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INNOVATING SUSTAINABLE COMPETITIVENESS SINCE 1992

Papua New Guinea:
Strategic Assessment
of the Coffee Sector

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Abstract: Coffee is one of PNG's most important crops, involving about a third of the population. Yet it is neither sufficiently remunerative nor efficient and overall production trends have declined for a decade. This strategic review identifies and prioritizes the key activities that are most likely to directly improve the performance and sustainability of the PNG coffee sector.

Its intrinsic production, processing and transport conditions mean that it is unlikely to be competitive in the provision of commodity-grade coffee. Instead, its best opportunities lie in the growing global trends toward quality and differentiation. The limited incentives available for producers make it difficult for any policies to influence production and thus exports. Advances will require more than public initiatives and should focus on private sector participation.

Research indicates four key areas of focus that will realistically leverage the most improvement in producer livelihoods and their sustainability: a) Institution building to provide producer group strengthening, market information, and sustainability initiatives; b) Extension and training that is demand-driven and performance-oriented; c) Finance for productive investments, including for those outside the typical scope of formal banking; and d) Infrastructure directly affecting the quality of coffee and its efficient marketing.

Keywords: coffee quality differentiated, sustainable, certified, small producers

Acknowledgements

It is always a challenging experience to assess the best strategic policies and investments needed to further the multiple objectives of a national coffee sector with its broad scope, diverse constraints, and the sometimes conflicting desires of different stakeholders. It is only with outstanding cooperation and participation that such an endeavor can be undertaken.

Therefore, our appreciation is extended to the Department of Agriculture and Livestock (DAL) for its guidance and support. To the many stakeholders in research, extension, production, co-ops, processing, and exporting that kindly shared their insights and valuable experience (see list). Thanks to the World Bank team, especially Marianne Grosclaude and Patrick Labaste for thoughtful comments and suggestions designed to get the best results possible from our field missions and reporting and to Peter McCrea, William Mandui and Tanya Tokaplen and for their tireless support of our efforts to fit in as many fruitful interviews and discussions as possible. We are also grateful for the excellent collaboration of Mr. Ricky Mitio (CEO) and the members of the Coffee Industry Corporation (past and present) whose open sharing of information and their commitment to improving their own efforts on behalf of the coffee sector helped to make our time in the field much more productive. Finally, we must thank the European Union's ACP program that generously supported the research and strategic process.

Executive Summary

The overall objective of this strategy document is to identify and prioritize the key activities that are most likely to directly improve the performance and sustainability of the PNG coffee sector.¹ It is designed to focus on the core issues rather than to be a comprehensive assessment of the sector.

Coffee is one of PNG's most important cash crops, in part because it involves about a third of the population in its production, processing and sale. In the Highland provinces it is a mainstay of the local economies. However, coffee production and marketing are inefficient and not as remunerative as they could be. The production trend for the last decade indicates a clear decline that is cause for concern. Despite its socio-economic importance, coffee has undergone an overall deterioration in quality and now both incomes and exports are at modest levels. The current sector situation is characterized by the dominance of smallholders that account for 85% of the supply and a limited large farm sector that is struggling.

PNG's intrinsic production, processing and transport conditions mean that it is unlikely to be competitive in the provision of stock commodity-grade coffee. Instead, the best opportunities to improve PNG's competitiveness, as well as coffee sector incomes, may lie in the growing global trends toward differentiated goods. As such, a key aspect of the proposed strategy is to give priority to quality and differentiation² rather than the previous policy to focus on more production. Accordingly, this report recommends that PNG coffee focus primarily on a quality approach. In fact, PNG could significantly improve its position in higher value markets well beyond the current 5% of coffees exports that are differentiated.

The limited incentives available for producers make it difficult for any policies to influence production and thus exports. It is important to note that while only a limited segment of producers will be able to respond to the demand for such differentiated coffees, the change will benefit many more producers indirectly. As more coffee moves into differentiated channels, there may be an increasing demand even for average coffee and as PNG's reputation grows, so will demand for its coffees and perhaps the prices paid as well. An important part of a PNG strategy is to improve livelihoods. Therefore, reducing the relative costs of production by improving producer access and increasing their returns to labor that can result from a focus on higher value coffees, can positively affect the livelihoods of the sector overall. Indeed, if the incentives of improved access, reduced costs, and better remuneration for improving quality actually reach producers, it is very likely that such incentives can lead to a greater level of production.

¹ This report seeks to build on the CIC's long-term strategic plans. Sustainability here is defined as the sensible and balanced handling of the important economic, environmental and social factors so as to help ensure not only the short-term but also the long-term viability of the sector.

² Differentiation here means to distinguish coffee from conventional or generic commodity coffee by a variety of means including particular quality characteristics, specific estate or geographic origins, and certifications for meeting sustainability processes.

With that vision in mind —of differentiation and improved incomes— this report suggests a strategic approach that coincides with most of the CIC's Strategic Plan for the Coffee Industry in terms of its intent to improve public-private extension, increase associativity³ in the sector, focus on demand driven research, and to improve incomes. This report also reflects the evolution in thinking within the CIC and the much of the PNG coffee industry away from the past objective of simply increasing production towards more emphasis on PNG's advantages in areas of differentiation and sustainability and quality.

Any serious advance in the sector will require structuring fair partnerships with private sector interests that are active in coffee. This will be vital in order for producers to effectively interface with processors, exporters, and even larger farms for services such as market access, extension, and the capacity-building to meet emerging standards and certifications.

To achieve the priority goals, sector activities must prioritize interventions, ensure that they are valid for producers and the industry, and focus on those that will realistically leverage the most improvement in producer livelihoods and their sustainability. Current research clearly indicates four key areas of focus:

1. *Institution building*, not only within CIC but also other entities that contribute to the sector and especially with producer associations in areas such as group strengthening, market information, and sustainability initiatives.
2. *Extension and training* that is demand-driven, cost-effective, and performance-oriented.
3. *Finance* for productive investments, including for those outside the typical scope of formal banking
4. *Infrastructure* directly affecting the efficient marketing of coffee and its quality

To achieve differentiation, in a manner that increases sector revenue and producer sustainability, will require some shifts away from a fragmented and not transparent sector toward greater associativity via groups and cooperatives and a commitment to offering sector participants practical quality and sustainability choices based on improved information. It will also require greater private sector participation and a commitment to results-oriented capacity building and extension services. A new vision of PNG as a leading source for high quality and sustainably produced coffees for the world's finest markets can have valuable returns not only to the sector itself but also for PNG's international reputation.

³ Associativity here means group-level cooperation to achieve particular goals such as procuring inputs, joint marketing and seeking technical assistance and extension services.

Measures

Papua New Guinea Kina (PNK) 2.49 per 1 USD in June of 2009

1 PNK = 100 toea

1 Bag = 60 kg

Glossary

ACIAR	Australian Centre for International Agricultural Research
ARDSF	Agriculture Research and Development Support Facility
AIGS	Agriculture Innovative Grant Scheme
AusAID	Australian Agency for International Development
CAFE Practices	Coffee and Farmer Equity
CCGS	Coffee Credit Guarantee Scheme
CIC	Coffee Industry Corporation
COSA	Committee on Sustainability Assessment
DAL	Department of Agriculture and Livestock
DCI	Department of Commerce and Industry
EHP	Eastern Highlands Province
EIRR	Economic Internal Rate of Return
FAST	Financing Alliance for Sustainable Trade
FPDA	Fresh Produce Development Authority
FLO	Fair-trade Labeling Organization
IISD	International Institute for Sustainable Development
NADP	National Agriculture Development Plan
NARI	National Agriculture Research Institute
NATTB	National Apprenticeship and Trade Testing Board
NDB	National Development Bank
PNK	PNG Kina
PPAP	Productive Partnerships in Agriculture Project
PRAP	Participatory Rural Appraisal and Planning
SCAN	Sustainable Commodity Assistance Network
SP	Service Provider
SSSPP	Smallholder Support Services Pilot Project
VEW	Village Extension Worker
WHP	Western Highlands Province

Papua New Guinea

Assessment of the Coffee Sector and Options for Strategic Investments

Daniele Giovannucci and John Hunt

1. Objective

Why

In some of the poorest and more remote regions of Papua New Guinea (PNG), farming is the dominant activity and coffee is the most popular and widespread cash crop in several of the provinces. It provides cash income through a large part of the year and its transportability favors even outlying communities. However coffee production and marketing are inefficient and not as remunerative as they could be. Coffee is a main focus of PNG's National Agricultural Development Plan and The Coffee Industry Corporation (CIC) has accordingly designed a broad sectoral strategy outlining many of the important focal areas for investment. This report offers a roadmap of key options for the sector and the proposed programs such as the Productive Partnerships in Agriculture Project (PPAP) that could work with the CIC and help to address the most important constraints facing the sector in order to leverage long-lasting improvements that are integrated into the highland communities and the existing business networks that bring coffee to market.

What

The overall objective of this strategy document is to build on the CIC's Coffee Industry Strategic Plan 2008-2018 in order to identify and prioritize key activities that are most likely to directly improve the performance and sustainability of the PNG coffee sector. It has been formulated in collaboration with many key stakeholders and informed by a number of sectoral studies (see Bibliography). A further measure of consensus was achieved during the Coffee Sector Strategy Workshop held at Goroka in June of 2009 with about 4 dozen stakeholders. The Workshop participants discussed 6 questions and the general findings of this report.

