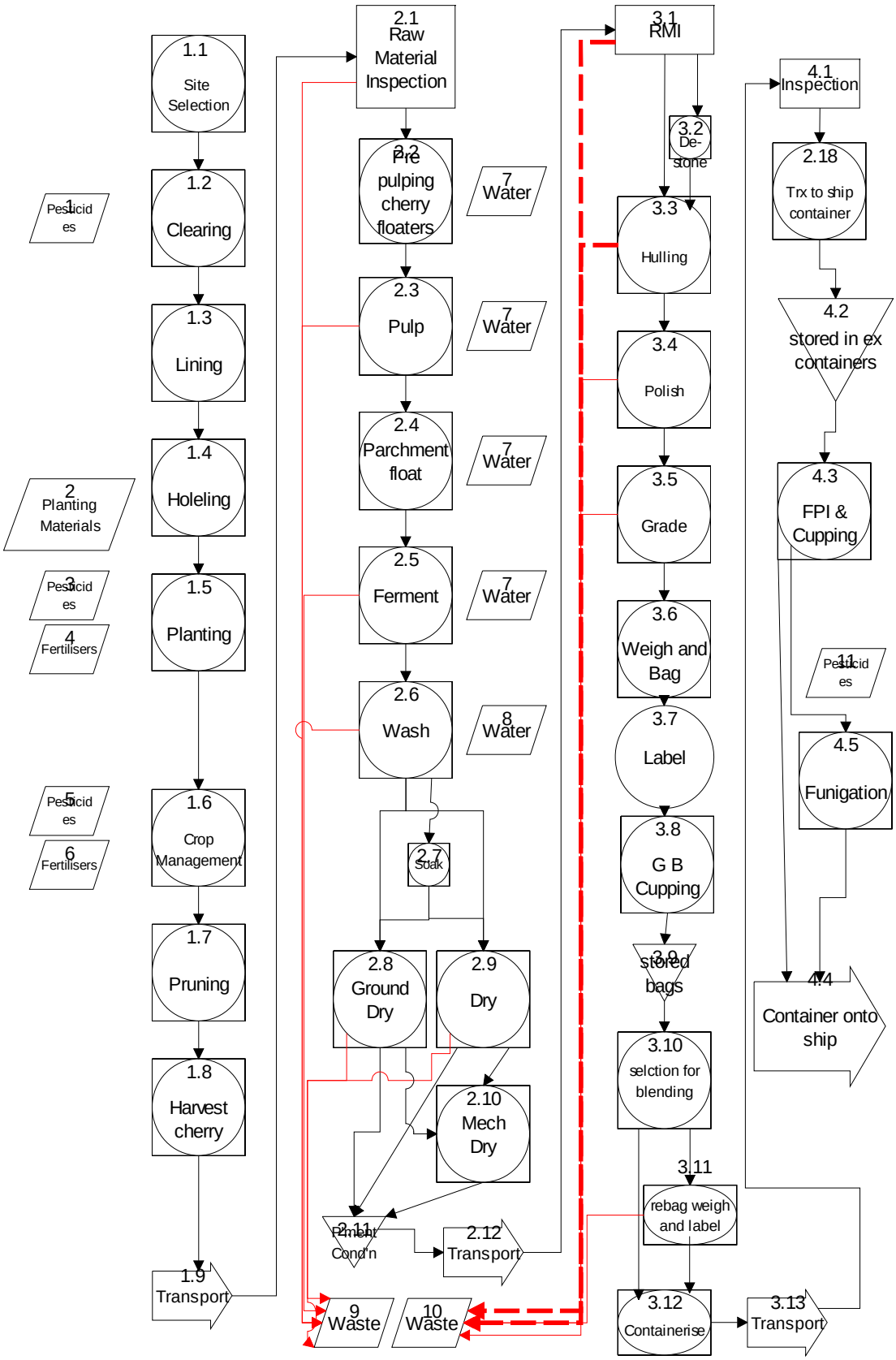
In proceeding to explore the downstream processing of the parchment to green bean, it was abundantly clear that the growers had no idea of the processes involved, the recovery rates or the economics. In order to obtain this information, the project team visited a number of both wet and dry factories including Lahamenegu, Minihalo (Monpi), Sihereni, Madan (Highland Arabicas) and Sigri. The processes were then documented and verified in the subsequent visit by the project team in July. Meetings were also conducted with each of the CCGS grower groups to verify the prevailing quality assurance practices on farm.

Development of training materials

Prior to undertaking the PRAP, it was envisaged that the project would need to develop five training modules on:

- finance and budgeting
- agronomy and crop husbandry
- quality management (in coffee processing)
- marketing
- leadership

Figure 4: A Generic HACCP Plan for the PNG Coffee Industry



These expectations were largely supported by the results from the PRAP (Table 26).

Table 26: Training needs identified by the collaborative marketing groups

	N
Financial management	5
Coffee husbandry	5
Quality management	4
Marketing	3
Integrated pest management	3
Writing loan applications	2
Nursery management	1

Several of the groups requested training in the preparation of applications for community loans/assistance from various government instrumentalities and NGOs. It was proposed that two 3-5 day training programs be conducted: one in the Eastern Highlands and one in the Western Highlands for between 2-3 participants from each group.

In consultation with the CIC Farm Training and Extension, the project team sought to identify the training materials that were currently available to service providers. Two new modules on quality management and marketing were developed by CIC staff from the Economics Division and Farm Training and Extension, with guidance from the project team. A financial management module was taken from Oxfam and developed by the Department of Agriculture and Livestock, following consultations between the project team, DAL and a service provider. The agronomic and crop husbandry module, integrated pest management module and nursery production module were developed from existing material by Farm Training and Extension staff.

Training was delivered to each of the groups with due regard to the coffee season and the production cycle:

- coffee rehabilitation/agronomy (October - November)
- bookkeeping (February - March)
- marketing (February - March)
- postharvest processing of parchment (pulping, fermenting, washing, drying, storage) (March - July)
- donor funding (July - August)

From the PRAPs, each of the eight groups identified a number of social issues which were prevalent within their communities and which had the potential to obstruct or to impede both the collaborative marketing groups and the subsequent delivery of the training programs. These underlying social issues included laziness, gambling, drug and alcohol abuse, violence and HIV/AIDS.

Following their participation in a ten day Personal Viability Training (PVT) program, Farm Training and Extension staff requested that an abridged 3 day PVT program be given to each of the groups, prior to the delivery of the training programs. Anecdotal evidence provided by both Farm Training and Extension staff and the group leaders suggests that the PVT empowered participants to take control of their own lives, opened their minds and made them more receptive to the training.

Prior to the delivery of the training programs, in August 2007, three workshops were held in Goroka, Kundiawa and Mt Hagen with the service providers subcontracted by the Farm Training and Extension staff to deliver the training material. Such was undertaken to ensure that all service providers were aware of the project objectives and the need for training in financial management, agronomy and crop husbandry, processing and quality management and coffee marketing.

Although the PRAP were completed for all eight groups, CIC were unable to proceed with the training for two groups. For the Sihereni group, tribal conflict re-emerged and various allegations of misconduct were directed towards the group leader. For the CCGS Fimito group, with two prominent members of the group seeking a position in local government, the group fragmented. This situation was aggravated by the unexpected death of a number of village elders.

At the grower level, the funding provided by ACIAR enabled CIC to re-engage the industry and to provide a range of training programs. In August 2008, three graduation ceremonies were conducted in Muturu, Mindima and Banz (for the three groups in Mt Hagen). On each occasion, financial support from the Australian government was duly acknowledged and CIC thanked for their support in facilitating the delivery of the training programs.

Development of economics and marketing modules

In consultation with the CIC Economist and Farm Training and Extension staff, a marketing and quality management training manual was prepared. Through a number of interactive workshops in Aiyura and discussions with group leaders, the modules were refined and subsequently pilot tested. However, when the project concluded in September 2008, not all groups had been trained in marketing and thus no evaluation of the marketing module was available. As a result, no further marketing modules were developed.

Improvements in quality

Although the PRAP's were completed on time, the subsequent delivery of the training programs was delayed six months by the PNG general elections. As the training was delivered in the last twelve months of the project, given that this was only a three year project, no formal evaluation of any improvement in quality could be undertaken.

Linkages established

Either directly or indirectly, at the inception of the project, each of the groups participating in this pilot project were linked to an exporter. As no new groups were formed, there was little opportunity to establish any new linkages. Nevertheless, on numerous occasions, the project team endeavoured to facilitate a visit to an exporter's premises to show group leaders what activities exporters undertook. Of particular interest was the desire to have group leaders participate in a cup tasting and thus to appreciate for themselves how the way in which they processed the coffee influenced the final flavour profile. However, on each and every occasion that these visits were planned, circumstances beyond the control of the project team forced their cancellation.

Throughout the duration of the project, the project team maintained regular contact, both formally and informally, with a number of processors, traders and exporters, irrespective of whether they were participating in the project. These visits provided valuable insights into the way in which coffee was purchased, processed and how the exporters managed their business. Requests for commercial-in-confidence information were often met favourably. In this respect, the project team provided a valuable conduit between CIC and the exporters.

6.1.3 Objective 4: To communicate and disseminate the project results and activities

no.	Activity	Outputs/ milestones	completion date	Comments
4.1	Communicate project activities through media	Media releases and interviews	On-going	Media releases were written and submitted to the office of the CEO after most visits. However, the subsequent release and publication of this material was at the discretion of the CEO
4.2	Conduct implementation workshop	Implementation workshop	July 2006	
4.3	Communicate outcomes of PRAP and training to chain leaders	Report to chain leaders Meeting with chain leaders		
4.4	Conduct research forum	Research forum		An executive decision was made by the CIC on June 17, 2008 to cancel the proposed research forum

Media releases and outputs

Over the duration of the project, a number of articles appeared in the press both in PNG and Australia:

- Farm Weekly (2008), Muresk is in a PNG brew: October 9: 17.
- Post Courier, Friday, July 1 (2005), Aust help to boost local coffee price.
- Post Courier, Thursday, July 7 (2005), Two year project to find better coffee markets
- Radio Australia. July 14 (2005)
- Muresk Messenger (2004), Restoring the taste to smallholder coffee in Papua New Guinea.

Over three years, no fewer than six peer refereed papers were presented to international research conferences and research symposia:

- Murray-Prior, R., Sengere, R. and Batt, P.J. (2008), Overcoming constraints to the establishment of collaborative marketing groups for coffee growers in the Highlands of PNG. Sixteenth International Symposium on Horticultural Economics and Marketing. Chiang Mai. December 7-11.
- Api, F. Murray-Prior, R., Aroga, L. and Batt, P.J. (2008), Establishing partnerships between private sector and government to deliver extension and training to smallholder growers in the PNG coffee industry. Fifth International Symposium on Horticultural Education, Extension and Training. Chiang Mai. December 7-11.
- Murray-Prior, R., Batt, P.J., Dambui, C. and Kufinale, K. (2008), Improving Quality in Coffee Chains in Papua New Guinea, In Batt, P.J. (ed) Proceedings of the Second International Symposium on Improving the Performance of Supply Chains in the Transitional Economies. Acta Horticulturae 794: 247-255.
- Murray-Prior, R. and P.J. Batt (2007), Emerging possibilities and constraints to PNG smallholder coffee producers in entering the specialty coffee market, in Batt, P.J. and Cadilhon, J-J (ed), Proceedings of an International Symposium on Fresh Produce Supply Chain Management. December 6-10, Lotus Pang Suan Kaew hotel, Chiang Mai, Thailand: 373-388.

- Batt, P.J and R. Murray-Prior (2006), Building capacity within the PNG coffee industry to improve returns for smallholder coffee producers. FAO/AFMA/FAMA Regional workshop on Marketing Training in Agricultural Supply Chains. November 20-24, PNB Darby Park, Kuala Lumpur, Malaysia [cd]
- Batt, P.J. and R. Murray-Prior (2006), Assessing and extending schemes to enhance the profitability of the PNG coffee industry via price premiums for quality. Proceedings of the FAP-Vredeseilanden Seminar, Enhancing capabilities of NGO's and Grower Groups to Link Growers to Markets. Sanur Paradise Plaza, May 9-12.

On each occasion that the project team visited PNG, a press release was drafted and submitted to office of the CEO. However, whether or not these press releases were published was at the discretion of the CEO.

Implementation workshop

The first introductory workshop was conducted at the National Sports Institute in Goroka on July 6, 2005. Although the timing of the workshop was far from ideal, for July is one of the busiest months in the PNG coffee industry, some 17 industry representatives attended (8 growers and 9 processors and exporters (from 6 companies).

The workshop sought to inform industry and outline the basis of the project, discuss the key concepts of business-to-business marketing, the need for long-term relationships and the need for a total quality focus to improve the profitability of the PNG coffee industry. However, more fundamental was the need to engage industry and for industry to not only take a degree of ownership, as evidenced by a number of groups willing to be involved, but for smallholder coffee producers, traders and exporters to realise the mutual benefits that could potentially arise from working together to collectively improve the quality of PNG coffee.

After delivering the opening address, it was immediately apparent from the very positive response from industry that the project team had successfully managed to capture the major issues impacting upon the poor quality of PNG coffee. It was most evident that there was a significant gap in the price between PNG Y grade coffee (USD -0.17 to -0.14 per pound) and specialty coffee on the NYC. Rather than to put more PNG coffee into the specialty market, some members of industry thought the project should aim to reduce the discount on the NYC by USD 0.05. This alone would have a positive and significant impact on the value of the industry as 80% of the coffee exported from PNG is Y grade.

Some exporters suggested that the greatest challenge for the PNG coffee industry was to secure tenure for PNG coffee on the NYC, although this had significant negative cost implications if and whenever coffee was rejected on arrival. Others felt that the most immediate way to improve the value of PNG coffee was to increase production. The problem was not price but low production.

However, it was evident that production would only increase if growers could generate sufficient returns. The abundance of abandoned plantations and blocks indicate that if issues such as land tenure, lawlessness, the poor infrastructure and finance were adequately addressed, the importance of coffee within the PNG economy would increase many fold.

Other factors adversely impacting upon the quality of PNG coffee included: the lack of water and machines (pulpers); poor agronomic practices; the lack of education among smallholder coffee growers (particularly with regard to quality); non standardised processing practices (pulping, fermenting, washing and drying); and opportunistic buying practices (particularly among roadside traders and dry mills, who in purchasing poor quality parchment, undermined the efforts of the processors and exporters to reward growers for producing better quality coffee).

As this meeting was one of the very few in which growers, processors and exporters had willingly participated together, not unexpectedly, the desire the build enduring long-term

relationships emerged as a high priority among all parties. Exporters and processors reinforced the need for smallholder growers to form collaborative marketing groups so that, upon implementing standardised processing systems, they could deliver a long line of consistent quality parchment to processors. Regrettably, however, there was a desire among the growers, to move towards grower operated dry mills. Two factors make this undesirable: (1) there is surplus dry mill capacity; and (2) a lack of expertise at the grower level to adequately operate and manage a dry mill.

A second workshop was conducted in Mt Hagen on October 7, 2005, at the Highland Agricultural Training Institute. On this occasion however, only 6 industry participants attended. As a result, the format of the workshop was modified to provide an overview of the project goals and activities (an identical power point presentation) and to facilitate a general discussion.

The major issue to emerge from the Mt Hagen workshop was a perception that most coffee companies in the Western Highlands were more concerned about volume rather than quality. As the one price system most widely practiced by traders and processors in Mt Hagen failed to reward growers for producing better quality coffee, the quality was perceived to have progressively declined.

The second issue related to the lack of capital. Those growers and processors present suggested that they knew what they needed to do to produce better quality coffee, but as the coffee industry had a very poor financial reputation, the major banks were unwilling to extend credit. As a result, growers could not secure the finance that they required to purchase fertilisers and chemicals and processors were unable to secure the credit lines they required to either advance loans to preferred suppliers or to purchase coffee at the factory door.

The third issue related to the mechanisms currently used to regulate quality in the PNG coffee industry. Those present recognised that controlling quality at the port of departure was unlikely to result in any significant improvement in quality. As all the costs had been incurred and since the exporter in most instances had to meet a forward contract, relying on end point inspection was only likely to result in inefficiencies in quality improvement.

In order to improve the quality of PNG coffee, the industry representatives present in Mt Hagen suggested that this might best be accomplished through the formation of collaborative grower groups; providing training to those grower groups in agronomy, processing and marketing; and then linking the groups to exporters who had a reputation from marketing superior quality coffee. Building linkages with the exporters was perceived to result in greater transparency, a much greater appreciation of market prices and dynamics and to overcome much of the distrust that currently pervaded the industry.

Communicate outcomes of PRAP and training to chain leaders

As indicated under Objective Two: to monitor and analyse operations of selected chains, at the conclusion of the training programs, in consultation with group leaders, Farm Training and Extension staff evaluate both the content and the ability of the Service Provider(s) to adequately convey the training material to the group. This simultaneously provides an opportunity to evaluate the outcomes of the PRAP and to identify any subsequent training which the group deems to be necessary. However, any additional support to the group is not immediately forthcoming, for approval must be sought from the CIC to engage the service providers and the appropriate Terms of Reference established.

The extent to which processors, traders and exporters become involved in the process is related to the target market. Where certification is required under any one of the quality assurance systems operating in the specialty coffee market, traders and exporters are intimately involved, but not so when the coffee is destined for the Y grade market.

Research forum

From the outset of the project, the project team was committed to the delivery of a research forum at the conclusion of the project to:

- extend the findings of the project
- develop a plan for replicating successful collaborative collection pricing and processing schemes
- promote the project activities

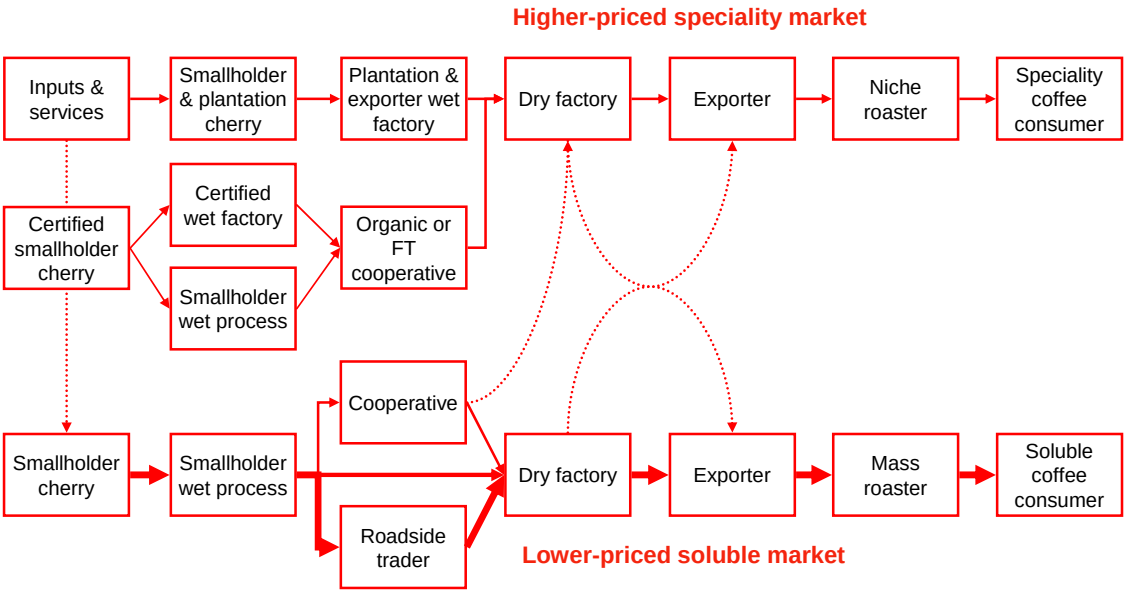
A proposal was developed and delivered to relevent agencies and CIC for consideration, but their support was not forthcoming and an executive decision was made in July 2008 not to proceed.

7 Key results and discussion

7.1.1 The PNG coffee marketing system

In PNG, there are two alternative routes to market for smallholder coffee producers (Figure 5).

Figure 5: Alternative supply chains in the PNG coffee industry



The soluble coffee supply chain

Traditionally, smallholder coffee growers in PNG harvest their cherry and through some very rudimentary on-farm processing systems, pulp, ferment, wash and dry the coffee to produce parchment. Once dried to 12 -14% moisture content, parchment can be stored at the village level for several months. Whenever the need arises for cash, the parchment is then sold to roadside traders or to the dry factories, where the parchment is machine dried, hulled and polished to produce green bean. After processing, the green bean is purchased by the exporters, who then blend, bag and transport the coffee to Lae where it is subsequently re-packed into bulk shipping containers (21 tonnes) for export.

For soluble coffee, the major markets are Germany and Australia. Into this market segment, price competition is intense, with roasters generally buying from whichever exporter offers the lowest price on the day - subject to confirmation after inspecting a sample. With some five roasters controlling 54% of the market, traders and exporters have little countervailing market power.

The specialty coffee market

For smallholder coffee growers, there are two alternative routes by which to enter the specialty coffee market. For those growers close enough to deliver the cherry to a wet mill on the day of harvest (or where the wet mill arranges transport to collect the cherry), the wet mills are capable of producing coffee not dissimilar to the plantation grades. At this level, the key difference between that coffee which is destined for the soluble market and the specialty market is the more consistent means by which smallholder cherry is processed. Otherwise, with the exception perhaps of bean size (for the plantations and block-holders are more likely to use fertilisers and more appropriate agronomic techniques to improve productivity per unit area), there is little difference between smallholder cherry and plantation cherry.

However, in the specialty market, the majority of buyers also require their suppliers to institute various quality assurance programs which seek to protect the environment and or to protect and provide the growers with returns commensurate with their efforts. Through such mechanisms as Fairtrade and Organic certification, it is also possible for smallholder coffee growers to enter the specialty market. However, the key limitations in this market are; (1) the ability of smallholder coffee growers to produce parchment which delivers the desired taste in the cup consistently; (2) the costs and the investment in time required to achieve certification. For Organic certification, it will take no less than three years to be fully certified during which time there is no financial incentive for those growers who follow prescribed practices; (3) the annual costs of auditing and verification; (4) the need for functional collaborative marketing groups; and (5) the on-going financial and technical support from the trader or exporter.

While these two coffee chains co-exist side by side, they are not mutually exclusive. For various reasons including equipment failure, power cuts, or an over supply of cherry, the quality of the parchment produced by the wet mills may fail to meet the quality standards demanded by the specialty market. Rather than to risk damaging their reputation in the market, such coffee may be diverted from the specialty market into the Y grade or soluble market to recover at least some of the costs. It is also conceivable that where smallholder growers, acting individually or collectively, follow prescribed processing practices, the resultant coffee may enter the specialty market. Elimbari, the premium brand produced by Kongo Coffee, is said to be derived primarily from smallholder parchment.

Even where a smallholder coffee grower may be selling their cherry direct to a wet mill, the need for an alternative route to market is evident. During the off-season, it is not unusual for some cherry to be produced. Known as the fly crop, the quantities of cherry available may be insufficient to recover the cost of despatching a truck to collect it. Furthermore, following the recent introduction of a cherry ban, unless there is a licensed buyer in the vicinity, the grower may be unable to sell the cherry. Thus the only option for the grower, if they have time, is to harvest and process the cherry themselves. When the need for cash arises, the parchment is then sold to roadside traders.

A similar situation may arise for those growers selling parchment through collaborative marketing groups. When sudden and unanticipated social obligations arise, parchment may be sold through the roadside traders for immediate cash. While the net returns may be higher selling through the collaborative marketing group, given the delays in payment, the grower would otherwise be unable to meet their social obligations. Hence, there are some very strong social and economic drivers supporting the retention of the dualistic coffee supply chain in PNG.

Price incentives

PNG currently supplies the majority of green bean into the soluble coffee market as Y grade at a discount ranging from USD 0.05 to 0.18 per pound. While opportunities exist to improve the quality of the smallholder coffee produced through training and the adoption of standardised processing systems, the potential gains available to the industry range from only USD 0.05-0.12 per pound. A far greater economic benefit can be achieved by moving more PNG coffee from the soluble to the specialty coffee market.

On the demand side, the specialty segment of the market is expanding. Although world coffee consumption remains stable at around 110 million bags per annum (ICO 2006), as consumers personal disposable income increases, consumers are not only trading up to higher quality coffees, but paying increasing attention to such issues as sustainable production, conservation and fair trade.

Fortunately, in many of the more remote locations of PNG, while the high costs of transport may significantly reduce the net return to growers, the high costs of transport may also preclude the use and purchase of inputs. As a result, such “natural” coffees, with appropriate certification, may readily find a niche in the organic market.

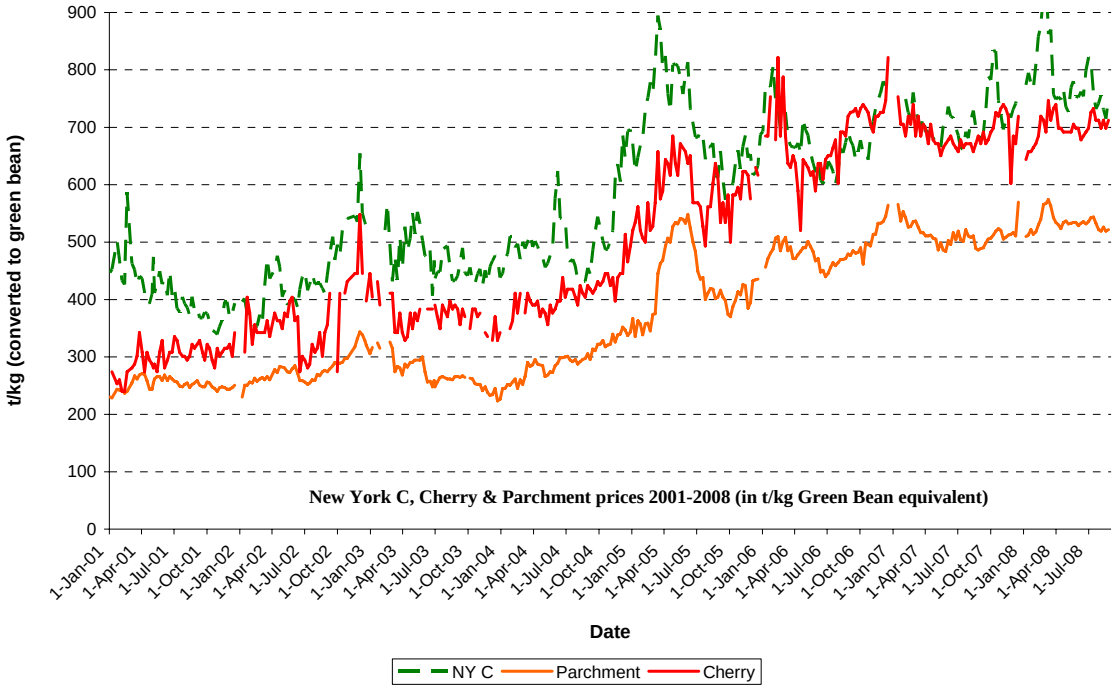
Although organics is a rapidly growing segment of the market, it commands at best about 2% of the market (Wheeler, Kufinale and Alu 2003). Furthermore, this segment of the market is beset by inconsistencies and confusion in the proliferation of different labels which attempt to either enhance or claim affiliation with the product without the rigorous application of the certifying procedures which define the term organic.

Despite the high costs associated with certification, the CIC reports that Organic coffee receives a price premium of at least 32% over Y grade (fob Lae)(Dambui et al 2006). However, the value of the premium is very much dependent on: (1) the quality of the coffee itself; (2) the overall price level in the market; and (3) the customer to whom the coffee has been sold (Wheeler, Kufinale and Alu 2003). In this respect, it becomes all the more important for those coffee growers wishing to pursue the organic market to deliver good quality parchment, reliably and consistently.

Additional value may also be extracted by pursuing registration under one of the Fairtrade labels. Like the organic movement, the Fairtrade initiative authenticates the product, but does not actively trade in it (Wheeler, Kufinale and Alu 2003). Fairtrade aims to provide small coffee producers with an opportunity to negotiate better terms of trade and to extract higher prices from roasters or packers. Under Fairtrade: (1) the roaster or buyer must facilitate access to credit for up to 60% of the value of the contracted coffee; and (2) the purchasing price must be fixed in accordance with the standard conditions of trade set by the Fairtrade initiative.

It is evident, in relation to the prices paid by traders and processors that parchment is purchased at a significant discount, reflecting the lack of control and the inherent variability in smallholder parchment (Figure 6).

Figure 6: New York C cherry and parchment prices: 2004-2008 (t/kg GBE)



Despite the higher price paid for cherry on a per kg basis, most growers seem unable to calculate the added value. With the conversion rate from cherry to parchment averaging 5 to 1, where growers receive K 4.50 per kg for parchment, the price per kg for cherry is equivalent to K 0.90 per kg. However, with the wet mills paying up to K 1.15 per kg for cherry, this represents an additional gain of K 0.25 per kg for the grower at the farm gate, with no additional cost.

For the processors, purchasing cherry entails significantly less risk, for quality can be readily assessed by observation at the point of delivery. Processors should only purchase

uniform red ripe cherry. Although 2-4% of under-ripe and over-ripe cherry is acceptable, larger amounts will introduce pulping problems, uneven fermentation and reduce the cup quality. For the growers, the sale of cherry results in significantly less work and thus, where labour must be employed, a significant savings in cash reserves. There are savings in transport costs as most wet mills collect the cherry directly from the farm or some designated collection point in order to secure the cherry. Furthermore, there is less likelihood of product deterioration through poor and inappropriate storage in the home (smoke damage and moisture) and less risk of theft, for parchment is to most growers, the major means of providing cash to meet anticipated household and social expenses.

For those smallholders producing parchment, it will prove very difficult to provide any price incentive for superior quality coffee without a parallel increase in scale. While the quality of the parchment can be readily determined by visual inspection and the moisture content evaluated by either biting the bean or using a moisture meter, quality is ultimately determined by the taste in the cup. Quite simply, it is not cost effective for processors to cup taste every bag of parchment that they receive. For those collaborative marketing groups and block-holders that trade in parchment, price incentives will be best conveyed by paying growers on the basis of recovery rates. With recovery rates at the dry mill averaging 68%, where growers provide parchment that is appropriately dry and free of foreign matter, recovery rates will improve to 81%. For the processors, as the profitability of their operations is contingent upon maximising the recovery rate, such an incentive mechanism will also minimise their risk, thereby transmitting price incentives directly to growers.

Price transmission

One of the underlying premises upon which this project was funded was that smallholder coffee growers in PNG were subject to exploitation by downstream traders, processors and exporters. With PNG coffee growers receiving between 68-80% of the FOB (Lae) price, there is little evidence to support this (Table 27).

Table 27: Growers share of the gross FOB price (Lae) for green bean

Comparison of NYC, Parchment and Cherry Prices	US c/lb	PNG t/kg
NYC	105.45	764
- Discount	-16	-116
FOB (Lae) Y grade per kg		648
Parchment (per kg) at factory door		353
Green bean equivalent		441
% FOB		68
Cherry (per kg) at factory door		83
Parchment equivalent		415
Green bean equivalent		518
% FOB		80
Advantage to cherry		
Green bean equivalent		77
Parchment		62

Assumptions: kg/lb = 2.2046, green bean recovery rate = 0.75, cherry to parchment = 0.20, exchange rate = 0.3403

Few growers understand the price volatility of the market. Wild fluctuations in price most often lead growers to the erroneous assumption that traders and exporters are taking advantage of them. Few growers understand the international market dynamics, risk management and the costs associated with export. In an industry where economies of scale offer significant financial benefits, competition between the traders and exporters to secure the growers coffee is intense.

However, after many years of discord, enduring long-term relationships will take some time to build. Through engaging in an open and transparent dialogue on costs and prices, growers will learn not only to appreciate the risk traders and exporters endure, but to more fully appreciate downstream customers demands. With complete disclosure on prices, trust will not only increase, but growers will come to realise the importance of working through traders and exporters to maximise the price they receive.

With a greater understanding of customer needs, growers will be less likely to engage in opportunistic trading and with appropriate recognition it is even possible for growers to assume some ownership of the brand and thereby to undertake additional activities to protect the integrity of the brand. While traders and exporters have a legitimate right to command and to lead the supply chain, the use and application of coercive power must be minimised. Trust can be facilitated through the delivery of training programs and to the maximum extent possible, by providing soft loans to preferred growers and collaborative grower groups to purchase farm inputs and to meet sudden unexpected social obligations. However, not unexpectedly, in delivering superior quality coffee to customers, the expectation of receiving higher prices will provide the major incentive for all actors in the supply chain.

Improving the quality of PNG coffee

To improve the quality of PNG coffee at the smallholder level, it is necessary to address two interrelated issues: poor productivity and low price.

At an industry level, three key issues have repeatedly emerged: (1) poor road access; (2) lawlessness; and (3) problems associated with land tenure and ownership. Coupled with the general decline in the farm gate price, these factors have collectively contributed to the demise of the plantation sector and the perception by coffee buyers in the world market that the quality of PNG coffee has declined.

At the individual farm level, the major problem for smallholder coffee growers is the need for cash to meet anticipated household and farm expenses. As household expenses (including school fees) and social obligations receive first priority, there are often insufficient funds available to provide for the costs of labour to prune the coffee trees and to provide fertilisers and chemicals. As a first priority, training programs must be delivered to encourage growers to save a greater proportion of the income generated from the sale of coffee and to develop and manage a household budget.

However, within the prevailing social system in PNG, this will prove to be difficult, for related family members are still able to call upon any readily accessible funds. To overcome this constraint, several processors and traders are voluntarily withholding a proportion of the income received from coffee sales to pay for anticipated household and farm expenses. Not unexpectedly, those growers who choose to leave some funds with downstream buyers are not only more likely to receive cash advances should it become necessary, but they are also signalling their intention to enter into a long-term relationship.

The principles of budgeting rely upon managing two key variables: income and expenses. In addressing farm income, two subsequent variables are involved; yield and price. Yield is best addressed by considering those agronomic components: pruning, fertilisers, pest and disease control, drainage and shade that impact on productivity. Price, on the other hand, is more complex, for price is a function of supply and demand in the international market, the investment decisions made by the financial institutions, quality and quantity. In agricultural markets where prices are determined primarily by supply and demand, growers are more certain of their costs than they are of their returns. Not unexpectedly, with limited financial resources, the amount of money smallholder coffee growers are willing to invest to sustain their coffee trees is very much dependent on the prices they expect to receive.

At the individual farm level, the CIC reports that there is a significant and positive relationship between productivity and price (after a one year lag), with price explaining

82% of production levels and a price elasticity estimate of 0.37 (CIC 2002). Historically, as farm gate prices have declined, smallholder coffee growers have become increasingly reluctant to invest in coffee production. As a result, soil fertility has declined, trees are ageing, there is minimal pest control and with general mismanagement, productivity per unit area has generally declined.

Even although prices have increased over the last few years, there is little evidence of any renewed interest or enthusiasm to invest in the coffee industry. At the farm level, an increasing demand for cherry has simply resulted in a marked increase in cherry theft. Unable to protect their investment, growers are reluctant to rehabilitate their coffee gardens, knowing full well that they are unlikely to benefit. Furthermore, the benefits of rehabilitation are generally achieved two to three years after the intervention. In a highly volatile market, there is an element of risk that any investment may not be recovered.

Pruning is one of the best ways to improve yields and extend the productive life of the coffee trees (CRI). However, the extent to which smallholder coffee growers are willing to employ the labour to prune is very much dependent upon the anticipated price in the market. Typically, smallholder coffee growers will allow the trees to go into a sedentary stage during times of low prices and will only harvest sufficient coffee to meet their immediate requirements for cash or to meet social obligations. Even when the prices rise, a household will only harvest as much coffee as they can carry and process in a day.

While growers can to some extent influence the productivity on farm, growers have much less control over price. In the international market, coffee prices are determined primarily by supply and demand and the investment decisions made by speculative fund managers and financial institutions. While demand is relatively stable, supply is susceptible to seasonal variations, natural catastrophes, political instability and conflict in any of the world's major coffee producing nations.

Coffee has for some time been considered as a homogeneous commodity and priced against the level established in one of the main terminal or futures market. Prices in the futures market are essentially speculative, where traders deliver coffee or take delivery of coffee with respect to contracts that have yet to be closed. Exporters, dealers and traders deliver coffee to the market if the prices being quoted on the futures market are higher than those being offered by the roasters. Likewise, traders, dealers and roasters can take delivery of coffee from the market if the prices being quoted are lower than what they are currently being offered by exporters (Wheeler and Kufinale 2005).

The futures market essentially enables different participants in the industry to hedge against the risk of adverse movements in price. Coffee exporters generally hedge to cover two potential risks: the risk that prices will rise when the trader has a fixed price contract to sell and the risk that the price will fall before the transaction is concluded with the buyer (Wheeler and Kufinale 2005). As the majority of PNG coffee is sold under the European Coffee Federation European Coffee Contract, although the freight is paid by the buyer, the buyer does not take delivery of the product until it arrives at its destination. Consequently, if the coffee has been mishandled in transit and the quality has deteriorated, the exporter must bear the associated costs and risks

For most smallholder coffee growers in PNG, participation in the futures market is not an option. Not only is the minimum quantity required too large (18 tonnes), but the cost of hedging and securing a price in the futures market is beyond the capacity of most growers and indeed, beyond most small exporters (Wheeler and Kufinale 2005).

Furthermore, there is a risk associated with managing currency exchange rates, the price differential (or discount) and the inherent risk that the product itself may fail to meet the customer's specifications. As smallholder growers do not have the expertise to perform these activities any more efficiently than the existing traders and exporters, little financial benefit will be derived by encouraging smallholder growers and grower groups to transact directly with overseas buyers. Quite to the contrary, a new and inexperienced exporter will

find that with no prior trading history, they will be forced to sell their coffee at a significantly greater discount in order to close the sale.

Under the traditional system of marketing, there is much variation in the quality of the parchment produced by smallholder growers. Fortunately, each of the major faults: (1) immature and over ripe fruit; (2) over ferment and inappropriate washing; (3) inadequate drying; and (4) poor storage can be reduced by training and the adoption of standardised processing systems.

In order to produce good quality parchment, only uniform red ripe cherries should be picked and processed on the same day of harvest. This requires access to running water and a pulper, both of which can be problematic for smallholders. Pale under-ripe cherry will not pulp. Under-ripe material that does go through to green bean will introduce raw, green or grassy flavours. On the other hand, over-ripe cherry is not only difficult to pulp, but the parchment will be badly discoloured. Mixed pickings containing under-ripe and over-ripe cherry will ferment unevenly and introduce bad flavours and taints.

Fermentation requires the parchment to be held for 34-36 hours to allow the mucilage or mesocarp to ferment and disintegrate so that it can be washed off the bean. This is undertaken in specially constructed fermentation pits, bags, wooden boxes or other perforated containers. Generally speaking, the quicker the fermentation process proceeds, the less chance there is of taints and off flavours developing. Prolonged contact of the beans with the solubilised mucilage and other fermentation products will damage the quality of the coffee by discolouring the parchment and introducing a “fruity” or “winey” flavour. In extreme instances, this can lead to sourness.

During the fermenting process, the coffee should be washed every day with clean running water. Delays in washing can result in flavour taints similar to over ferment, while the use of dirty water can introduce a “muddy” taint.

The parchment must then be dried, generally in a two-stage process. For the first 2-3 days, the parchment is dried in the shade to prevent shrinking and cracking of the bean. The parchment is then sun dried, preferably on raised benches to reduce the moisture content to 12-14%. Sun drying improves the visual quality of the parchment, reducing much of the brown discolouration and enhancing the blue-green colour of the coffee bean. However, delays in drying the parchment, especially during the early stages, can introduce musty smells and taints, and, in the worst case, introduce the phenolic Rio taint, which in the 1980’s, resulted in the suspension of PNG coffee imports to Germany.

At the point of purchase, while the quality of parchment may be assessed by a number of physical parameters such as: colour, odour, moisture content, freedom from trash and defects; quality is ultimately determined by the taste in the cup. As many of these characteristics are intangible until the parchment is processed, growers seem largely unaware of the impact that improper processing and handling may have on the cup quality. Ideally, structured tastings with growers should be conducted to illustrate the major faults. These are best conducted in conjunction with traders and exporters in the controlled environment of a tasting room, thereby exposing growers to the means by which their buyers ultimately determine the value of their coffee.

With regard to the existing quality regulations, there is a mismatch between the standards as defined by physical parameters such as size, colour and moisture content and the intangible quality attributes such as taste, body and aroma. As such attributes are highly subjective they are difficult to communicate in a manner that might assist traders and exporters to improve quality.

Quality assurance systems

Within PNG, four quality assurance systems are currently operating in the specialty coffee market: CAFE Practices, Fairtrade, Organic and the Common Code for the Coffee Community (4C).

