

Quality and Ethical Sourcing among Smallholder Coffee Producers in Papua New Guinea

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Abstract

In order to participate in the emerging speciality coffee market, there is a requirement for traders to implement third party certified quality assurance systems to verify that appropriate practices to protect the environment and worker welfare have been followed. This paper explores both the opportunities and impediments associated with the introduction of ethical procurement systems in the Papua New Guinea coffee industry. While remoteness and inaccessibility supports sustainable production systems, without a significant improvement in the way in which smallholder farmers process their coffee, price premiums in the long-term cannot be justified. Poor infrastructure, high costs and the high likelihood that collaborative marketing groups will fail present additional impediments.

Introduction

Consumers today are becoming increasingly conscious of the need to promote sustainability. This emerging paradigm captures consumers growing concerns about the long-term sustainability of global food production systems, the depletion of natural resources, greenhouse gases and climate change, pollution and the destruction of wildlife habitats. Concurrent with this, is a growing concern for the manner in which our food has been produced. This includes such aspects as food safety and the adherence to prescribed religious practices, worker welfare, child labour, non discriminatory working practices and rewards commensurate with effort. For others, it also includes the humane treatment of animals and appropriate livestock husbandry.

Generally speaking, ethical consumerism is about using purchasing power to make the world a better place (Lewis, 2006). Consumers want to see food companies becoming more ethical, caring and compassionate about the product, the consumer and the world we live in. However, consumers are not the only drivers of the demand for more sustainable food production systems. Consolandi, Innocenti and Vercelli (2009) report that there has been a sharp rise in Corporate Social Responsibility (CSR) to upgrade the ethical standards of firms beyond that which is required by law. CSR refers to a business philosophy that aims to create a better society and a cleaner environment (European Commission, 2001). Being very large, high-profile organisations, most food manufacturers and retailers are very sensitive to any criticism or exposure by the media, lobby groups or from their customers. Consequently, most either have or are in the process of establishing one or more third party certified quality assurance systems to ensure that the food is safe and that prescribed labour practices and environmental management guidelines have been followed. However, Browne et al. (2000) adds an additional dimension, arguing that ethical trade is primarily concerned with the trading relationships between the developed and developing worlds. Ethical trade is a development tool, often supported by NGO's as a means of facilitating the entry of disadvantaged Third World producers into modern food markets.

Coffee is one of the world's most widely traded commodities. In 2009/10, over 134 million bags (60 kg) of coffee were produced of which 97.5 million bags were exported (ICO, 2011). With consumption estimated to approach 130 million bags, coffee prices have steadily increased over the last twelve months. While coffee consumption in much of the developed world is stable, per capita consumption in the emerging economies is trending upwards, fuelled by the global diffusion of a café culture. The most significant impact of the café culture has been a marked increase in the demand for specialty coffee. These superior quality coffees, which often offer unique cup characteristics, have most often been grown at higher altitudes under ideal climatic and soil conditions (Giovannucci and Ponte, 2005).

However, in order to achieve a premium price, there is a parallel requirement for these specialty coffee chains to introduce third party certified quality assurance systems that focus not only on the desired product attributes, but also include various environmental and social criteria. Reynolds (2009) reports that the market is “booming” for sustainable coffees with desirable social and ecological traits. Organic coffee is the most popular sustainable coffee, with sales of 72,000 tons per year. A further 52,000 tons of certified Fair Trade coffee is consumed each year. Some gourmet coffee companies use Fair Trade certification along with organic, shade-grown and other labels such as Rainforest Alliance or the Smithsonian Institute Bird Friendly coffee to satisfy consumers demand and to convey their coffee’s multidimensional profile.

Confronted with the need to maintain a positive image or at least to avoid negative publicity, many large corporations have also established their own quality labels, the most notable of which is Starbucks’s CAFÉ practices. Furthermore, private labels for responsible, sustainable and/or ethical coffee are rapidly expanding their combined market share (Ruben and Zuniga, 2011).

This paper will explore both the opportunities and the constraints associated with the introduction of ethical sourcing in the Papua New Guinea coffee industry.

Coffee Production in Papua New Guinea

Papua New Guinea (PNG) currently produces around 1 million bags of Arabica coffee per annum. Coffee is the second most important agricultural export crop in PNG, earning 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 as their major source of income (Batt et al., 2009).

In PNG, coffee is produced by three groups: smallholders, block-holders and plantations. Over the past ten years, the contribution made 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 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.

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 (Batt et al., 2009). 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 directly 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 exporters, who then blend, bag and transport the coffee to Lae, where it is subsequently re-packed into bulk shipping containers for export. In this generic 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 only five roasters controlling 54% of the world market, traders and exporters have little countervailing market power.