1. Access to Finance: Is it a critical issue? If so, what are the needs and how could they be addressed?
2. Infrastructure: Given limited resources compared to the needs, how could investments be prioritized? Who could work in partnership to finance those needs?
3. How can extension services be made more effective and better delivered?
4. What information is needed by stakeholders and how could it be delivered?
5. How important is capacity and knowledge of sustainability for the future of the coffee industry?
6. What can be done to support more and stronger farmer groups?

Led by the CIC and the DAL the Workshop concluded that a **“paradigm shift” was necessary to improve livelihoods and competitiveness in the coffee sector**. The workshop helped to focus some general agreement on ways to achieve those key sectoral objectives. These include 3 major themes:

- Improve producer livelihoods by focusing on value and product differentiation as key thrusts for bettering productivity and profitability.
- Strengthening key value-chains to meet the demand of different segments of the market will mean working much more with farmer groups and improving extension services,
- Institutional strengthening and sustainability must be integrated as primary components in any development plans in order to achieve better quality, greater differentiation and more certified coffees.

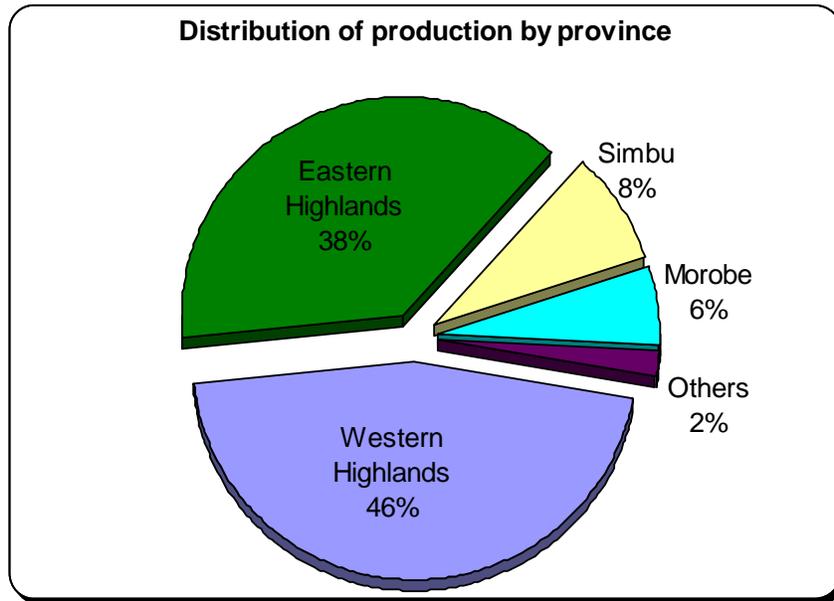
When

This strategy report looks toward the next five years, from 2010 to 2015.

Where

The proposed elements to be supported would be directed primarily to the main coffee producing Provinces, beginning with the Eastern and Western Highlands where 84 % of PNG's coffee is currently produced and also Chimbu.

Figure 1.1 Distribution of production by province (avg. of last 3 years)



Source: CIC Production data

Who

A number of projects and institutions could implement the recommendations of this report. In terms of targeting, an important focus is on the smallholders that are the mainstay of the sector. Yet, in order to be both effective and sustainable, it is vital to also include larger operators and the private sector enterprises that include mills, exporters, and entrepreneurs that can consistently deliver services to the sector as well as help it to gain access to markets. For efforts to have a lasting effect, partnerships must be developed, especially with local-level institutions. These include financial institutions, associations, co-ops, and NGOs that are involved in delivering services to producers.

2. Structure and flow of the Coffee Sector

The British first introduced coffee to Papua New Guinea (PNG) at the end of the nineteenth century. A phase of strong commercial growth began with a plantation orientation and primarily foreign ownership in the 1950s and surged significantly in the 1960s with rapid expansion from a few thousand hectares and the start of a shift to smallholder plots. After independence in 1975 the plantations found the business increasingly less viable both politically and physically and many shrank, were subdivided, or gradually stopped functioning. Many of those that remain are in precarious conditions with some very notable exceptions. The fragmentation of the plantation sector and government re-distribution created smaller “blocks” of 20-30 hectares with mostly domestic ownership. Today, PNG’s production is dominated by smallholders and exceeds 90,000 ha.

Table 2.1 PNG coffee basic participants

PNG coffee numbers	
Small Producers	397,772
Blocks (ca. 20 ha)	250
Plantations	60
Wet Mills	47
Dry Mills	57
Exporters	15
Roasters	5

Source: interviews, CIC 2008 data, and National Census 2000.

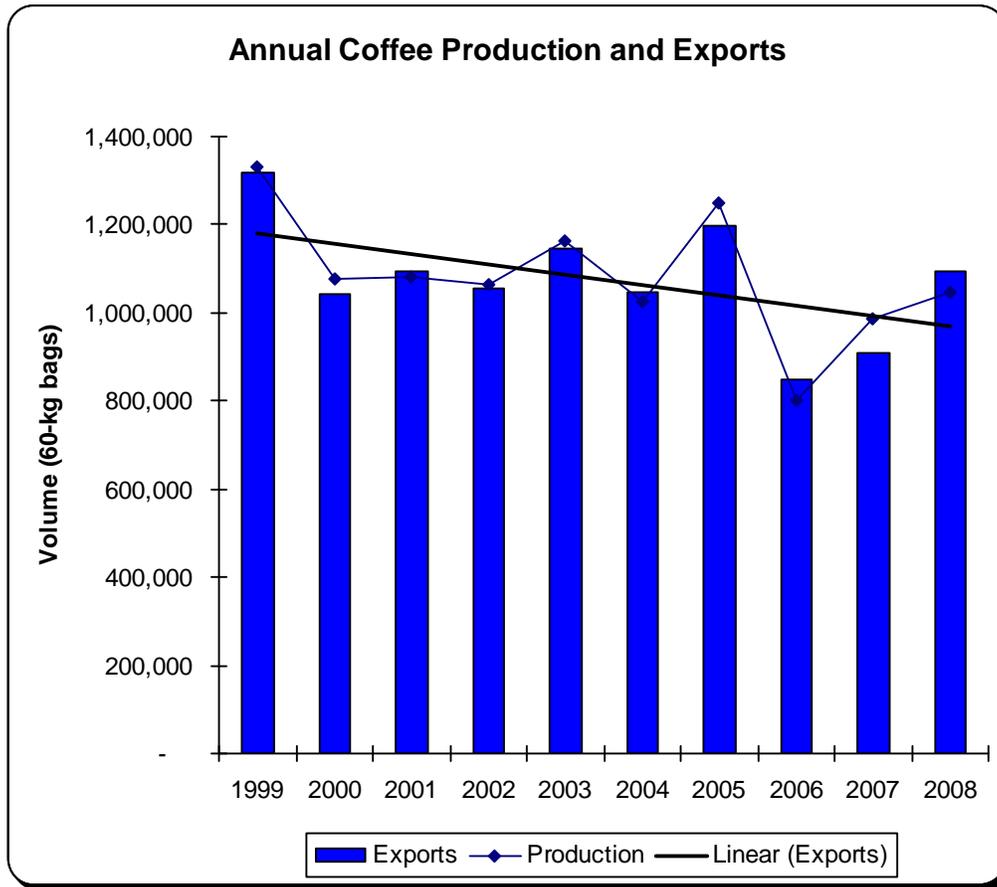
Figures for plantations list only those that are operational

Coffee is arguably PNG’s most important cash crop, primarily because it is not a plantation crop and involves a third of the population⁴ and a significant part of the total labor force⁵ in its production, processing and sale. Though coffee export revenues consistently top US\$ 100 million, it is second to Palm oil in export revenue. On a global scale, PNG is a modest exporter ranking 13th among 39 Arabica exporters and also shipping very small amounts of Robusta. It annually exports nearly all of its production or close to a million 60 kg. bags. In the most recent three years (2006-08) it has averaged 951,000 bags. This represents a modest decline from its 10 year average of 1,076,000 and its all-time high of 1.34 million bags.

⁴ Ca. 400,000 farmers with average family size of 5.1 persons or over 2 million persons in a population of ca. 6 million.

⁵ PNG labor force estimated at 3.6 million in 2008

Figure 2.1 Annual Coffee Production and Exports



Source: CIC Production & Export data

The majority of PNG coffee is used in blends and despite some desirable characteristics is generally fungible with the Other Milds category of coffees that includes dozens of producer countries. The small percentage (4-6%) that is currently differentiated or sold as Specialty coffee is often considered to be a good value for a high quality coffee. Most industry experts interviewed for this report note that this figure could be considerably higher.

Smallholders (those with less than 2.5 hectares) produce about 86% of the coffee, block holders (those with 2.5 – 30 hectares) and plantations (over 30 hectares) provide the remaining 14%. Some stakeholders estimate that production could easily double simply by improving yields and efficiencies on the existing land area; most industry experts disagree. While theoretically plausible, such growth is unrealistic in the near to mid term. The most viable option, based on the current and near-term outlook, is to maximize the returns from the existing capacity. With better incomes the impetus to increase production may emerge. Therefore, more coffee could be an objective in the long term but more coffee won't happen without first having a focus on better coffee incomes in the near to mid-term.

Production

PNG's coffee production systems are not homogenous but the majority are operated by smallholders who tend to the crop on a part time and as-needed basis. Only larger farmers employ formal labor and most farmers conduct their own farm management or may receive modest unpaid assistance from family or clan members. The majority invest very little regular labor. This keeps costs of production low but also diminishes the necessary cultivation and maintenance required to improve quality and yields. Field observations and some reports indicate that many are content with their labor/yields ratio and modest yield increases may not be worth the extra labor required. The typical production systems therefore present a challenge to formulate incentives for smallholders to take advantage of improved methods delivered by extension services.