Within each of these quality assurance programs is a desire to support more sustainable methods of production and to enhance worker welfare through the payment of minimum wages and the assurance of a safe working environment. The additional premiums available to growers from the implementation of these quality assurance systems vary considerably depending on the market acceptance of the standard as do the costs and time required to achieve certification.

Irrespective of whichever quality assurance system a trader or exporter may seek to implement in PNG, there are a number of institutional impediments which must first be overcome. At the farm level, the payment of a minimum wage is problematic. In many instances, landowners permit other families to reside on the property without the payment of rent in exchange for the provision of labour. Similarly, for those who do not own land, they may be remunerated for their labour through the provision of fresh vegetables rather than cash.

As the majority of smallholders practice mixed cropping subsistence farming, often growing vegetables between or adjacent to the coffee trees, the application of chemicals and fertilisers to the vegetable crop may contravene the requirements under both Organic and Fairtrade certification. Furthermore, where chemicals are applied, there are problems associated with the disposal of containers and even the storage of chemicals will prove problematic, for most growers store them in the house.

At the village level and in those instances where the quality assurance scheme is group based, there must be a functional cooperative or collaborative marketing group. Within each of these groups, practices and procedures must be followed and any product which fails to meet the standards excluded. Under Fairtrade, the group must be able to show that it has democratically decided how to invest the Fairtrade premium.

At the processor, trader and exporter level, not only must they have confidence in the people appointed to monitor quality at the village level, but they must implement a means by which they can trace the product to its source. This requires not only the registration of growers, but a means by which each growers output can be verified. Not unexpectedly, where higher prices are paid for either cherry or parchment, individual growers may find that they can profit by purchasing coffee from neighbouring growers. Unlike HACCP-based quality assurance systems where the main reason for traceability is to either identify the source of the contamination or the need to recall contaminated product, in the PNG coffee industry, the main reason for traceability is to ensure that the premiums paid to traders and exporters have indeed been paid to the individual growers and or the communities from which the coffee was sourced. By necessity, this requires accurate records of all transactions with growers to be maintained, at considerable extra cost for the exporter.

In addition, in order to achieve accreditation under each of the various environmental impact components and to address work safe practices, traders and exporters are required to assist their growers. Training has been required in agronomic practices that prevent erosion and the subsequent contamination of waterways and streams from organic wastes; the application of chemicals and the responsible storage and disposal of containers; and the provision and use of protective equipment (gloves and masks). In at least three instances, traders and exporters have employed farm liaison officers to deliver the training and in part, to secure the supply of both cherry and parchment

At the wet factory and at considerable cost, processing lines have required modification to prevent the contamination of waterways. In several instances, processors have sought to identify alternative uses for the disposal of the pulp.

For those traders and exporters who sell certified Organic coffee, it is important to realise that it is the entire supply chain which is certified. By necessity, this requires certified Organic coffee to be physically separated from other coffees, often requiring a significant investment in additional processing and storage capacity.

Irrespective of whichever quality assurance system smallholder groups may wish to pursue, direct linkages with exporters will be essential to provide not only the incentives, but also the means by which the groups are able to finance, directly or indirectly, the annual costs of accreditation. With the demand for quality assurance systems increasing from overseas customers, the need for training will increase not only among the growers, but also among the mill operators and the exporters themselves. There is evidence to suggest that by not following prescribed production systems, many of the mills are compromising the quality of the coffee produced by smallholder growers.

While this project did develop and verify a generic HACCP-based quality management system (Appendix 5), the mandatory introduction of a formal quality assurance system for the PNG coffee industry cannot be supported. This finding is made on the basis that the market already accepts CAFE Practices, Utz Certified, Organic, Fairtrade, Rainforest Alliance and the 4C quality assurance program. Without a demonstrable need for an additional quality management system, its mandatory introduction will only add further cost to the industry. As the majority of growers do not use chemicals, there are few identified food safety risks at the grower level. Nevertheless, individual organisations, and in particular, the wet mills, the dry mills and exporters, may find that operating under a quality assurance system will provide some economic benefits with regard to minimizing the amount of wastage and product that fails to conform to customers expectations.

Over the last two years, with the harvest in PNG falling well below expectations, the need to secure coffee to meet forward contracts has led to record cherry prices. Not unexpectedly, the incidence of cherry theft has escalated to such an extent that CIC has been forced to explore various options for the registration of growers and cherry traders. Such mechanisms are already inherent within the quality control programs necessary for registration under Fairtrade, Organics and the CAFE Practices quality assurance scheme.

However, it is also abundantly clear that within the coffee processing sub-sector, many of the wet mills are paying premium prices for poor quality cherry that is unlikely to achieve the specifications demanded by the specialty coffee segment. Not unexpectedly, the long term financial viability of such operations is highly questionable.

Collaborative marketing groups

Because of the small volume of parchment each individual grower produces, smallholder growers are unlikely to benefit from any improvement in quality without achieving a parallel increase in scale. This is best achieved through the formation of collaborative grower groups, where the members, either collectively or individually, follow a strict quality assurance system to reduce the variation in quality. By offering a long line of more consistent quality parchment, direct to processors and exporters, it is possible to secure a higher price.

However, the formation and on-going management of these collaborative groups is not without problems. In the past, most collaborative marketing groups in PNG have failed as a result of mismanagement, incompetence, corruption and conflicts of interest. There is also some doubt as to whether collaborative groups are a viable form of organisation in PNG, given the traditional tribal structure of society and the role and importance of the “big men”. Of particular importance is the issue of leadership to ensure that group members are not only fully informed, but that, in the event of the leader’s demise, the group has the capacity to continue.

More fundamental however, is the need for collaborative marketing groups to provide returns that are at least equal to, if not greater than those the members could achieve by transacting individually. Appropriate recording systems must be established to ensure that members are paid what they are due and appropriate control systems established to ensure that those growers who follow the prescribed quality systems are adequately rewarded and those who do not are sanctioned.

While the expectation of higher prices is the major motivation for the formation of collaborative marketing groups, the inability of the groups to deliver higher prices will correspondingly provide one of the major factors leading to their demise.

Not unexpectedly, the groups cannot function without good management, a willingness among the members to work together, and mutual trust and respect. On-going support and training in business management, leadership and quality management will be required for the long-term sustainability of the groups.

The formation of these collaborative marketing groups is foreseen to offer benefit even to those smallholder growers who sell cherry to processors. It is more cost effective to utilise such groups for the delivery of extension and training. Members may benefit from visits to each others farm, enabling them to learn from their collective experience and to evaluate and benchmark their performance.

Among many communities, various grower groups are actively considering the option of establishing their own wet mill. With appropriate training, management and financial support, these initiatives could be supported, for potentially they provide a greater means for self determination. However, extreme caution must be exercised, for in the majority of cases, community ownership of a wet mill is unlikely to achieve the desired result. The management of community wet mills will depend upon strong leadership, for the manager must have the authority, without question, to reject product that fails to meet specifications (red, ripe cherry). Upon delivery to the mill, growers will need to be paid at least 80% of the anticipated price of the parchment. Not only will this create major problems in the provision of sufficient working capital, but the net returns for the parchment are unlikely to match the returns achieved by those processors with established brand names and customers who are willing to pay for superior quality.

While sales should be conducted on a regular basis - perhaps one time per week - to reduce the volatility in the market price, accurate records will need to be maintained to ensure growers are paid the appropriate balance from each pool and indeed, that any dividends are paid according to patronage. Additional problems will arise with security, both of the parchment during drying and storage, but also in transportation. Furthermore, without access to water and a reliable supply of electricity, quality will be compromised.

There is a perception among many of the grower groups that establishing their own dry mills will lead to higher farm gate prices. However, there is abundant evidence to suggest that many of the dry mills operating in PNG are unable to accurately judge the moisture content and the quality of parchment at the time of purchase. As the economic viability of such operations is entirely dependent upon recovery rates, mills that purchase inferior quality coffee will find that their margins are inadequate to sustain operations in the long term.

In mobilising collaborative marketing groups, the Participatory Rural Appraisal and Planning Process (PRAP) model utilised by the CIC has been greatly improved by the introduction of Personal Viability Training (PVT). PVT has been instrumental in facilitating more enduring relationships within the community and between group members. PVT has raised the participants self awareness and opened the respondents minds, thereby making them more receptive to the training modules delivered.

As a result of this project, many of the groups participating in this project have sought to reintroduce community law as a way of addressing the root causes of social disorder. This process is guided by the PRAP which identifies the strengths, weaknesses, opportunities and constraints within each group. It is also becoming more evident that the more successful groups will be those which are based around traditional haus lines and/or where there is some enduring linkage with a processor or exporter.

8 Impacts

8.1 Economic impact

Over the duration of this project, despite the reservations by many of the need to improve the quality of PNG coffee, the opportunity to secure higher returns has provided sufficient inducement for many of the major processors and exporters to enter the specialty market.

The recent arrival of Starbucks into PNG has been largely responsible for the dramatic increase in the demand for smallholder cherry. Starbucks arrival in the market has also provided the major catalyst for the adoption of fully inclusive quality assurance programs that provide guidelines not only on the physical and cup quality characteristics, but also propose environmental, social welfare and equity conditions that preferred suppliers must meet. With Starbucks providing a commercial incentive, these developments have aligned themselves well with the project objectives.

At least initially, all of the major coffee traders and exporters were very enthusiastic about pursuing accreditation as either a preferred or strategic supplier to Starbucks. However, over time, as the commercial realities of achieving preferred supplier status became more apparent, many of the companies have since withdrawn, primarily because the incentives were not commensurate with the additional effort. Many have subsequently established more lucrative markets in the US, Europe and Japan that provide substantially higher returns without the additional costs of accreditation under CAFÉ Practices.

Coffee Connections, the major supplier of Organic and Fairtrade coffee, continue to increase their market share, but are very cautious about any major expansion of their supply base. The primary reasons for this are the difficulties associated with establishing the cooperative groups (for accreditation is not on an individual basis); the investment in both cash and time, for no financial incentives are achieved until the groups are formally accredited; and even if and when accreditation is achieved, there is some doubt that the group(s) will continue to supply.

Although there is some evidence to suggest that the smallholder growers participating in the CCGS coffee marketing schemes have received marginally higher prices, the scheme as it currently operates, is not commercially sustainable. In this respect, there are potential opportunities should CIC link CCGS groups to specific viable exporters.

8.2 Social impact

For the highly populated Highlands region, coffee is the principal source of cash income and there are few other sources of income. Money earned from coffee has become increasingly important due to the increasing costs of basic consumer goods such as rice, tinned fish, soap and cooking oil. With the increasing cost of these goods, people either have to earn more or to spend less. Even more pressing for smallholder coffee growers is the rising costs of school fees and other services for which they must now pay. With an increasing number of young people unable to continue their education because their parents cannot afford to pay the fees set by the institutions, this has led to many social problems such as migration to urban areas, the growth of squatter settlements, HIV Aids, gambling, alcoholism and lawlessness.

With one million people in the Highlands being largely dependent upon coffee for their livelihoods, the Highlands and indeed the whole of PNG, is strongly influenced by developments in the coffee industry. With coffee providing around K 1000 per family per year, those growers delivering cherry directly to wet mills are achieving price increases of at least 34%. Even greater returns are achievable, but these will be commensurate with the level of agronomic, technical and managerial inputs.

With coffee prices exceeding USD 1.00 per pound, there has been a dramatic increase in the incidence of cherry theft. In what largely remains a subsistence economy, there is massive under employment in PNG. For those households which do not grow coffee, there is little opportunity to earn sufficient money to meet household expenses. Under employment is also associated with a number of social disorders including alcoholism, drug abuse, gambling and the increasing incidence of HIV AIDS.

While not specifically targeting the block-holders or the few remaining plantations, disenfranchised land owners believe that the plantations are a legitimate target for theft. Even so, individual smallholders often find that as their crop approaches harvest, it too becomes a target. Within small rural communities, the police are often powerless to act and without the support of an extended family, it is almost impossible for an individual grower to protect their interests. Customary law is therefore returning to much of rural PNG.

These laws, flagged through the PRAP process, seek to address the underlying social issues which, if left unattended, have the potential to not only derail the project but indeed, to contribute to the further deterioration of law and order which has been identified as one of the three major industry impediments towards improving the quality of coffee in PNG.

Many of the impediments to quality raised by smallholder coffee growers: the lack of water; the lack of electricity; and the lack of capital to build wet mills at the village level, can be addressed by assisting collaborative grower groups in the preparation and submission of infrastructure grant applications. The likelihood of funds being allocated can be greatly improved by the ability of the community to demonstrate unity and its resolve to address the underlying social issues.

The most significant social impact to arise from this project has been derived from the introduction of personal viability training (PVT) into the PRAP process. PVT, developed by the Entrepreneurial Development Training Centre, was introduced by this project into the training program as a means of enabling participating growers to achieve their maximum potential. PVT is the development of the mind to discover what we do not know and to learn how to use the knowledge and resources possessed by oneself and others. PVT is about self-education, developing from within the means for continuous personal growth.

Anecdotal evidence suggests that from their participation in the PVT, growers have come to realise that they are responsible for their own actions. Who they are and where they are is the result of their own action or inaction. With renewed enthusiasm, participating growers are spending more time in their coffee gardens, pruning and weeding and digging ditches to rehabilitate their coffee. Collectively, the community has pulled together to address common issues such as banning cherry sales as a meaning of curbing cherry theft, to standardise processing, and to impose and enforce community rules on what constitutes acceptable behaviour.

8.3 Environmental impact

While the project itself did not seek to provide any direct environmental benefits, in the specialty market, the adoption of quality assurance programs is expected to result in some environmental benefits. In much of Europe and increasingly in North America and Japan, consumers are encouraging food manufacturers to consider not only their financial bottom line, but to give due consideration to the manner in which the food has been produced (sustainability) and the impact on the environment. Starbucks already require their suppliers to have processes in place which minimise pollution from the pulping, washing and fermenting of coffee, and for their growers to demonstrate environmental leadership in protecting watercourses and water quality, controlling surface erosion, maintaining soil productivity, a shade canopy, protecting wildlife and providing conservation areas, and encouraging ecological pest and disease control. Similar requirements, to varying degrees, are present in the majority of other quality assurance systems.

8.4 Scientific impact

Using an extensive process of industry consultation, the project team have facilitated interventions at the grower level, the chain level and at the industry level. Through the implementation of a monthly price recording system, the project team has been able to clearly demonstrate the correlation between the parchment price, the cherry price and the price for Other Mild Arabicas on the NYC. At the farm level, this analysis has clearly shown the extent to which smallholder parchment is discounted and thus the premiums available to growers through the sale of cherry direct to wet factories and processors.

Having gained the confidence of the processors and exporters, commercial-in-confidence figures have been obtained which make it possible to demonstrate how much of the fob price growers in PNG receive, and thus to dispel the popular myth that the exporters are taking advantage of the growers. Quite to the contrary, as competition in the market has intensified to secure a share of the declining quantity of coffee available, coffee growers in PNG are among the most fortunate in the world, receiving between 68-80% of the Lae fob price. Processors have also provided unprecedented access to their factories, disclosing the prevailing margins for the different grades of parchment, and in particular, the losses which can accrue from failing to accurately judge the moisture content and the amount of trash present in the parchment they have purchased.

This project has also had a significant influence on project ASEM/2004/017. Initially, this project sought to assess and improve quality management during the post-harvest processing and storage of coffee in PNG by exploring alternative means for drying the coffee. However, after extensive discussions between the project leaders, it soon became apparent that a review of the prevailing coffee processing practices and quality standards would be more appropriate. As a result, under project ASEM/2004/017, the criteria for assessing coffee quality in PNG are being reviewed and various trials undertaken to explore alternative means of processing, drying and storing coffee.

8.5 Capacity building

Without doubt, this project has had the most significant impact on the people who were involved in the delivery and the recipients of the training programs.

At the farm level, a comparison between the pre-training and post-training questionnaires suggests that the project has greatly improved the growers understanding as to whether parchment or cherry is more profitable (Table 28).

Table 28: Which coffee alternative is the most profitable

	Pre-training		Post-training	
	N	%	N	%
Cherry	32	33	25	60
Parchment	59	60	17	40
Don’t know	7	7		

This was supported by a comparison of the growers' capacity to more accurately determine the quantity of cherry required to produce each kg of parchment pre-training and post-training (Table 29).

Furthermore, as a result of the market training, smallholder coffee growers had a much greater understanding of how the dynamics of the international market impact on coffee prices in PNG (Table 30). In the longer term, this is expected to have a significant positive impact on the growers' relationship with the processors and exporters.

Table 29: Number of kg of cherry required to produce 1 kg of parchment

	Pre-training		Post-training	
	N	%	N	%
1	3	5.1		
2	5	8.5		
3	26	44.1		
4	5	8.5		
5	19	32.2	31	96.9
6	1	1.7	1	3.1

Table 30: Influence of NYC on coffee prices in PNG

	Pre-training		Post-training	
	N	%	N*	%
No relationship	9	8.6	1	2.2
A little	9	8.6	6	13.6
Moderate	2	1.9	1	2.2
Great deal	4	3.8	11	25.0
Don't know	76	72.4	25	56.8

** training had yet to be conducted for two groups*

However, more significant impacts have been achieved at the community level, where, through their participation in the training programs, smallholder coffee growers have come to appreciate the importance of trust and social capital in facilitating the formation and on-going management of successful collaborative marketing groups (Table 31).

Table 31: Critical success factors in grower groups

	Pre-training		Post-training	
	N	%	N	%
Desire to work together	39	37.1	5	11.1
Good management	22	20.9		
Trust/honesty	17	16.2	15	33.3
On-going support	9	8.6	2	4.4
Respect	4	3.8		
High prices	3	2.9	5	11.1
Quality focus	2	1.9	4	8.9
Commitment	2	1.9		
Common interest	1	0.9	5	11.1
Regular meetings	1	0.9		
Same religious affiliation	1	0.9	1	2.2
Patience	1	0.9		
Social ties			15	33.3
Training			7	15.6
Hard work			3	6.7
Effective leadership			1	2.2
Sufficient quantity			1	2.2

Through the PVT, growers have come to realise that they can only achieve their goal by working together as a united group, bound by the trust and social ties which permeate their society. With a common goal, a focus on quality and their own hard work, higher prices will be achieved.

However, just as equally important, growers recognised that the main reasons for their groups to fail included the lack of trust, mismanagement and the failure to cooperate. Post

training, many of the personal inadequacies (laziness and jealousy) were replaced by the recognition that a failure to focus on quality and the inability to secure a higher price would have adverse consequences on the group dynamics (Table 32).

Table 32: Reasons for potential failure of grower groups

	Pre-training		Post-training	
	N	**%**	**N**	**%**
No cooperation	27	25.7	10	22.2
Mismanagement	26	24.8	18	40.0
Laziness	18	17.1		
Jealousy	14	13.3		
Tribal conflict	9	8.6	5	11.1
Dishonesty	6	5.7	23	51.1
Financial problems	2	1.9		
Low prices	1	0.9	3	6.7
Conflict of interest	1	0.9	1	2.2
Lack of support	1	0.9		
Poor quality			7	15.6
Social tensions			4	8.9
Political differences			1	2.2

Through their participation in the workshops and in the delivery of the training modules, Farm Training and Extension staff at Aiyura have come to see the importance of marketing as being paramount in everything that they do, both in satisfying overseas consumers needs and in satisfying the needs of their own customers: the industry itself. This is best demonstrated by the contribution that Farm training and Extension staff made to the CIC Strategic Plan (2008), through (1) the shift in the support from grower-direct marketing to linking grower groups to exporters; (2) support for centralised wet mills; and (3) the desire to move more PNG coffee into specialty markets.

Just as important, the project has provided a means for CIC to interact with the exporters as a potential partner rather than only as a regulator. Whereas the previous policy sought to support grower-direct marketing in the belief that: (1) the exporters were taking advantage of the growers and (2) grower-direct marketing would result in higher returns, CIC now seeks to build enduring linkages between collaborative grower groups and the exporters. In part, the shift in direction is the result of the strong position this project took from the outset not to support grower-direct marketing. This has been reinforced by CIC's own negative experience with those schemes that attempted to support direct marketing. Without the financial backing that the major exporters have to manage risk, the discount and exchange rates, a new exporter will only survive for as long as it manages to sell all the coffee it has procured at pre-determined prices. As margins in the industry are very small, should an overseas customer reject a container (18-21 tonnes), without sufficient capital, the exporter will collapse and growers are unlikely to be paid.

For some time, CIC has been aggregating the parchment produced by the CCGS groups, collectively processing it and then offering the green bean to that exporter who offered the highest price. However, as the majority of the coffee produced in PNG is forward sold, an exporter can only offer a higher price when they have identified a buyer who is willing to pay. Furthermore, the means by which the coffee produced by the CCGS is aggregated and marketed potentially exposes the growers and the CIC to a great deal of risk, especially when the market is falling. Anecdotal evidence suggests that although the price premiums returned to the growers were marginally higher, growers have had to wait for an inordinate amount of time to be paid. More recently, the margins that the CCGS have been able to deliver to growers were significantly less than the price growers would have received if they sold cherry directly to processors. All that stops the growers from

recognising this is their inability to accurately convert the number of kg of cherry required to produce each kg of parchment. Not unexpectedly, the project has sought to redress this issue as a matter of priority.

At each of the various meetings with grower groups, the service providers and Farm Training and Extension staff, the project team has laboured the need for participants to understand the dynamics of the market and to explain the reasons for the day-to-day variations in price which have historically led to a perception that the exporters were drawing extraordinary profits. As growers gain more awareness of the market and its requirements, they will have the capacity to engage in more meaningful discussions with market intermediaries to better fulfil the needs of their downstream customers. Disagreements over pricing and price transmission will dissipate as growers learn to recognise that it is the international coffee buyers and roasters who determine the price in the world market. Providing that these integrated collaborative collection pricing and processing schemes can adequately reward the growers for producing good quality coffee and penalize them for producing sub-standard coffee, they will respond positively. Growers participating in these schemes will also be more educated in business management, financial management and marketing.

The project team has also worked extensively with the exporters to encourage them to consider the potential benefits of working with collaborative marketing groups. Intervention by this project, coupled with the sudden decline in the quantity of coffee available in PNG and the growing need for greater environmental management and worker welfare has resulted in at least three exporters engaging one or more grower liaison officers. In part, this has also been driven by CIC policy which requires exporters to extend their grower base as a condition for their license renewal.

Having received training in quality assurance principles, economics and marketing, CIC staff now have enhanced capacity in these areas. For Farm Training and Extension staff, their involvement in this project is expected to result in the acquisition of new extension approaches and methodologies that will greatly enhance their effectiveness in the field.

However, the greatest and most significant benefit for CIC is expected to arise from the improved relationships with all actors in the supply chain. CIC has the capacity to facilitate activities in the PNG coffee industry that will result in improved returns for all those involved.

9 Conclusions and recommendations

To improve the quality of the coffee produced by smallholder coffee growers, three broad strategies are available: (1) encouraging the sale of red ripe cherry direct to the wet mills where logistically appropriate; (2) the adoption of standardised processing systems at the village level; and (3) pursuing accreditation under Fairtrade, Rainforest Alliance, Organic and/or Utz Certified.

It is evident that parchment is purchased at a significant discount to cherry, reflecting the lack of control and the variability that is inherent within smallholder parchment. On a per kg parchment equivalent basis, the sale of cherry by smallholder growers direct to wet mills results not only in a 34% price premium, but significantly less work and costs for the growers. There are savings in processing and transport costs and there is less likelihood of parchment deteriorating through poor and inappropriate storage in the home (smoke damage and moisture) and less risk of theft.

For those smallholder coffee growers who are unable to deliver cherry to a wet mill on the same day of harvest, due to the lack of roads or the poor condition of the roads, they have no option other than to produce parchment. In order to produce good quality parchment, cherry must be processed on the same day of harvest. This requires access to running water, a pulper and it may also require additional labour. The beans must then be appropriately fermented, washed and dried.

However, without a parallel increase in scale, smallholder coffee growers are unlikely to benefit from any improvement in quality. This is best achieved through the formation of collaborative grower groups, where the members, either collectively or individually, follow a strict quality assurance system to reduce the variation in quality. The parchment must then be sold direct to traders and exporters, by-passing the traditional roadside traders.

Consolidation of parchment at the community level potentially offers traders and exporters a longer line of more consistent quality parchment. This then makes it possible for the exporters to cup the parchment on receipt and to pay a higher price for superior quality parchment. Notwithstanding, the exporters ability to pay a higher price will be dependent upon the group maintaining a consistent supply of good quality parchment and upon the ability of the exporter to identify a buyer who is willing to pay a higher price.

The most successful and sustainable collaborative groups are likely to be those where the members share a common desire to cooperate and to work together. Not only must the members be committed, but they must have confidence and trust in one another. At an operational level, the group must have a common goal and a commitment to quality. Good management will be facilitated by effective leadership and the open and transparent disclosure of payments to members, commensurate with the quantity and quality of the parchment supplied. Furthermore, the more successful groups are likely to be those based around the traditional haus or family lines, where strong social ties provide an alternative mechanism to govern behaviour.

However, the formation and on-going management of these collaborative groups will present numerous problems. In the past, most collaborative marketing groups in PNG have failed as a result of mismanagement, incompetence, corruption and conflicts of interest. While there is some doubt as to whether collaborative groups are a viable form of organisation in PNG, the factors that are most likely to cause the demise of collaborative marketing groups include dishonesty and poor management, tribal conflict and social tension, laziness and jealousy, and the inability of the group to deliver higher prices, either as a result of poor quality or a decline in the prevailing world price.

To facilitate the long term sustainability of these groups, on-going support and training in business management, leadership and quality management will be required. Even for those smallholder growers who sell cherry to processors, it is more cost effective to utilise

such groups for the delivery of extension and training. Members may benefit from visits to each others farm, enabling them to learn from their collective experience and benchmark their performance.

In the delivery of the training, the Participatory Rural Appraisal and Planning Process (PRAP) model should be utilised with the inclusion of a Personal Viability Training (PVT) module to facilitate more enduring relationships within the group and raise self awareness. The PVT has been instrumental in facilitating the learning process, opening growers' minds and forcing them to realise that where they are is very much the result of their own activity or inactivity. The impact of the PVT has been immediate, with anecdotal evidence suggesting that those growers who have received PVT are spending more productive time in their coffee gardens and participating more in collaborative group activities.

In order to facilitate the formation of more collaborative groups, it is immediately obvious that without a significant cash injection, CIC has little further capacity. With CIC funding tied to the levies paid upon export, insufficient funds are available to employ the additional staff required to manage the PRAP process and the engagement of the service providers. However, even more significant, is a critical shortage in the number of service providers capable of delivering the training. Thus an alternative source of funding is required immediately to deliver the personal viability training and the associated agronomy, coffee processing and marketing modules to other collaborative marketing groups.

One alternative is to deliver the training through innovative public-private partnerships between CIC and the exporters. Over the duration of this project, three exporters have each employed one or more agronomists to liaise with growers, to offer advice and in some instances, to offer credit as a means of securing supply. In at least one instance, CIC has agreed to co-fund an industry liaison officer to deliver the training required.

Given that much of the coffee in PNG is grown with minimal inputs and very much in sympathy with the environment, there are abundant opportunities to pursue accreditation under Fairtrade and Organic. However, growers must first be mobilised into collaborative groups and linked directly to an exporter who is willing to meet the annual costs of certification.

In the implementation of quality assurance systems, a distinction must be made between those systems which are certified and accepted by the market and those which are not. The prevailing quality assurance systems not only provide price incentives for superior quality, environmental stewardship and social equity, but these systems are universally accepted in the specialty coffee market.

On the other hand, there is no evidence of any demand for a generic HACCP-based quality assurance system for that coffee destined for the soluble market. Quite to the contrary, imposing a certified generic quality assurance system on the PNG coffee industry will only add costs and further reduce international competitiveness. Furthermore, as certification means establishing rules and procedures against which compliance can be assessed, a prescriptive HACCP-based generic quality assurance system will be unable to cope with the diversity of processing systems utilised by smallholder coffee growers in PNG.

However, that said, each of the collaborative marketing groups should be encouraged to adopt their own quality assurance system as a means of reducing the variation in quality. In this respect, the generic HACCP-based quality assurance system developed by this project can be used as a framework. However, it must be accompanied by training in quality management and growers must receive some price incentive. Such will require the collaborative marketing group to have an established link with an exporter who in turn has identified a customer who is willing to pay a premium for better quality coffee. At the grower level, these systems will need to take into consideration the resource constraints and the prevailing processing practices utilised by the group. Furthermore, the group must themselves establish a means of enforcing compliance with the system that they adopt, rather than to rely on a regulatory agency.

While the quality of the parchment is currently assessed by examining a number of physical parameters such as colour, odour, moisture content and freedom from defects, quality is ultimately determined by the taste in the cup. As few growers appreciate that how they handle the coffee influences the taste, structured tastings with growers must be employed as a means to demonstrate how each of the major faults influence the taste. Workshops to assist grower groups in the maintenance of pulpers and the adoption of standardised processing systems must be delivered.

With PNG coffee growers receiving more than 70% of the FOB (Lae) price, there is little evidence to support the premise that smallholder coffee growers in PNG are subject to exploitation by downstream traders, processors and exporters. Furthermore, there is no evidence to suggest that grower-direct marketing will provide higher returns to growers. Quite to the contrary, given the small volumes and the risks associated with managing exchange rates, the price differentials and the inherent risk that the product may fail to meet the customer's specifications, smallholder coffee growers do not have the expertise to perform these activities any more efficiently than existing traders and exporters.

The most appropriate means for smallholder coffee growers to engage in the international coffee market is through improved linkages between smallholder coffee growers and the exporters. To achieve that, growers need a greater understanding of the market dynamics, risk management and the costs associated with export. Furthermore, much is to be gained by facilitating visits by collaborative marketing groups to the wet and dry factories operated by the exporters. For the growers, not only with this expose them to the various processes involved in preparing the green bean for sale, but reinforce the need for quality at every step of the process. In particular, a better understanding of the key factors which influence parchment recovery rates (moisture and trash) will go a long way towards improving the relationships between collaborative marketing groups and the exporters.

While the prevailing marketing system has failed to deliver price premiums for quality, the roadside traders continue to offer the means by which most smallholder coffee growers sell their parchment. Even where growers sell the majority of their cherry direct to wet mills, or choose to sell their parchment through collaborative marketing groups, when the need for immediate cash arises, parchment will be sold to roadside traders at the prevailing market price. As this dualistic market system provides growers with marketing options, it should be retained, despite its inherent weaknesses.

9.1 Recommendations

In order to have some meaningful long-term impact on the PNG coffee industry, it is abundantly clear that intervention is required at the grower level, at the supply chain level and at the industry or national level.

At the national level, (1) the poor state of the roads and transport infrastructure; (2) the insecurity of land ownership and tenure; and (3) lawlessness must be addressed. Without appropriate Government intervention, any efforts to improve the quality of the coffee produced by smallholder growers will be compromised.

At the industry level, there is a clear need to build more direct linkages between coffee growers and the traders and exporters. Effective linkages with the private sector can only be made where smallholder growers are empowered and there is active dialogue between the parties.

Wherever logistically possible, smallholder coffee growers should be encouraged to sell cherry direct to the wet factories. However, where this is not possible and growers have little choice other than to produce parchment, collaborative marketing groups need to be encouraged. If collaborative marketing groups are to be successful, each of the following elements must be considered:

a comparative advantage. This will only occur where growers cannot sell cherry or do not have access to a wet mill. Fairtrade/Organic certification is likely to be the vehicle for achieving this as Fairtrade is targeted exclusively at smallholders

support for the collaborative marketing group from a company or an NGO. While there are rare exceptions, the highlands of PNG do not appear to be fertile territory for independent cooperatives in the foreseeable future. Registration under Fairtrade and/or Organic is a complex and expensive business which in PNG is well beyond the resources and capability of most smallholder coffee growers

suitable mechanisms to maintain trust within the collaborative marketing group and between the collaborative marketing group and the processor/exporter. Successful collaborative marketing groups will be those organised along haus lines with support from an outside organisation or company to maintain and support them. Similarly, considerable effort needs to be put into building trust between the collaborative marketing group and its processor/exporter. Certification may help with this process, but certification alone will not guarantee success. From the exporters' perspective, this process can be greatly facilitated by the employment of grower liaison officers to provide technical advice to smallholder growers and to facilitate the accreditation process.

However, the replication of these collaborative collection pricing and processing schemes could prove to be difficult. There is some doubt as to whether smallholder coffee growers are aware of the means by which they can engender support for the delivery of training programs. Also critical is the lack of resources to engage the industry and the lack of sufficient service providers to deliver the training to those grower groups who successfully complete the PRAP.

While the project identified and even reviewed the PRAP process as the most appropriate means to engage collaborative grower groups, opportunities exist to revise and improve the process still further. While growers collectively vote on the training priorities, it seems that they have little involvement in the actual execution of the training itself. The service providers engaged simply talk and deliver, and while they may seek to reinforce the teaching through one or more practical sessions in the growers' coffee garden, such does not provide an action-learning environment. As an integral part of any on-going revision of the PRAP process, it is recommended that PVT become an integral introductory module in the training process.

At the industry level there is variable and inconsistent understanding amongst the various actors along supply chains about coffee marketing issues and dynamics, both domestically and internationally. The industry needs to identify ways to rectify this for the future viability of a competitive industry.

Beginning with the market itself, there is a need to understand the root causes for the day-to-day variation in market prices and the mechanisms traders and exporters employ to stabilise and secure their market position. The distinction must also be made between the soluble (Y grade) and the specialty coffee market and the various means by which smallholder coffee growers can access these markets. This leads to concepts of quality management in processing, but also the quality of the product offer, with a discussion on cup characteristics and the reasons why faults emerge, environmental stewardship and fair trade and equity.

End point inspection (at Lae) provides a valuable means of ensuring that no substandard quality coffee is exported from PNG, but greater investments are required at both the grower level and at the factory level to prevent poor quality coffee from being produced in the first instance. In achieving this, the generic HACCP-based quality management plan will provide a valuable tool. However, quality assurance cannot be enforced: quality is something that the actors themselves must first embrace.

Nevertheless, as the need for quality assurance systems becomes more widely accepted in the PNG coffee industry, the need for training will increase not only among the growers,

but also among the mill operators and the exporters themselves. There is some evidence to suggest that by not following prescribed production systems, many of the mills are compromising the quality of the coffee produced by smallholder growers.

There are within PNG other collaborative collection pricing and processing schemes which have yet to be evaluated. In the business model under which New Guinea Tea, Coffee and Spice (now owned by Mainland Holdings) operate 50% of the costs of a grower liaison officer are provided by CIC and 50% by Mainland Holdings. Such public-private partnerships have the potential to overcome some of the resource constraints faced by the industry in PNG.

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11 Appendixes

11.1 Appendix 1: Coffee growers questionnaire

Location of your coffee garden(s)
……..

Total number of coffee trees [or area (hectares)]…….

Density of shade trees heavy – medium – light

What proportion of household income comes from coffee?

very little - almost half - more than half - most

Number of years you have been growing coffee?
…….

FOR THE 2005 HARVEST, what quantity of cherry did you produce?
……. kg or bags [standard bag]

For 2006, do you expect your production to; (please tick appropriate box below)

a. increase	
b. decrease	
c. stay the same	

Can you explain your reason?
…….

What type of labour did you use to harvest the cherry?

Household ( ) Wantok ( ) Hired ( )

How much did it cost you to harvest your cherry? ……K/kg or total kina cost

Did you grade cherry by separating ripe from over ripe and unripe cherries, prior to sale or pulping?

Yes [ ] No [ ]

If YES, what is the approximate cost per kilogram to separate the cherry?
……K/kg

FOR THE 2005 HARVEST, what proportions did you sell as cherry or parchment?

All parchment

Most parchment

Approx same cherry and parchment

Most cherry

All cherry

Why do you sell in these proportions?
…….

SELLING CHERRY

To whom did you sell your cherry?

What quantity of cherry did you sell to each market intermediary [bags]?

	Yes	No	Quantity
Other growers			
Grower cooperatives			
Roadside buyers			
Wet factory			
Other			

For each buyer to whom you sold cherry, what were the lowest, the most common and the highest prices you received for cherry in 2005?

	Lowest	Most common	Highest
Other growers			

Grower cooperatives			
Roadside buyers			
Dry factory			
Other			

Did the buyers to whom you sold your cherry pay different prices for different quality cherry?

Yes [ ] No [ ]

How is the quality of cherry defined?
……

What was the price differential between the grades?
……

Do the buyers to whom you sold your cherry often reject your cherry if it fails to meet some predetermined standard?

Yes [ ] No [ ]

If your cherry is rejected, what do you do with it?
……

Are you responsible for delivering your cherry to your buyers?

Do you have your own vehicle?

How much do you pay to deliver your cherry to each market intermediary to whom you sold cherry?

	Responsible for delivery	Own vehicle	Cost per kg
Other growers	Y/N		
Grower cooperatives	Y/N		
Roadside buyers	Y/N		
Wet factory	Y/N		
Other	Y/N		

What criteria do you use in deciding to whom you will sell your cherry?

……
……
……

Thinking about your cherry buyers, what things do you think your cherry buyer considers in choosing to purchase cherry from you?

……

……
……
……

How well do you think that the cherry you have supplied meets your buyers' needs?

……

……
……..

What things prevent you from better meeting your perceived cherry buyers' needs?

……
……
……

On a scale of 1 to 6, where 1 is "not at all important" and 6 is "very important", please indicate how important you believe EACH of the following criteria are to your cherry buyers in deciding who is a desirable supplier?

deliver consistently mature, ripe red cherry	1	2	3	4	5	6
provide large quantities of cherry	1	2	3	4	5	6
cherry is free of leaves, sticks and stones	1	2	3	4	5	6
reliable supplier of cherry	1	2	3	4	5	6
deliver cherry to repay cash advances	1	2	3	4	5	6
provide cherry that is competitively priced	1	2	3	4	5	6
don't continually seek cash advances	1	2	3	4	5	6
willing to disclose problems	1	2	3	4	5	6
grown coffee in a sustainable way	1	2	3	4	5	6

SELLING PARCHMENT

Did you pulp all ripe cherries on the same day as harvest?

No – not always – 50% of the time – most of the time - always

If you were unable to pulp all the ripe cherries on the same day as harvest, please explain why

…… ……..

Do you own a pulper? Yes [ ] No [ ]

Did you have access to clean water for pulping? Yes [ ] No [ ]

Do you ferment your pulped coffee in a bag or a box?

For how long do you ferment your pulped coffee? …….. hours/days

How often do you wash your fermenting coffee? ……..

Why do you wash your fermenting coffee this number of times? …….

What do you do when you wash your fermenting coffee? …….

Do you leave (soak) your coffee in clean water after fermentation has finished?

Yes [ ] No [ ]

If YES, for how long do you soak your coffee in clean water? ……..……

Do you always sun dry your wet parchment? Yes [ ] No [ ]

To what stage do you dry your parchment? …….

What criteria do you use to determine when the parchment is dry?.....……

Do you allow your wet parchment to shade dry your parchment before you sun dry?

Yes [ ] No [ ]

If YES, for how long do you shade dry your wet parchment? ……

Do you dry your wet parchment on raised beds? Yes [ ] No [ ]

Do you hand sort your parchment prior to sale? Yes [ ] No [ ]

If YES, what things do you remove by hand sorting? ……

How much does it cost to hand sort the parchment? ……..... K/kg

Do you store dry parchment prior to selling? Yes [ ] No [ ]

If YES, for how long do you store parchment? ……..……

Where do you store the parchment? ……

For what reason(s) do you store your parchment?

……..

What losses do you experience during storage? ……...

To whom did you sell your parchment?

What quantity of parchment did you sell to each market intermediary? [bags]

	Yes	No	Quantity
Other growers			
Grower cooperatives			
Roadside buyers			
Dry factory			
Other			

Did the buyers to whom you sold your parchment pay different prices for different quality parchment?

Yes [ ] No [ ]

If YES, for each buyer to whom you sold parchment, what were the lowest, the most common and the highest prices you received for Class 1 parchment in 2005?

	Lowest	Most common	Highest
Other growers			
Grower cooperatives			
Roadside buyers			
Dry factory			
Other			

If YES, for each buyer to whom you sold parchment, what were the lowest, the most common and the highest prices you received for Class 2 parchment in 2005?

	Lowest	Most common	Highest
Other growers			
Grower cooperatives			
Roadside buyers			
Dry factory			
Other			

What quantity of the parchment that you produced in 2005 was graded as Class 1 and Class 2? [bags]

Class 1 ……

Class 2 ……..

If NO, for each buyer to whom you sold mixed grade parchment, what were the lowest, the most common and the highest prices you received for your parchment in 2005?

	Lowest	Most common	Highest
Other growers			
Grower cooperatives			
Roadside buyers			
Dry factory			
Other			

Are you responsible for delivering your parchment to your buyers?

Do you have your own vehicle?