For those smallholder growers close enough to deliver cherry to a wet mill on the same day of harvest, or where the wet mill arranges transport to collect the cherry, the wet mills, most of which are affiliated to an exporter, can produce coffee not dissimilar to the plantation grades. At this level, the key difference between that coffee which is destined for the generic market and that which is destined for the specialty market is the more consistent means by which the 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, buyers invariably require their suppliers to institute various quality assurance programs. Currently, the most commercially significant quality assurance system operating in PNG is CAFÉ Practices. Introduced by Starbucks, CAFÉ 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. 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 (SCS nd). 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.

Through such mechanisms as Fair Trade and Organic, it is also possible for smallholder coffee growers to enter the specialty market. 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 also preclude the use and purchase of inputs. As a result, such “natural” coffees, with appropriate certification, may readily find a niche market. Although organics is the most rapidly growing segment of the market, it commands at best only 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 Coffee Industry Corporation (CIC) reports that organic coffee receives a price premium of at least 32% over the generic Y grade (fob Lae)(Dambui et al. 2006). However, the value of the premium is very much dependent on: (i) the quality of the coffee itself; (ii) the overall price level in the market; and (iii) the customer to whom the coffee has been sold.

Additional value may be extracted by pursuing registration under one of the Fair Trade labels. Like the organic movement, the Fair Trade initiative authenticates the product, but does not actively trade in it (Wheeler, Kufinale and Alu 2003). Fair Trade aims to provide smallholder coffee producers with an opportunity to negotiate better terms of trade and to extract higher prices from roasters. Under Fair Trade: (i) the roaster (or buyer) must facilitate access to credit for up to 60% of the value of the contracted coffee; and (ii) the purchasing price must be fixed in accordance with the standard conditions of trade set by the Fair Trade initiative. Fair Trade has established a minimum price when coffee prices are low. This is currently set at USD 1.21 per pound. When prices fall below this level (for example around USD 0.60-0.80 per pound at the beginning of this decade) growers received a considerable premium. However, when prices are above this level, registered growers receive a Fair Trade premium of USD 0.15 per pound. Of this, USD 0.05 goes to the growers and 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 certification adds a further premium of USD 0.15 per pound, providing a total premium of USD 0.30 per pound for coffee that has both Fair Trade and Organic certification.

Impediments to Ethical Trade

PNG currently supplies the majority of green bean as a generic Y grade coffee at a discount ranging from USD 0.05 to 0.18 per pound (Batt et al., 2009). 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 generic to the specialty coffee market. On the demand side, the specialty segment of the market is expanding. 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; (3) the annual costs of auditing and verification; (4) the need for functional collaborative marketing groups; and (5) on-going financial and technical support from the trader or exporter.

Smallholder processing

In the 2007 calendar year, certified Organic and Fair Trade coffee accounted for 3% of PNG green bean exports, with 26% classified as Organic, 57% as Fair Trade-Organic and 17% as Fair Trade (Dambui et al., 2006). While

there is much debate about the extent to which the market for both Organic and Fair Trade will continue to increase, there is an opportunity for more 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 Fair Trade will ultimately fail. In coffee supply chains, quality is ultimately determined by the cup characteristics: taste, body and aroma. As many of these characteristics are intangible until the parchment is processed, most smallholder growers seem largely unaware of the impact that improper processing and handling may have on the cup quality.

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 (CRI, nd).

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. 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, the quality of parchment is assessed on a number of physical parameters such as: colour, odour, moisture content and freedom from trash and defects. According to an overall assessment of the sample(s), most of which are very subjective, the parchment will be classified and the growers and or roadside traders paid the prevailing market price. Ideally, as cupping is the most critical component of the quality control process, processors should take a sample of the parchment and dehusk, roast and taste it. However, as the quantity that the mills receive from individual smallholder growers often amounts to only 1 or 2 bags, it is simply not practical. At the roadside, equipped with only a set of scales, traders have no capacity to identify and segregate the better quality parchment and hence, most smallholder coffee farmers perceive that there are few incentives to produce better quality coffee.

As both Fair Trade and Organic growers use similar processing systems to those used by producers for the mainstream generic Y grade coffee, customers are likely to complain about the inconsistent cup quality and markets will be lost. Lewis (2006) similarly describes how, if Fair Trade is to become mainstream, producers must overcome consumers' perceptions that product quality is low. However, higher prices do provide both the means and an incentive to overcome these issues. 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. However, 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 their coffee gardens and in many instances, they have had to manually carry the cherry some distance. Unfavourable weather conditions can make it difficult to sun dry the parchment. Enclosing wet coffee in sails on the ground for extended periods of time can result in moulds and in the most severe case, phenolic coffee. Furthermore, there is a high likelihood of product deterioration through poor and inappropriate storage in the home (smoke damage), for parchment is to most growers, the major means of providing cash to meet anticipated household and social expenses.

Fortuitously, by following well established best manufacturing practices, it is possible for smallholder cherry to be processed to the same standards as cherry derived from the plantation sector. On a per kg equivalent basis, the prices received by smallholder growers selling cherry are 35% higher than the prices received by growers selling parchment (Batt et al., 2009). In addition, those growers selling cherry do not incur the costs of either transport or processing, as most wet mills collect the cherry directly from the farm or some designated collection point. However, despite the higher price paid for cherry on a per kg basis, most growers seem unable to calculate the added value.