Cost of production is relatively high and exacerbated by cost of marketing (mostly getting cherry to market). One report notes that costs are substantially higher -- harvest labor being the main distinguishing factor -- than similar farming systems in Sumatra, Lao PDR, and Kenya.⁶ Most of the production is conducted in a rudimentary manner and without regular application of inputs. When inputs are applied, the most common is basic fertilizer either from natural or synthetic sources.⁷ The quality of synthetic fertilizer is often not discernible as accurate original packaging or labeling may not exist. In most cases, fertilizer is applied opportunistically and rarely in accordance with the results of soil testing. Herbicides are also used on some farms. Evidence of dangerous application methods is common and raises concerns for worker health and environmental sustainability.⁸

Few farmers utilize other basic low-cost cultivation practices such as using nitrogen fixing plants as soil cover, composting to maintain fertility and tilth, and pruning for improved yields. Production improvements are also constrained by aging tree stocks and very low levels of maintenance. Few farmers practice rotational tree replacement whereby small portions of the farm are annually renewed to ensure more productive trees without the heavy losses associated with overall farm renewal. Most new planting materials are drawn from the existing seedlings that sprout on the farm, without the ability to determine much about their characteristics or quality.

Post-harvest stages of production fare similarly: typically rustic and with only modest investments. Few producers have pulping equipment, drying patios or drying racks. The result is a negative impact on quality that diminishes returns and pushes much of the smallholder coffee toward undifferentiated commodity status.

Since independence in 1975, coffee production has gradually **fragmented** from large plantation holdings to large numbers of smallholdings and converted some local producers from laborers to producer-owners. For many the transition did not come with adequate preparation or training in the business of coffee farming and has introduced considerable inefficiencies though,

⁶ See GDS 2008.

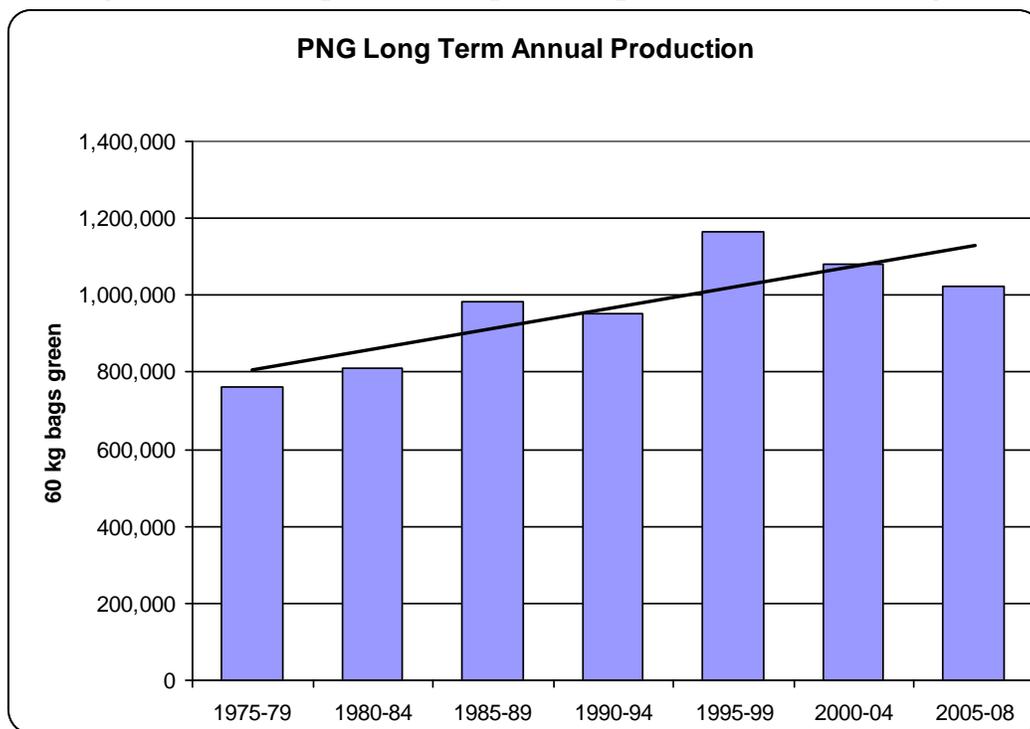
⁷ About 6% of Inu's (2007) recent survey of 500 smallholders applied fertilizer (cited in Collett 2008).

⁸ Typically applied with back-pack sprayers of from a drum by workers using no protective gear (gloves, masks, cover clothing) and are often barefoot thereby exposing themselves in multiple ways to toxic herbicides.

interestingly, not a significant decrease in production for 2 decades after independence. (See Figure 2.2) What has declined is the overall quality of exports. (See Figure 2.4)

As the distribution of production has consistently moved toward smallholders the expected (and in some cases reported) declines in national production levels are not evident (see Figure 2.2). The changes in long term production data when compared to the significant changes in composition of supply indicate that total output has not diminished as more smallholders have taken over the supply. What appears to have increased is the estimated size of land area under production so that productivity per ha. may be diminishing. However, the trend for the last decade does indicate a clear decline that is cause for concern. (See Figure 2.2)

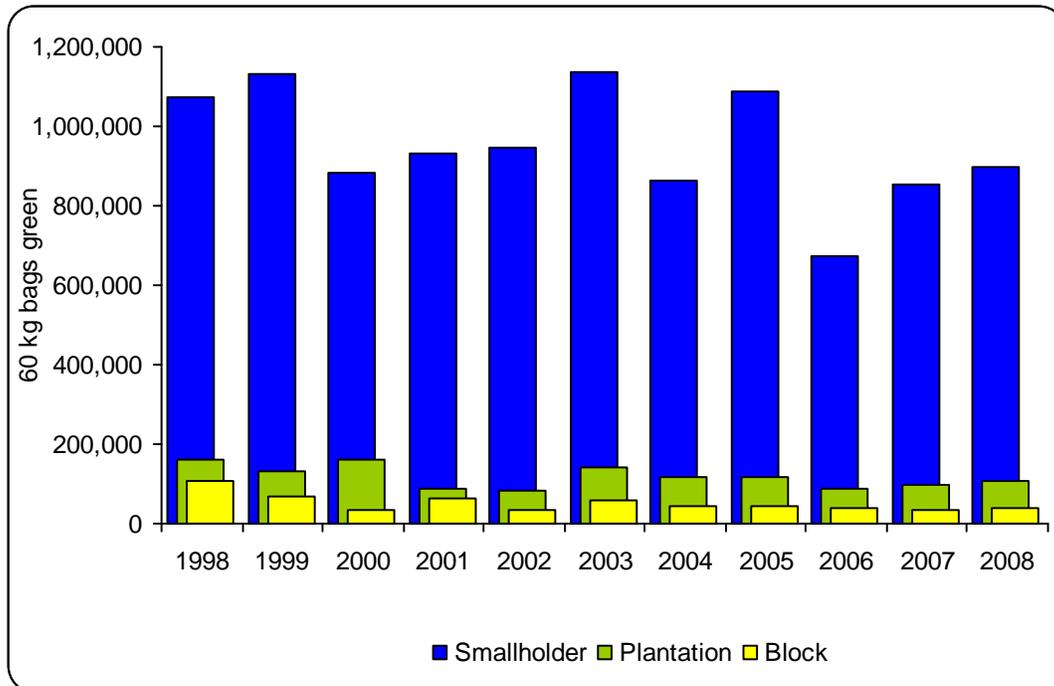
Figure 2.2 Coffee production: post-independence annual averages



Source: CIC Production data

Figure 2.3 illustrates the continuing change in the last decade as the share of large holdings has now somewhat steadied at about 15% of the total for the last 3 years. (See Table 2.2) In the face of recent higher input costs, including labor, it would be expected that larger operators that are dependent on these factors would have suffered most in 2007-08. Their cumulative output however, has not declined. This may reflect the indications emerging from the fieldwork that larger producers are in greater levels of indebtedness and that a number are in financial trouble.

Figure 2.3 Relative output of plantations, blocks and smallholders



Source: CIC Production data

Clearly, there are observable differences between some farms and others. The evidence available from the CIC, existing studies, and recent field visits do not support a clear understanding of productivity nor does this information allow a reasonably confident hypothesis for how the presumed explanatory factors (overall farm size, price incentives, distance to collection centers, asset base, or capitalization) affect results. For example, it is not altogether clear how much the difficulties of market access affect either costs (due to time/distance and security from predation) or productivity (due to unwillingness to invest or even to harvest). It is also not clear whether basic production skills are deteriorating though most reported observations suggest they are at low levels.⁹

What appears clear is that producers are significantly burdened by access costs, even if it is not clear to what extent. These access costs are primarily due to constraints in physical access (road infrastructure and security) and a ratio of coffee income relative to the effort required that is not contributing to an improvement in either the quantities available or the quality of the coffee. Any work on expected productivity levels would have to take both factors into account.

⁹ There is little evidence of systematic tree pruning, fertilization, and tree replacement activity.

Table 2.2 Estimates of producer farm size relative to production

Distribution of Coffee Production					
Size (ha)	Total area (ha)	Number of Farms	Production (green 60 kg bags)	%	Yield (green kg/ha)
0 – 2.5	76,000	397,772	810,000	86 %	640
2.5 – 30	5,000	250	38,000	4 %	456
over 30	9,000	60	98,000	10 %	653

Source: Author estimates using 3 year average rounding and CIC Production data

N.B: Listed for illustrative purposes only, yield calculations are questionable. Production numbers are known but estimates for land area and number of farmers are estimated by CIC. Not all lands classed as farms are fully productive and may thus diminish yield calculations especially for larger producers.