How much do you pay to deliver your parchment to each market intermediary to whom you sold parchment?

	Responsible for delivery	Own vehicle	Cost per kg
Other growers	Y/N		
Grower cooperatives	Y/N		
Roadside buyers	Y/N		
Wet factory	Y/N		
Other	Y/N		

What criteria do you use in deciding to whom you would sell your parchment?
……..
……..

Thinking about your parchment buyers, what things do you think your parchment buyer considers in choosing to purchase parchment from you?
……
……

How well do you think that the parchment you supplied met your buyers' needs?
……
……

What things prevent you from better meeting your perceived parchment buyers' needs?
……
……

On a scale of 1 to 6, where 1 is "not at all important" and 6 is "very important", please indicate how important you believe EACH of the following criteria are to your parchment buyers in deciding who is a desirable supplier?

deliver consistently mature, ripe red parchment	1	2	3	4	5	6
provide large quantities of parchment	1	2	3	4	5	6
parchment is free of leaves, sticks and stones	1	2	3	4	5	6
reliable supplier of parchment	1	2	3	4	5	6
deliver parchment to repay cash advances	1	2	3	4	5	6
provide parchment that is competitively priced	1	2	3	4	5	6
don't continually seek cash advances	1	2	3	4	5	6
willing to disclose problems	1	2	3	4	5	6
grown coffee in a sustainable way	1	2	3	4	5	6

SELLING GREEN BEAN

Do you sell green bean?

No – not always – 50% of the time – most of the time - always

If you do not sell green bean please explain why
……
……

Do you have your own dehulling machine? Yes [ ] No [ ]

If no, how much does it cost to dehull and polish your parchment into green bean?
…… K/kg

How much does it cost to deliver your parchment to the dry factory? ……K/kg

Do you hand sort your green bean prior to sale? Yes [ ] No [ ]

If YES, what things do you remove by hand sorting?
……

How much does it cost to hand sort the green bean?
…….. K/kg

Do you store green bean prior to selling? Yes [ ] No [ ]

If YES, for how long do you store green bean?
……..

Where do you store the green bean?
……

For what reason(s) do you store green bean?
……

What losses do you experience during storage?
……

To whom did you sell your green bean?
……

Did the buyers to whom you sold your green bean pay different prices for different quality green bean?

Yes [ ] No [ ]

If YES, for each grade of green been that you produced, what were the lowest, the most common and the highest prices you received in 2005?

	Lowest	Most common	Highest
AA			
A			
AB			
B			
C			
X			
PSC			
Y1			
Y2			
T			

What quantity of the green bean that you produced in 2005 was graded into each of the following classes?

	Bags
AA	
A	
AB	
B	
C	
X	
PSC	
Y1	
Y2	
T	

If your buyers did not differentiate between the different classes of green bean, what were the lowest, the most common and the highest prices you received for your green bean in 2005?

	Mixed classes		
	Lowest	Most common	Highest
Green bean			

Are you responsible for delivering your green bean to your buyers?

Do you have your own vehicle?

How much do you pay to deliver your green bean to each market intermediary to whom you sold green bean?

	Responsible for delivery	Own vehicle	Cost per kg
	Y/N		
	Y/N		

What criteria do you use in deciding to whom you would sell your green bean?
……
……

Thinking about your green bean buyers, what things do you think your green bean buyer considers in choosing to purchase parchment from you?
……
……

How well do you think that the green bean you supplied met your buyers' needs?
……
……

What things prevent you from better meeting your perceived green bean buyers' needs?
……
……

On a scale of 1 to 6, where 1 is “not at all important” and 6 is “very important”, please indicate how important you believe EACH of the following criteria are to your green bean buyers in deciding who is a desirable supplier?

deliver consistently good clean parchment	1	2	3	4	5	6
good colour	1	2	3	4	5	6
large quantities available	1	2	3	4	5	6
free from physical defects	1	2	3	4	5	6
free from foreign matter	1	2	3	4	5	6
no bad smell/stinkers	1	2	3	4	5	6
well dried	1	2	3	4	5	6
reliable supplier	1	2	3	4	5	6
competitively priced	1	2	3	4	5	6
deliver parchment to repay cash advances	1	2	3	4	5	6
Don’t continually seek cash advances	1	2	3	4	5	6
large bean	1	2	3	4	5	6
grown coffee in a sustainable way	1	2	3	4	5	6
willing to disclose problems	1	2	3	4	5	6

MARKETING COFFEE

For the 2005 harvest, was the way in which you sold coffee any different from the way in which you have sold coffee in the past?

Yes [ ] No [ ]

If yes, in what ways has it changed?

……

Why has it changed?

……..

In choosing to whom you will sell your coffee, how important are each of the following factors? Please circle the appropriate response where 1 is “not at all important” and 6 is “very important”.

able to take all my harvested coffee	1	2	3	4	5	6
provides me with a fair price for my effort	1	2	3	4	5	6
pays cash on delivery	1	2	3	4	5	6
rewards me for good quality	1	2	3	4	5	6
offers credit	1	2	3	4	5	6
voluntarily withholds part of my cash proceeds	1	2	3	4	5	6
is financially strong	1	2	3	4	5	6
has a good business reputation	1	2	3	4	5	6
provides technical information/advice	1	2	3	4	5	6
provides market/price information	1	2	3	4	5	6
transports/picks up my coffee	1	2	3	4	5	6
is willing to meet my immediate cash needs	1	2	3	4	5	6
is geographically close to me	1	2	3	4	5	6
makes the best price relative to the alternatives	1	2	3	4	5	6
we have a close personal relationship	1	2	3	4	5	6
we trust each other	1	2	3	4	5	6
my buyer is honest	1	2	3	4	5	6
my buyer considers my best interests	1	2	3	4	5	6
my buyer keeps their promise	1	2	3	4	5	6
I want to continue to sell to this buyer	1	2	3	4	5	6

In seeking to improve the quality of the coffee you produce, what things prevent you from producing better quality coffee?

……
……

In which areas do you believe you would find training most valuable in assisting you to produce better quality coffee?

……
……

ROADSIDE TRADERS

Do you currently sell cherry to roadside buyers? Yes [ ] No [ ]

If NO, why is it that you do not sell cherries to roadside buyers?

……
……..

If YES, is this roadside buyer an agent for a wet factory? Yes [ ] No [ ]

What quantity of cherry do you sell to these independent roadside buyers?

Very little – almost half - more than half - almost all – all

To how many independent roadside buyers do you sell cherry?

……

To what extent is your preferred roadside cherry buyer able to fulfil your needs? On a scale of 1 to 6, where 1 is “not at all well” and 6 is “very well”, please indicate how well you think your preferred roadside cherry buyer can meet EACH of these criteria.

able to take all my harvested coffee	1	2	3	4	5	6
provides me with a fair price for my effort	1	2	3	4	5	6
pays cash on delivery	1	2	3	4	5	6
rewards me for good quality	1	2	3	4	5	6
offers credit	1	2	3	4	5	6
voluntarily withholds part of my cash proceeds	1	2	3	4	5	6
is financially strong	1	2	3	4	5	6
has a good business reputation	1	2	3	4	5	6
provides technical information/advice	1	2	3	4	5	6
provides market/price information	1	2	3	4	5	6
transports/picks up my coffee	1	2	3	4	5	6
is willing to meet my immediate cash needs	1	2	3	4	5	6
is geographically close to me	1	2	3	4	5	6
makes the best price relative to the alternatives	1	2	3	4	5	6
we have a close personal relationship	1	2	3	4	5	6
we trust each other	1	2	3	4	5	6

my buyer is honest	1	2	3	4	5	6
my buyer considers my best interests	1	2	3	4	5	6
my buyer keeps their promise	1	2	3	4	5	6
I want to continue to sell to this buyer	1	2	3	4	5	6

What are the most important things that prevent your preferred roadside cherry buyer from meeting your needs or any of the above criteria?

……
……

To what extent do you believe that you were able to fulfil your preferred roadside cherry buyer's needs for EACH of the following criteria? On a scale of 1 to 6, where 1 is "not at all well" and 6 is "very well" please indicate how well you think you met EACH of these criteria.

deliver consistently mature, ripe red cherry	1	2	3	4	5	6
provide large quantities of cherry	1	2	3	4	5	6
cherry is free of leaves, sticks and stones	1	2	3	4	5	6
reliable supplier of cherry	1	2	3	4	5	6
deliver cherry to repay cash advances	1	2	3	4	5	6
provide cherry that is competitively priced	1	2	3	4	5	6
don't continually seek cash advances	1	2	3	4	5	6
willing to disclose problems	1	2	3	4	5	6
grown coffee in a sustainable way	1	2	3	4	5	6

What things prevent you from better meeting your preferred roadside cherry buyers' needs?

……..
.....

For how many years have you been trading with this roadside buyer?

……..……..……..……...

Do you currently sell parchment to roadside buyers? Yes [ ] No [ ]

If NO, why is it that you do not sell parchment to roadside buyers?

……..……..…….

What quantity of parchment do you sell to these independent roadside buyers?

Very little – almost half - more than half - almost all – all

To how many independent roadside buyers do you sell parchment?

……..……..……..……

To what extent is your preferred roadside parchment buyer able to fulfil your needs? On a scale of 1 to 6, where 1 is “not at all well” and 6 is “very well”, please indicate how well you think your preferred roadside parchment buyer can meet EACH of these criteria.

able to take all my harvested coffee	1	2	3	4	5	6
provides me with a fair price for my effort	1	2	3	4	5	6
pays cash on delivery	1	2	3	4	5	6
rewards me for good quality	1	2	3	4	5	6
offers credit	1	2	3	4	5	6
voluntarily withholds part of my cash proceeds	1	2	3	4	5	6
is financially strong	1	2	3	4	5	6
has a good business reputation	1	2	3	4	5	6
provides technical information/advice	1	2	3	4	5	6
provides market/price information	1	2	3	4	5	6
transports/picks up my coffee	1	2	3	4	5	6
is willing to meet my immediate cash needs	1	2	3	4	5	6
is geographically close to me	1	2	3	4	5	6
makes the best price relative to the alternatives	1	2	3	4	5	6
we have a close personal relationship	1	2	3	4	5	6
we trust each other	1	2	3	4	5	6
my buyer is honest	1	2	3	4	5	6
my buyer considers my best interests	1	2	3	4	5	6
my buyer keeps their promise	1	2	3	4	5	6
I want to continue to sell to this buyer	1	2	3	4	5	6

What are the most important things that prevent your preferred roadside parchment buyer from meeting your needs or any of the above criteria?

……...

……..

To what extent do you believe that you were able to fulfil your preferred roadside buyer's needs for EACH of the following criteria? On a scale of 1 to 6, where 1 is "not at all well" and 6 is "very well" please indicate how well you think you met EACH of these criteria.

deliver consistently good clean parchment	1	2	3	4	5	6
good colour	1	2	3	4	5	6
large quantities available	1	2	3	4	5	6
free from physical defects	1	2	3	4	5	6
free from foreign matter	1	2	3	4	5	6
no bad smell/stinkers	1	2	3	4	5	6
well dried	1	2	3	4	5	6
reliable supplier	1	2	3	4	5	6
competitively priced	1	2	3	4	5	6
deliver parchment to repay cash advances	1	2	3	4	5	6
don't continually seek cash advances	1	2	3	4	5	6
large bean	1	2	3	4	5	6
grown coffee in a sustainable way	1	2	3	4	5	6
willing to disclose problems	1	2	3	4	5	6

What things prevent you from better meeting your preferred roadside parchment buyers' needs?
………
………

For how many years have you been trading with this roadside buyer?
………
………

THINKING ABOUT GROWER COOPERATIVES

Do you currently sell cherry to grower cooperatives? Yes [ ] No [ ]

If NO, why do you not sell cherries to grower cooperatives?

……
……

If YES, why do you sell cherry to grower cooperatives?

……
……

What quantity of cherry do you sell to grower cooperatives?

Very little – almost half - more than half - almost all – all

To how many grower cooperatives do you sell cherry?

……

To what extent is the grower cooperative to whom you sell most of your cherries able to fulfil your needs? On a scale of 1 to 6, where 1 is “not at all well” and 6 is “very well”, please indicate how well you think your preferred grower cooperative can meet EACH of these criteria.

able to take all my harvested coffee	1	2	3	4	5	6
provides me with a fair price for my effort	1	2	3	4	5	6
pays cash on delivery	1	2	3	4	5	6
rewards me for good quality	1	2	3	4	5	6
offers credit	1	2	3	4	5	6
voluntarily withholds part of my cash proceeds	1	2	3	4	5	6
is financially strong	1	2	3	4	5	6
has a good business reputation	1	2	3	4	5	6
provides technical information/advice	1	2	3	4	5	6
provides market/price information	1	2	3	4	5	6
transports/picks up my coffee	1	2	3	4	5	6
is willing to meet my immediate cash needs	1	2	3	4	5	6
is geographically close to me	1	2	3	4	5	6
makes the best price relative to the alternatives	1	2	3	4	5	6
we have a close personal relationship	1	2	3	4	5	6
we trust each other	1	2	3	4	5	6

my buyer is honest	1	2	3	4	5	6
my buyer considers my best interests	1	2	3	4	5	6
my buyer keeps their promise	1	2	3	4	5	6
I want to continue to sell to this buyer	1	2	3	4	5	6

What are the most important things that prevent your preferred grower cooperative from meeting your needs or any of the above criteria?

……
……..

To what extent do you believe that you were able to fulfil your preferred grower cooperative's needs for cherry for EACH of the following criteria? On a scale of 1 to 6, where 1 is "not at all well" and 6 is "very well" please indicate how well you think you met EACH of these criteria.

deliver consistently mature, ripe red cherry	1	2	3	4	5	6
provide large quantities of cherry	1	2	3	4	5	6
cherry is free of leaves, sticks and stones	1	2	3	4	5	6
reliable supplier of cherry	1	2	3	4	5	6
deliver cherry to repay cash advances	1	2	3	4	5	6
provide cherry that is competitively priced	1	2	3	4	5	6
don't continually seek cash advances	1	2	3	4	5	6
willing to disclose problems	1	2	3	4	5	6
grown coffee in a sustainable way	1	2	3	4	5	6

What things prevent you from better meeting your preferred grower cooperative's needs in buying cherry?

……..
……..

For how many years have you been trading with this grower cooperative?

……..
……..

Do you currently sell parchment to grower cooperatives? Yes [ ] No [ ]

If NO, why is it that you do not sell parchment to grower cooperatives?

……..

If YES, why do you sell parchment to grower cooperatives?

……..

How quantity of parchment do you sell to grower cooperatives?

Very little – almost half - more than half - almost all – all

To how many grower cooperatives do you sell parchment?

……..……..……

To what extent is your preferred grower cooperative able to fulfil your needs in selling parchment? On a scale of 1 to 6, where 1 is “not at all well” and 6 is “very well”, please indicate how well you think your preferred grower cooperative can meet EACH of these criteria.

able to take all my harvested coffee	1	2	3	4	5	6
provides me with a fair price for my effort	1	2	3	4	5	6
pays cash on delivery	1	2	3	4	5	6
rewards me for good quality	1	2	3	4	5	6
offers credit	1	2	3	4	5	6
voluntarily withholds part of my cash proceeds	1	2	3	4	5	6
is financially strong	1	2	3	4	5	6
has a good business reputation	1	2	3	4	5	6
provides technical information/advice	1	2	3	4	5	6
provides market/price information	1	2	3	4	5	6
transports/picks up my coffee	1	2	3	4	5	6
is willing to meet my immediate cash needs	1	2	3	4	5	6
is geographically close to me	1	2	3	4	5	6
makes the best price relative to the alternatives	1	2	3	4	5	6
we have a close personal relationship	1	2	3	4	5	6
we trust each other	1	2	3	4	5	6
my buyer is honest	1	2	3	4	5	6
my buyer considers my best interests	1	2	3	4	5	6
my buyer keeps their promise	1	2	3	4	5	6
I want to continue to sell to this buyer	1	2	3	4	5	6

What are the most important things that prevent your preferred grower cooperative from meeting your needs or any of the above criteria?

……

……..

To what extent do you believe that you were able to fulfil your preferred grower cooperative's need for EACH of the following criteria? On a scale of 1 to 6, where 1 is "not at all well" and 6 is "very well" please indicate how well you think you met EACH of these criteria.

deliver consistently good clean parchment	1	2	3	4	5	6
good colour	1	2	3	4	5	6
large quantities available	1	2	3	4	5	6
free from physical defects	1	2	3	4	5	6
free from foreign matter	1	2	3	4	5	6
no bad smell/stinkers	1	2	3	4	5	6
well dried	1	2	3	4	5	6
reliable supplier	1	2	3	4	5	6
competitively priced	1	2	3	4	5	6
deliver parchment to repay cash advances	1	2	3	4	5	6
don't continually seek cash advances	1	2	3	4	5	6
large bean	1	2	3	4	5	6
grown coffee in a sustainable way	1	2	3	4	5	6
willing to disclose problems	1	2	3	4	5	6

What things prevent you from better meeting your preferred grower cooperative's needs?
……
……..……..……..……..……..

For how many years have you been trading with this grower cooperative?
……..……..……...

We would now like to ask you a few questions about your cooperative group performance.

What things were most important in the successful establishment of your cooperative group?
……..……..……..……..……..
……..……..……..……..……...

What are the most important factors that hold this group together?
……..……..……
……..……..……..……..……..……...

What are the most important factors that are most likely to cause this group to fall apart?
……..……..……..……..……
..……..……..……..……..……

Could you please indicate the extent to which you agree with EACH of these statements where 1 is "I strongly agree" and 5 is I "strongly disagree".

The cooperative group has clearly defined the marketing problem to be solved	1	2	3	4	5
The cooperative group has estimated the facilities needed to solve the problem	1	2	3	4	5
The cooperative group has developed a group financial plan	1	2	3	4	5
The cooperative group has agreement on membership fees and levy arrangements	1	2	3	4	5
The cooperative group has agreement on a definite set of rules for the group	1	2	3	4	5
The cooperative group has open communication between all parties	1	2	3	4	5
The cooperative group has open discussion and freely available information on all important group issues	1	2	3	4	5
The cooperative group has continuing and clearly identified benefits for members	1	2	3	4	5
The cooperative group has regular and orderly formal meetings	1	2	3	4	5
Members of the cooperative group have a high level of personal commitment	1	2	3	4	5
Members of the cooperative group have a willingness to provide an adequate amount of financial support to the group	1	2	3	4	5
Members of the cooperative group have a willingness to provide a consistent supply of produce					
Members of the cooperative group have a good understanding of the aims of the group					
Management of the cooperative group have a strong commitment to the success of the group					
Management of the cooperative group have a willingness to accept responsibility					
Management of the cooperative group have a willingness to assist other members					
Management of the cooperative group have a willingness to encourage prospective group leaders					

Management of the cooperative group have the ability to work together to overcome different opinions					
Management of the cooperative group have the ability to maintain the commitment and involvement of members					
The cooperative has a strong focus on the needs of all customers					
The cooperative has long range plan focusing on maintaining product reputation in the marketplace					
The cooperative has access to professional expertise in the marketing area					
The cooperative has obtained greater post harvest control of produce					

THINKING ABOUT THE WET AND DRY FACTORIES

Do you currently sell cherry to wet factories? Yes [ ] No [ ]

If NO, why is it that you do not sell cherries to wet factories?

……..……
……..……..….

If YES, why do you sell cherry to the wet factory?

…….....
.....…….....

How quantity of cherry do you sell to wet factories?

Very little – almost half - more than half - almost all – all

To how many wet factories do you sell cherry?

……...……...……...……...……
..……...……..……..

To what extent is your preferred wet factory able to fulfil your needs? On a scale of 1 to 6, where 1 is “not at all well” and 6 is “very well”, please indicate how well you think your preferred wet factory can meet EACH of these criteria.

able to take all my harvested coffee	1	2	3	4	5	6
provides me with a fair price for my effort	1	2	3	4	5	6
pays cash on delivery	1	2	3	4	5	6
rewards me for good quality	1	2	3	4	5	6
offers credit	1	2	3	4	5	6
voluntarily withholds part of my cash proceeds	1	2	3	4	5	6
is financially strong	1	2	3	4	5	6
has a good business reputation	1	2	3	4	5	6
provides technical information/advice	1	2	3	4	5	6
provides market/price information	1	2	3	4	5	6
transports/picks up my coffee	1	2	3	4	5	6
is willing to meet my immediate cash needs	1	2	3	4	5	6
is geographically close to me	1	2	3	4	5	6
makes the best price relative to the alternatives	1	2	3	4	5	6
we have a close personal relationship	1	2	3	4	5	6
we trust each other	1	2	3	4	5	6

my buyer is honest	1	2	3	4	5	6
my buyer considers my best interests	1	2	3	4	5	6
my buyer keeps their promise	1	2	3	4	5	6
I want to continue to sell to this buyer	1	2	3	4	5	6

What are the most important things that prevent your preferred wet factory from meeting your needs on any of the above criteria?

……
……..

To what extent do you believe that you were able to fulfil your preferred wet factory's needs for EACH of the following criteria? On a scale of 1 to 6, where 1 is "not at all well" and 6 is "very well" please indicate how well you think you met EACH of these criteria.

deliver consistently mature, ripe red cherry	1	2	3	4	5	6
provide large quantities of cherry	1	2	3	4	5	6
cherry is free of leaves, sticks and stones	1	2	3	4	5	6
reliable supplier of cherry	1	2	3	4	5	6
deliver cherry to repay cash advances	1	2	3	4	5	6
provide cherry that is competitively priced	1	2	3	4	5	6
don't continually seek cash advances	1	2	3	4	5	6
willing to disclose problems	1	2	3	4	5	6
grown coffee in a sustainable way	1	2	3	4	5	6

What things prevent you from better meeting your preferred wet factory's needs?

……
……..

For how many years have you been trading with this wet factory?

……
……..

Do you currently sell parchment to dry factories? Yes [ ] No [ ]

If NO, why is it that you do not sell parchment to dry factories?

……
……..

If YES, why do you sell parchment to these dry factories?

……
……..

What quantity of parchment do you sell to dry factories?

Very little – almost half - more than half - almost all – all

To how many dry factories do you sell parchment?

……..……..……..……..……
..……..……..……..……

To what extent is your preferred dry factory able to fulfil your needs? On a scale of 1 to 6, where 1 is “not at all well” and 6 is “very well”, please indicate how well you think your preferred dry factory can meet EACH of these criteria.

able to take all my harvested coffee	1	2	3	4	5	6
provides me with a fair price for my effort	1	2	3	4	5	6
pays cash on delivery	1	2	3	4	5	6
rewards me for good quality	1	2	3	4	5	6
offers credit	1	2	3	4	5	6
voluntarily withholds part of my cash proceeds	1	2	3	4	5	6
is financially strong	1	2	3	4	5	6
has a good business reputation	1	2	3	4	5	6
provides technical information/advice	1	2	3	4	5	6
provides market/price information	1	2	3	4	5	6
transports/picks up my coffee	1	2	3	4	5	6
is willing to meet my immediate cash needs	1	2	3	4	5	6
is geographically close to me	1	2	3	4	5	6
makes the best price relative to the alternatives	1	2	3	4	5	6
we have a close personal relationship	1	2	3	4	5	6
we trust each other	1	2	3	4	5	6
my buyer is honest	1	2	3	4	5	6
my buyer considers my best interests	1	2	3	4	5	6
my buyer keeps their promise	1	2	3	4	5	6
I want to continue to sell to this buyer	1	2	3	4	5	6

What are the most important things that prevent your preferred dry factory from meeting your needs or any of the above criteria?

……
……..……..……..……..……...

To what extent do you believe that you were able to fulfil your preferred dry factory's needs for EACH of the following criteria? On a scale of 1 to 6, where 1 is "not at all well" and 6 is "very well" please indicate how well you think you met EACH of these criteria.

deliver consistently good clean parchment	1	2	3	4	5	6
good colour	1	2	3	4	5	6
large quantities available	1	2	3	4	5	6
free from physical defects	1	2	3	4	5	6
free from foreign matter	1	2	3	4	5	6
no bad smell/stinkers	1	2	3	4	5	6
well dried	1	2	3	4	5	6
reliable supplier	1	2	3	4	5	6
competitively priced	1	2	3	4	5	6
deliver parchment to repay cash advances	1	2	3	4	5	6
don't continually seek cash advances	1	2	3	4	5	6
large bean	1	2	3	4	5	6
grown coffee in a sustainable way	1	2	3	4	5	6
willing to disclose problems	1	2	3	4	5	6

What things prevent you from better meeting your preferred dry factory's needs?
……
……..……..……..……..

For how many years have you been trading with this dry factory buyer?
.....……..……..……..……
…..……..……..……..……..……...

THINKING ABOUT THE TRADERS AND EXPORTERS

Do you currently sell green bean to traders and exporters? Yes [ ] No [ ]

If NO, why is it that you do not sell green bean to traders and exporters?
……
……..……..……

If YES, why do you sell green bean to traders and exporters?
……
……..……

What quantity of green bean do you sell to traders and exporters?

Very little – almost half - more than half - almost all – all

To how many traders and exporters do you sell green bean?
……………………………………………………………………………...……………………...……
……………...……………………….....……………………...……………………...…………………….....

To what extent is your preferred trader or exporter able to fulfil your needs? On a scale of 1 to 6, where 1 is “not at all well” and 6 is “very well”, please indicate how well you think your preferred trader or exporter can meet EACH of these criteria.

able to take all my harvested coffee	1	2	3	4	5	6
provides me with a fair price for my effort	1	2	3	4	5	6
pays cash on delivery	1	2	3	4	5	6
rewards me for good quality	1	2	3	4	5	6
offers credit	1	2	3	4	5	6
voluntarily withholds part of my cash proceeds	1	2	3	4	5	6
is financially strong	1	2	3	4	5	6
has a good business reputation	1	2	3	4	5	6
provides technical information/advice	1	2	3	4	5	6
provides market/price information	1	2	3	4	5	6
transports/picks up my coffee	1	2	3	4	5	6
is willing to meet my immediate cash needs	1	2	3	4	5	6
is geographically close to me	1	2	3	4	5	6
makes the best price relative to the alternatives	1	2	3	4	5	6
we have a close personal relationship	1	2	3	4	5	6
we trust each other	1	2	3	4	5	6
my buyer is honest	1	2	3	4	5	6
my buyer considers my best interests	1	2	3	4	5	6
my buyer keeps their promise	1	2	3	4	5	6
I want to continue to sell to this buyer	1	2	3	4	5	6

What are the most important things that prevent your preferred trader or exporter from meeting your needs or any of the above criteria?
…………………………………………………………………………………………………….……
……………………………………………………………………………………………………..

To what extent do you believe that you were able to fulfil your preferred trader or exporter's needs for EACH of the following criteria? On a scale of 1 to 6, where 1 is "not at all well" and 6 is "very well" please indicate how well you think you met EACH of these criteria.

deliver consistently good clean green bean	1	2	3	4	5	6
good colour	1	2	3	4	5	6
large quantities available	1	2	3	4	5	6
free from physical defects	1	2	3	4	5	6
free from foreign matter	1	2	3	4	5	6
no bad smell/stinkers	1	2	3	4	5	6
well dried	1	2	3	4	5	6
reliable supplier	1	2	3	4	5	6
competitively priced	1	2	3	4	5	6
deliver green bean to repay cash advances	1	2	3	4	5	6
don't continually seek cash advances	1	2	3	4	5	6
large green beans	1	2	3	4	5	6
grown coffee in a sustainable way	1	2	3	4	5	6
willing to disclose problems	1	2	3	4	5	6

What things prevent you from better meeting your preferred trader or exporters needs?
……
……..……..……..……...

For how many years have you been trading with this trader or exporter?
……..……..……..……..…
……..……..……..……...

THINKING ABOUT THE RELATIONS IN YOUR VILLAGE OR COMMUNITY

If you were asked to describe a village or area where the people who lived in that area were able to undertake collective action for the mutual benefit of people in that area, what would you say?

……
……..……..……..…….

How would you describe an area where this was unlikely to occur?

……
……..……..…….

Could you please indicate the extent to which you agree with EACH of these statements where 1 is "I strongly agree" and 5 is I "strongly disagree".

People in my village or community can be trusted	1	2	3	4	5
People in my community are likely to steal cherry from my trees	1	2	3	4	5
People who do not participate in village or community activities will be criticized or fined	1	2	3	4	5
Processors and exporters give us a fair price for our coffee	1	2	3	4	5
The views of local people are taken into account before important village or community decisions are made	1	2	3	4	5
I have confidence in the local community leadership to manage conflict in the community	1	2	3	4	5
There are often differences in characteristics between people living in the same village or community	1	2	3	4	5
People in my village or community make a fair contribution to communal activities	1	2	3	4	5

How often do you listen to the radio:

every day-a few times a week-once a week-less than once a week-never

I have easy access to the following:

power Yes [ ] No [ ]

telephone Yes [ ] No [ ]

water supply Yes [ ] No [ ]

You have now completed the survey.

Thank you for your time and assistance in helping us to improve the overall quality of the PNG coffee industry.

11.2 Appendix 2: Pre-and post-training questionnaires

Pre-training questionnaire

Section 1. Tell us a little about yourself

Name…….

Group…….

Number of coffee trees ……

Number of years growing coffee …….

Last season, what quantity of your coffee was sold as cherry …….. (bags)

what quantity of your coffee was sold as parchment ……. (bags)

Section 2. Tell us how you currently market your cherry

To whom did you sell your cherry? What quantity (bags) did you sell to EACH buyer?

Other growers ……. (bags)

Grower cooperatives …….

Roadside buyers …….

Wet factory …….

For what reasons did you choose to sell/not to sell cherry to

Other growers ……

……

Grower cooperatives ……

……

Roadside buyers ……

……

Wet factory ……

……

To what extent do you trust EACH of the buyers to whom you sell cherry? Please answer on a scale of 1 to 4 where 1 is “not at all”, 2 is “not much”, 3 is “a little” and 4 is “a lot”.

Other growers	1	2	3	4
Grower cooperatives	1	2	3	4
Roadside buyers	1	2	3	4
Wet factory	1	2	3	4

What price did you receive from EACH of the buyers to whom you sold cherry?

Other growers ……. (Kina per kg)

Grower cooperatives …….

Roadside buyers …….

Wet factory …….

Thinking about your coffee buyers, what do you think they look for in determining the price they will pay you for the cherry you have produced?

……

……

How well do you think you can meet your cherry buyers' needs?

……

……

What things prevent you from better fulfilling your cherry buyers' needs?

……

……

Section 3. Tell us how you currently produce and market your parchment

Last season, to whom did you sell your parchment? What quantity (bags) did you sell to EACH buyer?

Other growers ……. (bags)

Grower cooperatives …….

Roadside buyers …….

Dry factory …….

For what reasons did you choose to sell/not to sell parchment to

Other growers ……

……

Grower cooperatives ……

……

Roadside buyers ……

……

Dry factory ……

……

To what extent do you trust EACH of the buyers to whom you sell parchment? Please answer on a scale of 1 to 4 where 1 is “not at all”, 2 is “not much”, 3 is “a little” and 4 is “a lot”.

Other growers	1	2	3	4
Grower cooperatives	1	2	3	4
Roadside buyers	1	2	3	4
Dry factory	1	2	3	4

What price did you receive from EACH of the buyers to whom you sold parchment?

Other growers …… (Kina per kg)

Grower cooperatives ……..

Roadside buyers ……..

Dry factory ……..

Thinking about your coffee buyers, what do you think they look for in determining the price they will pay you for the parchment you have produced?

……

……

How well do you think you can meet your parchment buyers’ needs?

……

……

What things prevent you from better fulfilling your parchments buyers’ needs?

……

……

With regard to the processing of your parchment, please answer EACH of the following questions on a scale of 1 to 4 where 1 is “not at all”, 2 is “sometimes”, 3 is “most times” and 4 is “always”. Please circle the appropriate answer.

Pulp only red ripe cherry	1	2	3	4
Calibrate the pulper every time it is used	1	2	3	4
Pulp cherry on the same day of harvest	1	2	3	4
Wash the coffee with clean water every day	1	2	3	4
Ferment the coffee only until it passes the rub test	1	2	3	4
Shade dry the coffee	1	2	3	4
Sun dry the coffee until it reaches the hard black	1	2	3	4

stage

Dry on raised beds/benches	1	2	3	4
Hand sort the coffee prior to sale to remove debri	1	2	3	4
Coffee is dried in a secure fenced area	1	2	3	4

Section 4. Thinking about the market and marketing

How many kg of cherry do you think are required to produce ONE kg of parchment?
……..

If you had the choice to sell either cherry or parchment to your buyer, which do you think is the more profitable? Please circle your answer

Cherry Parchment Don't know

Please explain your answer

……

……

What factors influence the price that you receive for the coffee you have produced?

……

……

What relationship is there between the New York coffee market and the prices paid at the factory door for PNG coffee? Please circle your answer.

No relationship A little A moderate amount A great deal I don't know

What activities do the traders and exporters perform?

……

……

Section 5. Thinking about how you manage your coffee farm and your household?

What proportion of your household income is derived from the sale of coffee? Please circle your answer.

Less than one quarter

Between one quarter and one half

About one half

Between half and three quarters

More than three quarters

Do you draw up a household budget? Please circle your answer.

Yes No

From where do you access the funds necessary to pay your children's school fees?

……

Do you draw up a farm budget? Please circle your answer.

Yes No

From where do you access the funds necessary to operate your farm? Such funds might be used to pay for labour (pruning), purchasing fertilisers and chemicals, planting new trees.

……

Do you currently operate a bank account? Please circle your answer.

Yes No

Do you currently operate a cash book to record sales receipts and expenditure? Please circle your answer?

Yes No

Section 6. Thinking about your coffee farm

Do you expect the production of coffee on your farm to;

increase decrease stay the same

Please circle your response

Can you please explain your reason?

……..

……..

Within the last 12 months have rehabilitated any of your coffee trees? Please circle your answer.

Yes No

In what ways did you rehabilitate your trees?

……...

……...

How many trees have you rehabilitated? ……...

Within the last 12 months have you planted any new areas in coffee? Please circle your answer.

Yes No

How many new trees did you plant? …….

With regard to the way in which you manage your coffee trees, which of the following activities do you undertake? Please answer EACH of the following questions on a scale of 1 to 4 where 1 is “not at all”, 2 is “sometimes”, 3 is “most times” and 4 is “always”. Please circle the appropriate answer.

Control weeds	1	2	3	4
Check and repair fences	1	2	3	4
Dig and repair drains	1	2	3	4
Apply fertilisers	1	2	3	4
Apply chemicals to control insect pests	1	2	3	4
Apply chemicals to control diseases	1	2	3	4
Calibrate my knapsack sprayer	1	2	3	4
Wear protective equipment when applying chemicals (mask, gloves and waterproof clothing)	1	2	3	4
Prune my coffee trees	1	2	3	4
Prune my shade trees	1	2	3	4

Section 7. Thinking about your grower group

What was the primary reason for this group to come together?

……

……

What benefits did you foresee that you would obtain by being a member of this group?

……

……

To what extent have these benefits being realised?

……

……

In your opinion, what are the critical success factors that hold this group together?

……

……

What things are most likely to cause this group to fail?

……

……

With regard to the way in which this group operates, please answer EACH of the following questions on a scale of 1 to 4 where 1 is “I disagree a lot”, 2 is “I disagree”, 3 is “I agree” and 4 is “I agree a lot”. Please circle the appropriate answer.

The group meets regularly	1	2	3	4
Everyone in the group has an equal opportunity to speak	1	2	3	4
Everyone in the group is committed to producing good quality coffee	1	2	3	4
When a group member delivers sub standard coffee it is rejected	1	2	3	4
Everyone knows how much product each group member has contributed	1	2	3	4
Selling coffee through the group results in higher prices	1	2	3	4
Everyone in the group is treated fairly	1	2	3	4
Everyone within the group is respected	1	2	3	4
I trust the group leader	1	2	3	4
I trust the other group members	1	2	3	4
Group members readily accept responsibility for their actions	1	2	3	4
Group members deliver on their promises	1	2	3	4
Conflict is quickly resolved within the group	1	2	3	4
Group members belong to the same church	1	2	3	4
Group members belong to the same clan	1	2	3	4
Group members belong to the same family	1	2	3	4
People in my village or community can be trusted	1	2	3	4
People in my village or community are likely to steal cherry from my trees	1	2	3	4
Processors and exporters give me a fair price for my coffee	1	2	3	4

Post-training questionnaire

Section 1. Tell us a little about yourself

Name…….

Group…….

Number of coffee trees ……

Number of years growing coffee ……

This season, what quantity of your coffee was sold as cherry …….. (bags)

what quantity of your coffee was sold as parchment …… (bags)

Comparing this cropping season with the last, has the way which you sell your coffee changed?

Yes No

If yes, how has the way in which you sell your coffee changed?

……
……

Section 2. Tell us how you currently market your cherry

To whom did you sell your cherry? What quantity (bags) did you sell to EACH buyer?

Other growers …… (bags)

Grower cooperatives ……..

Roadside buyers ……

Wet factory ……..

Comparing this cropping season with the last, has the way in which you sell your cherry changed?

Yes No

If Yes, how has the way in which you sell your cherry changed?

……
……

To what extent do you trust EACH of the buyers to whom you sell cherry? Please answer on a scale of 1 to 4 where 1 is “not at all”, 2 is “not much”, 3 is “a little” and 4 is “a lot”.

Other growers	1	2	3	4
Grower cooperatives	1	2	3	4
Roadside buyers	1	2	3	4
Wet factory	1	2	3	4

What price did you receive from EACH of the buyers to whom you sold cherry?

Other growers ……. (Kina per kg)

Grower cooperatives …….

Roadside buyers …….

Wet factory …….

Comparing this cropping season with the last, has the price that you received from the sale of cherry

Increased Stayed the same Decreased

If the price that you receive for your cherry has changed, for what reasons do you believe the price of cherry changed?

……
……

Thinking about your coffee buyers, what do you think they look for in determining the price they will pay you for the cherry you have produced?

……
……

How well do you think you can meet your cherry buyers' needs?

……
……

Comparing this cropping season with the last, do you believe:

you are better able to meet your cherry buyers needs

or less able to meet your cherry buyers needs?

Why? What things are different?

……..
……..

Section 3. Tell us how you currently produce and market your parchment

To whom did you sell your parchment? What quantity (bags) did you sell to EACH buyer?

Other growers ……. (bags)

Grower cooperatives …….

Roadside buyers …….

Dry factory …….

Comparing this cropping season with the last, has the way in which you sell your parchment changed?

Yes No

If Yes, how has the way in which you sell your parchment changed?

……
……

To what extent do you trust EACH of the buyers to whom you sell parchment? Please answer on a scale of 1 to 4 where 1 is “not at all”, 2 is “not much”, 3 is “a little” and 4 is “a lot”.

Other growers	1	2	3	4
Grower cooperatives	1	2	3	4
Roadside buyers	1	2	3	4
Dry factory	1	2	3	4

What price did you receive from EACH of the buyers to whom you sold parchment?

Other growers ……. (Kina per kg)

Grower cooperatives …….

Roadside buyers …….

Dry factory …….

Comparing this cropping season with the last, has the price that you received from the sale of parchment

Increased Stayed the same Decreased

If the price that you receive for your parchment has changed, for what reasons do you believe the price of parchment has changed?

……
……

Thinking about your coffee buyers, what do you think they look for in determining the price they will pay you for the parchment you have produced?

……
……

How well do you think you can meet your parchment buyers’ needs?

……
……

Comparing this cropping season with the last, do you believe

you are better able to meet your parchment buyers needs

or less able to meet your parchment buyers needs?

Why? What things are different?

……
……

With regard to the processing of your parchment, please answer EACH of the following questions on a scale of 1 to 4 where 1 is “not at all”, 2 is “sometimes”, 3 is “most times” and 4 is “always”. Please circle the appropriate answer.

Pulp only red ripe cherry	1	2	3	4
Calibrate the pulper every time it is used	1	2	3	4
Pulp cherry on the same day of harvest	1	2	3	4
Wash the coffee with clean water every day	1	2	3	4
Ferment the coffee only until it passes the rub test	1	2	3	4
Shade dry the coffee	1	2	3	4
Sun dry the coffee until it reaches the hard black stage	1	2	3	4
Dry on raised beds/benches	1	2	3	4
Hand sort the coffee prior to sale to remove debri	1	2	3	4
Coffee is dried in a secure fenced area	1	2	3	4

Section 4. Thinking about the market and marketing

How many kg of cherry do you think are required to produce ONE kg of parchment? ……

If you had the choice to sell either cherry or parchment to your buyer, which do you think is the more profitable? Please circle your answer

Cherry Parchment Don’t know

Please explain your answer

……
……

What factors influence the price that you receive for the coffee you have produced?

……
……

What relationship is there between the New York coffee market and the prices paid at the factory door for PNG coffee? Please circle your answer.