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. However, the key constraint is time, for the cherry must be processed on the same day of harvest. Ordinarily, the wet mills will only purchase cherry within a radius of 20-30 km from the mill, depending on whether the road is trafficable to trucks.

In a market that is currently constrained by a growing shortage of coffee, given that most of the coffee in PNG is sold under the terms of the European Coffee Agreement, traders and exporters face significant penalties if they are unable to deliver coffee to their customers on time. Keen competition between the wet mills to secure the smallholder growers cherry is driving the price upwards, but it is also resulting in a marked increase in the incidence of cherry theft. Stolen cherry is generally of poor quality, for when strip picked, it contains a higher proportion of under and over-ripe cherry. Processors buying poor quality cherry will find it difficult to achieve a premium price in the specialty market, for the cup quality will inevitably be compromised. Unless cherry theft can be curtailed, there is evidence to suggest 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.

Furthermore, there has been a marked increase in inter-firm trading between coffee growers. Those growers selling cherry to their neighbours are more often the smaller growers. Many of the larger growers to whom the cherry is sold are registered growers under one of the many schemes operated by traders and exporters. Under their generic quality assurance program CAFÉ Practices, Starbucks require all their suppliers to be registered as a means of providing traceability, thus providing a means of verifying that the social and environment conditions have been met. As various incentives are payable to the exporter, a proportion of which is transferable to growers, depending on the level of registration achieved, it is in the growers best interest to sell as much cherry as possible.

Issues associated with certification

Within each of the ethical 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 members of their extended family 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. Furthermore, it is not unusual for school children, particularly during the vacation period, to assist their parents in harvesting the coffee, often without remuneration.

As the majority of smallholders practice mixed 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 Fair Trade certification. Furthermore, where chemicals are applied, there are

problems associated with the disposal of containers and even the storage of chemicals will prove problematic, as 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. Considerable time, costs and support is required to establish and maintain these groups. Leadership is critical and needs to come from the growers themselves rather than to be imposed from outside. Within each of these groups, practices and procedures must be followed and any product which fails to meet the prescribed standards must be excluded. Under Fair Trade, the group must be able to show that it has democratically decided how to invest the Fair Trade 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 is required in agronomic practices that prevent erosion and the subsequent contamination of waterways and streams; the appropriate application of chemicals and the responsible storage and disposal of containers; and the provision and use of protective equipment (gloves and masks).

While achieving Fair Trade certification takes from 3-6 months, Organic certification takes from 2-3 years (Batt et al., 2009). As smallholder growers are motivated primarily by price, it is necessary for traders and exporters to pay above market prices in order to secure the growers' coffee during the transition period. Furthermore, the growers themselves are unable to pay for the annual costs of auditing and verification. Even for Fair Trade, inspection costs up to AUD 500 per day plus airfares and accommodation. Because of the remoteness and the large number of growers involved, the process often takes considerable time and effort.

At the wet factory, and at considerable cost, processing lines often require 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.

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 a commensurate increase in scale. This is best achieved through the formation of collaborative marketing 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 (Murray-Prior, Sengere and Batt, 2009).

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. 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.

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. Not unexpectedly, collaborative marketing groups cannot function without good management, a willingness among the members to work together, and mutual trust and respect.

Financial considerations

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. Even if growers can be encouraged to save a greater proportion of the income generated from the sale of coffee, under the prevailing social system in PNG this will prove to be difficult, as 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, but they are also signalling their intention to enter into a long-term relationship.

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 (2002) 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. Historically, as farm gate prices have declined, smallholder coffee growers have allowed their 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. 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 coffee. 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. Even when prices do rise, a household will only harvest as much coffee as they can carry and process in a day.

Institutional impediments

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 illicit cherry. 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.

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 being able to pay the growers on delivery for either the cherry or parchment that is supplied. At a community level, the lack of infrastructure includes the lack of water and electricity and in some communities, the lack of appropriate roads to transport the parchment to dry factories.

However, it is also evident that there is a significant cultural difference between most smallholder farmers, the plantation managers and exporters (Murray-Prior and Batt, 2007). Most of the large plantations, processing factories and export operations are managed by expatriates whose cultural backgrounds are vastly different to the clansmen. With only a limited understanding of the dynamics of the world coffee market, many smallholder growers believe that they have been taken advantage of by traders and exporters. However, there is evidence to suggest that smallholder coffee growers in PNG receive between 68-80% of the fob price (Lae)(Batt et al., 2009).

Conclusions

While it is possible to move more smallholder coffee into the specialty/ethical coffee market, the generic market should not be excluded. 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, exporters will divert such coffee from the specialty market into the generic Y grade market to recover some of the costs.

Even where a smallholder coffee grower may choose to sell their cherry directly to a wet mill, the need for an alternative route to market is also 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. 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. Consequently, there are some very strong social and economic drivers supporting the retention of two parallel coffee supply chains in PNG.

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