Productivity claims by some researchers ranging from lows of about 500 kg per ha. to more than 2000 kg per ha. for smallholders and circa 2000 kg per ha. on plantations are not supported by current field observations.¹⁰ While 2000 kg per ha. yields are certainly possible, these are unlikely to be near the average for larger farms. The average yield in typical smallholder settings is almost certainly well below 1000 kg per ha and perhaps closer to 500 kg per ha on average.¹¹ Current higher estimates may be reliant on calculations extrapolated from small samples. In order to effectively design projects and policy, further research is required to have a real understanding of these figures. The program of The Committee on Sustainability Assessment (COSA), if adopted, can address this and other necessary data issues. More on COSA in Annex 1

Quality and Prices

Quality is somewhat constrained at the production and harvest levels but it is primarily constrained by a combination of inadequate price incentives and post-harvest hurdles in the processing and transport of coffee cherry. Today PNG producers, selling parchment to mills or to exporters tend to receive about 60-70% of the listed benchmark “C” market price. This percentage is near the average for similar producers elsewhere. However, given that PNG receives a considerable discount on the benchmark “C” market for most of its smallholder coffee (Y grades) the resulting price is not always attractive.

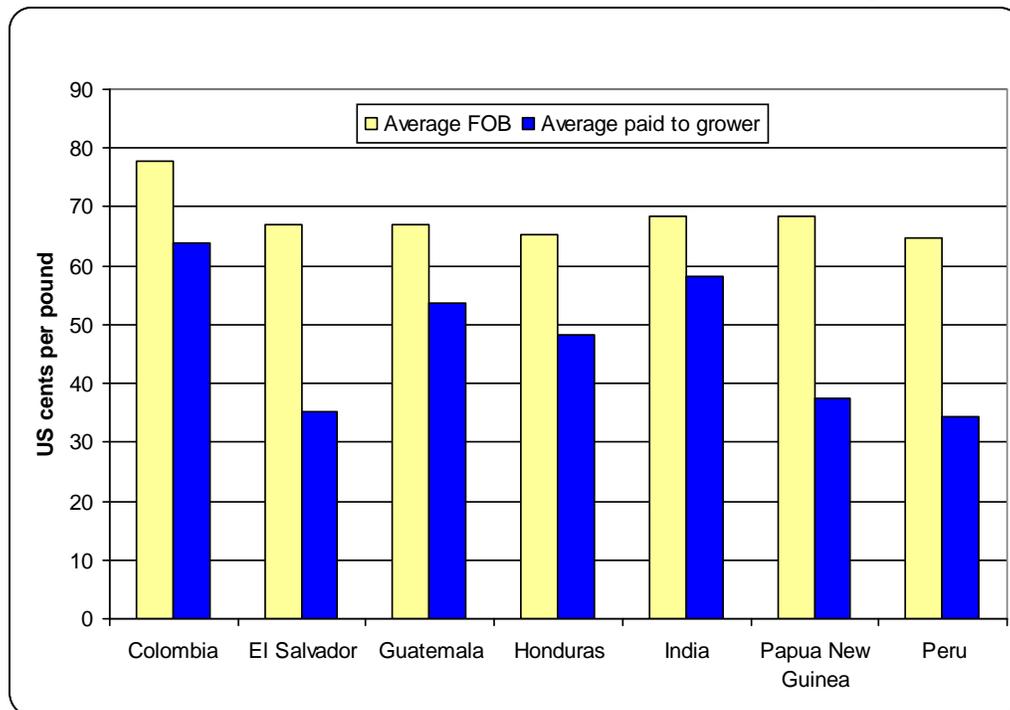
On the whole, smaller PNG growers have historically received prices that are in the range of those received by poor producers in countries such as Peru and only 59% to 70% of those received by producers in Mexico, Guatemala, Indonesia, India, and Colombia while the export prices received by PNG relative to these countries averaged less than 15% lower.¹² (See Figure 2.4). This could imply that post harvest costs are high or that exporters have good margins or some of both.

¹⁰ Collet, 2008 but citing work from 1989 and also citing Bourke and Harwood (2009) for their work up to mid-1990s.

¹¹ One of the longest working farm managers in PNG, currently managing 34 farms with 1395 ha of land, notes that their average yields are up to 1000 kg/ha. on larger and well managed farms.

¹² Comparing six year averages using ICO data sets from 2000-2005.

Figure 2.4 Differentials Grower to FOB (2000-2005 averages)



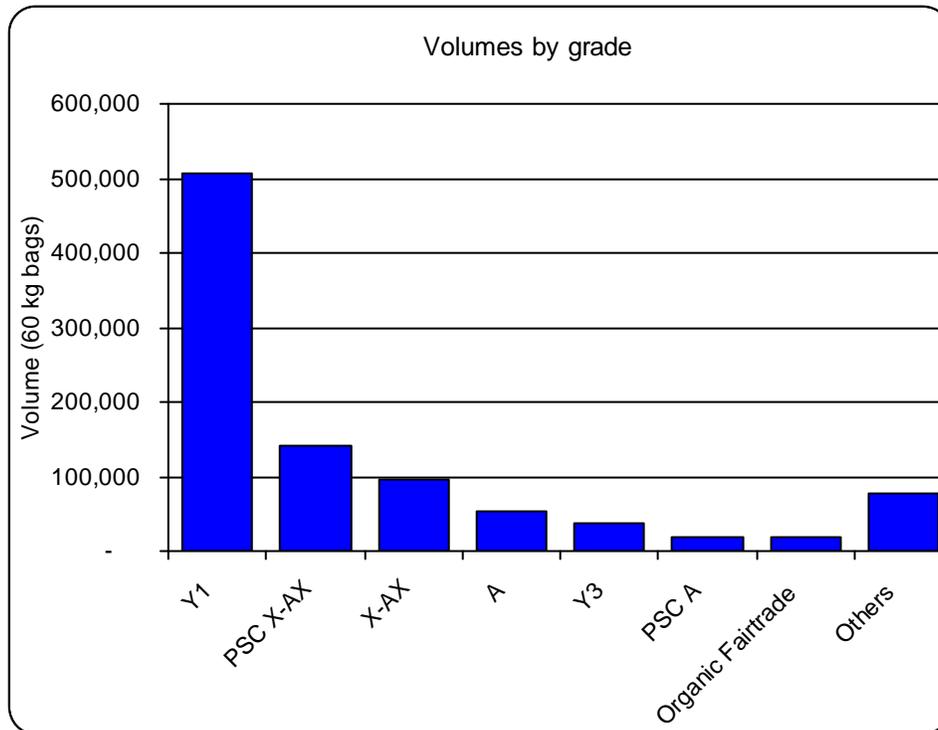
Source: CIC and ICO data

In the mid-1990s the better grades A and X accounted for about 25% of PNG exports¹³ the average of these grades a decade later was just over 12%. Recent higher prices and some renewed efforts appear to be reversing the decline. Most exports are of the fair quality Y grade produced by smallholders. (See Figure 2.5) While other smallholder premium grade PSC coffee has picked up some of the proportion that was A or X, this does not fetch the same premium prices and thus reduces the overall profitability of PNG coffee. The diverse grade combinations, more than in many countries, are not always easy to understand and can be streamlined if they are one of the barriers to transparency in buyers' dealings with small farmers.¹⁴

¹³ M. Wheeler report "Outlook for the International Coffee Market and Options for PNG" and data confirmed with CIC.

¹⁴ A half dozen classifications whose further combination of screen size, source, and defects can produce many more sub-classifications.

Figure 2.5 Quality and grades of production



Source: CIC data using 3-yr average (2005-08) classifications of exports

Robusta coffee

Robusta coffee is grown in small quantities in some of the lower altitudes. It represents about 4% of exports with USDA data indicating an annual average 45,000 bags in the last 5 years to 2008. Exports seem to have declined from the middle of the decade and are estimated at about 35,000 bags in 2008-09. The significant downturn in the largest exporter (Vietnam) has driven prices higher but this is expected to be temporary. As a varietal, Robusta is used almost exclusively in less expensive blends. The nature of the Robusta markets is such that they are oriented almost exclusively toward price. Attempts by the International Coffee Organization (Resolution 407) to improve quality were rejected by the industry in the world's leading Robusta producer countries: most notably in Vietnam. Competitiveness then requires having factors of intensive production such as: low-cost financing, input subsidies, irrigation, infrastructure investments, and mechanization or low-cost labor in order to achieve competitive productivity. PNG does not have any advantage in these areas and the NADP makes it clear that support to agriculture must be increasingly oriented toward private sector partnership and not toward subsidized production.

Currently, Robusta faces favorable market pricing but the increased investment occurring in the world's major producers (Vietnam and Brazil) is likely to mean a downturn in the price cycle. In such situations, Robusta producers must be able to weather the cycle because their production costs (primarily for various inputs) can put them in a high risk situation requiring government support as occurred in both Brazil and Vietnam. Finally, Robusta is typically sun-grown on clear-cut land with the accompanying environmental consequences. There may be select opportunities for Robusta growers in certain regions but these would require case by case

assessment (cost-benefit and risk analysis) and may not be the most fruitful focus of significant project interventions.

Motivation and incentives for smallholders

Though the importance of coffee as a cash crop varies from one agricultural system to another, one survey found that in many parts of EHP and WHP coffee is universally regarded as “significant” or “very significant”.¹⁵ Traditionally, coffee growers see coffee as a savings mechanism or as a rudimentary risk management tool. It is storable and thus used to provide ready cash for needs such as medical attention, socio-cultural events¹⁶, school fees or clothing as well as for food when needed.