No relationship A little A moderate amount A great deal

I don't know

What activities do the traders and exporters perform?

……
……

Section 5. Thinking about how you manage your coffee farm and your household?

What proportion of your household income is derived from the sale of coffee?

Less than one quarter

Between one quarter and one half

About one half

Between half and three quarters

More than three quarters

Do you draw up a household budget? Please circle your answer.

Yes No

From where do you access the funds necessary to pay your children's school fees?

……
……

Do you draw up a farm budget? Please circle your answer.

Yes No

From where do you access the funds necessary to operate your farm? Such funds might be used to pay for labour (pruning), purchasing fertilisers and chemicals, planting new trees.

……
……

Do you currently operate a bank account? Please circle your answer.

Yes No

Do you currently operate a cash book to record sales receipts and expenditure? Please circle your answer?

Yes No

Section 6. Thinking about your coffee farm

Do you expect the production of coffee on your farm to;

increase decrease stay the same

Can you please explain your reason?

……
……

Within the last 12 months have you rehabilitated any of your coffee trees? Please circle your answer.

Yes No

In what ways did you rehabilitate your trees?

……
……

How many trees have you rehabilitated? ……..

Within the last 12 months have you planted any new areas in coffee? Please circle your answer.

Yes No

How many new trees did you plant? ……

With regard to the way in which you manage your coffee trees, which of the following activities do you undertake? Please answer EACH of the following questions on a scale of 1 to 4 where 1 is “not at all”, 2 is “sometimes”, 3 is “most times” and 4 is “always”. Please circle the appropriate answer.

Control weeds	1	2	3	4
Check and repair fences	1	2	3	4
Dig and repair drains	1	2	3	4
Apply fertilisers	1	2	3	4
Apply chemicals to control insect pests	1	2	3	4
Apply chemicals to control diseases	1	2	3	4
Calibrate my knapsack sprayer	1	2	3	4
Wear protective equipment when applying chemicals (mask, gloves and waterproof clothing)	1	2	3	4
Prune my coffee trees	1	2	3	4
Prune my shade trees	1	2	3	4

Section 7. Thinking about your grower group

What was the primary reason for this group to come together?

……
……

Over the last 12 months, have the reasons for the group's formation changed?

Yes No

If yes, in what ways have the reasons for joining the group changed?

……
……

What benefits did you foresee that you will obtain by being a member of this group?

……
……

To what extent have these benefits being realised?

……
……

What were the major factors that prevented or impeded the group from delivering these benefits?

……
……

In your opinion, what are the critical success factors that hold this group together?

……
……

What things are most likely to cause this group to fail?

……
……

To what extent has the personal viability training enhanced group activities?

……
……

With regard to the way in which this group operates, please answer EACH of the following questions on a scale of 1 to 4 where 1 is “I disagree a lot”, 2 is “I disagree”, 3 is “I agree” and 4 is “I agree a lot”. Please circle the appropriate answer.

The group meets regularly	1	2	3	4
Everyone in the group has an equal opportunity to speak	1	2	3	4
Everyone in the group is committed to producing good quality coffee	1	2	3	4
When a group member delivers sub standard coffee it is rejected	1	2	3	4
Everyone knows how much product each group member has contributed	1	2	3	4
Selling coffee through the group results in higher prices	1	2	3	4
Everyone in the group is treated fairly	1	2	3	4
Everyone within the group is respected	1	2	3	4
I trust the group leader	1	2	3	4
I trust the other group members	1	2	3	4
Group members readily accept responsibility for their actions	1	2	3	4
Group members deliver on their promises	1	2	3	4
Conflict is quickly resolved within the group	1	2	3	4
Group members belong to the same church	1	2	3	4
Group members belong to the same clan	1	2	3	4
Group members belong to the same family	1	2	3	4
People in my village or community can be trusted	1	2	3	4
People in my village or community are likely to steal cherry from my trees	1	2	3	4
Processors and exporters give me a fair price for my coffee	1	2	3	4

11.3 Appendix 3: Prevailing coffee quality systems in PNG

11.3.1 C.A.F.E. Practices[3]

Introduction

Starbucks initiated C.A.F.E. (Coffee and Grower Equity) Practices to evaluate, recognize and reward the producers of high quality sustainably grown coffee. C.A.F.E. Practices is a green coffee sourcing guideline developed in collaboration with Scientific Certification Systems (SCS), a third-party evaluation and certification firm. C.A.F.E. Practices seeks to ensure that Starbucks sources sustainably grown and processed coffee by evaluating the economic, social and environmental aspects of coffee production against a defined set of criteria.

C.A.F.E. Practices evolved from Starbucks Preferred Supplier Program (PSP). The pilot program, which began in 2001, was created in partnership with the Conservation International Centre for Environmental Leadership in Business. Since then, Starbucks has further refined the PSP through extensive discussion with growers, processors and suppliers of coffee and other concerned stakeholders.

How C.A.F.E. Practices works

C.A.F.E. Practices requires each component of the supply chain (growers, processors and suppliers) to meet the minimum economic, social and environmental requirements of the C.A.F.E. Practices Guidelines.

However, before a supply chain can be evaluated, it must meet two pre-requisites: (1) product quality; which is evaluated by (i) green preparation and (ii) cup quality; and (2) economic accountability throughout the entire supply chain. The key issues of economic accountability are financial transparency (how much participants in the supply chain have been paid for their efforts), equity (the proportion each participant in the supply chain received) and the on-going financial viability of the chain.

Starbucks expects continuous improvement from its C.A.F.E. Practices suppliers. Verifiers apply the C.A.F.E. Practices Guidelines to either an independent applicant or to a supplier's network and score performance accordingly from a total of 100 points. The supply chain is assessed on the basis of:

- social responsibility (40 points)
  - SR-HP1 wages and benefits
  - SR-HP2 freedom of association/collective bargaining
  - SR-HP3 hours of work
  - SR-HP4 child labour/discrimination/forced labour
  - SR-WC1 access to housing, water and sanitary conditions
  - SR-WC2 access to education
  - SR-WC3 access to medical care
  - SR-WC4 worker safety and training

coffee growing – environmental leadership (40 points)

  - CG-WR1 watercourse protection

[3] *Information for this review of CAFÉ Practices was drawn from Scientific Certification Systems (SCS): www.scscertified.com/csr/starbucks*

  - CG-WR2 water quality protection
  - CG-WR3 water resources and irrigation
  - CG-SR1 controlling surface erosion
  - CG-SR2 maintaining soil productivity
  - CG-CB1 maintaining coffee shade canopy
  - CG-CB2 protecting wildlife
  - CG-CB3 conservation areas
  - CG-EM1 ecological pest and disease control
  - CG-EM2 farm management and monitoring
- coffee processing – environmental leadership (20 points)
  - CP-WC1 minimising water consumption
  - CP-WC2 reducing wastewater impact
  - CP-WM1 waste management operations/recycling
  - CP-EC1 energy conservation/impact
- and in the dry mill:
  - CP-WM2 waste management operations/recycling
  - CP-EC2 energy conservation/impact

The incentives

Suppliers who have met the pre-requisites of quality and financial transparency and scored the required minimums in the Social Responsibility area (SR-HP1) and (SR-HP4) are listed on the C.A.F.E. Practices approved supplier roster in descending order from the highest to the lowest score. Suppliers with higher scores are afforded first consideration in Starbucks coffee purchasing decisions, but only if the product specifications, quality and taste requirements have been met.

Starbucks extend preferred pricing and contract terms to participating suppliers who have been verified under C.A.F.E. Practices, with preference given to strategic and preferred suppliers.

For strategic supplier status: in the areas of Social Responsibility, Environmental Leadership – Coffee Growing and Environmental Leadership – Coffee Processing, the scores assigned by the approved verifier must meet or exceed 80% of the possible points in each subject area.

For preferred supplier status: in the subject areas of Social Responsibility, Environmental Leadership – Coffee Growing, and Environmental Leadership – Coffee Processing, applicants must achieve a minimum of 60% in each subject area.

For verified supplier status: applicants fail to achieve a minimum of 60% in each of the scored subject areas, but meet the minimum required indicators for the Minimum/Living Wage/Overtime Regulation (SR-HP1) and Child Labour/Discrimination/Forced Labour (SR-HP4). Starbucks expects a Verified Supplier to undergo a re-verification within one year after approval and demonstrate a 10 percentage point improvement with the aim of achieving Preferred or Strategic Supplier status. If an improvement of 10 percentage points is not attained the Verified Status is lost.

Conditional status is extended to suppliers who have not previously delivered coffee to Starbucks but meet the quality prerequisite through an approved sample. Conditional status is further expressed as Conditional Verified, Conditional Preferred and Conditional

Strategic. Once conditionally accepted suppliers fulfil their first contract with Starbucks, their status will be converted to full C.A.F.E. Practices status in accordance with their score. Should the conditionally accepted supplier fail to fulfil their first contract with Starbucks, they can re-apply to C.A.F.E. Practices only after they have fulfilled a subsequent contract with Starbucks and after they undergo re-verification.

A high performance incentive of USD 0.05 per pound of green coffee is paid one time per year for any ten percentage point improvement over a previous strategic supplier score above 80% within a three year period.

The application process

Product quality is an essential prerequisite to participate in C.A.F.E. Practices. Potential participants must first submit a sample to Starbucks Coffee Trading Company (SCTC), in Lausanne, Switzerland, and have that sample approved.

Prior to engaging in C.A.F.E. Practices, the supply chain to be verified needs to be fully identified and understood. When applying to C.A.F.E. Practices, applicants must list and detail their entire supply network. Typically suppliers are positioned at the top of a large supply network and work with many coffee producers and processors simultaneously.

Individual estates, processors (including their grower supply network) and producer associations can also receive an independent C.A.F.E. Practices score for their coffee if that coffee is sold as a discreet supply directly or through an agent or exporter. Those producer associations, estates and processors can also use that independent score for coffees that are blended and/or contribute to a larger coffee supply network as long as that C.A.F.E. Practices verified coffee can be accurately quantified and identified at the time of shipment.

Individual producers of coffee (farming entities without any vertical integration or central processors that cannot characterize their grower supply network) cannot apply to C.A.F.E. Practices.

11.3.2 Organic certification[4]

Introduction

Organic agriculture is a production method which manages the farm and its environment as a single system. It utilizes both traditional and scientific knowledge to enhance the health of the agro-ecosystem in which the farm operates. Organic farms rely on the use of natural resources and the management of the ecosystem rather than external agricultural inputs such as mineral fertilizers and agrochemicals. Organic agriculture therefore rejects synthetic chemicals and genetically modified inputs. It promotes sustainable traditional farming practices that maintain soil fertility such as fallow (FAO 2007).

The principles of organic agriculture

Organic agriculture is based on four guiding principles (IFOAM, 2008):

1. The principle of health

   Organic agriculture should sustain and enhance the health of soil, plant, animal, human and planet as one and indivisible.

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[4] *Information for this review of organic certification is drawn from IFOAM: www.ifoam.org; NASAA: www.nasaa.com.au and the FAO (2007). A Practical Manual for Producers and Exporters from Asia: Regulations, standards and certification for Agricultural Exports RAP Publication 13.*

This principle points out that the health of individuals and communities cannot be separated from the health of ecosystems - healthy soils produce healthy crops that foster the health of animals and people. Health is the wholeness and integrity of living systems. It is not simply the absence of illness, but the maintenance of physical, mental, social and ecological well-being. Immunity, resilience and regeneration are key characteristics of health.

The role of organic agriculture, whether in farming, processing, distribution, or consumption, is to sustain and enhance the health of ecosystems and organisms from the smallest in the soil to human beings. In particular, organic agriculture intends to produce high quality, nutritious food that contributes to preventive health care and well-being. In view of this it should avoid the use of fertilizers, pesticides, animal drugs and food additives that may have adverse health effects.

2. The principle of ecology

   Organic agriculture should be based on living ecological systems and cycles, work with them, emulate them and help sustain them.

   This principle roots organic agriculture within living ecological systems. It states that production is to be based on ecological processes and recycling. Nourishment and well-being are achieved through the ecology of the specific production environment.

   Organic farming, pastoral and wild harvest systems should fit the cycles and ecological balances in nature. These cycles are universal but their operation is site-specific. Organic management must be adapted to local conditions, ecology, culture and scale. Inputs should be reduced by reuse, recycling and efficient management of materials and energy in order to maintain and improve environmental quality and conserve resources. Organic agriculture should attain ecological balance through the design of farming systems, establishment of habitats and maintenance of genetic and agricultural diversity. Those who produce, process, trade, or consume organic products should protect and benefit the common environment including landscapes, climate, habitats, biodiversity, air and water.

3. The principle of fairness

   Organic agriculture should build on relationships that ensure fairness with regard to the common environment and life opportunities

   Fairness is characterized by equity, respect, justice and stewardship of the shared world, both among people and in their relations to other living beings. This principle emphasizes that those involved in organic agriculture should conduct human relationships in a manner that ensures fairness at all levels and to all parties - growers, workers, processors, distributors, traders and consumers. Organic agriculture should provide everyone involved with a good quality of life, and contribute to food sovereignty and reduction of poverty. It aims to produce a sufficient supply of good quality food and other products.

   Natural and environmental resources that are used for production and consumption should be managed in a way that is socially and ecologically just and should be held in trust for future generations. Fairness requires systems of production, distribution and trade that are open and equitable and account for real environmental and social costs.

4. The principle of care

   Organic agriculture should be managed in a precautionary and responsible manner to protect the health and well-being of current and future generations and the environment.

   Organic agriculture is a living and dynamic system that responds to internal and external demands and conditions. Practitioners of organic agriculture can enhance

efficiency and increase productivity, but this should not be at the risk of jeopardizing health and well-being. Consequently, new technologies need to be assessed and existing methods reviewed. Given the incomplete understanding of ecosystems and agriculture, care must be taken. This principle states that precaution and responsibility are key concerns in management, development and technology choices in organic agriculture. Science is necessary to ensure that organic agriculture is healthy, safe and ecologically sound. However, scientific knowledge alone is not sufficient. Practical experience, accumulated wisdom and traditional and indigenous knowledge offer valid solutions, tested by time. Organic agriculture should prevent significant risks by adopting appropriate technologies and rejecting unpredictable ones, such as genetic engineering. Decisions should reflect the values and needs of all who might be affected, through transparent and participatory processes.

Organic standards and certification

Organic standards have been used to create an agreement within organic agriculture about what an "organic" claim on a product means, and to some extent, to inform consumers. Regional groups of organic growers and their supporters began developing organic standards in the 1940's. Currently, there are hundreds of private organic standards worldwide. In addition, organic standards have been codified in the technical regulations of more than 60 governments.

Third-party organic certification was first instituted in the 1970's by the same regional organic farming groups that first developed organic standards. In the early years, the growers inspected one another on a voluntary basis, according to a general set of standards. However, third-party certification is a more complex and formal process.

Certification is a formal and documented procedure by which a third party assures that the organic standards are followed. Certification leads to consumers' trust in the organic production system and the products. Certification gives organic farming a distinct identity, builds credibility and makes market access easier.

The process

Achieving full certification as a primary producer is a three-year process. Converting any farm to an organic system requires forward planning and a long-term commitment. Producers need to be aware of the potential for some loss of income in the first year as farms enter the pre certification phase, at which time conventional farming methods and inputs are phased out and converted to organic, and during which time product cannot be sold as 'organic' (NASAA, 2008).

Year 1: Pre-certification

Following an initial farm inspection, there will be a pre certification period of one year, during which time the producer is under a contract agreement to operate according to the organic standards. Full compliance with organic production standards is required during this 'pre-conversion' period to demonstrate the producer's ability to manage their enterprise organically, prior to gaining 'in-conversion' status. During this period, no produce may be labelled or sold as 'organic'.

Years 2 and 3: In conversion certification

An inspection will be arranged towards the end of the first twelve months under pre certification to ascertain the degree to which producers have met the prescribed standards. Certification as 'in-conversion' may be achieved at this point, following a second review and the signing of a licence agreement.

The 'in-conversion' period will generally take two years to reach full certification. During this phase, producers may label their goods for sale as organic 'in-conversion'.

Years 3+: Organic certification

Following at least three years of consecutive organic management, full certification may be granted to the producer. However, compliance with production standards must be maintained for the certified status to be on-going. Annual re-inspections of the enterprise are required to ensure that the standards are being met.

As the majority of agriculture practitioners worldwide are smallholders, many operations, particularly within developing nations, run grower group schemes, which typically comprise a parent marketing or development company working with village-based growers (IFOAM, 2008). These systems operate according to the following:

- a central body responsible for marketing and the group's compliance to applicable standards
- one certification for all individual producers as well as processing and handling activities registered within the group. Individual operators within the group may not use the certification independently
- group members operate under contractual or binding membership requirements specifying the commitment to comply with applicable organic standards
- the presence of an internal control system (ICS), operated by the responsible central body or an external body contracted by the central body. The ICS normally maintains files on all members of the group and inspects each member's operation at least once a year
- the group, through the ICS, decides on members' compliance to applicable standards. Non-compliance is dealt with according to set procedures and sanctions.

These ICS are effective quality assurance tools, particularly in developing countries. Situated in the locality, ICS's can manage a higher and better surveillance regime than external annual visits. Internal control visits are often performed more than once a year, in many cases up to three times. The local organization knows the agricultural conditions and the local culture better than external inspectors and certification officers based outside the country. ICS's also serve as effective extension support for smallholders, in areas where none is available, to convert and improve organic practices.

Group certification offers two tiers of control as opposed to just an external annual inspection visit. The flow of produce from individual producers is controlled when growers collaboratively market as a group. The maze of transactions between different actors is a major cause of fraud in organic, especially when they are certified by different certification bodies. With group certification, at least one buyer is integrated as part of the group. This integration reduces the number of separate actors and certifiers in a specific supply chain.

Central to the certification process is the examination of the management systems of the parent company. Individual contracts with all registered growers must be recorded and managed by the parent body and annual inspections conducted by the parent company for all registered growers. This is ordinarily undertaken by a physical site visit, contracted to a number of international organic inspectors possessing experience in both the country's crops and cultural techniques.

It is important to note that all elements of the supply chain from production to processing, transport, handling and export must be certified.

The choice of a certification agency is very important. The certification agency chosen by the producer must be officially recognized in the country where the product is to be sold. National certification agencies are often less expensive than international agencies, but they may not be as well known in some foreign markets (FAO, 2007).

Once the farm is certified, selling organic products might improve the quality of life and income of producers. Producers shift to organic agriculture for a variety of reasons. Some

feel that the use of agrochemicals is bad for their health and the environment, while other producers are attracted by the higher prices and the rapidly growing market for organic products.

Converting to organic agriculture may be easier or more profitable for producers depending on whether they: (1) use organic fertilizers and other permitted inputs or use agrochemical products intensively; (2) own the land; and (3) have access to labour, as organic production often demands more labour.

11.3.3 Fairtrade[5]

Introduction

Fairtrade is an organized social movement and market-based approach to empowering developing country producers and promoting sustainability. Fairtrade's strategic intent is to work with marginalized producers in the transitional economies in order to help them move from a position of vulnerability to security and economic self-sufficiency. It aims to empower them to become stakeholders in their own organizations and actively play a greater role in the global arena to achieve greater equity in international trade.

In 2007, Fairtrade certified sales amounted to approximately USD 3.62 billion worldwide, a 47% increase. While this represents only a small fraction of world trade, Fairtrade products generally account for 1-20% of all sales in their respective product categories in Europe and North America. In June 2008, it was estimated that over 7.5 million disadvantaged producers and their families were benefiting from Fairtrade funded infrastructure, technical assistance and community development projects.

The principles of Fairtrade

The Fairtrade principles include:

- Fair price: democratically organized grower groups receive a guaranteed minimum floor price and an additional premium for certified organic products. Grower organisations are also eligible for pre-harvest credit.
- Fair labour conditions: workers on Fairtrade farms enjoy freedom of association, safe working conditions and living wages. Forced child labour is strictly prohibited.
- Direct trade: with Fairtrade, importers purchase from Fairtrade producer groups as directly as possible, eliminating unnecessary middlemen and empowering growers to develop the business capacity necessary to compete in the global marketplace.
- Democratic and transparent organisations: Fairtrade growers and farm workers decide democratically how to invest Fairtrade revenues.
- Community development: Fairtrade growers and farm workers invest Fairtrade premiums in social and business development projects like scholarship programs, quality improvement trainings and organic certification.
- Environmental sustainability: harmful agrochemicals and GMOs are strictly prohibited in favour of environmentally sustainable farming methods that protect growers' health and preserve valuable ecosystems for future generations.

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[5] *Information for this review of Fairtrade certification is drawn from en.wikipedia.org/wiki/Fair_trade; www.fairtrade.net: Fairtrade Standards for Coffee for Small Growers' Organisations; and www.ifat.org*

- Fairtrade helps producers realise the social benefits to their communities of traditional production methods. By promoting these values (which are not generally recognised in conventional markets) it enables buyers to trade with producers who would otherwise be excluded from these markets. It also helps shorten trade chains so that producers receive more from the final selling price of their goods than is the norm in conventional trade via multiple market intermediaries.
- The economic basis of transactions within Fairtrade relationships takes account of all production costs, both direct and indirect, including the safeguarding of natural resources and meeting future investment needs. Trading terms offered by Fairtrade buyers enable producers and workers to maintain a sustainable livelihood that not only meets day-to-day needs for economic, social and environmental wellbeing, but also enables improved conditions in the future. There is a commitment to a long-term trading partnership that enables both sides to cooperate through information sharing and planning and to ensure decent working conditions are maintained.
- Fairtrade relationships assist producer organisations to understand more about market conditions and trends and to develop knowledge, skills and resources to exert more control and influence over their lives. Fairtrade relationships provide the basis for connecting producers with consumers and for informing consumers of the need for social justice and the opportunities for change. Consumer support enables Fairtrade organisations to be advocates and campaigners for the wider reform of international trading rules.

Marketing Fairtrade products

All Fairtrade products originate from producers and workers committed to Fairtrade principles. However, in the subsequent supply chain, Fairtrade products are traded and marketed through two distinct but complementary channels:

The "integrated supply chain" route whereby products are also imported and/or distributed by organisations who have Fairtrade at the core of their mission and activities (commonly referred to as alternative trading organizations), using it as a development tool to support disadvantaged producers and to reduce poverty, and combine their marketing with awareness-raising and campaigning.

The "product certification" route whereby products complying with international standards are certified indicating that they have been produced, traded, processed and packaged in accordance with the specific requirements of the international standards.

Most Fairtrade organizations are members or certified by one or several national or international federations. These federations coordinate, promote, and facilitate the work of Fairtrade organizations. The following are the largest and most influential:

- The Fairtrade Labelling Organizations International (FLO), created in 1997, is an association of three producer networks and twenty national labelling initiatives that promote and market the Fairtrade Certification Mark in their countries. The FLO labelling system is the largest and most widely recognized standard setting and certification body for labelled Fairtrade products. It regularly inspects and certifies producer organizations in more than 50 countries in Africa, Asia, and Latin America.
- The International Fair Trade Association (IFTA) is a global association created in 1989 of Fairtrade producer cooperatives and associations, export marketing companies, importers, retailers, national, and regional Fairtrade networks and Fairtrade support organizations. In 2004, IFAT launched the FTO Mark which identifies registered Fairtrade organizations (as opposed to the FLO system, which labels products).

- The Network of European Worldshops (NEWS), created in 1994, is the umbrella network of 15 national worldshop associations in 13 different countries all over Europe.
- The European Fair Trade Association (EFTA), created in 1990, is a network of European alternative trading organizations which import products from some 400 economically disadvantaged producer groups in Africa, Asia, and Latin America. EFTA's goal is to promote Fairtrade and to make Fairtrade importing more efficient and effective. EFTA currently has eleven members in nine different countries.

In 1998, these four federations created together FINE, an informal association whose goal is to harmonize Fairtrade standards and guidelines, increase the quality and efficiency of Fairtrade monitoring systems and advocate Fairtrade politically.

Fairtrade certification

Fairtrade certification guarantees not only fair prices, but also the principles of ethical purchasing. These principles include adherence to ILO agreements such as those banning child and slave labour, guaranteeing a safe workplace and the right to unionise, adherence to the United Nations charter of human rights, a fair price that covers the cost of production and facilitates social development, and protection and conservation of the environment. The Fairtrade certification system also promotes long-term business relationships between buyers and sellers, crop pre-financing and greater transparency throughout the supply chain.

Fairtrade certification is the only certification system that provides an economic benefit to producers in the form of a guaranteed minimum price and a social premium for community investment. Fairtrade provides economic incentives for growers to improve the quality of their production, protect the environment, and reinvest in their farms. Fairtrade social premiums fund projects like scholarship funds, organic certification, and low-interest loan programs. In addition, Fairtrade provides growers with access to pre-harvest credit.

Fairtrade empowers growers and workers to make decisions that affect their organizations and communities. Fairtrade growers are organized into democratic, transparent organisations where members vote on the use of Fairtrade premiums.

Fairtrade's environmental standards are equally strict. The standards incorporate a list of prohibited agrochemicals, require environmental impact assessment, planning and monitoring, proper agrochemical usage and storage, waste disposal, soil and water conservation, and a ban on genetically modified organisms (GMO's). Small grower groups must implement Internal Control Systems to monitor member compliance with farm management protocol. Fairtrade certified environmental standards include:

- Conservation areas must be identified – buffer zones around water bodies and watershed recharge areas – left uncultivated and safely guarded against agrochemicals.
- New planting in virgin forests is prohibited and cultivated areas within the farm should be regenerated with natural flora and fauna to promotion agricultural diversification.
- Producer organisations cannot gather material from protected areas and material gathered from wild, uncultivated areas must be done sustainability, ensuring long-term viability of native species.
- Agrochemicals on the FLO Prohibited List may not be used, sold, handled or distributed by the producer organization.
- Producers must safely store and dispose of all agrochemicals and their containers, and cannot air-spray agrochemicals over buffer zones, residential areas, rivers and other significant water sources.

- Agrochemicals are used only when absolutely necessary, and producer organizations must continuously work to reduce their use and toxicity level.
- Hazardous waste must be disposed of safely, and organic waste must be disposed of in a sustainable manner (e.g. unsustainable ways of handling organic waste include burning crop residue or allowing processing residue to flow into drainage streams).
- Producers must be educated about how to properly handle waste in order to protect water quality, soil integrity and food safety.
- Possible causes of erosion or effected water resources must be investigated, and at-risk land must be regularly monitored and evaluated.
- Producers must adopt basic principles to enhance fertility and soil structure, such as tillage, irrigation and crop rotation, with a system of monitoring and evaluating compliance.
- Producers must use irrigation to minimize water consumption and only use fire to clear or prepare land when it's the preferred ecological option.
- Producers cannot grow Genetically Modified Organisms (GMO), or use products derived from GMOs in primary production or processing.
- Producers must monitor possible GMO usage by neighbours and take additional precautions to protect their crops or seeds from contamination.

The certification process

FLO manages the Fair Trade Register: a list of certified producer cooperatives and associations. FLO reviews every cooperative that applies for certification. Only those groups that meet product-specific criteria and are approved by FLO are eligible to sell to Fairtrade markets.

Once a producer group's written application is approved, a regionally based FLO inspector visits the group to determine whether it meets Fairtrade criteria. Certified producer groups are re-inspected every year. Any producers found to be in violation of Fairtrade Criteria are removed from the list. FLO inspectors are experienced and sensitive to the complexities of organisational structures.

In addition to ground-level inspections, FLO inspectors review financial documents and Fairtrade transactions of each producer group. FLO compares producers' Fairtrade sales data with purchase data from importers—provided by TransFair and the 16 other national initiatives. In this way, all Fairtrade transactions are cross-checked for integrity, and any discrepancies are reviewed and investigated. FLO reviews financial records to ensure that the Fairtrade premiums are being paid directly to the grower.

Finally, FLO interviews members of each producer group to ensure that members are fairly represented—and their voices clearly heard—within the producer groups.

Annual producer certification fees generally range from $2,500 to $10,000, based on the size of the producer group and the length of time the inspections take. For example, some Fairtrade cooperatives have fewer than 100 members, others have tens of thousands. Some cooperatives are more established and organized than others, thus reducing the time required to complete the inspection.

Inspection fees are intended to balance the costs of a rigorous, efficient and transparent certification system with the needs of growers. For small producer groups who have found the fees to be a barrier to entry into the Fairtrade system, FLO has developed producer certification grants that are partially funded by the European Union. Producer groups can have up to 75% of the certification fee covered by these grants.

Fairtrade coffee

Fairtrade only works with smallholder coffee producers (with 5 hectares or less), organised into democratically-run cooperative organisations.

For most products, including coffee, FLO calculates a minimum Fairtrade price that is intended to cover the cost of sustainable production. For washed Arabica, the highest quality coffee, the Fairtrade minimum price is set at USD 1.31 per pound, plus an organic differential of USD 0.20 if the coffee is certified organic (USD 1.51 per pound). Should the world market price rise above these prices, the Fairtrade minimum price rises accordingly and becomes the world market price.

In addition, importers pay grower groups a Fairtrade premium, which is USD 0.10 per pound, over and above the Fairtrade minimum price. The Fairtrade premium is spent by cooperatives on community and business development projects. Growers and farm workers decide democratically how to invest it, in projects ranging from infrastructure improvements to health initiatives to scholarship funds.

11.3.4 Common Code for the Coffee Community (4C)[6]

Introduction

The Common Code for the Coffee Community (4C) combines a voluntary code of conduct with good farming and management methods for improved efficiency and better profitability.

Established by the German Coffee Association (DKV) and GTZ, on behalf of the German Ministry for Economic Cooperation and Development (BMZ), a multi-stakeholder project commenced in 2003 and 2004. In a subsequent phase, the European Coffee Federation (ECF) and the Swiss State Secretariat of Economic Affairs (SECO) joined in 2005 and 2006.

Building on the Millennium Development Goals of the United Nations, 4C aims to facilitate social, environmental and economic sustainability in the production, postharvest processing and trading of coffee for all actors along the coffee chain, and to enhance long-term development through a process of continuous improvement. The 4C baseline approach enables producers to continuously improve their performance towards better coffee quality, higher efficiency and productivity, to secure social standards and to protect natural resources in coffee growing regions.

Code of practice

The Code consists of: 10 unacceptable practices which must be excluded before applying for verification; and 30 social, environmental and economic dimensions. The ten unacceptable practices include:

- child labour
- bonded and forced labour
- trafficking of persons
- prohibiting membership of or representation by a trade union
- forced eviction without adequate compensation

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[6] *Information for this review of organic certification is drawn from www.sustainable-coffee.net*

- failure to provide adequate housing where required by workers
- failure to provide potable water to all workers
- cutting of primary forest or destruction of other forms of natural resources that are designated as protected areas by national and/or international legislation
- use of pesticides banned under the Stockholm convention and listed in the Rotterdam Convention on Persistent Organic Pollutants (POPs)
- immoral transactions in business relations according to international covenants, national law and practices

The 30 social, environmental and economic dimensions include:

- social dimensions
- freedom of association
- freedom of bargaining
- discrimination
- right to childhood and education
- working conditions
- capacity and skill development
- living conditions and education
- environmental dimensions
- biodiversity
- agrochemicals
- soil fertility
- water
- waste
- energy
- economic dimension
- market information
- market access
- quality
- commerce
- supply chain

According to a traffic light system, the criteria of the code are classified in red, yellow and green. Red indicates that the current practice must be discontinued. Yellow indicates a practice that needs to be further improved within a transitional period and Green reflects a desirable practice. Under a process of continuous improvement, growers are encouraged to move from red to green over a two year period. Constant self monitoring further supports the growers in becoming more efficient.

This process of continuous improvement provides the basis for strengthened cooperation along the supply chain and a greater understanding of quality. This includes the intrinsic and sensory quality of the product and the sustainability of the production process.

How it works

To enter the system, an entity must first become a member of the 4C Association, commit to the Rules of Participation, undertake a rigorous self-assessment, exclude all unacceptable practices and be committed to continuous improvement.

To enter the 4C system, producers join or create a "4C Unit". A 4C Unit is defined as any coffee producing entity, farm, small producer group, cooperative, plantation, mill, exporter etc, which has the capacity to handle a minimum of one container. The managing entity of the 4C Unit bears the responsibility for compliance with the requirements of the Code.

As a first step in the verification process, the 4C Unit and its producers analyse their situation regarding their social, environmental and economic practices. This self-evaluation is done based on a "self-assessment" document, which guides producers in their analysis. Having gathered the information, the document will show if they have reached the baseline level of sustainability defined by 4C. If so, the self-assessment is sent to the 4C Secretariat, which organizes the visit of an independent, third-party verifier who checks if the self-assessment reflects the real situation and supports the producers in identifying ways for improvement. The request for assessment must list organisations like national coffee councils, extension services or support from NGO as a means of helping 4C to determine the capability of the unit to comply with sustainable practices.

Building on the self-assessment report, an independent third-party verification checks the compliance with the requirements of the Common Code, rates the current performance of the 4C Unit (e.g. “average yellow”) referring to the principles and criteria of the Code of Conduct and feeds its results back to the 4C Secretariat as well as to the 4C Unit. These checks must be conducted by independent third-party verifiers approved and registered by the 4C Secretariat.

On the basis of a successful verification, the 4C Unit develops an improvement plan to remove all remaining “Reds” in a defined period of time, but within a maximum of two years. A re-verification after three years checks the level of compliance with the 4C Code of Conduct, monitors the continuous improvement process and allows the constant development of improvement plans. If a verification fails, the 4C Unit loses its license to supply 4C compliant coffee until it regains verification.

The benefits for 4C accreditation

In the highly competitive coffee market, 4C provides good agricultural practices, services and capacity building for producers to become more efficient and produce a good product with respect to society and environment. The benefits for producers are reduced costs, improved market access, better access to credit, enhanced market transparency and better margins for their products in the global coffee market. Greater transparency along the chain improves the transfer of value to the producers.

The 4C quality includes the quality of the product and the quality of a sustainable production process. Consumers can be assured that their coffee is a quality product produced with due respect to society and the environment

11.4 Appendix 4: Selected case studies of collaborative collection, pricing and processing schemes in the PNG coffee industry

Coffee Connections and the Emasa village cluster of Highlands Organic Agricultural Cooperative chain

Background

Coffee Connections is one of two main exporters of Fair Trade and Organic coffee in PNG. With the assistance of the managers of Coffee Connections, the Emase village from the Okapa district was chosen as the cluster to be involved with the project. These growers are members of the Highlands Organic Agricultural Cooperative (HOAC). The chain was chosen to be involved in the project because of its involvement in the specialty coffee market and because it involved one of the few successful agricultural cooperatives involved with the PNG coffee industry.

Chain leader, participants

Coffee Connections is one of the smaller exporters, accounting for just 2.6% of PNG exports in the 2007/08 coffee year, although this has grown from 1.7% in the 2005/6 coffee year. However Coffee Connections is the largest certified organic and the largest Fair Trade exporter. In 2007/-8 it exported 66% (or 25,655 bags) of PNG's certified coffee with 75% (12,627 bags) of this as Fair-Trade/Organic coffee.

Coffee Connections operate through grower cooperatives which establish direct links with family units at an individual village level in remote areas. Coffee Connections buys parchment from registered Organic/Fair Trade growers who are members of the cooperatives. In this respect it is an example of a strategic alliance between an exporter and a cooperative, although Coffee Connections provides considerable support to the cooperatives.

Highlands Organic Agricultural Cooperative (HOAC) is spread over an area of around 500 square kilometres in the Purosa valley region, Eastern Highlands Province. They have about 3,000 growers in the cooperative, mobilised into 300-400 family units. Coffee Connections facilitated the establishment and running of the cooperative. They employ 12 representatives from the cooperatives who look after operations in 3-5 villages each. Each village in turn is comprised of around 20 family units, from 10-12 households.

Exporter

Coffee Connections took over the organic operations of the ANCO company after it collapsed in 2001. It is managed by Craig McConaghy and Henry Ame. While it has a small share of the market, it is growing and it is the only exporter focussed entirely on the Organic and Fair Trade markets. It began its Fair Trade operations in January 2005. It does not own a dry factory and consequently contracts out this part of its operations.

Focus of study chain

This chain has been focussed on organic coffee with NASAA certification, but has more recently switched its focus to the Fair Trade market and achieving dual certification which is reflected in its recent export figures, with 75% being exported under dual certification.

Wet and dry processing

The suppliers' remoteness means they have to produce parchment in smallholder wet factories which means the small holder coffee is Y grade coffee, although considerable effort is put into standardising wet processing procedures at the farm level and hand sorting the green bean. Depot managers and inspectors at the collection points have a role in monitoring and checking that growers are meeting organic standards and

parchment quality standards and assist with extension activities to meet the required standards. Dry processing is contracted out to a Goroka dry mill.

Grower group

The grower group that forms part of this chain is one cluster group of 50 registered members from two villages, Emasa 1 and Emasa 2 in the Okapa area. John Wase is Chairman of the group which consists of males and females. It was established in 2002 and registered with Coffee Connections. Emasa village is situated three (3) kilometers south-east of Okapa station. This cluster is affiliated with HOAC (Highlands Organic Agricultural Cooperative) in a remote area of the Eastern Highlands Province. It is at least two hours drive by 4 wheel drive vehicle during reasonably dry conditions to the road leading into the village, but until recently when the road was upgraded, could become impassable during wet weather. From the road access to the village is by foot over a walking track taking about 20-30 minutes. The main focus of group membership is to sell their coffee for a better.

When the PRAP was conducted on 16-17th August 2006, 58 people attended at least some of the activities with 8 of them being women.

Group relationships with outside agencies

As part of the PRAP process the group's relationships with outside agencies were analysed and positive and negative implications assessed. Positive implications included:

- Coffee Connections provides better coffee price and technical knowledge.
- CIC may provide technical assistance in training and credit facilities where applicable.
- Police enforce law and order lowering unlawful activities.
- Church provides spiritual support settling people to live harmoniously in their community.

Negative implications included:

- Rural Development Bank has strict lending policies and thus may not be approached for help.
- Local MP may not upgrade road for easy accessibility.
- Department of Agriculture and Livestock representative can not be easily contacted at district office for information and assistance as he is hardly found in Okapa.
- The group expressed a desire to establish closer relations with the RDB and other lending institutions and with donor agencies.

Group resources

This section on group resources draws on information collected during the PRAP process. Key points include:

- The road from Okapa provides accessibility to the project site for transportation of produce to markets and easy access to main centres for other services, but until it recent upgrading, maintenance had been inconsistent and is sometimes impassable during continuous wet weather. This could be an ongoing problem which could affect transportation of produce to market resulting in quality deterioration.
- Coffee gardens are densely distributed, making it easy for demonstrations and transfer of technical ideas from grower to grower by observations, although the gardens are located on slopes and are susceptible to land slides.
- Area has good fertile soils and coffee is grown organically.

- Water is availability all year round from the river which runs through the centre of the location and this is a good source of water for processing of coffee, however, it is situated down hill, creating a tedious task for growers to process good quality coffee.
- Bush materials such as timber for construction of houses, drying beds, nursery etc. are available
- District office near project site for easy networking and collaboration with other agencies.
- Not all growers own coffee pulpers and there is some shortage of tools and equipment for growing coffee.
- Labour input on coffee harvesting during peak period in July may be disturbed or lessened due to yam/taro planting and harvesting activities.

Social capital within group

One of the factors influencing the on-going success and cohesion of a group is the level of social capital in the group. For this group the main way this was assessed was through surveys of growers pre and post training using a number of social capital items (Table 1).

Table 1: Summary means of measure of social capital from pre and post training surveys for Emasa group compared with all groups

Item	Emasa group (n=47)	All groups (n=150)
Group meets regularly.	2.9*	2.5
Everyone in the group has an equal opportunity to speak.	3.8	3.1
Everyone in the group is committed to producing good quality coffee.	3.8	3.3
When a group member delivers sub standard coffee it is rejected.	2.5	2.4
Everyone knows how much product each group member has contributed.	3.5	2.9
Selling coffee through this group results in higher prices.	3.3	3.1
Everyone in the group is treated fairly.	3.4	3.3
Everyone within the group is respected.	3.8	3.3
I trust the group leader.	3.7	3.3
I trust the other group members.	3.0	3.0
Group members readily accept responsibility for their actions.	3.2	2.9
Group members deliver on their promises.	2.9	2.7
Conflict is quickly resolved within the group.	3.3	3.0
Group members belong to the same church	3.9	2.6
Group members belong to the same clan.	2.9	2.3
Group members belong to the same family	1.3	1.6
People in my village or community can be trusted.	3.0	2.6
People in my village or community are likely to steal cherry from my trees.	1.3	2.1

** Mean of 4 point scale with 1 being disagree a lot and 4 being agree a lot.*

It appears from these items that the Emasa group has higher levels of social capital and trust when compared with the average of all grower groups surveyed for the ACIAR project. In particular the group performs better than other groups on measures of trust in the community, cherry theft, opportunity to speak and trust in the group leader. Of interest is there is not much difference on the measure of selling through this group bringing higher prices, but the measure of 3.3 out of 4 reflects a fair level of satisfaction with the group.