Smallholder culture in the coffee growing areas is not necessarily responsive to purely economic or market demands. In some cases, producers only bring as much coffee to the market as required to satisfy immediate needs. The domestic raw coffee market is a mechanism used by smallholders to facilitate their livelihoods but only a modest percentage have the drive to produce and market as much as possible. The lack of correlation between changes in FOB market prices and selling levels may point to this reality.¹⁷ In many cases, social obligations and food production requirements are more important than expanding coffee. To alter the market situation requires understanding the motivations of producers and how they perceive the welfare benefits of this cash crop. For many, though certainly not all, the priority may not be to produce more or even better coffee if that requires considerably more labor or investment.

Producers seek to optimize, rather than maximize, their investments for coffee. These existing conditions appear unlikely to alter in the near future and may thus limit any large production increase in the near to mid term. PNG’s coffee sector development plans have included production increases for several years, but this is unlikely to occur unless coffee can significantly improve their livelihoods and keep risks low. To improve livelihoods from coffee, the most likely avenue of success is to refocus on **better coffee rather than more coffee**. The result can have 2 distinct sets of benefits. First, this will help to position PNG coffee as a quality origin that will eventually offer more permanent competitive benefits than the fleeting economic benefits of more production. In fact, more can be problematic when periodic global market saturations occur. Second, it can give producers greater remuneration with the same production or land area and reduce the need for physical expansion that not only requires more labor but also can risk creating tensions with neighbors.

Producer organizations

Achieving scale economies and improving both producer capacity building and marketing require some sort of effective organization. For most smallholders to get beyond the most basic levels of agriculture, associativity is critical. Associativity is essentially group-level cooperation

¹⁵ Survey ranking by Bourke *et al.* identifying 33 agricultural systems in Eastern Highlands and 14 in Western Highlands.

¹⁶ Important celebrations, funerals, marriages, etc.

¹⁷ CIC reports, cited in Collett (2008) indicate no correlation between change in FOB price and production from 2002-2007 though the analysis did not control for other factors or look at local market prices that may have been more or less elastic during the period observed.

to achieve particular goals such as procuring inputs, joint marketing and seeking technical assistance and extension services.

Such producer organizations have reportedly not been very successful in the past. Trust is one of the biggest issues. Like many agriculture sectors in many countries, the often-repeated cases of leaders stealing funds also occur in PNG. Addressing this is a prerequisite for any organization to survive. Regardless of the difficulty, organizations are a critical pre-requisite to significantly improve smallholder livelihoods and the competitiveness of the coffee sector. They must be strengthened with patient and persistent processes. One approach is to build on existing networks of trust (clan, church, etc.). Projects creating new groups risk high expected levels of failure when there is no pre-existing internal rationale for organizing.¹⁸

Apart from trust, limited management skills are the most common hurdle for effective organizations. Organization members lack understanding of their rights and obligations, their boards lack oversight capacity and even direction, and management has little expertise to fulfill the demanding needs of such a job while often also continuing to farm full time. Past failures to promote co-ops may not have adequately taken into account the socio-cultural dimensions of the 'big man' village models or the business realities faced by producers¹⁹ and their limited group management capacity.

As groups acquire these basic skills, they even influence events beyond their immediate borders. One highlands association with strong leadership and general support was able to negotiate a peace agreement between its neighboring warring tribes and bring them into the association.²⁰ Others have addressed critical labor shortages by organizing members and families to form working groups to help each other.

Training in personal skills such as communication and financial literacy has apparently made a marked difference in helping producers to better associate with a co-operative. The National Development Bank agreed to open microfinance funds to community based organizations that undergo basic training.²¹ One Australian Centre for International Agricultural Research's (ACIAR) project report²² notes that:

Significant impacts [were] achieved at the community level, where, through their participation in the training programs, smallholder coffee growers [came] to appreciate the importance of trust and social capital in facilitating the formation and on-going management of successful collaborative marketing groups. Through the Personal Viability Training, growers [came] to realize 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.

¹⁸ See, for example, Bingen *et al.* that rural organizations stimulated solely by new projects, without impetus from their own socio-economic rationale have a high mortality rate

¹⁹ especially the need for cash at time of sale by members requiring the organization to have significant operating capital in order to avoid side selling to others

²⁰ From experience of Monpi Sustainable Services, the outreach organization of Monpi Coffee in Goroka (discussion with Joeri Kwaij 2 April, 2009).

²¹ "NDB targets rural people" by Johnny Poiya in PNG Post-Courier, 15-06-2009, Pg. 9

²² ASEM/2004/042 project cited in Batt and Murray-Prior (2009), p.69

Producer Diversification

Smallholder farming systems in the highlands of PNG are well diversified, though not necessarily due to intercropping. A typical farming landscape will have, separate from coffee, several other farming activities: food crops, marketable vegetables, small livestock, and a variety of trees for timber, fruit and firewood. In some instances smallholders have expanded their activities to bee keeping and fish farming, flower production, and fruit growing. According to an FPDA survey, the average produce farmer (whose family is likely to also farm coffee) grows 4.7 produce crops for sale.²³ In some farming systems of EHP and WHP up to 30 different crops are grown.²⁴

Diversification can be a valuable component of risk management for a small producer and thus often merits consideration. This is particularly true where food security is a concern. However, it can also reduce the time allotted to coffee and reduce yields or quality unless diversification is well managed.

Until recently, smallholders were advised to grow coffee as a mono-crop with an upper story of Casuarina or sometimes Albizia shade trees. However, over the years, especially where there is pressure on land, smallholders in particular have used mixed cropping. Other shade trees (including fruit trees such as banana, pandanus, avocado, orange, guava and mango) have been mixed in with casuarinas, and now cover about 20 percent or more of the coffee area.²⁵ On a limited scale, ground nuts, beans, corn, sweet potato, and leafy vegetables are found as integrated crops, especially at the establishment stage of coffee gardens or where heavy coffee pruning has been done.²⁶ Repeated visits (up to 3 times per week) to tend vegetables allow a more regular inspection of coffee and a chance to deal with problems such as damaged fencing (allowing pigs to enter) or clearing weeds.

If indeed 2/3 to 3/4 of coffee gardens, according to the CIC, are still mono-cropped, this presents the possibility of expanding this mixed farming system. According to Paul McLaren little research has been done on intercropping.²⁷ A research project needs to be undertaken to identify the extent to which the systems now being adopted are successful at supporting high-quality coffee production and could be further expanded. Countries such as Mexico and Colombia have developed menus of intercropping options and methods to help producers get the most out of diversification. This sort of knowledge could be usefully adapted to PNG conditions with the help of the relevant PNG research institutions.

Produce and coffee share many basic requirements. Some technologies that are applicable to one farming activity can benefit another. For example FPDA is responding to farmers' requests by disseminating new technologies on pest and disease control that can also have an impact on the

²³ There is quite a diversity of nutrition as well as products. In addition to the staple crop of sweet potato, English cabbage, potatoes, carrots, lettuce and broccoli are now all important cash crops in the Highlands.

²⁴ Bourke *et al.* (1998)

²⁵ personal communication Fabian Api, CIC 14 April 2009

²⁶ personal communication A. Ramakrisna, NARI 15 April 2009

²⁷ McLaren (1999)

family's coffee plots. Similarly, NARI's readiness to develop a soil fertility program for coffee could benefit the other crops a family or clan grows (see Appendix 3). This will become increasingly important as food production pressure is now driving down fertility levels according to NARI. In the presence of diversified production systems it makes sense to increase cross-sectoral collaboration for areas such as resource and soil management practices.

Processing

Smallholder quality is perhaps the greatest hurdle in the processing arena. Hand-operated de-pulpers (some fitted with a small motor) are available but not in sufficient numbers for the more remote producers that are unlikely to get their cherry coffee to a wet mill within 24 hours of picking in order to preserve basic quality. Even when de-pulpers are available, keeping them adjusted and achieving the basic requirements for quality processing is not easy. Ongoing training, integrated with feedback from the supply chain, is needed until producer groups learn to manage the process well.

Reportedly a number of wet mills exist, even though a number are not functional and in some areas they are in short supply.²⁸ Reports indicate that many of the existing mills are mostly using antiquated technology. Older wet mill technologies, besides potentially reducing quality, are also notoriously polluting.²⁹

Considerable dry milling capacity in many of the key growing areas provides a measure of competition that benefits producers. It is unlikely that more are needed.

Infrastructure

Market-oriented infrastructure conditions are generally not good. In addition to mostly private equipment needs such as small scale de-pulpers and wet processing plants there are also infrastructure needs that could be considered public goods.. Access is a major issue for most producers since the majority are not near the very few all-weather roads that exist in the Highlands. The lack of necessary public goods in the form of rural roads offers a rationale for public financing as part of a development project. However, the costs of roads can be prohibitive.

To alleviate the costs of transport, innovative options must be explored. Some opportunities that are proposed in the final section include novel approaches that have not been tried in the PNG Highlands areas but that have functioned in other countries. Public-private financing could be arranged for investments such as draught animals to carry coffee (donkeys) or cable-gondola systems; both can be used for other hauling needs as well.

Domestic Markets

The CIC's regulations requiring licensed buyers to post prices clearly facilitate an increasing transparency in the marketplace. This is a useful way to make markets more efficient and to

²⁸ They do require a certain level of technical capacity and management thus are not appropriate in some situations.

²⁹ Traditional forms of wet processing involve high levels of water consumption (about 1m³ for 10 kg green coffee) and estimates of pollution discharges into waterways are equivalent to the unfiltered effluence of breweries and abattoirs.

provide more opportunities for smallholders to participate. Similarly, recently improved telecommunications in many rural areas have increased competition among buyers and reduced the costs to producers of discovering the price.

As in many countries, the smallholder dominated production is channeled via intermediaries to mills and exporters. Most passes through the hands of at least 2 intermediaries prior to reaching an exporter. This reflects both the lack of producer organizations and the difficult physical access to the market. There is general consensus that intermediaries are competitive and take a fair percentage of the value for their services. Plantation or larger producers supply exporters directly or even sometimes export themselves. Their political and economic situation, due to perennial land claim issues, violence and theft, is making many large plantations increasingly less viable.

There is no significant domestic consumption of coffee. Most is covered by Nestlé's soluble offering³⁰ and higher value products aimed at elite consumers, tourists, and expatriates. There are no official estimates of the size of the market but anecdotal evidence suggests that there is not much room for growth in the near to mid term.

International Markets

Shipping and port logistics do not improve PNG's position in its two primary markets: the US and EU. Reported costs are high due to distances but not considerably different than those of its competitors in Indonesia and Southeast Asia. Timing from dock is sometimes longer than from other regional ports due to less traffic but compares favorably with competitors in East Africa where delays of several weeks are not uncommon.

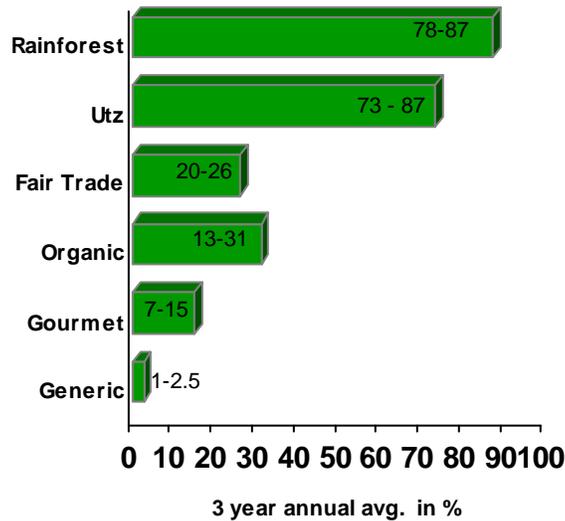
Most PNG coffee (Y grade) trades at a discount to the "C" market of the Intercontinental Exchange (ICE) where its lower price is due primarily to low quality expectations. However, much of the coffee is not actually tendered against the "C" and a number of exporters get prices well above the exchange for the better grades of coffees that they export particularly to traditional markets such as Germany and the US.

Globally, coffee demand has accelerated slightly averaging 2.1% annual growth in this decade to 2008 compared to 1.5% in the 1990s. However, disaggregating the figures reveals that in the last 5 years, the traditional markets for conventional coffee, of the sort produced in PNG, have been practically stagnant leaving farmers who produce more each year to struggle with market share.³¹ The high end of the market and the low end meanwhile have continued to grow well. Various differentiated coffees are growing at a rate much faster than the market average and increasingly taking not only market share but also greater proportions of market value. Figure 2.6 shows the range of annual growth overall for conventional or generic coffees over the past three years. This reflects the similar, but even more dramatic, differences of the past decade indicating the strength of this trend.

³⁰ made abroad but packed locally and called Niugini blend

³¹ Here including only that sort of coffee which PNG most produces and not including robusta for soluble processing. Soluble and some low-cost products continue to thrive particularly in emerging markets such as Asia, Eastern Europe and the CIS countries.

Figure 2.6 Global growth rates of different market segments for coffee



Source: D. Giovannucci calculations from various sources.

N.B. The numbers inside each bar represent growth ranges in US and Global markets (2005-07)

These differentiated coffees, despite their growth, only command a modest total share of about 11% of global coffee imports. In 2008 about 10.5 million bags of differentiated coffees were sent to consumer import markets. This is concentrated in three major consumer markets: US, EU, Japan. Gourmet coffees are the dominant category. Quantities marketed globally are now roughly similar between the major certified coffees. A very few private certifications such as Nespresso are growing fast and one, Starbucks, is becoming as large as any public certification in terms of volumes. Figure 2.7 illustrates the seals of the major public certification systems.

Figure 2.7 Public certification systems seals



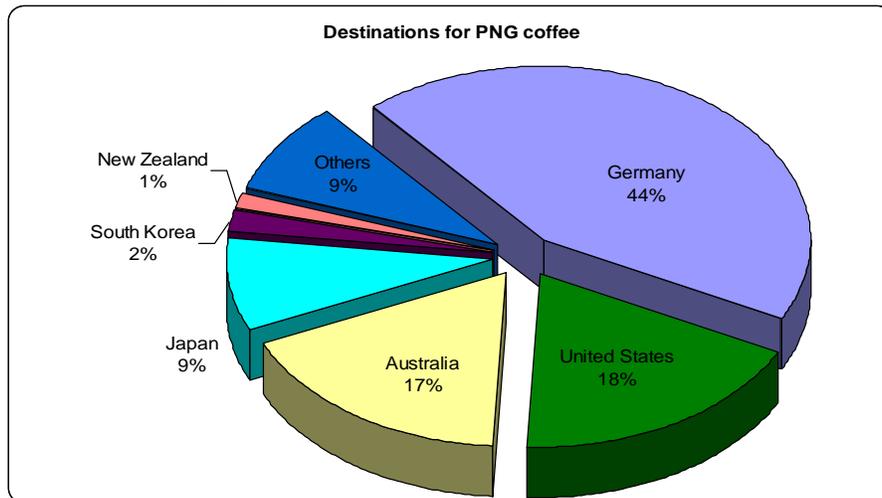
Certifications have now shifted to mainstream distribution channels and growth is expected to continue for some of the world's biggest brands. Kraft procures more than 50% of its Yuban brand needs as Rainforest Alliance with stated intentions to reach 100%. Sarah Lee is the principal buyer of UTZ Certified and its sales have grown sharply from 2,500 tons in 2004 to 20,000 tons (330,000 bags) in 2008. McDonalds now sells all four of the major certifications in several though not all regions. Walmart, the world's largest food retailer, has become a major retailer of certified coffees, now selling more than 10 certified coffee products and focusing mostly on Organic, Fair Trade and Rainforest Alliance certifications.

The important differences that are vital to understand are which type of certification is most appropriate for certain types of producers and producing regions: each has its distinct pros and cons. It is useful to note that while some of these differentiated markets have slowed somewhat since the beginning of the financial crisis, most have continued with their double digit growth in last quarter of 2008 and first quarter of 2009.

As noted in the SWOT analysis below, PNG does not excel in the factors of production (such as market infrastructure, low-cost capital, and low-cost productive labor) that could make it very competitive in the high volume-low value markets. It does however have some factors that could make at least a substantially greater proportion of its coffees competitive in the market for differentiated coffees. The other main route for adding value at origin is advanced processing such as roasting/packageging or soluble manufacture. However, neither of these are viable due to the considerable barriers to entry in the form of very high investment costs, a significant level of market competition, semi-saturation in markets for finished products, and tariffs on processed coffee in destination countries.

Industry experts in the differentiated segments generally concur about the unique values of certain PNG coffees.³² There are considerable opportunities in the gourmet market segments for high quality from PNG. Current PNG export destinations are all traditional markets where segmentation is occurring and many good prospects exist for such differentiated coffees. The U.S. is the largest buyer of differentiated coffees, particularly the A and X grades as well as the certified (sustainable) coffees. Germany is the dominant buyer of the most common Y grades and Australia is also a prominent client. These three account for ¾ of PNG’s total exports. See Figure 2.8

Figure 2.8 Destinations for PNG coffee

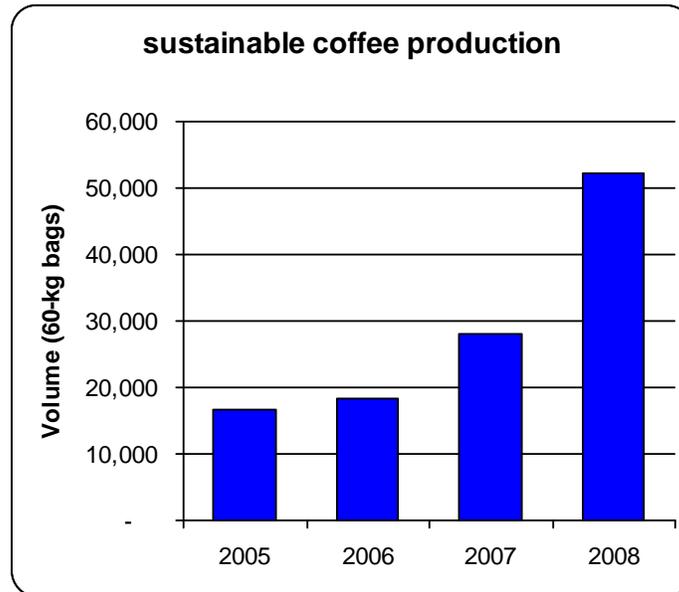


Source: CIC Export data using last 3 year average purchases

³² For example, Kenneth Davids has written about them repeatedly in his influential “The Coffee Review”, legendary copper Mary Williams’ praise (p.comm. June 15, 2009), and Starbucks now buys a substantial amount of PNG coffee.