Issues arising from SWOC activity in PRAP

The SWOC activity conducted as part of the PRAP process provided an understanding of the needs and concerns of the group. In the preliminary investigations, the group members registered finance and materials as a constraint but this did not rate highly in the SWOC analysis. No consensus was reached by the participants on the issue of tools and equipment because it was listed under both strengths and weaknesses. This clearly indicates some group members do not have vital tools and equipment for coffee work. It also became clear that those who wanted tools and equipments under weaknesses are those who do not invest back in coffee, or those who have smaller size coffee gardens.

Following problem sorting and ranking in the SWOC exercise, the following issues were identified as internal problems to be addressed by the group members. They are shown in order of ranking:

- Tools and equipment
- Land dispute
- Stealing

The external problems which require support from outside agencies in order of ranking were:

- Limited knowledge and skills in coffee husbandry
- Limited knowledge & skills in pest and disease
- Limited knowledge and skills in post-harvest handling
- Limited knowledge and skills in cooking and nutritional skills
- Lack of water reticulation system (water supply)
- Road construction and maintenance

The first three external problems are within the scope of CIC to address, while the other three were not. The request for training in nutrition and cooking were to be passed on to other agencies such as ADB, EHPDAL and SSCF to address.

The absence of a reticulated water supply was identified as affecting coffee processing and consequently affecting quality. Similarly the poor road condition will hinder timely movement of coffee for sale and this can also lead to decline in quality. An additional concern was that land disputes are a big threat and could disrupt training if the target group decides to be involved in the disputes.

Training activities with group arising from PRAP

Arising from the PRAP, CIC organised training in the following areas using contracted service providers:

- Coffee rehabilitation and basic agronomic practices
- Coffee quality production systems
- Integrated pest and disease management
- Basic book keeping and financial management

These have been delivered and evaluation of the training provided by the service providers is underway. One measure of changes in perception comes from the pre and post training survey. Table 2 shows the results on the processing items with many showing a considerable improvement. This may not necessarily reflect the reality, but it at least indicates that growers have accepted the recommendations contained in the training.

Table 2: Results from pre and post training survey of Emasa group on growers processing practices (percentages rating 'always')

Item	Before	After
Pulp only red ripe cherry	97%	100%
Calibrate the pulper every time it is used	30%	93%
Pulp cherry on the same day of harvest	81%	93%
Wash the coffee with clean water every day	81%	93%
Sun dry the coffee until it reaches the hard black stage	35%	73%
Dry on raised beds/benches	48%	80%
Hand sort the coffee prior to sale to remove debri	48%	87%
Coffee is dried in a secure fenced area	45%	87%
N	**30**	**15**

One of the most significant changes was that before the training only 7% of respondents correctly gave the figure of 5kg of cherry converting to 1kg of parchment, whereas after the training 100% gave the correct answer. There was a slight shift towards recognition of selling cherry being more profitable than selling parchment, however, as there is little cherry trade in this area this is a realistic answer. However, almost all growers did not know the relationship between local coffee prices and the New York coffee market both before and after the training, however, coffee marketing was not a key part of the training for this group. Conversely, the proportion of respondents indicating they had a household budget declined from 65% before to 47% after training.

Operations of the chain

Management and services provided by chain leader

Coffee Connections operate through grower cooperatives which establish direct links with family clusters at an individual village level in remote areas. They have about 3,000 growers in the cooperatives, mobilised into 300-400 family units. They employ 12 representatives from the cooperatives who look after operations in 3-5 villages each. Each village in turn is comprised of around 20 family units from10-12 households. At the village level, inspectors communicate directly with family clusters to ensure that organic production principles are practiced and to ensure that family members follow the prescribed production practices to ensure high quality parchment. This approach provides full traceability and reduces the costs of auditing.

Coffee Connections has facilitated the establishment and the running of these cooperatives. Cooperatives and members must be registered. The cost of registration is Euro 700 for Fair Trade if the cooperative is less than 500 members, but 2-3,000 Euro for larger cooperatives. The clusters and the cooperative must be democratically run and provide evidence that they are. Coffee Connections organises the visits by the inspectors for Organic and Fair Trade certification and covers the costs of certification. Inspection for registration occurs annually with costs of A$500 per day plus airfares and accommodation. Because of the remoteness and the number of growers involved this takes considerable effort. Achieving Fair Trade certification takes from 3-6 months while Organic takes 2-3 years, however, the major effort is in establishing the cooperatives, with local leadership being critical to this.

Coffee Connections have also established depots to which members bring their coffee. The depot managers are employees of Coffee Connections. Registered growers are provided with a card that must be presented at the depot for payment.

A major issue for the company is recovering the coffee over poor roads and from remote airstrips. Many of the roads are so bad that 4-wheel drive vehicles or 4-wheel drive tractors and trailers are the only means of bringing in the coffee. These are owned and

operated by the company. There also have to make repairs to the roads so their vehicles can use them. Coffee Connections also provides support to the villages through helping build and maintain schools and medical centres.

Pricing mechanisms to growers and results

Fair Trade and Organic offer premiums above the PNG Y grade parchment price (which is normally at a discount to NYC averaging around -12 USc/lb). Fair Trade coffee also establishes a minimum price when prices are low. However, there are additional costs associated with Fair Trade and Organic coffee.

For Coffee Connection growers the Fair Trade premium is 15 USc/lb. Of this 5 USc/lb goes to the growers, the remaining 10c/lb covers the additional costs, but discretionary payments may then be made to growers as a reward for better quality. Organic coffee adds a further 15c/lb premium providing a total premium of 30c/lb for both Fair Trade and Organic coffee.

Because of the remote location and difficult access, prices received from the cooperative and from roadside buyers were not collected.

Chain quality programs and outcomes

Existing quality programs

The chain is registered for both Fair Trade and Organic (through NASAA) and there are annual inspections. Depot managers & inspectors at the collection points have a role in monitoring and checking that growers are meeting organic standards and parchment quality standards. There is still a requirement to achieve quality parchment for Fair Trade and Organic coffee so some extension activities are being conducted. In addition all green coffee is hand sorted.

At the village level, inspectors communicate directly with family clusters to ensure that organic production principles are practiced and to ensure that family members follow the prescribed production practices to ensure high quality parchment. This approach provides full traceability and reduces the costs of auditing. In this respect, the arrangement between HOAC and Coffee Connections is an example of a strategic alliance between an exporter and a cooperative.

Drivers and impediments to the adoption of QA systems

In the case of Fair Trade and Organic systems, improved price is an important driver for remoter coffee growers to be involved. A major constraint is the need for growers to be involved with cooperatives to be eligible. Many grower cooperatives in PNG fail and the skills and leadership needed to run a cooperative effectively are not always available. Considerable time, costs and support are required to establish and maintain cooperatives. Leadership is critical and needs to come from the growers themselves rather than be imposed from outside.

Another constraint is the costs associated with certification. Organic certification often takes 3 years. While Fair Trade certification can occur within around 3 months, the preliminary work required to establish an effective cooperative and to have processes in place to achieve certification means longer is required.

Relationships between the grower group and Coffee Connections

This section discusses evidence of the level of trust and confidence of the growers in Coffee Connections. It draws evidence from the PRAP and the pre and post training questionnaires. The evidence seems to be slightly contradictory.

In the pre-assessment phase of the PRAP one of the expectations raised by the growers was the need for an improved coffee price and a complaint that Coffee Connections does not offer a good price. This is supported by the response to the question in the survey asking them the general question of ‘Processors and exporters give me a fair price for my

coffee' which received an average rating of 1.9 which was lower than the rating of 2.1 for respondents from all groups. On the other hand 83% (considerably higher than the percentage for all groups) said they trusted the cooperative to whom they sold their coffee 'a little', compared with 77% who said they trusted dry factory buyers of their parchment 'not much'. It suggests a greater level of trust in the cooperative and by implication Coffee Connections. Interestingly the rating for 'Selling coffee through this group results in higher prices' was 3.3 out of 4 (higher than for other groups) and indicating a reasonable level of satisfaction with price.

One possible explanation for these seemingly contradictory findings is that to some extent growers distinguish between their relationship with the cooperative and their relationship with Coffee Connections. They appear at one level to believe they get higher prices from their cooperative, but still mistrust Coffee Connections and believe they should be getting a still greater return from them. However, they probably trust Coffee Connections more than they trust other processors/exporters.

Factors influencing on-going change & success

Cooperatives and their members must be registered and audited to receive Fairtrade and organic certification. Clusters and the cooperative must be democratically run and provide evidence that they are. Coffee Connections organises the visits by the inspectors for Organic and Fairtrade certification and covers the costs of certification. Because of the remoteness and the number of growers involved this takes considerable effort. Achieving Fair Trade certification takes from 3-6 months in theory, although in practice it can take considerably longer, while Organic certification takes 2-3 years. Nonetheless, the major effort is in establishing the cooperatives, with local leadership being critical to this.

Two factors critical to the successful establishment of a CMG are a comparative advantage generally arising from a market failure and a reasonable level of trust amongst the members of the community seeking to establish the CMG. Smallholders are faced with two key issues that make it difficult for them to compete against larger growers and investor owned firms (IOFs): (i) internal factors related to the characteristics of small growers (e.g. small-scale production, poverty, high levels of illiteracy, ill health, and low social and political status) and (ii) their external environment (e.g. poor transport infrastructure leading to high transport and handling costs, expensive and limited access to physical inputs, credit and information, inferior technology, high transaction costs, problems of land tenure, and law and order).

The combination of internal factors and the external environment make it difficult for well-managed IOFs to enlist them into a value chain. Smallholders face even greater challenges in this environment. Smallholder growers in PNG will be unlikely to succeed with CMGs on their own when faced with these constraints, so strategies are required to help them, although of course, the best strategy would be to focus on removing the education, infrastructure and other constraints in the first place and IOFs would be able to provide many of the services growers require without the need for CMGs or cooperatives. The Coffee Connection arrangment incorporates strategies that overcome some of the key constraints to the operations of CMGs in PNG. These are:

A comparative advantage

In this case the comparative advantage is provided by the improved price for Fairtrade and organic coffee, which can be considerable when world prices are low, but is less significant when world prices are high. However, there are also considerable costs associated with the certification process. These include the costs of annual certification by an independent certifier, plus the costs of complying with the certification including running a smallholder cooperative, maintaining and supplying the appropriate documentation and meeting the quality control standards.

Support for the cooperative managers

Because Coffee Connections supports the operations of the cooperative and provides training for its leaders, it overcomes some of the problems associated with the lack of skills and knowledge in business management possessed by the cooperative leaders, managers and members.

Monitoring of cooperative operations

Monitoring of cooperative operations has been found to be a key factor linked to sustainability of cooperatives in PNG. In this situation, both Coffee Connections and the NASAA certification body monitor the operations of the cooperative and hence help maintain member trust and confidence in it.

The level of social capital and trust

The low levels of social capital and trust in the highlands of PNG will remain a difficult issue for the cooperative and its partner. The strategies and structures involved with this operation, however, may help to overcome this constraint in a couple of ways. Firstly, at its core, the cooperative is organised at a local level around 'haus lines' and villages, which tend to be more socially stable. Secondly, considerable effort is involved in identifying and supporting strong local leaders to run the cooperative. Thirdly, the involvement of the company in monitoring the cooperative and the independent auditors who in turn monitor both the company and the Cooperative Act to reduce the chances of fraud and provide transparency to the operations of the cooperative. These in turn increase the level of trust in the operations and reduce suspicion among participants.

However, it is evident that despite it apparent success and the structuring of this chain that it faces considerable hurdles to overcome the inherent distrust between smallholder coffee growers and exporters. Coffee Connections will need to actively manage this problem. Approaches that may work to help with this include:

Conduct information campaigns with their members so that they are aware of: the various conversions of cherry to parchment to green bean; the link between local prices and the world coffee prices (particularly New York prices); provide comparisons of their prices and alternative prices.

One approach that might help is to publicise the findings from the accreditation agencies and use them to help overcome some of the mistrust.

Fimito Coffee Credit Guarantee Scheme (CCGS) Chain

Background

The Coffee Credit Guarantee Scheme (CCGS) was established in 1997 by the CIC under the Smallholder Agricultural Credit Scheme. The scheme was initiated by the CIC as a means of providing capital to smallholder coffee producers in PNG, who, without sufficient collateral, security and equity, are unable to borrow from the banks. To facilitate the repayment of loans, those coffee producers who borrowed from the CCGS were placed into clusters at either the village level or on the basis of clans. Under Phase Two of the Smallholder Agricultural Credit Scheme, CIC established a growers marketing cooperative to process the growers coffee into green bean. The green bean is then sold on consignment to the exporter who offers the highest price.

The Fimito group is part of this scheme and is in the Ungai/Bena District of the Eastern Highlands Province in the highlands of PNG. It is located about 15 km west of Goroka along the Highlands Highway.

Chain leader, participants

Because of the central role of the CIC in the formation and support of these groups, there is no formal chain, because the CIC organises the grower group's parchment to be

processed through a commercial dry mill and then to be sold to an exporter. The Fimoto Group is affiliated to the EHP CCGS Cooperative. Both and dry mill and exporter can change from year to year. In the case of the Fimito group, organisation of processing and sale of green bean is conducted by Brian Kuglame of CIC. In 2005 the coffee was processed by the Lahamengu mill and sold to PNG Coffee Exports. In 2006 the coffee was processed by Goroka Coffee Producers and sold to Kundu Coffee in Lae. Consequently this is an example of a tender relationship.

Focus of study chain

The focus of the Fimito chain is to maximise their price by having large of quantities of green bean available to sell to exporters, rather than selling small quantities of parchment to roadside traders or to dry factories. They also focus on improving the quality of their parchment by improving their picking and wet processing procedures and some hand sorting of parchment.

Wet and dry processing

Each smallholder processes their own cherry through to parchment. The grower group then combines their parchment for delivery to the EH CCGS Cooperative, where Brian Kuglame arranges for dry processing. Collections of parchment for delivery occur in April, July and October.

Growers group

The Fimito group consists of 54 members (including 18 females) from 5 villages, Feremura, Kamuka, Kafana, Oyafayufa and Lafamogona. The central location of the group is around 30 minutes drive South of Goroka of a mostly trafficable gravel road. The group leader is Michael Sasa who is an innovative grower and a church elder.

The focus of the group is to produce volumes of consistent quality coffee. When the PRAP was conducted from 9-10th August 2006, 23 people (5 females) were present on the first day rising to 42 (15 females) on the next day. Altogether 54 people attended, including 18 females.

Group location and resources

This section on group resources draws on information collected during the PRAP process. Key points include:

- Land is mostly flat.
- Soil ranges from loam to sandy clay to clay loam.
- Group is linked to markets and other vital services by road and has access to electricity and water from the river. However coffee gardens along the river banks are subject to flooding and washing away.
- Coffee covers much of the land owned by Fimito villagers, but land is scarce limiting chances of coffee expansion.
- School within the village for children’s education.

Group relationships with outside agencies

As part of the PRAP process the group’s relationships with outside agencies were analysed and positive and negative implications assessed. Positive implications included:

- Fimito group has a good working relationship with the Coffee Industry Corporation whereby, group members coffee is sold through the Eastern Highlands pilot Cooperative Marketing facilitated by CIC. However, benefits from this marketing arrangement are yet to be realized.
- The group is gradually working towards strengthening working relationship with institutions it regards as very important in dealing with coffee.

- DAL is also involved with the group through other agricultural projects.

Negative implications included:

- Other organizations and individuals not considered important by the group may be willing to assist however; the group is not proactive in approaching and discussing with them.

Social capital within group

One of the factors influencing the on-going success and cohesion of a group is the level of social capital in the group. For this group, this was assessed through pre and post training surveys of growers using a number of social capital items backed up by observations from the PRAP process and other observations and discussions. From the PRAP process it was identified that:

- Better prices received by the Fimito Cooperative Group members will definitely encourage other members of Fimito to join.
- There are alcohol and drug related social problems.
- Village courts minimize law and order problem in the community, but people congregate at village court venues every Wednesdays and Thursdays even though they are not summoned to stand trial which is also a waste of time.

The information on trust levels for the community is limited because only 4 people were interviewed pre training and the training hasn't been completed so no post-training interviews are available. The people interviewed from Fimito have higher than average levels of social capital on most items than the average for all groups (Table 1). However, there is an anomaly with the issue of the rating for cherry stealing which is poor and in contrast with the scores on other community items.

Issues arising from SWOC activity in PRAP

The SWOC activity conducted as part of the PRAP process provided an understanding of the needs and concerns of the group. In the preliminary expectations exercise the participants raised the following items such as: expectations in form of coffee tools and equipment such as knapsack sprayers, fencing materials; construction of roads and a central wet processing facility; and training to enhance current levels of technical knowledge and skills in various aspects of coffee production systems. Group members were informed that CIC did not provide material assistance, but could help with training.

Table 1: Summary means of measure of social capital from pre and post training surveys for Fimito group compared with all groups

Item	Muturu group	All Groups
Group meets regularly.	3.0	2.5
Everyone in the group has an equal opportunity to speak.	4.0	3.1
Everyone in the group is committed to producing good quality coffee.	4.0	3.3
When a group member delivers sub standard coffee it is rejected.	3.0	2.4
Everyone knows how much product each group member has contributed.	4.0	2.9
Selling coffee through this group results in higher prices.	4.0	3.1
Everyone in the group is treated fairly.	4.0	3.3
Everyone within the group is respected.	4.0	3.3
I trust the group leader.	3.5	3.3
I trust the other group members.	4.0	3.0
Group members readily accept responsibility for their actions.	4.0	2.9
Group members deliver on their promises.	3.5	2.7
Conflict is quickly resolved within the group.	3.5	3.0

Group members belong to the same church	2.5	2.6
Group members belong to the same clan.	2.8	2.3
Group members belong to the same family	3.3	1.6
People in my village or community can be trusted.	4.0	2.6
People in my village or community are likely to steal cherry from my trees.	3.5	2.1
N	**4**	**150**

Following problem sorting and ranking in the SWOC exercise, a number of issues were identified as internal problems to be addressed by the group members. In order of ranking these were: animal destruction, land disputes, time management, gambling, and stealing. It was pointed out that these issues could not be addressed by the CIC and required the community to address themselves or to request assistance from other agencies. Some of these issues such as time management, land disputes, drugs, and gambling were recognised by the groups as having the potential to cause problems for the delivery of programs by the CIC.

The external problems that require support from outside agencies in order of ranking were:

- Limited knowledge and skills in coffee husbandry and management
- Limited knowledge and skills in nutritional food preparation
- Limited knowledge in basic financial management
- Lack proper water reticulation system
- Need for establishment of wet coffee processing facility.

The first three were recognised as issues that could be addressed through the assistance of the CIC and the project with provision of training activities. The water supply problem was to be addressed by the group with assistance by CIC to identify other partners who might provide technical assistance. The wet mill was to be addressed by the group members with the provision of cash and kind to build a wet mill. The CIC would provide assistance with the design of the wet mill.

Training activities with group arising from PRAP

Arising from the PRAP, CIC organised training in the following areas using contracted service providers:

- Coffee rehabilitation and basic agronomic practices.
- Basic booking and financial management.
- Coffee quality improvement and market information.
- Accessing donor agencies and credit facilities.

However, until recently these could not be delivered because the group was split because two of its leaders were standing for local council elections. Now the elections have been completed the training will be completed because neither of the leaders succeeded in the election.

Consequently, only results from the pre-training survey are available. Another constraint is that only four growers were interviewed in this survey and this is likely to have led to biased results. Certainly the results in Table 2 suggest these growers are not representative of the group as a whole or there may have been bias in the conduct of the survey because on many issues they rate themselves as following recommended practices.

Table 2: Results from pre training survey of processing practices used by Fimito growers (percentages rating 'always' & 'most times')

Item	Before
Pulp only red ripe cherry	100%
Calibrate the pulper every time it is used	100%
Pulp cherry on the same day of harvest	100%
Wash the coffee with clean water every day	100%
Ferment the coffee only until it passes the rub test	75%
Shade dry the coffee	0%
Sun dry the coffee until it reaches the hard black stage	100%
Dry on raised beds/benches	0%
Hand sort the coffee prior to sale to remove debri	67%
Coffee is dried in a secure fenced area	100%
N	4

All respondents appear to be confused about the conversion of cherry to parchment, because all gave an incorrect answer of 500kg of cherry converting to 1kg of parchment. Similarly the results for the question asking which was the more profitable to sell cherry or parchment, 100% said parchment was the most profitable. This is not surprising since this group was set up as the parchment cooperative and have little experience with selling cherry. Similarly they do not appear to understand the relationship between local coffee prices and the New York coffee market with 75% saying 'a little' before training and 1 suggesting they didn't know. The percentage who said they had a household budget was 100% before the training which is surprising, especially in relation to responses from other groups.

Operations of the chain

Management and services provided by chain leader

As previously mentioned CIC is acting as the chain leader and providing administrative and training support.

Pricing mechanisms to growers and results

The group delivers generally delivers parchment to the CCGS group three times per year, in April, July and October. CCGS arranges for processing of the coffee by a contracted dry mill depending upon costs of processing and then sells to an exporter based on the price offered for the green bean.

Shipments to date and relative prices are in Table 3. Over the last three years group growers appear to have received price premiums of around K0.58 per kg of parchment. This equates to a 17% increase in price with a range from 9-24%. Figures were not available for the performance of the scheme on prices on 2006, 2007 or 2008.

Table 3: Estimated price premiums obtained by CCGS members for parchment

Date sold	Project price	Comparison price	Price difference
Jun-04 & Sep-03	K2.80	K2.80	K0.40
Sep-04	K2.89	K2.89	K0.54
Dec-04	K3.44	K3.44	K0.84
May-05	K4.70	K4.70	K0.90
Jul-05	K3.46	K3.46	K0.31
Oct-05	K3.60	K3.60	K0.20
Weighted average	K3.50	K3.09	K0.41

Source: CCGS & Cooperative Coordinator 2006, CCGS & CIC pilot market group: 2005 Annual Report for Manager Farm Training & Extension, CIC Research & Grower Services Division, Goroka, EHP, PNG.

Chain quality programs and outcomes

Existing quality programs

There are no existing chain quality programs except for the focus on quality with the group members and any systems implemented by the dry factory and exporter. Some growers are hand sorting cherry prior to pulping to remove green cherry, but not overripe cherry.

Drivers and impediments to the adoption of QA systems

Because there are no formal linkages along the chain there is no chain driver for the adoption of a QA system, rather this arrangement is an impediment to the adoption of such systems. The main driver for adoption of quality assurance is the higher prices growers are receiving due to being able to sell larger quantities of coffee of an improved quality. Combining coffee through a cooperative overcomes the problem for small growers of not being able to receive premiums for quality in the traditional selling system.

Relationships between the grower group and processors and exporters

This section discusses evidence of the level of trust and confidence of the Fimito growers group and buyers, processors and exporters who buy and handle their coffee. Unfortunately it relies on answers from only 4 growers in the pre-training survey, which probably biases the results. In response to the question in the pre training surveys asking them the general question of ‘Processors and exporters give me a fair price for my coffee’, growers gave an average rating of 2.0, which is similar to the rating of 2.1 for respondents from all groups. It appears the questions relating to trust of buyers of their cherry and parchment were only answered by one of the respondents so they are not presented.

Factors influencing on-going change & success

The CIC formed groups composed of growers who received loans through the Coffee Credit Guarantee Scheme (CCGS). It established the CCGS in 1997 under the Smallholder Agricultural Credit Scheme to provide capital to smallholder coffee producers who could not obtain loans from commercial banks because of insufficient capital, security and equity. Growers who received loans were placed into clusters at the village or clan level to facilitate repayment. However, many did not repay their loans in full. Under Phase Two, the CIC established a growers marketing cooperative to process parchment and sell it as green bean, with the hope of obtaining higher prices for the CCGS growers.

Because the CIC takes a central role in the formation and support of the CCGS groups, there is no formal chain. The CIC organises the processing of grower groups’ parchment through a commercial dry mill and its subsequent sale to an exporter. Both the dry mill and exporter can change from year to year although in recent years the exporter has been Kundu coffee. CIC is effectively acting as the chain leader. Growers process their own cherry and the parchment is delivered at a specified time to a number of designated collection points. The focus of these groups is to maximise their prices through a three-fold strategy: to improve the quality of their picking, wet processing and drying in order to

produce better quality parchment; to have larger quantities of green bean available to sell to exporters to improve their bargaining power; and to cut out the roadside traders and market intermediaries. CCGS groups generally deliver parchment to the cooperative three times per year, in April, July and October. CCGS arranges for processing of the coffee by a contracted dry mill, depending upon the costs of processing and then sells to an exporter based on the price offered for the green bean.

There are no existing chain quality programs except for the focus on quality with the group members and any systems implemented by the dry factory and exporter. Some growers are hand sorting cherry prior to pulping to remove green cherry, but not overripe cherry. Problems arise with variation in cherry quality, wet processing methods and moisture levels of the parchment. Because there are no formal linkages along the chain, there is no chain driver for the adoption of a QA system; rather this arrangement is an impediment to the adoption of such systems. The main driver for improving quality is the higher prices growers receive for selling larger quantities of improved quality through the cooperative. The cooperative overcomes the problem for small growers of not being able to receive premiums for quality in the traditional selling system, which relies on roadside traders bulking up small quantities of highly variable coffee.

Both these cooperative schemes use village-level processing methods to produce coffee. They inherently have problems with consistency of quality and taste because there are differences between growers in the quality of the cherry harvested, wet processing and fermentation methods and times, and the moisture levels of the parchment. However, they produce better quality coffee than the average smallholder and are rewarded for this. However, without the use of well run centralised wet mills they are unlikely to be able to enter the specialty coffee market unless they can establish a niche market that is willing to pay higher prices for smallholder coffee. Such markets include the organic and Fair Trade markets, which some other grower groups are accessing.

A key constraint to the long-term success of these schemes is the long-term sustainability of the cooperative groups. Most cooperatives have failed in PNG. Relatively low levels of education among village growers and cultural issues generally lead to the failure of cooperatives due to a combination of conflict, poor management and corruption. In the case of the Fimito group, something as simple as competition between leaders in council elections has led to problems in delivering training. Such rivalry could have disastrous consequences for the efficient operation of a wet mill. One factor in favour of the CCGS scheme is that they have established a price advantage for their members, although this has not always resulted in commitment as some growers try to obtain premiums in other ways. However, more recently the dramatic fluctuations in world prices have meant that in some cases growers have lost out. This is because the scheme involves collecting parchment three times a year, processing it and then selling it. By the time the coffee is sold to the exporters, prices can change between 40-50 USc/lb. In some cases famers have paid a large opportunity cost when the market has moved against them. In addition, growers have to wait for their money.

At present, these cooperative groups rely on support from the CIC to organise the processing, marketing and accounts. If CIC removed all support, it is doubtful the groups would continue in any effective manner. Consequently, replication is a problem because CIC staff are already heavily committed. Ideally, the staff should be able to work for a couple of years with each group after which time they would be self-supporting, allowing them to move on to other groups. However, the success rate has not been good and there is only limited opportunity to increase the numbers of growers participating through such schemes as they are currently structured.

Three possible alternatives are available to overcome some of these constraints. The first is for the groups that have access to a centralised wet mill to deliver cherry either as individuals or as a group. Effectively, they become part of a centralised wet mill chain targeting the specialty market. Another solution is for a cooperative to build and operate their own wet mill that attains the processing standards achieved by commercial wet mills

supplying coffee to the specialty market. This means meeting the standards outlined earlier for the centralised wet mills. Such an approach is popular with growers, including those from the Fimito group, but only a few wet mills in the PNG manage to achieve this standard. The key constraints are: access to reliable power and water; the large capital outlay required to build a suitable wet mill; the on-going working capital required to maintain the mill at a suitable standard and to buy the cherry; finding and retaining a manager with the technical, financial and labour management skills required; and cohesive and effective leadership from the cooperative's board. In addition, the group would probably need support from a third party such as the CIC or an exporter and would benefit from developing a relationship with an exporter who could market their product into the specialty market. Only a small number of groups are likely to be able to meet these requirements and succeed by adopting this strategy. It is best suited to groups that do not have access to a large wet mill linked to an exporter. Groups in areas such as the Waghi valley and Eastern Highlands face strong competition from large integrated chains such as WR Carpenters. The advantage of the large integrated chain is that they achieve economies of size and even small, integrated plantations with their own wet and dry mills struggle to compete on price with the larger operations. Consequently, grower owned and run wet mills will not compete unless they achieve the economies of size of cooperative such as Mainland Holdings.

Where the groups are too remote or do not have the capital resources and management expertise to establish and operate their own wet mill, the third alternative is for the group to target the organic and Fair Trade market. However, this approach will probably not work for the Fimito group because of their proximity to Goroka.

In summary, the cooperative schemes supported by the CIC, like this one, will be constrained by the level of agency support they require and may have more potential if they attempt to form linkages similar to those in the cherry and organic/Fair Trade chains. An alternative that might work for some groups is to be supported by an NGO or church group. However, the commitment would need to be long term and considerable effort would need to go into structuring the cooperative to maintain trust and in capacity building so that growers could eventually take over management of the cooperative. The danger for the latter type of model is that it just creates a dependency on the NGO or church.

Highland Arabicas and Tolu village, Banz chain

Background

This chain was chosen, because it involved a smaller, local plantation owner in the Western Highlands area trying to establish a relationship with a group of small-holder growers from the Tolu village near Banz in the North Waghi district. This was not a formal alliance, but the objective of the plantation owner was to obtain cherry to sell under a Tribal Coffee label.

Chain leader, participants

The Highlands Arabicas chain is lead by Paul Pora who owns the Madan plantation. Initially he had links with Niugini Coffee Tea and Spice who are exporters, but he now has his own export licence and exports as Highlands Arabicas. Highlands Arabicas uses its wet mill and dry mill based at Madan and buys in cherry from smallholders and blockholders. An important linkage, which is the focus of this study, is to a group of growers from Tolu village near Banz. In this respect, it is an example of nuclear estate model although it is also a strategic alliance because the growers could also deliver to Sigiri Plantation, which is much closer.

Exporter

The majority of production from Highlands Arabicas (around 30 containers) at the start of the project was sold to Starbucks through Niugini Coffee Tea and Spice (NGCTS) while some specialty coffee was sold by Highlands Arabicas to a roaster in the US, Portland

Roasting (1 container in 2001, 2 containers in 2002, 4 containers in 2004, 7 containers in 2005). About 20 containers was smallholder coffee. NGCTS was an independently owned exporter that exported around 12% of PNG exports of green bean. It was also the largest exporter of Fair Trade coffee although Highlands Arabicas does not produce any of this. NGCTS provided financing and shipping services to Highlands Arabicas. However, Mainland Holdings Limited (a diversified company owned by 15 smallholder business groups) bought NGCTS in 2006. Paul currently produces specialty coffee and sells these through his own export company Highlands Arabicas Ltd.

The focus of Highlands Arabicas is to produce plantation style coffee for the specialty market. They aim to increase their exports of coffee to their own specialty markets with the focus on quality rather than volume. They are also improving their quality assurance systems to qualify for preferred supplier status with Starbucks. The plantation coffee is branded as 'Madan Estate while the smallholder coffee was branded as 'Madan Tribal'.

Processing factory

The wet and dry factories located at the Madan plantation owned by Paul Pora process coffee for this chain. The Madan plantation is 21 km east of Mount Hagen with good all weather road access. This factory also processes the plantation coffee although the different coffees are kept separate, with a different receival bin for smallholder cherry. The wet mill has the capacity to process 50 tonne of cherry per day. Improvements have been made to the dry mill with construction of conditioning bins and the addition of extra processing equipment and a quality control laboratory.

Grower group

The group of growers identified for this study is from the Tolu village near Banz in the North Waghi District of the Western Highlands province. The village is 2 km south-east from Banz, 31 km east of the Madan plantation and 51 km east of Mount Hagen. It is also only 10 km from the Sigiri Plantation run by WR Carpenters. When the PRAP was conducted on 22-24th August 2006, 38 people attended the activities with 8 of them being women. The group was formed following a recommendation from Paul Pora and a referral to the local council.

The landowners from Tolu village have taken over the Mintal and Kamarl plantations under a lease, lease back arrangement with the former managing director, Mr. Dick Hagen. This arrangement was put in place so that the plantations would not be completely run down. The Tolu villagers who own the land on which Mintal and Kamarl plantations were developed, have moved in and taken control of portions of the plantations, not as a joint force but as individuals and in family units. The farms are easily accessible by an all weather road.

They were supplying their cherry to Highland Arabicas in 2006, however this arrangement appears to have ceased. While the group is informal, they have the same interests and have been in existence since 2006. It does not appear to have a formal management structure, but initially Gelu Kombuk a ward councillor provided leadership. The group has since formally applied for registration to the IPA (as Tolu Coffee Growers Cooperative Ltd) and is waiting for registration before opening a bank account.

Group relationships with outside agencies

As part of the PRAP process the group's relationships with outside agencies were analysed and positive and negative implications assessed. Positive implications included:

- Growers connected to the Madan coffee plantation for sale of cherry and can earn more from cherry sales than in selling parchment due to easy market access and avoiding the costs of wet processing and drying.
- Other coffee buyers and factories provide competition resulting in price differentials.
- Women folk in church groups provide labour when requested, at a reasonable rate.

- Agriculture supply store easily accessed for purchase of coffee tools, equipment and chemicals.
- Health centre and aid post easily accessible in case of any illness or injuries sustained in relation to coffee activities.
- CIC will provide technical trainings and advisory roles in all aspects of coffee production systems
- Donor Agencies like the CDS may help in future as long as the community is organized and request for assistance basing on CDS requirements

Negative implications included:

- Not receiving much help from political leaders as local MP, the Local Level Government and the Governor may not fund the main plantation road or assist with the construction of the proposed wet factory.
- Minor law and order issues like drugs and cherry theft could affect project.
- Stringent Rural Development Bank lending policies not very helpful and other commercial banks do not have confidence in lending to small growers.

DAL not helpful in the absence of CIC.

Group location and resources

This section on group resources draws on information collected during the PRAP process. Key points include:

- The entire Tolu village and the Kamarl and Mintal plantations are established on flat plains of the Waghi River, and are ideally suited to coffee and other agricultural production. However, water logging is a problem and drainage is a necessary, which is very laborious job.
- The soil is mainly a silt and clay loam and is very fertile.
- The Binz River flows through the land owned by the people of Tolu and is utilized for drinking and pulping of coffee, however is a concern for both these activities.
- Tolu is linked by surfaced road via Banz to Mount Hagen and other parts of the Highlands region including Lae and Madang. Other vital services are easily accessed due to the road and transportation system. Kamarl and Mental plantations and the smallholder coffee are also linked to markets via the road network. However, road conditions have worsened over the years and other infrastructure has deteriorated.
- There are land shortages due to high population densities and competition for arable land and agriculture developments are a constraint source of conflict.

Social capital within group

One of the factors influencing the on-going success and cohesion of a group is the level of social capital in the group. For this group, this was assessed mainly through pre and post training surveys of growers using a number of social capital items backed up by observations from the PRAP process and other observations and discussions.

It appears from the items in Table 1 that despite its relatively recent formation and perceived lack of leadership identified in the PRAP process, this group currently has reasonably high levels of social capital and trust in its leaders, both in absolute terms and in comparison with other groups. The items on: trust in group leader (3.8), trust in other group members (3.6) and conflict is resolved quickly (3.4), for example, are high. The items of community trust (trust and stealing) are also relatively high when compared with all groups. It is not surprising that the item on delivering sub-standard coffee is low as they don't deliver coffee to the group and there are plenty of buyers for sub-standard cherry in the Western Highlands.

Table 1: Summary means of measure of social capital from pre and post training surveys for Tolu group compared with all groups

Item	Tolu group	All groups
Group meets regularly.	2.6	2.5
Everyone in the group has an equal opportunity to speak.	3.2	3.1
Everyone in the group is committed to producing good quality coffee.	3.5	3.3
When a group member delivers sub standard coffee it is rejected.	1.9	2.4
Everyone knows how much product each group member has contributed.	2.8	2.9
Selling coffee through this group results in higher prices.	3.3	3.1
Everyone in the group is treated fairly.	3.5	3.3
Everyone within the group is respected.	3.6	3.3
I trust the group leader.	3.8	3.3
I trust the other group members.	3.6	3.0
Group members readily accept responsibility for their actions.	3.2	2.9
Group members deliver on their promises.	3.0	2.7
Conflict is quickly resolved within the group.	3.4	3.0
Group members belong to the same church	1.6	2.6
Group members belong to the same clan.	1.8	2.3
Group members belong to the same family	1.6	1.6
People in my village or community can be trusted.	2.9	2.6
People in my village or community are likely to steal cherry from my trees.	2.4	2.1
N	17	150

Issues arising from SWOC activity in PRAP

The SWOC activity conducted as part of the PRAP process provided an understanding of the needs and concerns of the group. In the preliminary expectations exercise the participants raised the following items: that CIC provide training in coffee rehabilitation, harvesting and processing for quality, financial management and loan to assist in managing their projects; and that CIC should reinforce cherry ban to stop unlicensed buyers from buying cherry, which will stop people from stealing.

Following problem sorting and ranking in the SWOC exercise, a number of issues were identified as internal problems to be addressed by the group members. Establishing a wet factory was the only item which was ranked by participants. Other items raised although not ranked included: Gambling, Alcohol and illegal drugs consumption, Social activities, Stealing of coffee cherry, Pig damage, Tribal conflict, Lack of cooperation, Sale of cherry coffee, Labour demand, Poor health conditions.

The external problems that require support from outside agencies in order of ranking were:

- Coffee rehabilitation and basic husbandry
- Post harvest coffee quality improvement
- Basic financial management and bookkeeping
- Coffee marketing
- Integrated pest and disease management.

Training activities with group arising from PRAP

Arising from the PRAP, CIC organised training in the following areas using contracted service providers:

- Coffee rehabilitation and agronomic practices
- Coffee quality improvement
- Coffee sales and marketing
- Basic book keeping and financial management
- Accessing credit facilities and donor agencies

These have been delivered and evaluation of the training provided by the service providers is underway. One measure of changes in perception comes from the pre and post training survey. Table 2 shows the results on the processing items. These results are seemingly contradictory, but may just reflect the small sample size and that different people were surveyed before and after.

One of the most significant changes was that before the training only 33% of respondents correctly gave the figure of 5 kg of cherry converting to 1 kg of parchment, whereas after the training 100% gave the correct answer. There was a shift towards recognition of selling cherry being more profitable than selling parchment, with 17% perceiving it to be more profitable before and 60% after. Similarly before training 55% said there was no relationship (with 45% saying don't know) between local coffee prices and the New York coffee market compared with after training when 40% said there was a great deal (with 60% saying don't know). Similarly, the proportion of respondents indicating they had a household budget increase from 15% before to 40% after training.

Table 2: Results from pre and post training survey of Tolu group on growers processing practices (percentages rating 'always')

Item	Before	After
Pulp only red ripe cherry	75%	100%
Calibrate the pulper every time it is used	25%	33%
Pulp cherry on the same day of harvest	50%	25%
Wash the coffee with clean water every day	75%	0%
Ferment the coffee only until it passes the rub test	75%	25%
Shade dry the coffee	25%	0%
Sun dry the coffee until it reaches the hard black stage	25%	25%
Dry on raised beds/benches	0%	0%
Hand sort the coffee prior to sale to remove debri	25%	0%
Coffee is dried in a secure fenced area	0%	25%
N	4	4

Operations of the chain

Management and services provided by chain leader

The nature of the relationship of the growers, processor (HAL) and exporter is akin to a strategic alliance. There is no formal control in any aspect of the chain. HAL receives cherry from the growers and provides some chemicals, advice and community incentives to the growers. However, the growers have no formal commitment to deliver to HAL.

Pricing mechanisms to growers and results

Prices to growers for their cherry are based on the amount of cherry delivered that is accepted. Prices paid have to compete with prices paid by the price leaders Carpenters and Kigibah. Prices received by growers for their cherry over the last three years average about 110 more than they would have received had they delivered No 1 Grade parchment (assuming conversion rates and ignoring growers wet processing costs).

Chain quality programs and outcomes

Existing quality programs

The chain is registered for Café Practices as a preferred supplier. This means it is inspected regularly and has to meet certain standards for items relating to: product quality, economic accountability, social responsibility, coffee growing and coffee processing. Paul Pora is currently pursuing accreditation under Rainforest Alliance.

Bags of cherry are visually inspected and weighed. Sometimes coffee is overripe and underripe and price is discounted if quality is below expectations. Rotten bags are refused. The factory has water recycling procedures and pulp waste handling systems. Pulp is used as ground cover on the plantation. Green bean is hand sorted before being sent to market.