Besides differentiation for quality (physical and organoleptic properties), PNG has considerable potential for more certified sustainable coffee. It now exports not only organic but also Starbucks C.A.F.E. Practices, Fair Trade, and soon Rainforest Alliance certified as well. Most mills and all exporters predict a significant increase in these coffees that currently account for about 5% of the total. See Figure 2.9

Figure 2.9 PNG certified sustainable coffee production



Source: CIC data

There may also be opportunities for single origins or Geographical Indications (GIs) expressed as the unique flavor profiles emerging from some defined regions and even single estates. GIs essentially create a brand name. This is one of the effective ways that producers can differentiate and thereby avoid the commodities trap. However, creating a successful IG is not easy, and a number of failed attempts prove that a GI is not a simple recipe for higher prices.

Leaders such as Colombia, Guatemala, Jamaica, and Hawaii are actively promoting their GIs as their primary form of differentiated competition. Others such as Costa Rica, Mexico, India, Indonesia, Rwanda, and Ethiopia are among those that are actively advancing in this arena.

PNG already has a start in this area. Sigiri is one well-known example and Chuave, Yonki and Evangoy are also possibilities worth exploring. A new book from the United Nations International Trade Centre covers this topic at length and could be consulted for further guidance on the options available and the pros and cons of undertaking Geographical Indications.³³

³³Geographical Indications - The value links between products and origins.2009 in publication from the United Nations International Trade Centre: Geneva. By Daniele Giovannucci, Tim Josling, William Kerr, Bernard O'Connor, May Yeung.

3. Enabling Environment

Roles of the CIC and NADP

The CIC has recently reformulated its strategic plans to better reflect the realities of the sector and to align with national priorities. Among its priorities, more complete stakeholder involvement is a key underlying issue for the CIC to address in order to be an effective steward of the coffee sector. The Corporation's aim now is to "encourage and facilitate collaboration and constructive competition among and between all stakeholders of the industry; and to encourage and facilitate public-private partnership and networking" (CIC Strategic Plan 2008-2018). In addition to its role in policy and regulation, its responsibilities include efforts toward maximizing returns for the coffee sector.

This report concurs with the CIC intention to address these issues through a number of actions and programs that include:

- *Demand-driven research* that responds to coffee growers' needs
- *Quality improvement*, including nursery development and better post-harvest wet processing
- *Demand-driven extension* via outsourcing to contracted service providers
- *Associativity*, through facilitating formation of collaborative groups or co-operatives
- *Facilitating better partnerships* through supply chain linkages between producers, processors and exporters
- *Sustainability* certification
- *Market information and transparency*

Key parts of the Strategic Plan 2008-2018 highlight a shift in focus toward more demand-driven approaches and more integration between public and private efforts including helping to link grower groups with exporters. The Plan also points to a more forward thinking vision that includes assessments of farmer needs, evaluation of comparative advantage and a stronger move into differentiated markets.

The CIC's Plan and the proposed PPAP reflect the main thrusts of the Government's National Agriculture Development Plan (NADP) that outlines the direction for PNG agriculture in the coming years. Specifically, the main NADP policy objectives (p34) are to:

1. Concentrate efforts in investment programs having potential for high economic returns in terms of production, exports, income and employment
2. Create an environment conducive for greater private and commercial sector participation
3. Ensure development of human resources for them to participate productively and improve general rural welfare
4. Ensure the long term sustainability of the natural resource base.

The NADP addresses coffee issues in its sections on the Coffee Production Indicators, the Coffee Development Program, and the Coffee Development Implementation Framework. The National Department of Agriculture and Livestock (NDAL) intend for the NADP to achieve a number of key development objectives in coffee. They include:

1. Improving the efficiency and international competitiveness of traditional export crops by raising smallholder productivity and product quality, and by lowering production and marketing costs
2. Assisting smallholder farmers to exploit opportunities for efficient diversification of the agricultural production base
3. Fostering a more balanced development of the sector to generate broad based rural income and employment, reduce rural poverty, maintain food security, and promote sustainable natural resource exploitation.

In addition to a new focus on public-private integration and rural sustainability, the NADP highlights how to better serve farmer needs to achieve competitiveness. For example, it states that research must aim towards meeting the requirements of the market yet consider local needs and that extension capacity needs to be expanded to improve production efficiency and quality (p52). One of NADP's priority programs is to improve productivity of tree crops by 10-20 percent so that it contributes to the five percent increase in GDP projected for the agriculture sector in the medium term development strategy (MTDS p. 95-99) requiring a mobilization and empowerment of smallholders organized into co-operative groups.

The broad thrusts of the NADP thus integrate sound ideas and allow for many opportunities. In order to operationalize this Plan, it is vital for priorities to emerge and a sequencing of investments to be determined so that Government, with its partners, can most effectively steward coffee development that is inclusive and sustainable.

Policy

Policymaking in general is likely somewhat hampered by the limited information and analysis that is available about the sector and a few complaints are registered in this arena by some of those interviewed. However, policies and regulations for coffee are generally reasonable and not on anyone's list of the most important sectoral problems. Sectoral taxation, at 10 *toea* per kg. of green coffee exported, is levied at the port. This is not onerous (less than US\$ 0.02 per pound) and compares favorably to other exporting countries. Other public functions such as research and extension are reasonably handled and appear to be on the progressive side, increasingly offering demand-driven components that reduce waste.

Some stakeholders note evidence of considerable gaps between general government policy and sectoral policy. For example, last year there were PNK 50-60 million of investments reportedly channeled to some members of the coffee sector by government without CIC participation or knowledge. The status and performance of many of these investments is still unknown. Furthermore, with different segments of the industry pursuing different priorities and with insufficient communication and coordination, the task of the CIC in areas such as coordinating a common export promotion strategy is made more difficult.

Increased sustainability is one of the CIC’s policy objectives. Management has expressed its commitment to offering public support to sustainability initiatives especially the market-oriented ones such as Organic, Fair Trade and Rainforest Alliance certifications. Though currently not budgeted in the work program, management has noted their desire to improve knowledge dissemination about the varied pros and cons of sustainability standards, facilitate certification processes, and perhaps include improved standards as part of the preferential selection priorities for coffee projects or co-operatives to be supported or provided with extension.

Public Security

Coffee cherry theft is so commonplace that the CIC has banned the unlicensed sale of coffee cherries, an act that may reduce theft but also is likely to elevate costs for smaller producers to bring their coffee to market via informal traders. Maintaining public order is not the role of the CIC and it is a sign of the seriousness of the problem that it has been forced to take some action to try and protect the interests of coffee farmers.³⁴ Rampant criminality is one of the most frequently cited negatives that constrain the sector at all levels and represents a failure of local and national policy that, given the current high rate of early school leavers, may only worsen. See Table 3.1. If it can be clearly demonstrated that with effective management coffee farms can be viable business prospects then more young people may be encouraged to make a living in their villages rather than drifting away to urban areas..

Table 3.1 Most frequently cited constraints

Coffee sector constraints, in order of importance
1. Roads and Transport
2. Coops and associativity
3. Security
4. Finance

Source: results of an informal survey by the authors in March 2008 with 88 diverse industry stakeholders. Listed in order of importance are those named by more than 1/3 as a major constraint

Research and Development

A number of the research proposals in recent years share the common shortcoming of proposing scientifically interesting work that is not interesting for producers to utilize.³⁵ Nevertheless, some of the current support programs do appear to reflect the actual needs of farmers.³⁶ The CIC’s

³⁴ Police authorities in EHP have provided training to CIC coffee inspectors, but the police force itself in that province is hampered in its duties due to re-deployment of 45 officers to other provinces while awaiting the rebuilding of burnt out police barracks (personal communication, David Seine, Acting Provincial Police Commander

³⁵ Personal discussions with Managers of CIC’s Aiyura Research Station; AusAID review of the Coffee Research Institute Project (1998) and CIC’s Coffee Research Institute Review ((SMEC 1998) noted in Collett (2008) were echoed by several of the stakeholders interviewed for this report.

³⁶ Agricultural Research Development Support Facility supported by AusAID is among the most prominent.

Participatory Rural Appraisal and Planning (PRAP) efforts are beginning to identify farmer priorities and the sort of knowledge they want. Any applied research has to take into account the main agro-ecological areas of production and tailor efforts toward appropriate cultivation and land management practices as well as the development or adoption of varieties that best meet farmers' needs.

The mixed farming systems of the Highlands are increasingly facing problems of sustainability. The 3% annual population growth is resulting in increased food production and substantially decreased fallow rejuvenation periods³⁷ thereby reducing land fertility. In some regions erosion is a problem as is the identification of companion planting materials that are low maintenance, fix nitrogen, increase organic matter, and improve soil tilth and water percolation. The productivity of staple food crops such as sweet potato is declining and the increased cost of purchased agrochemical fertilizers prevents smallholder access. While there is no clear information (one of the data gaps that make choices difficult), it is possible that soil fertility may also decline in the companion crops such as coffee. There is therefore a need for research to investigate the nutrient dynamics and requirements of mixed coffee-food cropping systems and to develop low-input innovative methods for maintaining soil fertility and sustaining production. (See Appendix 3)

Given PNG's rich environmental patrimony – a factor that can serve to drive its marketing and its linkage to tourism – the environment ought to be carefully considered. Small production is by default somewhat eco-friendly in terms of agrochemical contamination and the preservation of some tree cover and even forests in and around coffee areas. However, research policy does not yet appear to prioritize ecologically sound or biodiversity-sensitive considerations in production and processing.

Currently, even the CIC's own plantations still use limited mono-species shade cover and highly toxic agrochemicals that are banned by some firms and countries.³⁸ This can be readily altered to better fulfill the stated research and demonstration purpose of the CIC's own farms so that they can reflect smallholder conditions and thus better serve the knowledge or research needs of the majority of producers as well as those of larger farmers.