Elements of quality control include:

- dual cherry receival line to separate plantation and smallholder cherry
- coffee is inspected and discounted if below expectations
- stored in water & floaters removed
- have repass pulper for floaters
- fermentation for 36-37 hours
- float off skins, trash and floaters that have passed through system
- washed 3 times
- sun dried on ground
- parchment stored in conditioning bins for 2-3 weeks – separate for tribal
- passed through destoner, huller, polisher, catedor & grader
- hand sorting of green bean to remove broken, chipped poor colour and black beans

Drivers and impediments to the adoption of QA systems

The main driver for adoption of QA systems is that provided by Starbucks through Café Practices. This provides a premium price for chains that meet the preferred supplier status and a further premium for those who reach the strategic supplier status. However, there are considerable time and costs involved in meeting these requirements.

There are however a number of impediments to the adoption of this and other QA systems. These include:

- Apart from Starbucks, there is little economic incentive to adopt QA systems because there are few potential human health problems associated with coffee.
- While it is possible to adopt QA requirements in the wet and dry factory and on the plantation, considerable effort would be required to extend these back to smallholder gardens. The Café Practices system is currently more relevant to the political and social conditions found on the larger farms in the Americas.

Relationships between the grower group and Highland Arabicas

This section discusses evidence of the level of trust and confidence of the growers in Highland Arabicas. It draws evidence from the PRAP and the pre and post training questionnaires.

Paul Pora indicates he is no longer buying cherry and parchment from the Tolu group, apparently because of unreliability of supply, linked to non-payment of monies advanced. It is not clear at this stage who the group is delivering cherry to, and it is probably whoever offers the best price on the day. This is likely to be Sigiri plantation given its proximity to

the growers and their dominance of the Western Highlands cherry buying, particularly at the eastern end.

In response to the question in the pre and post training surveys asking them the general question of 'Processors and exporters give me a fair price for my coffee', growers gave an average rating of 2.4, which was slightly higher than the rating of 2.1 for respondents from all groups. On the other hand for the rating of their trust in the wet factory to whom they sold their cherry, 58% said they trusted the wet factory 'a lot' compared with their trust of roadside buyers (40%) and other growers (0%)(Table 3). Conversely, the percentages for 'not at all' were 17% for the wet factory, 13% for roadside buyers and 100% for other growers. For the wet factory, this is a considerably higher ranking when compared with the average ranking for all groups (34%). As this was undertaken when Highland Arabicas was linked to this group, it shows a reasonable level of trust in the company.

It is interesting to compare the ratings for cherry with their ratings for parchment sold to dry factory and roadside buyers. Here roadside buyers perform poorly, whereas dry factories perform much better than roadside buyers but more poorly than wet factories. Given that these growers are mainly sellers of cherry, but also sell some parchment it provides a good comparison of the relative levels of trust in cherry and parchment buyers. It probably reflects that fact that it is easier to assess cherry (which is mainly on colour and freshness) than parchment (which requires assessment of moisture, colour, rubbish, and a subjective assessment of off flavours and standard of fermentation).

Table 3: Extent to which Tolu growers trust buyers of their cherry or parchment 'a lot' or 'not at all' (n=6)

	Other growers		Roadside buyers		Wet/dry factory	
	'a lot'	'not at all'	'a lot'	'not at all'	'a lot'	'not at all'
Cherry	0%	100%	40%	13%	58%	17%
Parchment	0%	100%	0%	50%	50%	33%

Factors influencing on-going change & success

Centralised chains can only operate where smallholders have road access to the wet mills. This is normally within a radius of 20 to 30 kilometres depending on the whether the road is trafficable to trucks. In the case of Highlands Arabicas and the Tolu group the distance is 10 km whereas the distance to Sigiri is 31 km. This probably explains why Highlands Arabicas wasn't getting all the cherry from the growers as it appears the key consideration with most growers is price.

Highlands Arabicas has an integrated operation that includes a dry mill and an exporting arm which provides some control over quality and allows it to develop its own brand, but in the Western Highlands it has some powerful competitors including Sigiri (the market leader), Kigibah and Rilke (linked to PNGCE). Highlands Arabicas has provided some credit, technical advice and fertilisers and chemicals to various groups, but has generally not achieved a satisfactory return on these investments.

Prices received by growers selling cherry are considerably higher than the prices received by growers selling parchment. In addition, sellers of cherry do not incur the costs of processing and therefore have an additional advantage. The cherry market has become highly competitive and competition appears to be increasing as the number of chains involved in buying cherry increases. During the main production months for the 2004, 2005, 2006, 2007 and 2008 coffee season, the price of cherry averaged 110 toea per kg parchment equivalent more than the price paid for No. 1 grade parchment. This difference varies from season to season and from week to week (range 27-184) depending on the world price and domestic seasonal factors, but has remained remarkably constant over time. For example, in 2006, with high world prices and low production in PNG, fierce competition increased the premium to around 130 toea per kg parchment equivalent. When converted to an FOB green bean price, this equates to a premium over Y1 grade of

approximately USc 23 per pound which means growers are receiving a price that is at a premium to NYC and slightly better than the average for plantation X grade.

Statistics on the quantities of cherry sold to centralised processing mills are difficult to obtain because of commercial confidentiality, but discussions with processors indicate that the quantities processed in this manner are expanding and have the potential to expand further. The factors influencing on-going change and success include increasing demand for quality assured coffee, cherry theft, the poor condition of the roads and lawlessness.

Recently there has been an increase in cherry theft. There are two main causes for this, higher prices for coffee over the last three years and an increase in cherry buying including the appearance of many roadside cherry buyers. There have been calls from some in the industry to ban cherry buying, but this was not implemented. Instead, CIC is banning and attempting to enforce a ban on cherry buying except by licensed buyers, although this has not been enforced in all areas. Where it has it appears to be working, but it is unclear if it is a sustainable policy. Stolen cherry is generally of poor quality, for it contains a higher percentage of under and over-ripe cherry. Wet factories buying poor quality cherry will find it difficult to achieve specialty premiums, which may squeeze their margins. Cherry theft also affects the profitability and hence motivation of plantation, block holders and smallholder growers to rehabilitate and maintain coffee gardens. This is affecting yield of trees and production is declining.

The poor condition of secondary roads and to a lesser extent roadside theft, limits the expansion of the nuclear estate model. PNG produces most of its coffee in areas that are not accessible by trucks. To achieve premium quality, cherry must be delivered to the mill for processing on the same day it is harvested. Because of the poor roads, this generally limits cherry collection to areas within 20-30 kilometres of the wet mill.

It appears the relationship between Highlands Arabicas and the Tolu group has broken down, however, this does not mean that Highlands Arabicas will not be able to establish relationships with groups of smallholder coffee growers in the future. Western Highlands is a special case because of its relatively good roads in the Waghi Valley and the very competitive nature of coffee buying. In effect, there are overlapping nuclear estates/wet factories and the relationships between smallholder coffee growers and the wet factories will probably remain fluid because the key driver of cherry selling appears to be price on the day and there is little loyalty of growers towards cherry buyers.

In summary the nucleus estate model of selling cherry, such as the one outlined in this case, is likely to be a good model for providing higher returns for growers in the long run. While there are many well-managed cherry buying chains in the Waghi Valley, the success of the model will not depend on the success of any one model. However, to enhance its chances of success, considerable effort needs to be put into educating growers about the world coffee market and the advantages to them of larger, professionally managed chains integrating wet factories, dry factories and exporting.

Mindima Coffee Credit Guarantee Scheme (CCGS) group

Background

The Coffee Credit Guarantee Scheme (CCGS) was established in 1997 by the CIC under the Smallholder Agricultural Credit Scheme. The scheme was initiated by the CIC as a means of providing capital to smallholder coffee producers in PNG, who, without sufficient collateral, security and equity, are unable to borrow from the banks. To facilitate the repayment of loans, those coffee producers who borrowed from the CCGS were placed into clusters at either the village level or on the basis of clans. Under Phase Two of the Smallholder Agricultural Credit Scheme, CIC established a growers marketing cooperative to process the growers coffee into green bean. The green bean is then sold on consignment to the exporter who offers the highest price.

The Mindima group is part of this scheme and is in the Kundiawa District of the Simbu Province in the highlands of PNG. It is located about 9 km west of Kundiawa along the Highlands Highway.

Chain leader, participants

Because of the central role of the CIC in the formation and support of these groups, there is no formal chain, because the CIC organises the grower group's parchment to be processed through a commercial dry mill and then to be sold to an exporter. The Mindima Group is affiliated to the Simbu CCGS Cooperative. Both and dry mill and exporter can change from year to year. In the case of the Mindima group, organisation of processing and sale of green bean is conducted by Brian Kuglame of CIC. In 2005 the coffee was processed by the Lahamengu mill and sold to PNG Coffee Exports. In 2006 and 2007 the coffee was processed by Goroka Coffee Producers and sold to Kundu Coffee in Lae. Consequently this is an example of a tender relationship.

Focus of study chain

The focus of the Mindima chain is to maximise their price by having large of quantities of green bean available to sell to exporters, rather than selling small quantities of parchment to roadside traders or to dry factories. They also focus on improving the quality of their parchment by improving their picking and wet processing procedures and some hand sorting of parchment.

Wet and dry processing

Each smallholder processes their own cherry through to parchment. The grower group then combines their parchment for delivery to the Simbu CCGS Cooperative, where Brian Kuglame arranges for dry processing. Collections of parchment for delivery occur from two to three times per year at around April, July and October.

Grower group

Mindima is an informal grower group spearheaded by a minority (6 members) of influential growers. The group leader is Larius Womare who is a CIC model grower and a member of the Simbu CCGS Co-operative group. Another model grower who is a member of the group is Toa Taiya. An informal group was established in 2004 and since then membership has increased from 50 to 85 mostly represented by household male family heads. However, the group is still striving to formalize into a legal entity.

The group has members from three sub-clans namely Gamgane, Sungakane and Bruglgauma of the Narku Tribe in the Waiye LLG. They speak the popular Kuman dialect. It is approximately 6 km west of Kundiawa along Highlands Highway towards Mt.Hagen with the central location of the group being approximately 20 minutes walk off the road along a track accessible by 4-wheel drive in dry weather.

The focus of the group is to develop a smallholder cluster group that would collectively promote the coffee cash economy in their area and to add value by improving quality. When the PRAP was conducted over three days finishing on 20th July 2006, 31 people were present on the first day rising to 84 on the final day. Of the 84 people attending the final session, 21 were women.

Group location and resources

This section on group resources draws on information collected during the PRAP process. Key points include:

- The group has members from the neighbouring villages of Kaukau, Keramugl, Mengagle Damar and Bamugl.
- The topography is mostly hilly, with some steep slopes and is dissected by small streams. Landslides can occur and have a serious impact.

- Soils are mostly clay loams derived from volcanic deposits and are reasonably fertile. Around 1/3 of the area is arable. Each grower has from 2-5 hectares of productive coffee.
- The common coffee varieties grown in the area are Arusha and Blue Mountain. Mindima has the highest coffee growing areas in terms of production whereby a grower has farms from 2 to 5 hectares on clay loamy soils.
- Smallholder coffee with accompanying shade trees and interspersed with vegetable gardens and trees make up most of the vegetation.
- Mindima is linked by surfaced road to Kundiawa and via the Highlands Highway to Goroka and Lae. This means it has access to a range of government and commercial services. However, some infrastructure and roads have deteriorated over the years.
- Power and reticulated water are not available at the village.
- Enough labour is available that could be mobilized for economic activities such as in the coffee plantations and bigger smallholder coffee blocks and assisting women in laborious activities in subsistence gardening, although much time is spent on uneconomic activities.

Social capital within group

One of the factors influencing the on-going success and cohesion of a group is the level of social capital in the group. For this group, this was assessed through pre and post training surveys of growers using a number of social capital items backed up by observations from the PRAP process and other observations and discussions. From the PRAP process it was identified that:

- Stealing including stealing of cherry is an issue in the community.
- Time and resources are wasted on gambling and cards.
- Drugs and alcohol are a problem.
- There is a need to reintroduce community law.

It appears from the items in

Table 1 that the Mindima group has average to slightly lower than average levels of social capital and trust in its leaders, in comparison with other groups. The items on: trust in group leader (3.1), trust in other group members (2.8), members accept responsibility (2.8) and conflict is resolved quickly (3.3), for example, are about the average for all groups. The group itself may have some problems with its coffee operations, with the measures on: commitment to producing good quality coffee (2.9), sub-standard coffee is rejected (2.1) and know how much everyone has contributed (2.3) being low. The group appears to be only satisfied with the prices they are receiving from the cooperative with this rating 3.0 out of 4. Unfortunately, there appear to be some community problems because the items for community trust (trust and stealing) are also low when compared with all groups.

Table 1: Summary means of measure of social capital from pre and post training surveys for Mindima group compared with all groups

Item	Mindima group	All groups
Group meets regularly.	3.0	2.5
Everyone in the group has an equal opportunity to speak.	2.8	3.1
Everyone in the group is committed to producing good quality coffee.	2.9	3.3
When a group member delivers sub standard coffee it is rejected.	2.1	2.4
Everyone knows how much product each group member has contributed.	2.3	2.9
Selling coffee through this group results in higher prices.	3.0	3.1

Everyone in the group is treated fairly.	3.4	3.3
Everyone within the group is respected.	3.4	3.3
I trust the group leader.	3.1	3.3
I trust the other group members.	2.8	3.0
Group members readily accept responsibility for their actions.	2.8	2.9
Group members deliver on their promises.	2.6	2.7
Conflict is quickly resolved within the group.	3.1	3.0
Group members belong to the same church	2.1	2.6
Group members belong to the same clan.	2.3	2.3
Group members belong to the same family	1.5	1.6
People in my village or community can be trusted.	2.3	2.6
People in my village or community are likely to steal cherry from my trees.	2.8	2.1
N	12	150

Issues arising from SWOC activity in PRAP

The SWOC activity conducted as part of the PRAP process provided an understanding of the needs and concerns of the group. Following problem sorting and ranking in the SWOC exercise, a number of issues were identified as internal problems to be addressed by the group members. In order of ranking these were: stealing, time management, poor financial management and drugs/alcohol. The group decided these problems could be handled by forming a working group to reintroduce community law to the community.

The external problems that require support from outside agencies in order of ranking were:

- Uniform quality coffee production for market viability. This was to be solved by establishing a wet processing factory, which required support from outside donors and perhaps a link with an exporter.
- Easy transportation of coffee cherry to wet mill the same day of harvest. Animal transport was required and assistance would be requires from DAL and others to address this.
- Link markets that pays better price. Growers would be trained by the project in market requirements and producing better quality coffee and then linked to exporters to help process this coffee.
- Improve coffee quality via methods of central wet mill. Before starting a wet mill it was decided that growers required training on processing to help with understanding of what is required from a wet mill.

Thus, general knowledge gaps were identified in:

- Post harvest coffee quality improvement
- Establish central wet mill to improve & maintain quality
- Coffee marketing.

Training activities with group arising from PRAP

Arising from the PRAP, CIC organised training in the following areas using contracted service providers:

- Coffee rehabilitation and agronomic practices
- Coffee quality improvement and market information
- Access to donor agencies and credit facilities
- Basic book keeping and financial management.

These were delivered and evaluation of the training provided by the service providers is underway. One measure of changes in perception comes from the pre and post training survey. Table 2 shows the results on the processing items. In the key areas of pulping red cherry, calibrating the pulper, pulping on the same day, washing in clean water and fermenting until it passes the rub test it appears the message has been received, understood and acted on. These are the key determinants of quality in coffee. The other measures, while important, are more marginal in their effect on quality, and it appears the training was less effective with these.

Table 2: Results from pre and post training survey of Mindima group on growers processing practices (percentages rating 'always' & 'most times')

Item	Before	After
Pulp only red ripe cherry	75%	100%
Calibrate the pulper every time it is used	80%	100%
Pulp cherry on the same day of harvest	38%	100%
Wash the coffee with clean water every day	57%	100%
Ferment the coffee only until it passes the rub test	43%	100%
Shade dry the coffee	33%	60%
Sun dry the coffee until it reaches the hard black stage	100%	100%
Dry on raised beds/benches	50%	20%
Hand sort the coffee prior to sale to remove debri	43%	40%
Coffee is dried in a secure fenced area	67%	0%
N	8	8

One of the most significant changes was that before the training only 17% of respondents correctly gave the figure of 5kg of cherry converting to 1kg of parchment, whereas after the training 67% gave the correct answer. There was only a slight shift towards recognition of selling cherry being more profitable than selling parchment, with 14% perceiving it to be more profitable before and 20% after. There was no effect on understanding of the relationship between local coffee prices and the New York coffee market compared with 22% saying a great deal (and 67% don't know) before training and 0% saying a great deal (with 80% saying don't know) after training. However, as indicated above this group did not receive the marketing training module.

There was a slight increase in the percentage who said they had a household budget from 30% before to 40% after training.

Operations of the chain

Management and services provided by chain leader

As previously mentioned CIC is acting as the chain leader and providing administrative and training support.

Pricing mechanisms to growers and results

The group delivers generally delivers parchment to the CCGS group three times per year, in April, July and October. CCGS arranges for processing of the coffee by a contracted dry mill depending upon costs of processing and then sells to an exporter based on the price offered for the green bean. In recent years this has been Kundu coffee.

Shipments to date and relative prices are in Table 3. Over the last three years group growers appear to have received price premiums averaging K0.58 per kg of parchment. This equates to a 17% increase in price with a range from 9-24%. Figures were not available for the performance of the scheme on prices on 2006, 2007 or 2008.

Table 3: Estimated price premiums obtained by CCGS members for parchment

Date sold	Project price	Comparison price	Price difference
Jun-04 & Sep-03	K2.80	K2.80	K0.40
Sep-04	K2.89	K2.89	K0.54
Dec-04	K3.44	K3.44	K0.84
May-05	K4.70	K4.70	K0.90
Jul-05	K3.46	K3.46	K0.31
Oct-05	K3.60	K3.60	K0.20
Weighted average	K3.50	K3.09	K0.41

Source: CCGS & Cooperative Coordinator 2006, CCGS & CIC pilot market group: 2005 Annual Report for Manager Farm Training and Extension, CIC Research & Grower Services Division, Goroka, EHP, PNG.

It is estimated that only 10% of coffee is sold through the group, with the remainder sold individually.

Chain quality programs and outcomes

Existing quality programs

There are no existing chain quality programs except for the focus on quality by the group members and any systems implemented by the dry factory and exporter. Group members are encouraged to harvest only red ripe cherry and to leave green and overripe cherry but this is not undertaken by all members. Members are also encouraged to pulp on same day, ferment for no more than 36 hours and wash after 2 days with fresh, clean water, but these are not always implemented.

Drivers and impediments to the adoption of QA systems

Because there are no formal linkages between the grower group and processors and exporters there is no chain driver for the adoption of a QA system. Rather this arrangement is an impediment to the adoption of such systems because the arrangements do not require traceability. The main driver for adoption of quality assurance is the potentially higher prices growers could receive from being able to sell larger quantities of coffee of an improved quality. For this to occur there needs to be a market that is willing to pay higher prices for product that can ensure quality attributes that cannot be detected by the buyer under ordinary circumstances.

Relationships between the grower group and processors and exporters

This section discusses evidence of the level of trust and confidence of the Mindima growers group and buyers, processors and exporters who buy and handle their coffee.

In response to the question in the pre and post training surveys asking them the general question of 'Processors and exporters give me a fair price for my coffee', growers gave an average rating of 2.8, which was considerably higher than the rating of 2.1 for respondents from all groups. The questions from the pre and post training surveys indicate that growers do not trust any of the buyers of their cherry or parchment. They trust their cooperative and the dry factory about equally when it comes to selling their parchment (Table 4). This is a problem for the cooperative, since without this trust there is likely to be leakage of parchment sales away from the cooperative to dry factories and roadside buyers. However, trust in wet factories as buyers of cherries is low (25%). This rating is lower than the average for all groups, but appears to be more typical of the rating for groups that do not have a direct relationship with a wet factory. Groups that do such as Sihereni and Tolu have a much higher rating.

Table 4: Extent to which Mindima growers trust buyers of their cherry or parchment 'a lot' or 'not at all'

	Other growers		Cooperative		Roadside buyers		Wet/dry factory	
	'a lot'	'not at all'	'a lot'	'not at all'	'a lot'	'not at all'	'a lot'	'not at all'
Cherry	29%	14%			20%	20%	25%	25%
Parchment	25%	50%	44%	33%	30%	20%	38%	13%

Factors influencing on-going change & success

The CIC formed groups composed of growers who received loans through the Coffee Credit Guarantee Scheme (CCGS). It established the CCGS in 1997 under the Smallholder Agricultural Credit Scheme to provide capital to smallholder coffee producers who could not obtain loans from commercial banks because of insufficient capital, security and equity. Growers who received loans were placed into clusters at the village or clan level to facilitate repayment. However, many did not repay their loans in full. Under Phase Two, the CIC established a growers marketing cooperative to process parchment and sell it as green bean, with the hope of obtaining higher prices for the CCGS growers.

Because the CIC takes a central role in the formation and support of the CCGS groups, there is no formal chain. The CIC organises the processing of grower groups' parchment through a commercial dry mill and its subsequent sale to an exporter. Both the dry mill and exporter can change from year to year. CIC is effectively acting as the chain leader. Growers process their own cherry and the parchment is delivered at a specified time to a number of designated collection points. The focus of these groups is to maximise their prices through a three-fold strategy: to improve the quality of their picking, wet processing and drying in order to produce better quality parchment; to have larger quantities of green bean available to sell to exporters to improve their bargaining power; and to cut out the roadside traders and market intermediaries. CCGS groups generally deliver parchment to the cooperative three times per year, in April, July and October. CCGS arranges for processing of the coffee by a contracted dry mill, depending upon the costs of processing and then sells to an exporter based on the price offered for the green bean.

There are no existing chain quality programs except for the focus on quality with the group members and any systems implemented by the dry factory and exporter. Some growers are hand sorting cherry prior to pulping to remove green cherry, but not overripe cherry. Problems arise with variation in cherry quality, wet processing methods and moisture levels of the parchment. Because there are no formal linkages along the chain, there is no chain driver for the adoption of a QA system; rather this arrangement is an impediment to the adoption of such systems. The main driver for improving quality is the higher prices growers receive for selling larger quantities of improved quality through the cooperative. The cooperative overcomes the problem for small growers of not being able to receive premiums for quality in the traditional selling system, which relies on roadside traders bulking up small quantities of highly variable coffee.

Both these cooperative schemes use village-level processing methods to produce coffee. They inherently have problems with consistency of quality and taste because there are

differences between growers in the quality of the cherry harvested, wet processing and fermentation methods and times, and the moisture levels of the parchment. However, they produce better quality coffee than the average smallholder and are rewarded for this. However, without the use of well run centralised wet mills they are unlikely to be able to enter the specialty coffee market unless they can establish a niche market that is willing to pay higher prices for smallholder coffee. Such markets include the organic and Fair Trade markets, which some other grower groups are accessing.

A key constraint to the long-term success of these schemes is the long-term sustainability of the cooperative groups. Most cooperatives have failed in PNG. Relatively low levels of education among village growers and cultural issues generally lead to the failure of cooperatives due to a combination of conflict, poor management and corruption. One factor in favour of the CCGS scheme is that they have established a price advantage for their members, although this has not always resulted in commitment as some growers try to obtain premiums in other ways. However, more recently the dramatic fluctuations in world-prices has meant that in some cases growers have lost out. This is because the scheme involves collecting parchment three times a year, processing it and then selling it. By the time the coffee is sold to the exporters, prices can change between 40-50 USc/lb. In some cases famers have paid a large opportunity cost when the market has moved against them. In addition, growers have to wait for their money.

At present, these cooperative groups rely on support from the CIC to organise the processing, marketing and accounts. If CIC removed all support, it is doubtful they would continue in any effective manner. Consequently, replication is a problem because CIC staff are already heavily committed. Ideally, the staff should be able to work for a couple of years with each group after which time they would be self-supporting, allowing them to move on to other groups. However, the success rate has not been good and there is only limited opportunity to increase the numbers of growers participating through such schemes as they are currently structured.

Three possible alternatives are available to overcome some of these constraints. The first is for the groups that have access to a centralised wet mill to deliver cherry either as individuals or as a group. Effectively, they become part of a centralised wet mill chain targeting the specialty market. Another solution is for a cooperative to build and operate their own wet mill that attains the processing standards achieved by commercial wet mills supplying coffee to the specialty market. This means meeting the standards outlined earlier for the centralised wet mills. Such an approach is popular with growers, but only a few wet mills in the PNG manage to achieve this standard. The key constraints are: access to reliable power and water; the large capital outlay required to build a suitable wet mill; the on-going working capital required to maintain the mill at a suitable standard and to buy the cherry; finding and retaining a manager with the technical, financial and labour management skills required; and cohesive and effective leadership from the cooperative's board. In addition, the group would probably need support from a third party such as the CIC or an exporter and would benefit from developing a relationship with an exporter who could market their product into the specialty market. Only a small number of groups are likely to be able to meet these requirements and succeed by adopting this strategy. It is best suited to groups that do not have access to a large wet mill linked to an exporter. The advantage of the large integrated chain is that they achieve economies of size and even small, integrated plantations with their own wet and dry mills struggle to compete on price with the larger operations. Consequently, grower owned and run wet mills will not compete unless they achieve the economies of size of cooperative such as Mainland Holdings.

Where the groups are too remote or do not have the capital resources and management expertise to establish and operate their own wet mill, the third alternative is for the group to target the organic and Fair Trade market. In this case, they must first establish a relationship with an exporter who is willing to help them achieve organic and Fair Trade

certification. An additional advantage of this strategy is that the exporter may be able to facilitate and support the on-going management of the cooperative.

In summary, the cooperative schemes supported by the CIC, like this one, will be constrained by the level of agency support they require and may have more potential if they attempt to form linkages similar to those in the cherry and organic/Fair Trade chains. An alternative that might work for some is to be supported by an NGO or church group. However, the commitment would need to be long term and considerable effort would need to go into structuring the cooperative to maintain trust and in capacity building so that grower could eventually take over management of the cooperative. The danger for the latter type of model is that it just creates a dependency on the NGO or church.

Muturu Coffee Credit Guarantee Scheme (CCGS) Chain

Background

The Coffee Credit Guarantee Scheme (CCGS) was established in 1997 by the CIC under the Smallholder Agricultural Credit Scheme. The scheme was initiated by the CIC as a means of providing capital to smallholder coffee producers in PNG, who, without sufficient collateral, security and equity, are unable to borrow from the banks. To facilitate the repayment of loans, those coffee producers who borrowed from the CCGS were placed into clusters at either the village level or on the basis of clans. Under Phase Two of the Smallholder Agricultural Credit Scheme, CIC established a growers marketing cooperative to process the growers coffee into green bean. The green bean is then sold on consignment to the exporter who offers the highest price.

The Muturu group of Kabiufa village is part of this scheme and is in the Goroka District of the Eastern Highlands Province in the highlands of PNG. It is located about 15 km south-east of Goroka.

Chain leader, participants

Because of the central role of the CIC in the formation and support of these groups, there is no formal chain, because the CIC organises the grower group's parchment to be processed through a commercial dry mill and then to be sold to an exporter. The Fimito Group is affiliated to the Eastern Highlands CCGS Cooperative. Both and dry mill and exporter can change from year to year. In the case of the Mindima group, organisation of processing and sale of green bean is conducted by Brian Kuglame of CIC. In 2005 the coffee was processed by the Lahamengu mill and sold to PNG Coffee Exports. In 2006 and 2007 the coffee was processed by Goroka Coffee Producers and sold to Kundu Coffee in Lae. Consequently this is an example of a tender relationship.

Focus of study chain

The focus of the Muturu chain is to maximise their price by having large of quantities of green bean available to sell to exporters, rather than selling small quantities of parchment to roadside traders or to dry factories. They also focus on improving the quality of their parchment by improving their picking and wet processing procedures and some hand sorting of parchment.

Wet and dry processing

Each smallholder processes their own cherry through to parchment. The grower group then combines their parchment for delivery to the Simbu CCGS Cooperative, where Brian Kuglame arranges for dry processing. Collections of parchment for delivery occur from two to three times per year at around April, July and October.

Growers group

Initially, the Muturu group consisted of 110 members from the villages of Kabiufa and Ifiyufa (37 CCGS growers and 73 non CCGS growers). The group membership has

increased because of the CCGS marketing program. The group has split and now consists of around 58 members including 15 females. The central location of the group is around 15 minutes drive West of Goroka along the Highlands Highway and then by a mostly trafficable gravel road. The group leader is Nicholas Elo who has a small wet mill and is a church leader. The group secretary is Elizah Lemeki.

The focus of the group is to produce volumes of consistent quality coffee. When the PRAP was conducted from 7-8th August 2006, 35 people (7 females) were present on the first day rising to 40 (6 females) on the next day.

Group location and resources

This section on group resources draws on information collected during the PRAP process. Key points include:

- Land ranges in slope from moderate to steep as it moves away from the highway towards the hills and mountains at the back of the village.
- Likewise soil ranges from alluvial silt through to clay loam.
- Similarly vegetation ranges from coffee and vegetable gardens to steeper grass land and forest.
- The village is linked by a very good road to Goroka, but coffee gardens at the back of the village are a considerable distance from the road.
- Power and reticulated water are available in some parts of the village.
- Because of the good road there is easy access to coffee wet and dry factories and buyers and other essential input supply services.
- Sufficient cash is available from coffee throughout the year.
- Community law enforcement through village court system maintains law and order, however, there is a problem with cherry theft.
- Sufficient family and communal labour is available. Hired labour is provided by youth, women and church groups.

Group relationships with outside agencies

As part of the PRAP process the group's relationships with outside agencies were analysed and positive and negative implications assessed. Positive implications included:

- The group will cooperate well with the CIC officers.
- The group believes that the LLG, Provincial Government, MP for Goroka, NARI and Rural Development Bank are organizations and individuals who could assist them.

Social capital within group

One of the factors influencing the on-going success and cohesion of a group is the level of social capital in the group. For this group, this was assessed through pre and post training surveys of growers using a number of social capital items backed up by observations from the PRAP process and other observations and discussions. From the PRAP process it was identified that:

- There is a gender imbalance in group meetings.
- Time and money is unnecessarily wasted on social obligations, gambling and attending village court cases.
- Cherry theft is an increasing problem.

It appears from the items in Table 1 that the Muturu group has very low levels of social capital when compared with the average for other groups. The items on: trust in group leader (1.2), trust in other group members (1.5), members accept responsibility (1.5) and

conflict is resolved quickly (1.3), for example, are well below the average for all groups. The group itself may have some problems with its coffee operations, with the measures on: commitment to producing good quality coffee (1.8), sub-standard coffee is rejected (1.6) and know how much everyone has contributed (1.7) being low. Similarly, the group appears to be dissatisfied with the prices they are receiving from the cooperative with this rating 1.6 out of 4. There also be a failing of trust in the community. Unfortunately, there appear to be some community problems the rating for trust in the community is also low, but surprisingly the rating for cherry stealing is good which is inconsistent with the raising of the issue in the PRAP.

Table 1: Summary means of measure of social capital from pre and post training surveys for Muturu group compared with all groups

Item	Muturu group	All groups
Group meets regularly.	1.2	2.5
Everyone in the group has an equal opportunity to speak.	1.8	3.1
Everyone in the group is committed to producing good quality coffee.	1.8	3.3
When a group member delivers sub standard coffee it is rejected.	1.6	2.4
Everyone knows how much product each group member has contributed.	1.7	2.9
Selling coffee through this group results in higher prices.	1.6	3.1
Everyone in the group is treated fairly.	1.4	3.3
Everyone within the group is respected.	1.6	3.3
I trust the group leader.	1.2	3.3
I trust the other group members.	1.5	3.0
Group members readily accept responsibility for their actions.	1.5	2.9
Group members deliver on their promises.	1.4	2.7
Conflict is quickly resolved within the group.	1.3	3.0
Group members belong to the same church	1.8	2.6
Group members belong to the same clan.	1.6	2.3
Group members belong to the same family	1.4	1.6
People in my village or community can be trusted.	1.2	2.6
People in my village or community are likely to steal cherry from my trees.	1.4	2.1
N	14	150

If these ratings are accurate they indicate this group faces some serious problems in the future. The other alternative is that some errors have occurred in the conduct of the surveys.

Issues arising from SWOC activity in PRAP

The SWOC activity conducted as part of the PRAP process provided an understanding of the needs and concerns of the group. In the preliminary expectations exercise the participants raised the following items such as: expectations in form of coffee tools and equipment such as knapsack sprayers, fencing materials; construction of roads and a central wet processing facility; and training to enhance current levels of technical knowledge and skills in various aspects of coffee production systems. Group members were informed that CIC did not provide material assistance, but could help with training.

Following problem sorting and ranking in the SWOC exercise, a number of issues were identified as internal problems to be addressed by the group members. In order of ranking these were: cherry theft; no road access to coffee plots; labour shortage; land pressure; lack of tools and equipment. It was pointed out that these issues could not be addressed by the CIC and required the community to address themselves or to request assistance from other agencies. However, it was suggested that the CIC should impose tougher

regulations to penalize owners of wet factories that buy stolen coffee cherries or abolish/minimize wet cherry trading.

The external problems that require support from outside agencies in order of ranking were:

- Limited knowledge and skills in financial management
- Limited knowledge and skills in post harvest
- Limited knowledge and skills in coffee husbandry and agronomy
- Limited knowledge and skills in coffee nursery establishment and management
- Consequently The PRAP survey identified general knowledge gaps in:
- Coffee husbandry and agronomy practices
- Post harvest coffee quality improvement
- Coffee nursery establishment and management
- Basic financial management and bookkeeping

Training activities with group arising from PRAP

Arising from the PRAP, CIC organised training in the following areas using contracted service providers:

- Coffee quality improvement
- Coffee nursery establishment and management
- Coffee rehabilitation and basic agronomic practices
- Basic booking and financial management.

These were delivered and evaluation of the training provided by the service providers is underway. One measure of changes in perception comes from the pre and post training survey. Table 2 shows the results on the processing items. Unfortunately only one person has answered these questions for the pre-training questionnaire, so we are not able to make any meaningful interpretation of the results.

Table 2: Results from pre and post training survey of Muturu group on growers processing practices (percentages rating 'always' & 'most times')

Item	Before	After
Pulp only red ripe cherry	100%	100%
Calibrate the pulper every time it is used	100%	67%
Pulp cherry on the same day of harvest	100%	100%
Wash the coffee with clean water every day	100%	100%
Ferment the coffee only until it passes the rub test	100%	100%
Shade dry the coffee	0%	33%
Sun dry the coffee until it reaches the hard black stage	100%	83%
Dry on raised beds/benches	100%	83%
Hand sort the coffee prior to sale to remove debri	0%	33%
Coffee is dried in a secure fenced area	100%	40%
N	1	5

More respondents appear to have answered the questions about knowledge of the conversion of cherry to parchment, but the training has not had an effect because 100% of respondents correctly gave the figure of 5kg of cherry converting to 1kg of parchment before training, whereas after the training 88% gave the correct answer. This result may be biased in some way as our discussions with growers prior to training had indicated that

they mostly believed the conversion to be 3 to 1 as they normally do it by volume as they do not have access to scales. Similarly the results for the question asking which was the more profitable to sell cherry or parchment, 80% said cherry before and 57% after. There was little difference in understanding of the relationship between local coffee prices and the New York coffee market with 20% saying a great deal (and 0% don't know) before training and 33% saying a great deal (with 11% saying don't know) after training. This result is also hard to believe, as most grower appear to have little understanding of the relationship between the New York coffee market and don't know is normally the most common answer. There was a slight increase in the percentage who said they had a household budget from 20% before to 67% after training.

Operations of the chain

Management and services provided by chain leader

As previously mentioned CIC is acting as the chain leader and providing administrative and training support.

Pricing mechanisms to growers and results

The group delivers generally delivers parchment to the CCGS group three times per year, in April, July and October. CCGS arranges for processing of the coffee by a contracted dry mill depending upon costs of processing and then sells to an exporter based on the price offered for the green bean.

Shipments to date and relative prices are presented in Table 3. Over the last three years group growers appear to have received price premiums of around K0.58 per kg of parchment. This equates to a 17% increase in price with a range from 9-24%. Figures were not available for the performance of the scheme on prices on 2006, 2007 or 2008.

Table 3: Estimated price premiums obtained by CCGS members for parchment

Date sold	Project price	Comparison price	Price difference
Jun-04 & Sep-03	K2.80	K2.80	K0.40
Sep-04	K2.89	K2.89	K0.54
Dec-04	K3.44	K3.44	K0.84
May-05	K4.70	K4.70	K0.90
Jul-05	K3.46	K3.46	K0.31
Oct-05	K3.60	K3.60	K0.20
Weighted average	K3.50	K3.09	K0.41

Source: CCGS & Cooperative Coordinator 2006, CCGS & CIC pilot market group: 2005 Annual Report for Manager Farm Training and Extension, CIC Research & Grower Services Division, Goroka, EHP, PNG.

Chain quality programs and outcomes

Existing quality programs

There are no existing chain quality programs except for the focus on quality by the group members and any systems implemented by the dry factory and exporter. Group members do not intentionally harvest green cherry, however, they do harvest ripe cherry. They do not hand sort cherry prior to pulping but some immature cherry is removed as floaters. Partly because of the distance from the coffee gardens to the pulpers, some growers do not always pulp on same day of harvest. One of the arguments is they are tired after carting the cherry. Growers do not store under water if they don't pulp on the same day.

Drivers and impediments to the adoption of QA systems

Because there are no formal linkages between the grower group and processors and exporters there is no chain driver for the adoption of a QA system. Rather this arrangement is an impediment to the adoption of such systems because the

arrangements do not require traceability. The main driver for adoption of quality assurance is the potentially higher prices growers could receive from being able to sell larger quantities of coffee of an improved quality. For this to occur there needs to be a market that is willing to pay higher prices for product that can ensure quality attributes that cannot be detected by the buyer under ordinary circumstances.

Relationships between the grower group and processors and exporters

This section discusses evidence of the level of trust and confidence of the Muturu growers group and buyers, processors and exporters who buy and handle their coffee.

In response to the question in the pre and post training surveys asking them the general question of 'Processors and exporters give me a fair price for my coffee', growers gave an average rating of 1.5, which was considerably lower than the rating of 2.1 for respondents from all groups. The questions from the pre and post training surveys indicate that growers do not trust any of the buyers of their cherry or parchment (Table 4). Even the cooperative does not perform any better than the dry factory when it comes to selling parchment. This is a problem for the cooperative, since without this trust there is likely to be leakage of parchment sales away from the cooperative to dry factories and roadside buyers. Buyers of cherry also seem to have a problem, which could be a problem for wet factories who want to buy cherry from these growers because only 20% trust them a lot. This rating is lower than the average for all groups, but appears to be more typical of the rating for groups that do not have a direct relationship with a wet factory. Groups that do such as Sihereni and Tolu have a much higher rating. As might be expected roadside buyers are not trusted at all.

Table 4: Extent to which Muturu growers trust buyers of their cherry or parchment 'a lot' or 'not at all'

	Other growers		Cooperative		Roadside buyers		Wet/dry factory	
	'a lot'	'not at all'	'a lot'	'not at all'	'a lot'	'not at all'	'a lot'	'not at all'
Cherry	0%	0%			0%	80%	20%	40%
Parchment	0%	100%	0%	33%	0%	60%	33%	67%

Factors influencing on-going change & success

The CIC formed groups composed of growers who received loans through the Coffee Credit Guarantee Scheme (CCGS). It established the CCGS in 1997 under the Smallholder Agricultural Credit Scheme to provide capital to smallholder coffee producers who could not obtain loans from commercial banks because of insufficient capital, security and equity. Growers who received loans were placed into clusters at the village or clan level to facilitate repayment. However, many did not repay their loans in full. Under Phase Two, the CIC established a growers marketing cooperative to process parchment and sell it as green bean, with the hope of obtaining higher prices for the CCGS growers.

Because the CIC takes a central role in the formation and support of the CCGS groups, there is no formal chain. The CIC organises the processing of grower groups' parchment through a commercial dry mill and its subsequent sale to an exporter. Both the dry mill and exporter can change from year to year although in recent years the exporter has been Kundu coffee. CIC is effectively acting as the chain leader. Growers process their own cherry and the parchment is delivered at a specified time to a number of designated collection points. The focus of these groups is to maximise their prices through a three-fold strategy: to improve the quality of their picking, wet processing and drying in order to produce better quality parchment; to have larger quantities of green bean available to sell to exporters to improve their bargaining power; and to cut out the roadside traders and market intermediaries. CCGS groups generally deliver parchment to the cooperative three times per year, in April, July and October. CCGS arranges for processing of the coffee by a contracted dry mill, depending upon the costs of processing and then sells to an exporter based on the price offered for the green bean.

There are no existing chain quality programs except for the focus on quality with the group members and any systems implemented by the dry factory and exporter. Some growers are hand sorting cherry prior to pulping to remove green cherry, but not overripe cherry. Problems arise with variation in cherry quality, wet processing methods and moisture levels of the parchment. Because there are no formal linkages along the chain, there is no chain driver for the adoption of a QA system; rather this arrangement is an impediment to the adoption of such systems. The main driver for improving quality is the higher prices growers receive for selling larger quantities of improved quality through the cooperative. The cooperative overcomes the problem for small growers of not being able to receive premiums for quality in the traditional selling system, which relies on roadside traders bulking up small quantities of highly variable coffee.

Both these cooperative schemes use village-level processing methods to produce coffee. They inherently have problems with consistency of quality and taste because there are differences between growers in the quality of the cherry harvested, wet processing and fermentation methods and times, and the moisture levels of the parchment. However, they produce better quality coffee than the average smallholder and are rewarded for this. However, without the use of well run centralised wet mills they are unlikely to be able to enter the specialty coffee market unless they can establish a niche market that is willing to pay higher prices for smallholder coffee. Such markets include the organic and Fair Trade markets, which some other grower groups are accessing.

A key constraint to the long-term success of these schemes is the long-term sustainability of the cooperative groups. Most cooperatives have failed in PNG. Relatively low levels of education among village growers and cultural issues generally lead to the failure of cooperatives due to a combination of conflict, poor management and corruption. One factor in favour of the CCGS scheme is that they have established a price advantage for their members, although this has not always resulted in commitment as some growers try to obtain premiums in other ways. However, more recently the dramatic fluctuations in world prices has meant that in some cases growers have lost out. This is because the scheme involves collecting parchment three times a year, processing it and then selling it. By the time the coffee is sold to the exporters, prices can change between 40-50 USc/lb. In some cases famers have paid a large opportunity cost when the market has moved against them. In addition, growers have to wait for their money.

At present, these cooperative groups rely on support from the CIC to organise the processing, marketing and accounts. If CIC removed all support, it is doubtful they would continue in any effective manner. Consequently, replication is a problem because CIC staff are already heavily committed. Ideally, the staff should be able to work for a couple of years with each group after which time they would be self-supporting, allowing them to move on to other groups. However, the success rate has not been good and there is only limited opportunity to increase the numbers of growers participating through such schemes as they are currently structured.

Three possible alternatives are available to overcome some of these constraints. The first is for the groups that have access to a centralised wet mill to deliver cherry either as individuals or as a group. Effectively, they become part of a centralised wet mill chain targeting the specialty market. Another solution is for a cooperative to build and operate their own wet mill that attains the processing standards achieved by commercial wet mills supplying coffee to the specialty market. This means meeting the standards outlined earlier for the centralised wet mills. Such an approach is popular with growers, but only a few wet mills in the PNG manage to achieve this standard. The key constraints are: access to reliable power and water; the large capital outlay required to build a suitable wet mill; the on-going working capital required to maintain the mill at a suitable standard and to buy the cherry; finding and retaining a manager with the technical, financial and labour management skills required; and cohesive and effective leadership from the cooperative's board. In addition, the group would probably need support from a third party such as the CIC or an exporter and would benefit from developing a relationship with an exporter who

could market their product into the specialty market. Only a small number of groups are likely to be able to meet these requirements and succeed by adopting this strategy. It is best suited to groups that do not have access to a large wet mill linked to an exporter. Groups in areas such as the Waghi valley and Eastern Highlands face strong competition from large integrated chains such as WR Carpenters. The advantage of the large integrated chain is that they achieve economies of size and even small, integrated plantations with their own wet and dry mills struggle to compete on price with the larger operations. Consequently, grower owned and run wet mills will not compete unless they achieve the economies of size of cooperative such as Mainland Holdings.

Where the groups are too remote or do not have the capital resources and management expertise to establish and operate their own wet mill, the third alternative is for the group to target the organic and Fair Trade market. In this case, they must first establish a relationship with an exporter who is willing to help them achieve organic and Fair Trade certification. An additional advantage of this strategy is that the exporter may be able to facilitate and support the on-going management of the cooperative.

In summary, the cooperative schemes supported by the CIC, like this one, will be constrained by the level of agency support they require and may have more potential if they attempt to form linkages similar to those in the cherry and organic/Fair Trade chains. An alternative that might work for some groups is to be supported by an NGO or church group. However, the commitment would need to be long term and considerable effort would need to go into structuring the cooperative to maintain trust and in capacity building so that growers could eventually take over management of the cooperative. The danger for the latter type of model is that it just creates a dependency on the NGO or church.

Ruts Kofi smallholder cooperative group

Background

Ruts Kopi is a smallholder grower cooperative based on trust and honesty in transactions. Incorporated in April 2001, Ruts kopi was established as a result of grower frustration and the need to improve the quality of the parchment produced to improve returns to smallholder coffee producers. It is composed of several grower groups from WHP, EHP and Morobe, which collectively have over 2,000 hectares of coffee production, making it potentially one of the larger coffee producers in PNG. It was initially supported by the EU funded ‘Stabex’ project which had the objective of assisting grower groups to improve the quality of parchment delivered to processors and exporters, but was subsequently deleted from the program. It was incorporated in the ACIAR project as one of the models of groups being supported under the CIC objective of taking growers to market.

Chain leader, participants

This group is not part of a formal chain and is an example of an attempt at ‘bottom up’ development. It was supported by Tiri Kuimbakul who was in charge of the ‘Stabex’ project, however, he only provided training and audited the books. He helped the group to look for buyers, but did not make the decision for the group about who to sell to. The ‘Stabex’ project provided subsidies for dry processing to the group. In the past the group had sent some coffee through Goroka Coffee Roasters, Niugini Coffee Tea and Spice and Highland Coffee Exports, but since the training has established a relationship with Highland Arabicas.

Focus of study chain

The group’s aim is to improve quality and thus improve returns to their members. Their strategy for achieving this is to have their own wet and dry factories, a marketing warehouse and to export directly to overseas markets for a better price, bypassing the middlemen.

Wet and dry processing

The group produces parchment which is processed in a dry factory which is in receivership but is on land belonging to one of their members. It sold 1 container in 2003 and 2 containers in 2004 to Goroka Coffee Roasters and Niugini Coffee Tea and Spice. Although it was not possible to obtain official figures, it appears little coffee was processed by the group from 2005 on. During the PRAP survey the group was noted to have been buying parchment from group members and non members who accepted the price offered by the group; essentially acting as a middleman. The group claimed to have sold 75 tonnes of parchment in July 2006. The group claims to have sold 125 tonnes through Highland Coffee Exports but it is not clear when and if this was done.

Grower group

Minj was selected as the focus location for this group although members came to the PRAP and training from remoter locations. The group headquarters is located 2-3 minutes in from the Minj market towards the Minj station. Minj is located in the South Waghi District about 1 hour east of Mount Hagen along an all weather road.

The group leader or Chairman is Sam Kaima, while they also have a patron in Sir Tumun Dupre. It has an executive of 4 including Sam with a working committee of another 4. The group bases itself on Christian principles of trust and honesty in transactions. It obtained a K40,000 grant from the government in 2005 to provide capital to purchase and pay for parchment, to purchase a small vehicle to transport coffee and for coffee processing. When the PRAP was conducted with the group on 23-24th August 2006, 45 growers attended (all male).

Group relationships with outside agencies

As part of the PRAP process the group's relationships with outside agencies were analysed and positive and negative implications assessed. Positive implications included:

- Existence of good strong community leadership combined with village court system and involvement of churches encourages Christian principles which reduce law and order problems.
- Availability of education services and facilities within easy reach for educating group members' children.
- Health services within easy reach for medical attention.
- Agriculture supply store easily accessed for purchase of coffee tools, equipment and chemicals.
- Group has established a close working relationship with the Coffee Industry Corporation and Western Highlands Division of Agriculture and Livestock which will reinforce the group's vision to produce quality coffee for marketing.

Negative implications included:

- The group will need to establish dialogue with financial institutions for possible assistance in future.
- The group should establish dialogue and work closely with existing export companies.
- Not much help and support from political leaders.
- Women and youth groups must be involved to reduce labour problem (this is reflected in the attendance at the PRAP activity).
- The group may not sustain as members do not value the potentials and strengths they have to achieve their goals but rather, think their local MP, the National Government, Local Level Government and Donors will guarantee their success.

Group location and resources

This section on group resources draws on information collected during the PRAP process. However, because the members of the group come from all over the Western Highlands, the information only relates to the area around Minj where the majority of the participants in the PRAP live. Key points include:

- The majority of the Minj area is flat and suitable for growing a range of crops including coffee. However, water logging is a problem and drainage is a must, but this is laborious.
- Soils are mainly of silt and clay loam derived from very fertile alluvial deposits although often waterlogged in wet weather unless drained.
- The Waghi River and all year round flowing creeks are the major water source although pollution is a concern.
- Smallholder and plantation coffee make up much of the vegetative growth of the area and with the high population densities there are some land shortages.
- Minj is linked by surfaced road to Mount Hagen and other parts of the Western Highlands and via the Highlands Highway to Goroka and Lae. This means it has access to a range of government and commercial services. However, some infrastructure and roads have deteriorated over the years.
- Enough labour is available that could be mobilized for economic activities such as in the coffee plantations and bigger smallholder coffee blocks and assisting women in laborious activities in subsistence gardening, although much time is spent on uneconomic activities.
- Cash is plentiful during coffee season, but money earned from coffee is not invested back into coffee.

Social capital within group

One of the factors influencing the on-going success and cohesion of a group is the level of social capital in the group. For this group, this was assessed through pre and post training surveys of growers using a number of social capital items backed up by observations from the PRAP process and other observations and discussions. From the PRAP process it was identified that:

- Transparency and accountability is a cause for concern.
- The group is not well organized, lacks a management structure, operational policies and financial policies, which could result in disintegration of the cooperative.
- There is a general lack of knowledge and skills in all aspects of coffee husbandry and production systems among group members.
- Tribal conflicts among warring tribes will prevent group members from moving freely for meetings, trainings and marketing of their coffee.

It appears from the items in Table 1 that despite some of the issues with a lack of organisation identified in the PRAP process, this group currently has reasonably high levels of social capital and trust in its leaders, both in absolute terms and in comparison with other groups.

Table 1: Summary means of measure of social capital from pre and post training surveys for Rutz Kofi group compared with all groups

Item	Rutz group	All groups
Group meets regularly.	3.4	2.5
Everyone in the group has an equal opportunity to speak.	3.5	3.1

Everyone in the group is committed to producing good quality coffee.	3.9	3.3
When a group member delivers sub standard coffee it is rejected.	2.7	2.4
Everyone knows how much product each group member has contributed.	2.6	2.9
Selling coffee through this group results in higher prices.	3.4	3.1
Everyone in the group is treated fairly.	3.9	3.3
Everyone within the group is respected.	3.6	3.3
I trust the group leader.	3.5	3.3
I trust the other group members.	3.2	3.0
Group members readily accept responsibility for their actions.	3.3	2.9
Group members deliver on their promises.	3.4	2.7
Conflict is quickly resolved within the group.	3.3	3.0
Group members belong to the same church	1.6	2.6
Group members belong to the same clan.	1.6	2.3
Group members belong to the same family	1.4	1.6
People in my village or community can be trusted.	2.0	2.6
People in my village or community are likely to steal cherry from my trees.	3.4	2.1
N	17	150

The items on: trust in group leader (3.5), trust in other group members (3.2) and conflict is resolved quickly (3.3), for example, are high. The group itself also appears to be cohesive with high measures on: commitment to producing good quality coffee and everyone is treated fairly and respected. Currently the group appears to be satisfied with the prices they are receiving from the cooperative with this rating 3.4 out of 4. Unfortunately, there appear to be some community problems because the items for community trust (trust and stealing) are also low when compared with all groups.

Issues arising from SWOC activity in PRAP

The SWOC activity conducted as part of the PRAP process provided an understanding of the needs and concerns of the group. In the preliminary expectations exercise the participants raised the following items: Group needs a vehicle to transport coffee; Group members require financial assistance to purchase tools, equipments and chemicals for use on coffee; Group demanded training assistance in coffee husbandry and management practices. Group members were informed that CIC did not provide material assistance, but could help with training.

Following problem sorting and ranking in the SWOC exercise, a number of issues were identified as internal problems to be addressed by the group members. In order of ranking these were: group does not own vehicle to transport coffee; alcohol, illegal drugs consumption and gambling are a problem; members lack time management and commitment; and political deception.

The external problems that require support from outside agencies in order of ranking were:

- Limited knowledge on fertilizers & application rates
- Limited knowledge in pest and disease management
- Lack knowledge in accessing credit & donor agencies
- Limited knowledge in accessing better markets.

Training activities with group arising from PRAP

Arising from the PRAP, CIC organised training in the following areas using contracted service providers:

- Coffee rehabilitation and basic agronomic practices
- Integrated pest and disease management
- Coffee sales and marketing
- Access to donor agencies and credit facilities

These were delivered and evaluation of the training provided by the service providers is underway. One measure of changes in perception comes from the pre and post training survey. Table 2 shows the results on the processing items. In the key areas of pulping red cherry, calibrating the pulper, pulping on the same day, washing in clean water and fermenting until it passes the rub test it appears the message has been received and understood.

Before training, only 29% of respondents gave the correct figure of 5kg of cherry converting to 1kg of parchment, with most saying 10kg. Unfortunately, the figures for post training are not available at this stage. There was only a slight shift towards recognition of selling cherry being more profitable than selling parchment, with 10% perceiving it to be more profitable before and 20% after. There was a greater recognition of the relationship between local coffee prices and the New York coffee market compared with 11% saying a great deal (and 44% don't know) before training and 60% saying a great deal (with 40% saying don't know) after training. Similarly, the proportion of respondents indicating they had a household budget increase from 0% before to 80% after training.

Table 2: Results from pre and post training survey of Rutz Kofi group on growers processing practices (percentages rating 'always' & 'most times')

Item	Before	After
Pulp only red ripe cherry	67%	100%
Calibrate the pulper every time it is used	33%	80%
Pulp cherry on the same day of harvest	56%	100%
Wash the coffee with clean water every day	56%	80%
Ferment the coffee only until it passes the rub test	56%	100%
Shade dry the coffee	22%	0%
Sun dry the coffee until it reaches the hard black stage	100%	100%
Dry on raised beds/benches	33%	0%
Hand sort the coffee prior to sale to remove debri	33%	25%
Coffee is dried in a secure fenced area	22%	80%
N	9	5

Operations of the chain

Management and services provided by chain leader

At this stage there is no chain as such, with the cooperative as the chain leader. It is essentially a 'grower driven' attempt to vertically integrate upwards. However, recently the group has established a relationship with Highland Arabicas although it is not clear at this time how this has progressed and the level of relationship.

Pricing mechanisms to growers and results

No information could be obtained on the performance of the group in terms of prices paid to members relative to other alternatives. No report or information could be obtained on the prices paid by the group while they were attached to the Stabex project and information on prices paid by the group could not be obtained since then. However, since the group is buying and selling parchment when many of their members could be selling cherry there was probably an opportunity cost involved with selling to the group since cherry prices have been averaging 100+ toea/kg parchment equivalent higher than parchment prices paid by dry factories for Class 1 Parchment.

Chain quality programs and outcomes

Existing quality programs

There are no existing chain quality programs except for the focus on quality by the group members and any systems implemented by the dry factory and exporter.

Drivers and impediments to the adoption of QA systems

Because there are no formal linkages between the grower group and processors and exporters there is no chain driver for the adoption of a QA system. Rather this arrangement is an impediment to the adoption of such systems because the arrangements do not require traceability. The main driver for adoption of quality assurance is the potentially higher prices growers could receive from being able to sell larger quantities of coffee of an improved quality. For this to occur there needs to be a market that is willing to pay higher prices for product that can ensure quality attributes that cannot be detected by the buyer under ordinary circumstances.

Relationships between the grower group and processors and exporters

This section discusses evidence of the level of trust and confidence of the Rutz Kopi growers and buyers, processors and exporters who buy and handle their coffee.

In response to the question in the pre and post training surveys asking them the general question of 'Processors and exporters give me a fair price for my coffee', growers gave an average rating of 2.5, which was slightly higher than the rating of 2.1 for respondents from all groups. The questions from the pre and post training surveys indicate that growers do not trust other growers or roadside buyers to whom they sell their cherry or parchment, but trust their cooperative and the dry factory about equally when it comes to selling their parchment (Table 3). Since the cooperative does not buy cherry this question was not answered by many growers and in any case is not relevant. However, trust in wet factories as buyers of cherries is low (29%). This rating is lower than the average for all groups, but typical of the rating for groups that do not have a direct relationship with a wet factory. Groups that do such as Sihereni and Tolu have a much higher rating.

Table 3: Extent to which Rutz Kofi growers trust buyers of their cherry or parchment 'a lot' or 'not at all'

	Other growers		Cooperative		Roadside buyers		Wet/dry factory	
	'a lot'	'not at all'	'a lot'	'not at all'	'a lot'	'not at all'	'a lot'	'not at all'
Cherry	0%	88%	14%	29%	0%	60%	29%	14%
Parchment	0%	78%	54%	0%	0%	60%	50%	13%

Factors influencing on-going change & success

Rutz Kofi initially received support under the EU Stabex program. This was a K2.6m project for three years beginning in 2003. The aim of the project was to increase prices received by smallholder coffee growers by enabling them to process their parchment and sell green bean to local exporters through direct sales as well as auctioning. The project was organised through a non-profit incorporated association called Stretpasin Kopi Association. It proposed to develop an alternative marketing arrangement under which coffee growers would be involved in growing, processing and marketing. Stretpasin Kopi also provided training, audited the books, and looked for buyers for the groups, but did not make the decision about which one to use. It also provided subsidies in the first few years for dry processing of parchment. Coffee growers associations or cooperatives were assisted to process their parchment coffee into green bean, which was sold to local exporters through direct negotiation with exporters as well as through weekly auctions. It was also proposed to lease dry mills in Goroka and Mount Hagen to process the coffee.

The project has ceased, but to date no information could be obtained about its outcomes. It proposed to achieve two main results:

- Smallholder growers are processing their coffee using existing well-equipped processing mills with quality assurance facilities in Goroka and Mt Hagen.
- A number of well-established marketing groups are successfully processing their coffee and selling to local exporters.

It was also suggested that the CCGS groups would be incorporated under the Stretpasin Kopi Association. Currently none of these results appear to have occurred. Growers are not processing their coffee using their own processing mills and the groups involved are not independently successfully processing and selling to local exporters.

Rutz Kopi was suspended from this project, apparently because it was buying parchment rather than collecting members parchment for processing. Over the period of the project it has followed various strategies: working through Stretpasin, selling its coffee to exporters such as Goroka Coffee Roasters and Niugini Coffee Tea and Spice, and arranging for processing of its parchment through a local dry mill. It still has plans to buy its own dry mill although lack funds to do so. In 2005 it received a K40,000 grant from the government to provide capital to purchase and pay for parchment, to purchase a small vehicle to transport coffee and for coffee processing. However, as indicated in the PRAP, there was a further request for a vehicle.

Like the CCGS scheme, Rutz Kopi growers produce coffee using village-level wet processing methods and hence problems remained with the consistency of quality and taste. There are no chain quality programs except for the focus on quality with the group members and any systems implemented by the dry factory and exporter. Some growers hand sort cherry prior to pulping to remove green cherry, but not overripe cherry. Problems arise with variation in cherry quality, wet processing methods and moisture levels of the parchment. Because there are no formal linkages along the chain, there is no chain driver for the adoption of a QA system. Consequently, it is difficult for these schemes to produce coffee for the specialty market at best they can hope to obtain PSC prices for most of their coffee. The main driver for improving quality is the perception of higher prices growers receive for selling larger quantities of improved quality through the cooperative. The cooperative overcomes part of the problem for small growers of not being able to receive premiums for quality in the traditional selling system, which relies on roadside traders bulking up small quantities of highly variable coffee. However, with the volatility in the market, growers are also vulnerable to price risk because the cooperative holds coffee to bulk it up for sale but is not able to hedge the coffee. Without the use of well run centralised wet mills they are unlikely to be able to enter the specialty coffee market unless they can establish a niche market that is willing to pay higher prices for smallholder coffee. Such markets include the organic and Fair Trade markets, which some other grower groups are accessing.

A key constraint to the long-term success of these schemes is the long-term sustainability of the cooperative groups. Most cooperatives have failed in PNG. Relatively low levels of education among village growers and cultural issues generally lead to the failure of cooperatives due to a combination of conflict, poor management and corruption. Two factors critical to the successful establishment of a CMG are a comparative advantage generally arising from a market failure and a reasonable level of trust amongst the members of the community seeking to establish the CMG. Smallholders are faced with two key issues that make it difficult for them to compete against larger growers and investor owned firms (IOFs): (i) internal factors related to the characteristics of small growers (e.g. small-scale production, poverty, high levels of illiteracy, ill health, and low social and political status); and (ii) their external environment (e.g. poor transport infrastructure leading to high transport and handling costs, expensive and limited access to physical inputs, credit and information, inferior technology, high transaction costs, problems of land tenure, and law and order).

The combination of internal factors and the external environment make it difficult for well-managed IOFs to enlist them into a value chain. Smallholders face even greater

challenges in this environment. Smallholder growers in PNG will be unlikely to succeed with CMGs on their own when faced with these constraints, so strategies are required to help them, although of course, the best strategy would be to focus on removing the education, infrastructure and other constraints in the first place. IOFs would then be able to provide many of the services growers require without the need for CMGs or cooperatives.

At one stage Rutz Kofi relied on support from the CIC and the EU project, however, without this support it is doubtful they would continue in any effective manner. Consequently, replication is a problem because CIC staff are already heavily committed. Ideally, the staff should be able to work for a couple of years with each group after which time they would be self-supporting, allowing them to move on to other groups. However, the success rate has not been good and there is only limited opportunity to increase the numbers of growers participating through such schemes as they are currently structured. In the Western Highlands, collaborative grower groups like Rutz Kopi face additional competition from cherry buyers who can pay growers around 110 toea per kg higher than they pay for Class 1 parchment.

Three possible alternatives are available to overcome some of these constraints. The first is for growers from the group that have access to a centralised wet mill can deliver cherry either as individuals or as a group. In effect they become part of a centralised wet mill chain targeting the specialty market. Another solution is for a cooperative to build and operate their own wet mill that attains the processing standards achieved by commercial wet mills supplying coffee to the specialty market. This means meeting the standards outlined earlier for the centralised wet mills. Such an approach is popular with growers, but only a few wet mills in the PNG manage to achieve this standard. The key constraints are: access to reliable power and water; the large capital outlay required to build a suitable wet mill; the on-going working capital required to maintain the mill at a suitable standard; finding and retaining a manager with the technical, financial and labour management skills required; and cohesive and effective leadership from the cooperative's board. In addition, the group would probably need support from a third party such as the CIC or an exporter and would benefit from developing a relationship with an exporter who could market their product into the specialty market. Only a small number of groups are likely to be able to meet these requirements and succeed by adopting this strategy.

The third alternative is for the group to target the organic and Fair Trade market. In this case, they must first establish a relationship with an exporter who is willing to help them achieve organic and Fair Trade certification. An additional advantage of this strategy is that the exporter may be able to facilitate and support the on-going management of the cooperative. Currently, Rutz Kopi does not appear to be interested in this strategy. Since many members have ready access to cherry sales and fertiliser and chemicals, the advantages of organic and Fair Trade markets are not as significant, especially with the current high international and local prices for coffee.

In summary, based on the Rutz Kofi experience, the model proposed by the Stabek project of growers controlling the dry processing and marketing of their coffee does not appear to have a high probability of success. There is a good argument to say that many of their members have had a high opportunity cost for their involvement with Rutz Kofi as they could have obtained considerably higher prices had they sold their coffee as cherry.

Sigri Plantation/WR Carpenters and Sigri Growers Group Chain

Background

This chain was chosen because WR Carpenters is the market leader for specialty coffee in the Western Highlands and has a long established reputation for producing quality coffee. They purchase much of their cherry from smallholder growers and blockholders surrounding their plantations and wet mills in the Western Highlands. These growers are

not organised into groups so it was decided to form a group of growers from Sigri village next to the Sigri plantation.

Chain leader, participants

Sigri is perhaps the most well known plantation and brand in the PNG coffee industry. Owned and operated by the W.R. Carpenters Group, Sigri plantation in the Eastern End of the Western Highlands is 8 km from Banz township and 57 km from Mount Hagen over a largely all weather road. The plantation has had a couple managers over the time of the project. The growers' group in this study comes from nearby suppliers to the Sigri plantation. No formal alliance exists between these growers and Sigri, although the grower sell most of their coffee to Sigri. Sigri plantation sometimes helps individual growers by providing advice and access to fertiliser and chemicals at cost. In this respect, it is an example of a nucleus estate model.

Exporter

WR Carpenters manage and export tea and coffee grown on their plantations and purchased from other growers. Their head office is in the town of Mount Hagen in the Western Highlands although they have coffee plantations and six wet mills spread throughout the Waghi Valley. They export around 4.5% to 7% of PNG's coffee exports by volume although the percentage by value is higher because most of their coffee goes in to the plantation A/AA, X and PB grades. In 2007/08, they exported around 40% of PNG's plantation A/AA grade coffee. They also have established markets with roasters and buyers, such as Starbucks, who offer a premium over the NY C. Apart from cherry purchased from surrounding block holder and small holder growers, Carpenters is a vertically integrated operation which undertakes all functions from wet processing, dry processing, warehousing and exporting green bean.

Focus of study chain

The focus of Carpenters chain is to produce plantation style coffee for the specialty market. They do this by combining cherry from their own plantations and by buying cherry from small holders surrounding their plantations and factories and processing it to achieve consistent quality coffee. Carpenters brands are used for the sale of all plantation grade coffee.

Wet and dry processing

Wet and dry factories located at the Sigri plantation process the coffee for the Sigri chain. While the Sigri plantation has a relatively small wet mill with a capacity of around 25 tonnes of cherry per day, it has the main dry mill for the Carpenters operation. The dry mill has good equipment and achieves green bean recovery rates of 80-81%.

Carpenters plantations purchase cherry from surrounding block and smallholder plantations and process cherry through to parchment. Kindeng, which is the largest Carpenters wet mill with a capacity of 300-400 t/day of cherry, purchases cherry throughout the season. A number of trucks are sent out to purchase cherry on a daily basis during the season. Cherry comes from these sources and from their plantations.

Grower group

No formal groups of growers are associated with supplying Sigri with coffee. The group identified for this study is an informal group of 60 growers, which formed in 2006 as a result of the activities of the ACIAR project and the CIC. They are blockholders or larger smallholder growers located opposite the WR Carpenter's Sigri Estate and are located 8 km or 10 minutes from the Banz Township along an all weather road, provided the bridges have not been washed away. Banz is about 40 minutes from Mt. Hagen. Initially, the Sigri Village Coffee Growers group was a group in name only, as it was formed because of the activities of the project. There were some linkages between group members because of family and church connections, but little else.

Initially there was resistance from the Sigri Village Coffee Growers to the PRAP process, but after some discussions, 15-25 members attended most of the activities conducted on 24th and 25th August, while 50 attended the final session. However, attendance was spasmodic which indicates that initially at least there was little interest in forming a group. It does not appear to have a formal management structure, but Julius Tai, a respected community leader, provides leadership.

Group relationships with outside agencies

As part of the PRAP process, the group's relationships with outside agencies were analysed and positive and negative implications assessed. SVCG is surrounded by vital service organizations. The SVCG have close relationships with WR Carpenters, CLTC, schools, Lutheran Church and the sitting MP, Mas Karl. Positive implications included:

- The SVCG may access direct services from the MP, Mas Karl who is from Sigri village.
- SVCG gets financial support from CLTC.
- WR Carpenters and Sigri Plantation provide vital services in buying coffee cherries.
- Government services such as electricity, education and health are readily available.

Other organizations such as the CIC, DAL, NGO, water board and Agriculture bank exist within the reach of the SVCG. When the time is right, the SVCG may benefit from these organizations

Negative implications included:

- Growers do not understand why Sigri buys cherry from them.
- Young people in the Sigri village are not serious about going to school and getting educated.
- The organizations such as the CIC, DAL, NGO, water board and Agriculture bank do not currently provide services to the SVCG, though the SVCG are not proactive in accessing services from these organizations.
- It is apparent from the Venn diagram that before the PRAP, CIC had a distant relationship with the SVCG.

Group location and resources

This section on group resources draws on information collected during the PRAP process. Key points include:

- There are many coffee trees grown by the growers, however there are many low producing areas, with unmaintained or poorly pruned coffee trees and heavy shade.
- The Sigri village is on flat plains of the Waghi River, and the area is ideally suited to coffee and other agricultural production. However, water logging is a problem and drainage is a necessary, which is very laborious job.
- The soil is mainly a silt and clay loam and is very fertile.
- There are food gardens as the basis for subsistence existence and the hills behind the village can be used for food crops because the water table is low. There are signs of land has been over used, with a consequent reduction in food yield.
- There is a shortage of timber for construction and much of the land is under coffee.
- There is a river flowing about 500m from the village, which is potentially a good water source, but there is no reticulated water supply.
- There is a Lutheran church in the village which facilitates nourishing of the spiritual lives.

- Sigri coffee estate of WR Carpenters is nearby which provides a secure coffee market especially for cherry.
- Major Government and NGO services are accessible by the villagers.
- Sigri village has an electrical supply and is linked by a good road system to major centres such as Mount Hagen, Minz and via the Highlands Highway to Goroka and Lae.
- There is a labour problem. Shortage of labour can lead to neglect of coffee trees.
- There are social indicators such as gambling, drug abuse, alcoholism and stealing that show that Christian principles are declining.
- Constant travel into towns is at the expense of valuable time that could be used for other useful and beneficial purposes.

Social capital within group

One of the factors influencing the on-going success and cohesion of a group is the level of social capital in the group. For this group the main way this was assessed was through surveys of growers, pre and post training using a number of social capital items backed up by observations from the PRAP process and other observations and discussions.

It appears from the items in Table 1 that with its relatively recent formation and lack of cohesion identified in the PRAP process, this group only performs at about average on the items for social capital and trust in its leaders, when compared with other groups. The items on: trust in group leader (3.8), trust in other group members (3.1), members deliver on their promises (2.5) and conflict is resolved quickly (2.7) are around or below average. The items of community trust (trust and stealing) are also at or below the average for all groups. The latter items are consistent with the PRAP issues raised by the group members mentioned earlier and in the SWOC process.

Issues arising from SWOC activity in the PRAP

The SWOC activity conducted as part of the PRAP process provided an understanding of the needs and concerns of the group. In the preliminary expectations exercise, some of the following issues were raised by participants: CIC to organize SVCG marketing group; CIC to build a wet factory for SVCG; Need CIC assistance in water supply; Lack of hand operated pulping machine; CIC to conduct post harvesting processing training; CIC and other financial institutions to provide financial assistance; CIC to provide training on coffee rehabilitation; Need knowledge on HIVAIDS awareness; CIC to provide training on financial management and bookkeeping; and Growers need better grower roads. This is very much a wish list, with an expectation that the CIC would deliver a range of resources. It was pointed out to growers that all these were not possible and they would have to rely on their own resources for some.

The problem sorting and ranking process in the SWOC exercise helped identify a number of issues as internal problems to be addressed by the group members. Items which were ranked by participants in order of ranking were: no wet factory; no coffee pulper no electricity; no money; stealing; gambling; alcohol; marijuana; and laziness.

Table 1: Summary means of measure of social capital from pre and post training surveys for Sigri group compared with all groups

Item	Sigri group	All groups
Group meets regularly.	1.8	2.5
Everyone in the group has an equal opportunity to speak.	2.5	3.1
Everyone in the group is committed to producing good quality coffee.	3.0	3.3
When a group member delivers sub standard coffee it is rejected.	2.5	2.4
Everyone knows how much product each group member has contributed.	2.4	2.9

Selling coffee through this group results in higher prices.	3.5	3.1
Everyone in the group is treated fairly.	3.6	3.3
Everyone within the group is respected.	3.2	3.3
I trust the group leader.	3.3	3.3
I trust the other group members.	3.1	3.0
Group members readily accept responsibility for their actions.	2.7	2.9
Group members deliver on their promises.	2.5	2.7
Conflict is quickly resolved within the group.	2.7	3.0
Group members belong to the same church	2.8	2.6
Group members belong to the same clan.	2.7	2.3
Group members belong to the same family	2.0	1.6
People in my village or community can be trusted.	2.6	2.6
People in my village or community are likely to steal cherry from my trees.	2.6	2.1
N	30	150

Below are the external problems that require support from outside agencies in order of ranking:

- Lack of water supply
- Lack of marketing information
- Lack of financial management & book keeping skills
- Lack of credit facilities
- Lack of knowledge on all aspects of coffee husbandry
- Poor road & bridge condition.

The key issues for follow-up by this project are 2, 3, & 5. The group will address the others with assistance from other agencies, although a training program on accessing donor funding will assist with addressing the lack of water supply, wet mill and lack of credit facilities. The desire of growers to operate their own wet factory, despite the likely lower prices they would receive through such a development shows a lack of understanding of the operations of the coffee market. CIC has chosen to address this by conducting training in marketing and processing to highlight the difficulties of running a wet mill that will achieve prices competitive with Sigri plantation and other large wet factories.

Training activities with group arising from PRAP

Arising from the PRAP, CIC organised training in the following areas using contracted service providers:

- Coffee rehabilitation and agronomic practices
- Coffee quality improvement
- Coffee market information and dissemination
- Basic book keeping and financial management
- Access to credit facilities and donor agencies.

These trainings have since been delivered and post-training interviews collected. Reports on performance of service providers delivering these trainings are being prepared. One measure of changes in perception comes from the pre and post training survey, however, at this time the answers to some of the questions from the pre-training questionnaire are not available. Table 2 shows the results on the processing items. Given the small numbers of respondents there is not much that can be concluded about all growers in the

SVCG group, except that those interviewed do not appear to have got the message about cherry processing.

Table 2: Results from pre and post training survey of Sigri group on growers processing practices (percentages rating 'always' and 'most times')

Item	Before	After
Pulp only red ripe cherry		50%
Calibrate the pulper every time it is used		50%
Pulp cherry on the same day of harvest		25%
Wash the coffee with clean water every day		25%
Ferment the coffee only until it passes the rub test		100%
Shade dry the coffee		25%
Sun dry the coffee until it reaches the hard black stage		50%
Dry on raised beds/benches		0%
Hand sort the coffee prior to sale to remove debri		0%
Coffee is dried in a secure fenced area		0%
N	25	4

One of the most significant changes was that before the training only 36% of respondents correctly gave the figure of 5kg of cherry converting to 1kg of parchment, whereas after the training 100% gave the correct answer. However, there was a negative shift towards recognition of selling cherry being more profitable than selling parchment, with 70% perceiving it to be more profitable before and 60% after training. On the other hand before training 100% said they did not know if there was a relationship between local coffee prices and the New York coffee market compared with after training when 60% said there was a great deal (although 20% said there was none and 20% said sometimes). Conversely, the proportion of respondents indicating they did not have a household budget decreased from 88% before to 100% after training. Unfortunately, it is difficult to draw meaningful conclusions because of the small sample size of the post training survey and because most probably different people were interviewed pre and post.

Operations of the chain

Management and services provided by chain leader

Essentially the provision of cherry by growers to Carpenters is a commercial transaction with growers paid for the cherry they supply provided it meets Carpenters requirements. As there is little organisation apart from this the chain is an akin to nuclear estate model, but with some of the characteristics of a hierarchical- pyramidal network.

The main service provided by Carpenters is transport to collect the coffee from the roadside for growers who lack transport. Growers don't have to pay for transport and receive cash on the day. The manager provides advice to some growers and sells some fertiliser and chemicals at cost, although no formal arrangement exists.

Pricing mechanisms to growers and results

Growers are paid for cherry based on the amount of cherry delivered that is accepted. They may deliver the cherry themselves, or some deliver to the roadside where it is collected by Sigri trucks. Sigri is recognised as the price leader in the Waghi valley. Prices received by growers for their cherry over the last four years averages around 110 toea per kilogram more than they would receive had they delivered No 1 Grade parchment (assuming certain conversion rates and ignoring growers wet processing costs). In addition, since growers are not always able to deliver No. 1 Grade parchment this is a conservative estimate of the price advantage they receive.

Chain quality programs and outcomes

Existing quality programs

Sigri has its own quality systems although these have not been independently assessed apart from the requirements to meet the preferred supplier status for Café Practices. The main elements of the quality control system are those normally required in well run plantation wet and dry factories.

Elements of quality control include:

- Coffee is inspected before purchase and is either accepted or rejected (reject green, black, or stored cherry, some of which may be sold to other processors).
- Plantation and growers cherry is separated.
- Surplus cherry is loaded into a water tank prior to pulping.
- Main and secondary pulpers – floaters process separately.
- Pulpers adjusted continuously & cleaned daily.
- Fermentation take 3 days and is washed and pumped into a different tank each day.
- Soaked for 1 day at end.
- Parchment is sun dried mainly on raised beds.
- Dry parchment is stored in conditioning bins for 10-14 days.
- Regrading to extract high quality – checked twice per day at end of shifts.
- Green bean is hand sorted & checked by supervisors.
- Batches become mixed after hulling.
- Samples are sent to client for approval before it is rebagged into export bags.
- Husks bagged & sent to other plantations for fuel for mechanical driers.
- Cherry & waste water treated in settling pond before release.
- This quality is recognised in the price premium paid for Carpenters coffee which is sold at a differential of +30 and higher to the NY C.

Drivers and impediments to the adoption of QA systems

Carpenters has a well established reputation as the leading producer of quality coffee in PNG, with much of its green bean sold under its own brand names such as Sigri and Bunum-Wo. Customers such as Starbucks through their Café Practices are beginning to demand the implementation of QA systems. Carpenters have already implemented a HACCP system for their tea as a result of customer demands. A critical issue for Carpenters with their current system is that they do not have traceability with the cherry obtained from growers. This creates a problem in meeting Café Practices' traceability requirements and quality assurance requirements for cherry growers with out implementing a trace-back system. However, Carpenters are able to achieve premiums for their coffee without being tied to Starbucks.

In addition there are however a number of impediments to the adoption of this and other QA systems. These include:

Apart from Starbucks, there is little economic incentive to adopt QA systems because there are few potential human health problems associated with coffee.

While it is possible to adopt QA requirements in the wet and dry factory and on the plantation, considerable effort would be required to extend these back to smallholder gardens. The Café Practices system is currently more relevant to the political and social conditions found on the larger farms in the Americas.

Relationships between the grower group and Sigri plantation and WR Carpenters

This section discusses evidence of the level of trust and confidence of the growers in Highland Arabicas. It draws evidence from discussions with growers and Carpenters, the PRAP and the pre and post training questionnaires.

Carpenters have a strategy of establishing 'friends' around their plantations by leasing and managing, helping with management, or buying cherry from surrounding block and small holder growers. Carpenters also feel they are contributing to the local community by building and maintaining roads and bridges at their own expense.

On the other hand, some growers feel Carpenters keep their distance from growers and don't establish a relationship except by buying their coffee. While many growers recognise that Carpenters produce quality coffee and give a good price for cherry, they see the relationship is strictly a buyer-seller relationship based on cash payment for cherry. Growers are committed to the company because they are close. However, there is some resentment that Carpenters receive a large proportion of their coffee from surrounding growers, and these growers believe they are not recognised or appreciated by Carpenters and perceive them as not really being interested in helping them to grow better. They believe they receive no support in the way of chemicals, fertilisers or finance to grow their coffee.

In response to the question in the pre and post training surveys asking them the general question of 'Processors and exporters give me a fair price for my coffee', growers gave an average rating of 1.9, which was slightly lower than the rating of 2.1 for respondents from all groups and suggests a relatively low level of trust. This is confirmed with the rating of their trust in the wet factory to whom they sold their cherry, 27% said they trusted the wet factory 'a lot' compared with their trust of roadside buyers (50%) and other growers (0%)(Table 3). For the wet factory, this is lower than the average ranking for all groups on this measure (34%), but perhaps of more relevance is it is lower than the scores for the other two nuclear estate chains, which scored 60% and 58% on this measure. Another indicator of a lack of trust is that in these other cases the wet factory scored higher than the roadside buyers of cherry and considerably higher than dry factory and roadside buyers of parchment. This appears to confirm the anecdotal evidence of a lack of trust between Carpenters and their nearby cherry buyers.

Table 3: Extent to which Sigri growers trust buyers of their cherry or parchment 'a lot' or 'not at all' (n=22)

	Other growers		Roadside buyers		Wet/dry factory	
	'a lot'	'not at all'	'a lot'	'not at all'	'a lot'	'not at all'
Cherry	0%	83%	50%	0%	27%	0%
Parchment	0%	100%	20%	20%	80%	20%

It is interesting to compare the ratings for cherry with their ratings for parchment sold to dry factory and roadside buyers. Here roadside buyers perform poorly, whereas dry factories perform much better than roadside buyers. Since these growers are mainly sellers of cherry, but also sell some parchment, it provides a good comparison of the relative levels of trust in cherry and parchment buyers. It probably reflects that fact that it is easier to assess cherry (which is mainly on colour and freshness) than parchment (which requires assessment of moisture, colour, rubbish, and a subjective assessment of off flavours and standard of fermentation).

Factors influencing on-going change & success

Centralised chains can only operate where smallholders have road access to the wet mills. This is normally within a radius of 20 to 30 kilometres depending on the whether the road is trafficable to trucks. In the case of Sigri plantation and the SVCG group most of the growers are just outside the gate of the plantation. This means that these growers are

likely to continue to supply Sigri provided Sigri is able to pay equivalent or higher prices than other cherry buyers in the Waghi Valley.

WR Carpenters has an integrated operation that includes a dry mill and an exporting arm which provides control over quality and allows it to develop its own brand, but in the Western Highlands it has some competitors including Kigibah, Rilke (linked to PNGCE) and Highland Arabicas. Sigri has provided some credit, technical advice and fertilisers and chemicals to growers, but has generally not achieved a satisfactory return on these investments and this does not appear to be appreciated by growers.

Prices received by growers selling cherry are considerably higher than the prices received by growers selling parchment. In addition, sellers of cherry do not incur the costs of processing and therefore have an additional advantage. The cherry market has become highly competitive and competition appears to be increasing as the number of chains involved in buying cherry increases. During the main production months for the 2004, 2005, 2006, 2007 and 2008 coffee season, the price of cherry averaged 110 toea per kg parchment equivalent more than the price paid for No. 1 grade parchment. This difference varies from season to season and from week to week (range 27-184) depending on the world price and domestic seasonal factors, but has remained fairly consistent over time. For example, in 2006, with high world prices and low production in PNG, fierce competition increased the premium to around 130 toea per kg parchment equivalent. When converted to an FOB green bean price, this equates to a premium over Y1 grade of approximately USc 23 per pound which means growers were receiving a price that is at a premium to NYC and slightly better than the average for plantation X grade.

Statistics on the quantities of cherry sold to centralised processing mills are difficult to obtain because of commercial confidentiality, but discussions with processors indicate that the quantities processed in this manner are expanding and have the potential to expand further. The factors influencing on-going change and success include increasing demand for quality assured coffee, cherry theft, the poor condition of the roads and lawlessness.

Recently there has been an increase in cherry theft. There are two main causes for this, higher prices for coffee over the last three years and an increase in cherry buying including the appearance of many roadside cherry buyers. There have been calls from some in the industry to ban cherry buying, but this was not implemented. Instead, CIC is banning and attempting to enforce a ban on cherry buying except by licensed buyers, although this has not been enforced in all areas. Where it has it appears to be working, but it is unclear if it is a sustainable policy. Stolen cherry is generally of poor quality, for it contains a higher percentage of under and over-ripe cherry. Wet factories buying poor quality cherry will find it difficult to achieve specialty premiums, which may squeeze their margins. Cherry theft also affects the profitability and hence motivation of plantation, block holders and smallholder growers to rehabilitate and maintain coffee gardens. This is affecting yield of trees and production is declining.

The poor condition of secondary roads and to a lesser extent roadside theft, limits the expansion of cherry buying through the nuclear estate model. PNG produces most of its coffee in areas that are not accessible by trucks. To achieve premium quality, cherry must be delivered to the mill for processing on the same day it is harvested. Because of the poor roads, this generally limits cherry collection to areas within 20-30 kilometres of the wet mill.

From the growers' point of view, it appears the relationship between Sigri and the SCFG group is largely commercial with relatively low levels of loyalty and trust of the growers towards Sigri. The project has attempted to overcome some of the inherent mistrust of smallholder growers in Sigri and other wet processors and exporters through providing information about the coffee market and processing conversion ratios. However, this has only occurred on one occasion and will need to continue if these deep-seated mistrusts are to be overcome. Sigri might also like to consider strategies that could decrease this level of mistrust, although this will be difficult for them because they will be seen as having

a vested interest. The mistrust contributes to growers still desiring to process their own cherry even though such a strategy has a very low chance of achieving them higher returns and a high probability of losing them money.

Western Highlands is a special case because of its relatively good roads particularly in the Waghi Valley and the very competitive nature of cherry buying. In effect, there are overlapping nuclear estates/wet factories and the relationships between smallholder coffee growers and the wet factories will probably remain fluid because the key driver of cherry selling appears to be price on the day and there is little loyalty of growers towards cherry buyers.

In summary the nucleus estate model of selling cherry, such as the one outlined in this case, is likely to be a good model for providing higher returns for growers in the long run. While there are many well-managed cherry buying chains in the Waghi Valley, the success of the model will not depend on the success of any one model. However, to enhance its chances of success, considerable effort needs to be put into educating growers about the world coffee market and the advantages to them of larger, professionally managed chains integrating wet factories, dry factories and exporting.

Sihereni Village, Sihereni Plantation and Monpi Coffee Exports Chain

Background

This chain involves a relationship between smallholder growers from the Sihireni area, the Sihereni Coffee Project located at the Sihereni Plantation and Monpi Coffee Exports. The Sihereni area is in the Upper Asaro area of Daulo district, Eastern Highlands Province. A key reason for the choice of this chain is that it is an example of a nucleus estate model with villages around the Sihereni plantation supply cherry which is processed in the plantation wet mill and the sold to Monpi Coffee Exports. There is no formal relationship between the smallholder coffee growers and the plantation, although the manager of the plantation has cultural links to the area. Sihereni Coffee Project (SCP) has established financial and trading links with Monpi Coffee Exports.

Chain leader, participants

Sihereni began as a coffee plantation in 1956, and was abandoned in 1991 because of land tenure problems. It was purchased by David Oromarie in 2001 and is currently being rehabilitated, with 38 hectares under coffee. He is currently also managing a further 120 ha of coffee for traditional owners. In this chain leadership is provided through a strategic alliance between SCP and Monpi Coffee. SCP has its own wet mill and through Monpi contracts out the dry processing operations. It buys coffee from smallholder growers in the immediate vicinity and up the valley. It is an example of the nucleus estate model.

Exporter

Monpi Coffee Exports Ltd has its main office in Goroka. It is owned by Ecom Agroindustrial Corporation Ltd whose head office is in Switzerland. Over the time of this project Monpi has grown from the fifth largest coffee exporter by weight in PNG with around a 9% share to the fourth largest exporter in the 2007/08 coffee year with a 14.1% market share. Its main focus was as a Y1 exporter but is increasing its share of the plantation A and X grades and is focussing more on specialty coffee being the largest exporter of X and PSC A/AA grades. It does not own a dry processing factory.

Focus of Sihereni plantation and Monpi

While the focus of the Sihereni plantation is to establish its own brand of coffee it also is buying cherry from small and blockholder growers which it aims to sell as plantation style coffee into specialty markets such as Starbucks. It has applied for Café Practices accreditation, using it as a template. For its own brand, SCP is also focussing on specialty markets in Japan. It is also interested in obtaining sustainability accreditation through Utz kopi.

Wet and dry processing

Wet processing is the smallholder coffee is undertaken at the Sihereni factory, with the plantation and smallholder coffee processed separately. The wet mill is in the Asaro area, and approximately a 20 minute drive from the Asaro district station in good weather. Once off the highway the road is poor quality gravel and dirt and is subject to flooding, landslips and boggy patches. Factory capacity is approximately 10t per day, but the factory is seen as a constraint and David would like to replace and relocate if finance was available. Around 2/3 of total production comes from small grower outgrowers.

Dry processing is contracted out to a Goroka dry mill.

Grower group

The grower group that was involved in this study consists of 26 smallholder coffee growers (only 1 of whom was a woman) from villages surrounding Sihereni plantation who were involved in the PRAP process conducted at Sihereni on the 7-8th August 2006.

The cherry is processed separately and marketed separately to the plantation cherry. Cluster group leadership is not clear as the group was essentially formed as part of the project. The Chairman of the group is Kinde but the cluster group leadership is weak as much of the leadership has been provided by David Oromarie who is a local leader and owner manager of Sihereni plantation. He uses Christian principles as a guiding force. The road to the farms and wet mill has problems during wet weather, but is generally passable.

The focus of the cluster group is to:

- Improve quality & maximise returns
- Undertake coffee basic training
- Increase planting.

Group relationships with outside agencies

As part of the PRAP process the group's relationships with outside agencies were analysed and positive and negative implications assessed. Positive implications included:

Sihereni coffee growers have good relationship with SCP, which inturn has good relationship with Monpi Coffee Exports.

SCP has a contract with Starbucks via Monpi and sells its coffee under a Brand Name "Muruk Coffee". This relationship has enabled SCP provide spin off benefits to the surrounding villages by transferring higher prices for cherry.

Negative implications included:

- Previous donors had raised expectations (e.g. ADB through the Nucleus Agriculture Estate Project) which did not eventuate. This disheartened people but also lead them to look to outside organisations to solve their problems rather than be self reliant.
- Relationships with Daulo LLG, Bank and the village court are not good or absent.
- Relationships with the Police, DAL, Works and the Daulo District Administration are poor, because many times their needs have being delayed or ignored completely (e.g. in May 2005 a landslide blocking their main road access to Goroka was reported but was not attended to quickly so SCP had to organize clearing at its own cost.

Group resources

This section on group resources draws on information collected during the PRAP process. Key points include:

- There is a good road network through villages enabling cluster groups to have access to market outlets, however landslides occur and the road can become impassable during wet weather.
- Land is available for future project expansion.
- There is a good health centre and school run by Nazarene Church.
- Have a permanent church building that caters for the Spiritual needs of the community.
- SCP has five (5) cherry buying points to serve the community.
- Soil erosion and landslide are likely to occur in coffee gardens
- The wet mill is located very close to river bank and could potentially be washed away although the river has not change in the past. However, the closeness to the river creates a treat of polluting the river and is a constraint to accreditation in some quality assurance schemes.

Social capital within group

One of the factors influencing the on-going success and cohesion of a group is the level of social capital in the group. For this group the main way this was assessed was through surveys of growers pre training using a number of social capital items backed up by observations from the PRAP process. While much of the tribal fighting has been settled, there has been recent unrest in the area which has caused the training to be postponed. Consequently only the pre-training survey has been completed and this was undertaken with only 6 respondents (Table 1).

Table 1: Summary means of measure of social capital from pre-training survey for Sihereni group compared with all groups from pre and post surveys

Item	Sihereni	All groups
Group meets regularly.	2.8*	2.5
Everyone in the group has an equal opportunity to speak.	2.8	3.1
Everyone in the group is committed to producing good quality coffee.	3.2	3.3
When a group member delivers sub standard coffee it is rejected.	3.0	2.4
Everyone knows how much product each group member has contributed.	2.7	2.9
Selling coffee through this group results in higher prices.	3.0	3.1
Everyone in the group is treated fairly.	2.7	3.3
Everyone within the group is respected.	2.7	3.3
I trust the group leader.	3.0	3.3
I trust the other group members.	2.8	3.0
Group members readily accept responsibility for their actions.	2.7	2.9
Group members deliver on their promises.	2.2	2.7
Conflict is quickly resolved within the group.	2.8	3.0
Group members belong to the same church	1.2	2.6
Group members belong to the same clan.	1.8	2.3
Group members belong to the same family	1.5	1.6
People in my village or community can be trusted.	2.2	2.6
People in my village or community are likely to steal cherry from my trees.	1.3	2.1
n	6	150

** Mean of 4 point scale with 1 being disagree a lot and 4 being agree a lot.*

As might be expected from a group that has only just been formed and has yet to complete any training apart from the PRAP, the group performs more poorly than other

groups on almost all items. It performs relatively poorly on many of the group cohesion and trust measures. It performs most strongly on the item of rejecting substandard coffee. This probably reflects the strong leadership provided by Sihereni plantation in rejecting substandard cherry. The group is about average on the measure of selling through this group bringing higher prices, but the measure of 3.0 out of 4 reflects a fair level of satisfaction with the prices received.

Issues arising from SWOC activity in PRAP

The SWOC activity conducted as part of the PRAP process provided an understanding of the needs and concerns of the group. In the preliminary expectations exercise the participants listed the following items:

- Budgeting (Financial Management)
- Lack of skills in Pest & Disease control in coffee
- Lack of skills in coffee nursery establishment
- Lack of skills in general coffee husbandry
- Relevant & appropriate tools used in coffee cultivation
- Herbicides for weed control in coffee gardens
- Appropriate chemicals for control of post and diseases in coffee
- Lack of skills in constructing proper drainage system
- Appropriate fencing materials
- Lack of skills in purchasing different standard of application
- Labour force

Following problem sorting, the following issues were identified as internal problems to be addressed by the group members:

- Land dispute
- Law and order
- Jealousy
- Attitude problem
- Road maintenance
- Landslides
- Wantok system

The external problems which require support from outside agencies were voted on and ranked by the participants and in order of ranking the four most important were:

- Coffee production & management
- Financial management skills
- Waste management
- Food preparation & nutrition

It was decided that the Coffee production and management issue would be addressed through delivering training Modules to cover Agronomy Practices, Quality Improvement & Marketing & Price Information. The second issue of Financial management skills would be addressed through training modules on basic financial management. Both these to be delivered by service providers contracted by by CIC. The third issue of Waste

management was to be delivered in the form of advisory services by CIC Post Harvest & Inspecting Department. Food preparation and management was to be addressed by DAL.

Training activities with group arising from PRAP

Arising from the PRAP, CIC contracted service providers to deliver the following training modules:

- Coffee production and management
- Coffee market information
- Basic book keeping and financial management

However, to date these have not been delivered because of tribal unrest and problems with management of the Sihereni plantation.

Operations of the chain

Management and services provided by chain leader

The nature of the relationship of the processor (SCP) and the exporter (Monpi) is akin to a strategic alliance while the relationship of the cluster growers to the processor is more hierarchical because of David Oromarie's leadership in the local community. Monpi provides financing, marketing and exporting services to SCP. In turn SCP receives cherry from growers and provides competitive prices for cherry, transport to pick up cherry and credit for sprays. David Oromarie provides some training by organising meetings at village level and providing pamphlets from CIC. He also tries to educate growers who are not delivering good quality cherry.

Pricing mechanisms to growers and results

Prices paid for cherry are competitive with Goroka prices and are adjusted to follow changes in NY market. Growers receive payment for cherry on delivery to the vehicle.

Chain quality programs and outcomes

Existing quality programs

Currently the chain is registered with Café Practices to be a preferred supplier. However, most of the coffee from cluster growers goes into PSC X, with some Plantation A & X. Plantation coffee and smallholder coffee is receiving premiums to traditional Y grade coffee. However, some problems have been experienced meeting Café Practices requirements.

Elements of quality control include:

- plantation and small outgrower cherry processed separately
- quality procedures to encourage the delivery of red cherry with cherry not meeting the standard rejected
- cherry is hand sorted with rejects pulped separately
- placed in water until processing commences with floaters and debris removed
- floaters processed separately
- building raised drying beds, although insufficient to take all cherry
- no hand sorting after drying

Drivers and impediments to the adoption of QA systems

The main driver for adoption of QA systems is that provided by Starbucks through Café Practices. This provides a premium price for chains that meet the preferred supplier status and a further premium for those who reach the strategic supplier status. However, there

are considerable time and costs involved in meeting these requirements. There are however a number of impediments to the adoptions of this and other QA systems. These include:

Apart from Starbucks there is little economic incentive to adopt QA systems because there are few potential human health problems associated with coffee.

While it is possible to adopt QA requirements in the wet and dry factory and on the plantation, considerable effort would be required to extend these back to smallholder gardens. The Café Practices system is currently more relevant to the larger farms found in the Americas.

Relationships between the actors in the chain

This section discusses evidence of the level of trust and confidence of the growers in SCP and Monpi and SCP. It draws evidence from discussions with the main actors, the PRAP and the pre-training questionnaire.

The relationship between Monpi and SCP and its manager David Oromarie is well established and appears stable. According to the main actors, it is based on openness, trust, flexibility and financial assistance.

In response to the question in the survey asking them the general question of 'Processors and exporters give me a fair price for my coffee', growers gave an average rating of 2.3 which was slightly higher than the rating of 2.1 for respondents from all groups. On the other hand for the rating of their trust in the wet factory to whom they sold their cherry, 60% said they trusted the wet factory 'a lot' and 40% said 'a little', a considerably higher ranking when compared with the average ranking for all groups (34% and 30% respectively). It suggests a great level of trust in SCP. Interestingly the rating for 'Selling coffee through this group results in higher prices' was 3.0 out of 4 (slightly lower than for other groups) although still indicating a reasonable level of satisfaction with price. The evidence from all sources suggests reasonably good relations between all the main actors in this supply chain. However, the grower cluster will require further work for it to become a sustainable group.

Factors influencing on-going change & success

While the principles underlying a nucleus estate model are potentially viable and when linked with an exporter so that it is producing specialty coffee can provide higher returns to outgrowers supplying the chain, its success and sustainability relies on a couple of key factors:

- the management expertise and profitability of the nucleus estate (in this case the SCP)
- the succession strategy and alternative leadership possibilities
- the level of conflict in the communities surrounding the nucleus estate.

In this example SCP appears to be performing well on the first of these but could have potential problems with the other two factors. SCP relies heavily for its success on the personality and management expertise of David Oromarie. There does not appear to be a successor to David if he is forced to relinquish management of SCP. In this case it is likely that the enterprise would fail. Given the recent troubles between SCP and some landowners and other landowners in the area there is potential for the chain to have serious problems with this issue which could lead to a decline in profitability which may reduce outgrower commitment to the chain.

11.5 Appendix 5: Generic HACCP plan

Green Bean Arabica Coffee

Uncontrolled Document

Introduction

The following document provides a generic HACCP plan developed using the CODEX Alimentarius approach to HACCP.

The plan was developed from a workshop with the HACCP team members and others associated with ACIAR project ASEM/2004/042 Assessing and extending schemes to enhance the profitability of the PNG coffee industry via price premiums for quality held in Goroka in April 2006.

The plan is NOT intended to be comprehensive. The plan is intended to provide the basis from which an appropriately validated and verified HACCP plan or food safety plan can be extracted and further developed. This is especially the case for the process steps beyond the drying and storage of parchment. The factory phases of processing green bean coffee were not within the initial scope of the project activities, however the 'common' process steps for phases three (wet factory) and four (transhipment) have been including in the process mapping or flow diagram steps.

This plan should be supported by appropriate supporting programs such as:

- Calibration of all equipment critical to safety and quality
- Good Agricultural Practices – Fertilisers and Pesticides
- Good Handling Practices
- Good Storage Practices
- Good Manufacturing Practices
- Integrated Pest Control
- Sanitation and Hygiene
- Security (to prevent malicious tampering)
- Site selection
- Training
- Waste Management

All aspects of the plan require on the ground validation and verification by a suitably skilled person who is formally trained in the application of HACCP.

DISCLAIMER

While every precaution has been taken in the preparation of this generic HACCP food safety and quality plan, it should not be applied without appropriate interpretation and modification to suit individual circumstances. The plan must be revalidated in all circumstances of its use.

The authors accept no liability whatsoever by reason of negligence or otherwise arising from the use or release of this information or any part of the plan.

John Noonan
Curtin University of Technology
July 2007

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HACCP Team Details

Name	Position	Skills/ Qualifications
Gary Ellis	Monpi Coffee	Coffee processor
Nick	CCGS Kabiyufa	Small Holder Coffee grower
Eilja	CCGS Kabiyufa	Small Holder Coffee grower
Robert	CCGS Kabiyufa	Small Holder Coffee grower
Kim	CCGS Fimito	Small Holder Coffee grower
Michael	CCGS Fimito	Small Holder Coffee grower
Timoli	CCGS Fimito	Small Holder Coffee grower
Laurus	CCGS Chimbu	Small Holder Coffee grower
John	CCGS Chimbu	Small Holder Coffee grower
Kessy	CIC	Project Manager / Economist
Brian	CIC	Coffee Production Extension
Tiri	CIC	Coffee Production Extension
Kiyo	CIC	Coffee quality technical specialist
Peter Batt	Curtin University	Marketing Specialist
Roy Murray-Prior	Curtin University	Extension Specialist
John Noonan	Curtin University	HACCP Specialist

Scope and Purpose

Arabica Coffee - green bean in export quality jute bags (60 kg gross)

Scope:

- From site preparation to delivery of containerised bags onto export vessels

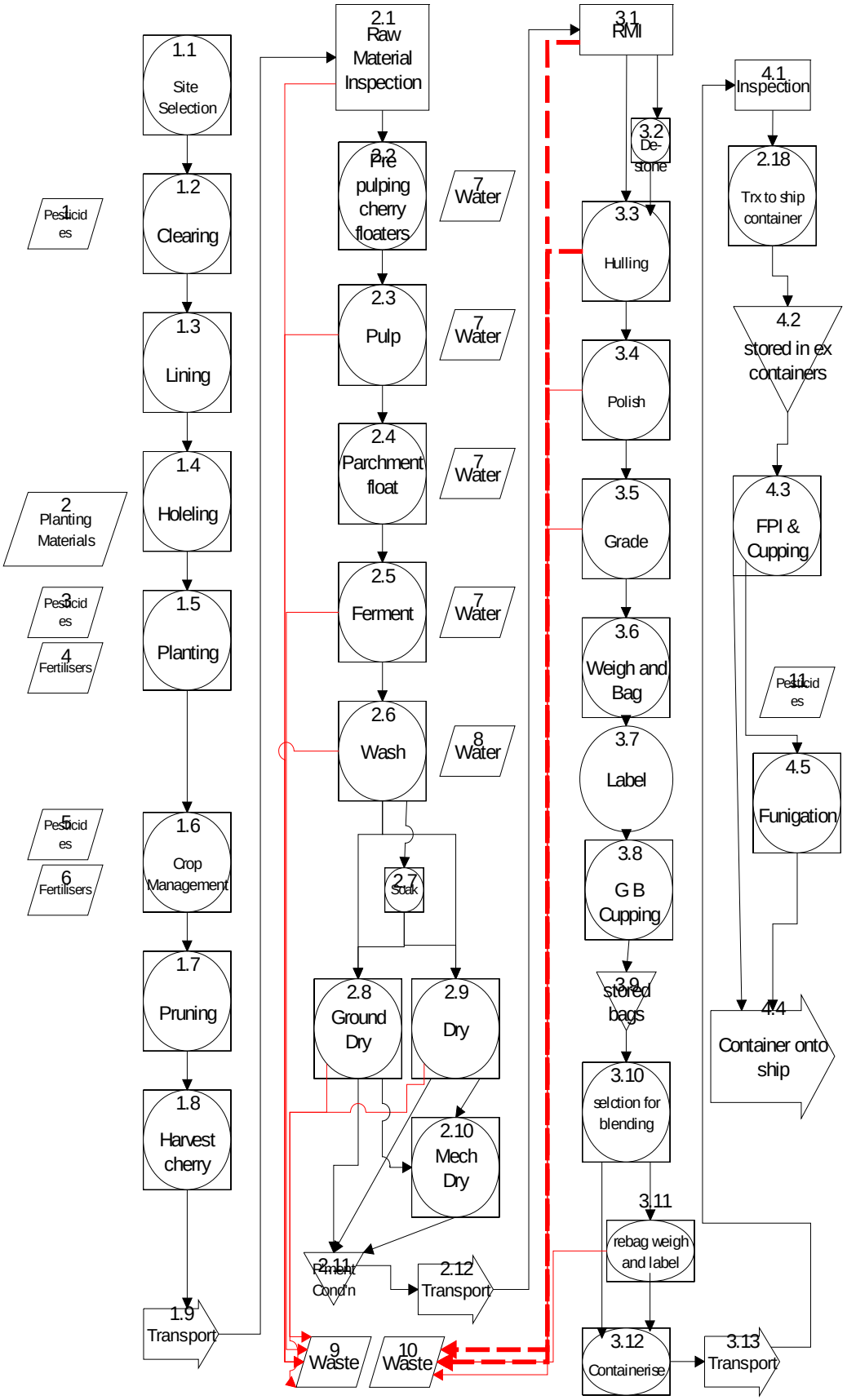
Purpose:

- To assure food safety this HACCP plan complies with CODEX Alimentarius guidelines for the application of HACCP and is constructed to enable moving towards meeting the requirements the SQF 2000CM Code
- To address environmental impact; and
- To help deliver Coffee Industry Corporation and government responsibilities

Product Description

Product Description	**Arabica Coffee**
Composition	green bean arabica
Method of Preservation	Cool and dry storage
Inner Packaging (the primary package)	60Kg jute bags; PPE lined bulker bags
Packaging (the shipper package)	20 ft container
Storage Conditions	Cool and dry storage
Distribution Method	Land transport then ship
Shelf Life	3-5 months
Special Labelling	To met government export an customer requirements
Customer Preparation	Green been ready for roasting
Sensitive Population	Intended for General Consumption

Process Flow



Step / Input	Hazard	Cause	Lik	Sev	Control Measures	⇐ Principle 2 ⇒						
						Q1	Q2	Q3	Q4	Q5	CCP / CQP / CP / QP	Reason for Decision
1.1 Site Selection	RIO – flavour taints	High altitude – poor drying	L	L	Common sense, experience and good planning	N						
	Erosion	Selecting site with too greater grade or slope	L	H	Drainage Terracing Contour plant Companion planting	Y	Y	N			QP	
	Storage and processing faults	Inability to transport to next stage of process	L	H	Common sense, experience and good planning	Y	Y	N			QP	
1.2 Clearing	Erosion	Site not prone to erosion after clearing	L	H	Drainage Terracing Contour plant Companion planting	Y	Y	N			QP	
1.3 Lining	Poor drainage resulting in inferior taste	Lines too close together	L	H	Planning the lines	Y		Y			CQP	Mainly an issue for new plantings Not an issue for small growers
1.4 Holing	No hazards assessed											
Input Plants	Poor market acceptability	Poor taste characteristics associated with a specific variety	L	L		N						
Inputs Pesticides	No hazards assessed											
Input Fertilize	No hazards assessed											

Step 1.5 Planting	No hazards assessed											
1.6 Crop Management	Pesticide Residues	Spray drift Wrong amount of pesticide Uncalibrated equipment Untrained workers	H	H	Don't spray in windy conditions Apply at label rates Adhere to WHP Calibrate the equipment Training workers	Y	Y	N	Y	N	CCP	Chemical residues are of major concern and significance in the food industry. This hazard cannot be controlled at a later stage. But chemicals are not often used in the PNG Coffee Industry.
		Chemical, application rate is incorrect Wrong chemical is used Overlap of chemical/spray drift	L	H	Apply appropriate chemicals, fungicides, at or below label rates or under permit Chemical use Spray equipment is calibrated according to Calibration Procedure Equipment used is suitable for weather conditions	Y	Y	N	Y	N	CCP	Chemical residues are of major concern and significance in the food industry. This hazard cannot be controlled at a later stage
Pesti cides	Chemical residues	Incorrect Chemicals			Approved Supplier and inspection of incoming pesticides	Y					CCP	Incorrect chemical application can have major impacts
Fertilize	Toxic or above maximum levels in the harvested cherry	Wrong fertilizer is used	L	H	Only obtain fertilisers from reputable suppliers Check application rates for fertilisers prior to use	N						
1.7 Pruning	No hazards assessed											
1.8 Harvest	Sourness	Harvest too early Under ripe cherry	L	H	Training Standardised picking guides pictorial Payment penalties on basis of percent green cherry picked	Y	Y	Y			CQP	

	Stinkers	Over ripe cherry	L	H	Training Picking guides pictorial More frequent harvest/picking	Y	Y	Y			CQP	
	Chemical Residues	Harvest before WHP has been elapsed	L	H	Don't pick before WHP has elapsed (example we came up with was either days to next church service or coloured pegs)	Y	Y	N	Y	N	CCP	Chemical residues are of major concern and significance in the food industry. This hazard cannot be controlled at a later stage
1.9 Transport	Fermented cup	Cherry is not transported soon enough	H	H	Store in water	Y	Y	N	Y	Y	QP	Cherry can be down graded if it is known to have been stored too long before transporting
2.1 Raw Material Inspection	Many different types of off flavours	Improper inspection and out of specification cherry and raw materials	L	H	Training Standardized receival criteria – colour Foreign materials – rocks sticks, faeces, leaves	Y	Y	Y			CQP	
2.2 Remove floaters	Off flavours				Pre-pulping removal of cherry floaters, stones etc.	N						
2.3 Pulping	Winey flavour Too acidic Off flavour Low acidity	Incomplete pulping Too much flesh Nipped beans			Calibrate pulper	Y	Y	N	Y	Y	QP	
2.4 Remove floaters		Incomplete parchment floater removal				N						
2.5 Fermenting	Fermented cup Grease coffee	Over fermenting Under fermenting	H	H	Rubbing test Sun drying	Y	Y	Y			CQP	

2.6 Wash	Fermented cup Dirty cup	Incomplete ferment and parchment floater removal Dirty water Still water	L	H	Rubbing test Remove floaters Clean fresh water	N						
2.7 Soak	Uneven cup	Not soaked				N						
2.8 Ground Dry	Earthy cup Musty cup Rio flavour	Physical contaminants Biological contaminants Exposure to rain Wet parchment stored too long	H L- SH L- SH	H	Raised beds where possible Location & controlled access Store inside Ventilate while keeping inside	Y	Y	N	Y	Y	QP	Can be sorted and or downgraded later
2.9 Raised bed dry	No hazards assessed					N						
2.10 Mechanical drying	Inconsistent roasting	Dry too fast Remove chlorophyll	L	H	Control temperature and monitor	N						
2.11 Parchment storage	Smoky Earthy Musty Woody	Storage longer than 4 months due to lack of transport access	L	H	Transport before 4 months or downgrade Local processing of parchment to green bean	Y	Y	N	Y	Y	QP	Can be sorted and or downgraded later
2.12 Transport	No hazards assessed											

3.1 Raw Material Inspection (parchment arrives at the dry factory)	Off flavour Poor colour Foreign Material	Parchment is too wet – not dried well enough Dirty parchment – too much foreign material – physical contaminants	M M	H H	Sample and assess for moisture content - rub test and bite test Colour and FM assessment Approved suppliers – know where the parchment came from Specifications – number of permissible defects – colour charts Staff well trained in inspection of incoming RM Cupping assessment	Y	Y	Y			CQP	Later steps may not be able to fully control these hazards
Machine Drying (=Step 2.10)	Inconsistent roasting	Dry too fast Dry to a moisture content < 10-12 %	L	L	Control temperature & monitor							
3.2 De-stoning (optional process)	No hazards assessed											The immediate following processes including Dehulling Polishing and Grading are designed to control foreign material
3.3 Hulling	Inconsistent roasting	Uncalibrated equipment	L	L	Hulling equipment is set up for optimum hulling	N					QP	Grading later in the process will reduce the number of out of specification beans
3.4 Polish	No hazards assessed	Incomplete polishing results in silver skins	L	L	Sampling and inspection for effectiveness of polishing process	N						
3.5 Grade	Inconsistent roasting	Inconsistent bean size	L	H	Calibration and adjustment of grader Trained operators Frequent sampling and inspection of output	N						
3.6 Weigh and bag	No hazards assessed					N						Weight is based on mass in containers not individual bags

3.7 Label pallets	Loss of traceability	Incorrect labelling of bags/pallets	L	H	Labels are checked by supervisor	Y	Y	N	Y	Y	QP	Very low chance of leaving the warehouse with incorrect ID and end point inspection will identify inconsistent labelling
3.8 Green bean cupping	Inconsistent roasting	No adhering to cupping procedures	L	H	Procedures are followed	Y	Y	N	Y	Y	QP	Later steps will enable hazards to be managed
3.9 Stored in bags and conditioned (Storage phase)	No hazards assessed					N						Next step will address any specification issues
3.10 Selection blending and re-bagging and labelled for outturn	Blend does not met customer specifications	Not following blending procedures	L	H	Sample/ blend sheet to meet customer specification	Y	Y	Y			CQP	The is the last opportunity to ensure that the GB meets customers requirements
3.11 Weigh and re – bag	No hazards assessed					N						Weight is based on mass in containers not individual bags
3.12 Contanerise	Contamination of load with taints and off flavours	Back loading of agricultural inputs and other stuff	M	H	All containers are cleaned , dried and aerated by approved suppliers of transportation services Inspect containers prior to loading Traceability on previous use of containers.	Y		N		N	CCP/CQP	It is possible to contaminate the load and the contamination would be ‘hidden’

Step / Input	P1		P2	P3	⇐ P4 ⇒					P5	P6	P7
	Hazard	Control Measure (6)	CP Type (7)	Critical Limit (8)	Monitoring (9)					Corrective Action (10)	Verification (11)	Records (12)
					What	Where	How	When	Who	What & Who	What & Who	
1.6 Crop Management and Pesticides	Pesticide Residues	Appropriate chemicals, are applied at or below label rates or under permit according to Chemical Use SOP Spray equipment is calibrated according to Calibration SOP Equipment used is suitable for weather conditions Training workers Check incoming chemicals	CCP	All pesticides are used according to label rates or under permit from govt agency	Chemical application	Garden or plantation	Visual with reference to label / permit or SOP	Prior to spraying	Operator	Immediate: Stop spraying Identify sprayed area Dispose of incorrect tank mix and re-mix spray Reassess withholding period or earliest pick time Preventative: Review chemical use procedure, re-train operator	Review of spray records Chemical residue tests	Chemical used and application rate Sprayer Calibration Dispatch docket or invoice
1.8 Harvest	Sourness	Training Standardised picking guides pictorial Payment penalties on basis of percentage green cherry picked	CQP	All pickers understand which cherry to pick Picking guide is used and is current	Pickers understand by demonstration	Garden/ Plantation	Visual	Before picking	Owner (Boss) Supervisor	Immediate: Stop the picker and retrain or sack them Preventative: Higher level of supervision Training Review picking guide	RMI at Wet processing Cupping and later quality tests	Picking record / cash book
1.9 Transport	Fermented cup	Store in water	CQP	If transport is not available until the next day either store in water or pulp on site	Storage before end of day	On - site	Visual	End of day	Grower / processor	Immediate: Identify and notify down chain user Preventative: Organise transport		Receipt book

Step / Input	P1		P2	P3	⇐ P4 ⇒					P5	P6	P7
	Hazard	Control Measure (6)	CP Type (7)	Critical Limit (8)	Monitoring (9)					Corrective Action (10)	Verification (11)	Records (12)
					What	Where	How	When	Who	What & Who	What & Who	
2.1 Raw Material Inspection of cherry	Lots of different types of off flavours	Training Standardized cherry receival criteria – colour / maturity Foreign materials – rocks sticks leaves doggy do does	CQP	All people who inspect are trained	Whoever is inspecting is trained	At point of sale or before processing	Visually	Before sale or processing	Grower/ supervisor	Immediate: Reject the load Resort (hand sort) the load Preventative: Retrain the person Retrain the pickers in the garden / plantation	Review of cherry receipt records By: head man/ factory manager /coop chairman / extension worker	Cherry receipt book
				All cherry in inspected against the standards and meets the standard Foreign material levels are within the specification	All cherry is inspected against the standard	At point of sale or before processing	Visually	Before sale or processing	Grower/ supervisor	Immediate: Reject the load Resort (hand sort) the load Preventative: Retrain the person Retrain the pickers in the garden / plantation Change payment arrangements for pickers		

Step / Input	P1		P2	P3	⇐ P4 ⇒					P5	P6	P7
	Hazard	Control Measure (6)	CP Type (7)	Critical Limit (8)	Monitoring (9)					Corrective Action (10)	Verification (11)	Records (12)
					What	Where	How	When	Who	What & Who	What & Who	
2.3 Pulping	Winey flavour Too acidic Off flavour Low acidity	Calibrate pulper	QP	Pulpers are calibrated to owners manual requirements	Pulpers are calibrated	At the pulper	Visually	Before each pulping day	Pulp operator	Immediate: Stop pulping and calibrate Repulp where possible Pass on to ferment where possible Reject (nipped) Preventative: Training of pulp machine operator Ensure pulper Calibration SOP is undertaken each day	Review of records Level of nipped bean rejections	Calibration record
2.4 Parchment floaters	Fermented cup Dirty cup	Remove floaters	CQP	All floaters are removed	No floaters remain	Fermenation tank	Visual	Before	Grower / operator	Immediate: Reprocess	Absence of off flavours at cupping	Grower processing record
2.5 Fermenting	Fermented cup Grease coffee	Rubbing test Sun drying	CQP	Each batch passes the rubbing test	Each batch passes	Fermentation tank	Feel	48 hours until acceptable	Grower / operator	Immediate: Further fermentation	Absence of off flavours at cupping Colour assessment	Grower processing record
2.6 Washing	Fermented cup Dirty cup	Rubbing test Remove floaters Fresh running water	CQP	Each batch passes the rubbing test All floaters are removed	Each batch passes No floaters remain	Wash tank	Feel Visual	24 hours after washing starts Before	Grower / operator	Immediate: Further washing	Absence of off flavours at cupping	Grower processing record
2.7 Soak	Uneven cup									Immediate: Preventative:		

Step / Input	P1		P2	P3	⇐ P4 ⇒					P5	P6	P7
	Hazard	Control Measure (6)	CP Type (7)	Critical Limit (8)	Monitoring (9)					Corrective Action (10)	Verification (11)	Records (12)
					What	Where	How	When	Who	What & Who	What & Who	
2.8 Ground drying and hand sorting	Earthy cup Musty cup Rio flavour Physical contaminants	Location & controlled access Hand sorting Store inside Ventilate while keeping inside Raised beds where possible	CCP /CQP	Drying site is secure (either fence or site is attended) Hand sorting at least once	Site is secure fenced or attended Hand sorting completed	On-site	Visual	During all of process	Grower / operator	Immediate: Repair fence Remove sources of contamination Re-sort to reject contaminated portion of parchment Preventative: Maintain fences Ensure enough people to attend site Retrain sorters	Absence of off flavours at cupping Raw Materials inspection at next stage	Grower processing record
3.1 Raw Material Inspection (parchment arrives at the dry factory)	Off flavour Poor colour	Sample and assess for moisture content - rub test and bite test Colour and FM assessment Approved suppliers – know where the parchment came from Specifications – number of permissible defects – colour charts Staff well trained in inspection of incoming RM	CQP	All incoming parchment is tested and meets specification Only source from approved suppliers Only approved staff can purchase / receive parchment	All parchment meets specification Parchment is from an approved supplier	Factory door	Visual and or moisture meter	Before purchase	Buyer or representative	Immediate: Identify and segregate Down grade if applicable Dry if appropriate Regrade after processing Preventative: Retrain receiver Review specifications Review supplier status	Absence of off flavours at cupping Down time to repair or rest equipment	RMI record

Step / Input	P1		P2	P3	⇐ P4 ⇒					P5	P6	P7
	Hazard	Control Measure (6)	CP Type (7)	Critical Limit (8)	Monitoring (9)					Corrective Action (10)	Verification (11)	Records (12)
					What	Where	How	When	Who	What & Who	What & Who	
3.1 b Raw Material Quality characteristics assessment	Off flavour Poor colour	Cupping assessment	QP	Selected parchment is tested against end product specifications	Parchment characteristics	Factory	Visual / taste	Before purchase	Buyer or representative	Immediate: Identify and segregate Down grade if applicable Reject Preventative: Retrain receiver Review	Customer complaints	Sample record
3.10 Selection, blending and re-bagging and labelled for outturn	Blend does not met customer specifications	Sample/ blend sheet to meet customer specification								Immediate: Preventative:		
3.12 Containerise	Contamination of load with taints and off flavours	All containers are cleaned, dried and aerated by approved suppliers of transportation services Inspect containers prior to loading Traceability on previous use of containers.								Immediate: Preventative:		

Process steps identified between 4.1 and 4.6 (shipment) are not included in this HACCP AUDIT TABLE and would be required to included and completed to enable the application of the table in any commercial application of this plan.

Supporting Schedules

Critical Limit Validation

Step/Input	Critical Limit	Validation Details
Pesticide usage	All pesticides are used according to label rates or under permit from govt agency	Health Dept MRL's DAL European Union / CODEX

Product: Arabica Coffee (green bean)

Verification Schedule – (CCP's & CQP's)

Step/ Input	Description of What is to Inspected / Tested	Type & Test Inspection Method Used	Frequency	Record Source	Verification Completion Date	Person Responsible	Signature
2.2	Pesticide applications	Residue Analysis of Green Beans	Random Consignment FOB	Analysis Lab Report		Export manager	