Extension

The majority of smallholders do not have the capacity, incentive or resources to adopt costly or complex management practices. Any improved technologies need to reflect these realities. They must offer appropriate agricultural practices that can be relatively easily adopted to improve quality and reduce risks through better natural resource management. Extension can go beyond teaching cultivation to also provide useful business skills or associative practices that improve incomes and strengthen producer participation in their groups and in value chains.

To provide specific support services and take account of literacy levels, training needs to be practical and village centered. It must comprise sequential modules to reflect seasonal farming

³⁷ Allen *et al.* 1995; Sem 1996; Bourke 2005.

³⁸ Paraquat, for e.g., is one of the world's most dangerous herbicides (part of the Dirty Dozen List). It accumulates in soils and is acutely toxic to humans and animals.

activities, have user friendly resource material, and be conducted by those who are familiar with the local farming system and socio-cultural norms.

After several years of development and refinement, the CIC's current extension model – endorsed at the April 2009 National Agricultural Council – complies with much of the above criteria. Its demand-driven extension services, contracted to the private sector, are very much in line with the interests of the National Agriculture Development Strategy. The private extension contracting approach taps into the prior experience of the hundreds of former CIC extension officers. Of the nearly 100 farmer groups in EHP that are participating or have participated in the process, 42 are now formal co-operatives registered with the co-operative society, and most of the others are expected to follow.

ACIAR reviewed various aspects of the CIC's Participatory Rural Appraisal and Planning (PRAP) extension model.³⁹ It found that:

- the PRAP process is the most appropriate means to engage collaborative grower groups, but opportunities exist to revise and improve the process still further' such as the need for service providers to give more attention to practical skills' training (p 74).
- as a result of the PRAPs, groups identified a number of social issues which had the potential to obstruct or to impede both the collaborative marketing groups and the subsequent delivery of the training programs. (p 49)
- PRAP process [was able to identify] many of the impediments to quality [that were] raised by smallholder coffee growers...(p 66)

The ACIAR report notes that the CIC has limited capacity to further the process and needs support. It recommends an alternative source of funding be sought to deliver the associated agronomy, coffee processing, and marketing modules to other collaborative producer groups. It further recommends that this training within the PRAP model should include a module to enhance personal skills in such areas as communication, conflict resolution and basic financial literacy – this sort of effort was found to facilitate more enduring relationships within the group and improve their individual and collective effectiveness.⁴⁰

Although CIC is yet to carry out its own full evaluations on the impact of the extension process, an economic appraisal done for the smallholder support services project shows that the Economic Internal Rate of Return (EIRR) was estimated at around 14 percent and that perceptions of the three key stakeholders in the extension process were positive (using a 1-10 ranking, with 10 being the most satisfactory): for farmers it was 8.0; for DAL staff it was 7.2; and for service providers it was 8.9.⁴¹

³⁹ noted by the ASEM/2004/042 project review in Batt and Murray-Prior (2009)

⁴⁰ *Ibid* p.72

⁴¹ SSSPP report in press

Table 3.2 Proposed changes to reduce costs and improve efficacy of CIC extension model

Activity	Present Situation	Proposed
PRAP		
Streamline procedure	CIC/ HQ micro-manages	Provincial committees to take over non-financial tasks
Facilitators/ report write up tasks	CIC + Service Providers	Service Providers
Time	3 weeks	1 week
Costs	Up to PNK3,500	PNK1,200
Extension project contracts		
Training to emphasize the practical	Partly	Fully
Contract costs, coffee production	PNK3,000	PNK5,000 ⁴²
Contract costs, financial management	PNK2,500	PNK2,500 ⁴³
Personal skills training	None	PNK1,000
Management		
Subcontracting PRAP and extension contracts to Service Provider (SP) associations, NGOs	Minimal	As much as possible
Evaluations, SP performance, impact of training/ lessons learned	None	Regular sampling
Storage of electronic data	CIC/ HQ	EHP at CIC/HQ electronically connected to Chimbu, WHP Mt. Hagen
ID photos of participants	Starting	Fully
Facilitate linkages of groups to coffee exporters (for sustainably certified production)	Minimal	More vigorously

Private and public sectors need to coordinate their extension and training activities to ensure each of their resources are best deployed. The private sector is playing an increasingly important role in providing support to groups of coffee growers. Information provided by five of the main coffee exporters shows that between them they have dealings with up to 19,000 growers. Of this number 13,500 reside in EHP and of these, 1,050 receive agri-inputs while only about 30 smallholders and four block holders receive direct financial support in the form of advance payments or loans. The expectation is that some percentage of those smallholders will supply the exporters loyally while most will not.⁴⁴

⁴² Increased costs take into account provision of sets of hand tools. Use of correct pruning equipment (rather than bush knives) is essential to maintain health of the coffee trees and provision of hand tools is in line with CIC's parallel rehabilitation program where hand tools are being made available.

⁴³ Service Providers engaged for financial management and bookkeeping contracts will now be required to also facilitate linkage of trainee group to credit agencies.

⁴⁴ For comparison purposes CIC contacts 5,000 growers through its current extension program, and this number will be boosted to 45,000 if extension is fully accepted under the first round of the coffee garden rehabilitation program in 2009 onwards.

Offering extension services, farming-related activities and socio-economic support could strengthen the relationships between buyers and producers. Such private enterprise initiatives are in the coffee sector's interest. They open up the opportunity for the participating groups to increase the quantity of coffee and to improve its quality. To take advantage of this approach, CIC could consider an arrangement with exporters to provide certain targeted and even buyer-specific extension services at a cost lower than exporters are likely to manage. This collaboration could be economical if it is done on a significant enough scale and combined with efforts to better organize producers and thus meet multiple sector needs.

Some efforts have been less fruitful. In order to increase coffee production, a consortium of coffee exporters has established a coffee nursery near Goroka and is offering smallholders seedlings at the cost of production prices. The uptake so far is not encouraging because many producers lack transport (at least 1,500 to 2,500 seedlings are needed to plant one hectare) or do not see the value of paying for seedlings when some can be found freely on their farms. More hands-on instruction and smaller, local, farmer-owned nurseries could overcome the resistance to improving the productive stock of trees.⁴⁵

Exporters are taking the lead in various other aspects of the industry. They are, for example, now seeing the importance of assisting growers in forming and maintaining groups to take advantage of certifications such as Fair Trade. Their leadership helps overcome the costs to smallholders of initial certification and of finding a market. The demand from exporters is projected to be strong so that these forms of collaboration can readily be expanded.

Some sector leaders have been lobbying for an innovative form of extension: that coffee to be included in the school curriculum. The CIC has now produced a set of teaching materials for upper primary and secondary schools on coffee farming; and the education department has developed a syllabus that guides students to taking up rural enterprises such as growing coffee. Dissemination is in the pilot stages and this could serve as a productive long-term investment for very little cost.

Land tenure

As much as 97 percent of the productive land is held under customary tenure. While tribal law and common property approaches need not be problematic (functioning in many cultures) the ownership situation in PNG is rarely clear and often contested. With few effective resolution methods, investment and transfer of land rights is often seriously impeded due to competing and often not readily apparent claims. The government has announced it intends to introduce new mechanisms to deal with land disputes. Only a small percentage of the land in PNG is currently registered to a specific owner.

⁴⁵ Nurseries are a publicly subsidized benefit in many producer countries. Farmers, perhaps a contracted VEW, can provide soil, maintenance, and labor while a project (CIC) can provide a template for a basic nursery, bags, and certified seedlings. Experiments to demonstrate the superiority of these seedlings *en situ* can facilitate uptake by local village producers if available at very low cost..

Finance

Formal financing for investment in production is uncommon for all but some plantations or larger farmers with assets. While there is certainly a call for such financing, especially to meet the needs of rehabilitating many larger farms, current conditions and past failures in this arena do not make this a palatable option for most financial institutions. This makes it difficult to rationalize a separate coffee industry credit facility or a guarantee fund linked with an entity such as the National Development Bank as proposed in the Coffee Industry Strategic Plan (Strategy 9/4). Creative approaches will be necessary to support large-scale rehabilitation and these will necessarily include private sector involvement.

Formal financial institutions have not fared well in PNG agriculture. The most recent effort: the Coffee Credit Guarantee Scheme collapsed due primarily to low repayment rates. Most of the industry agrees that producers often do not feel an obligation to repay loans to 'distant' agencies and that basic financial literacy does not exist. Such basic literacy is a pre-requisite to securing and repaying credit and conducting financial transactions.

Trade credit does exist but is also not common except from buyers toward select middlemen and producers with which they have had years of positive experience. In one notable case a buyer even holds some payments due to the producer in safekeeping for several months (with permission), therefore acting as a private savings service for the producer. On the basis of the savings record, the buyer is willing to lend an amount equivalent to the amount the producer has saved in the past. However, the trust implicit in such arrangements is relatively uncommon and the majority of producers can do no better than some short-term credit from intermediaries that expect the repayment (with usually high levels of interest) in the form of the coffee harvest.

Besides the sometimes onerous nature of these financial arrangements, they lock producers into seasonal cycles of indebtedness that prevent them from participating in organizations such as co-ops that could market their coffee. Co-ops rarely have the cash reserves to advance financing to farmers and find it difficult to even have sufficient operational financing to pay farmers for their crop upon delivery since many must wait to be paid by their buyers. When farmers fail to deliver their crop to the co-op, it risks defaulting on its commitment to deliver to the buyer.

While some buyers offer producers inputs (usually fertilizer and herbicides) on credit, this is very rare though some will purchase bulk inputs and offer them at their (lower) cost. A number of buyers do offer certain producers some extension services and several buyers employ full time extension agents to service loyal producers. Even so, it is clear that many, though not all, producers will seek the best price for their coffee and not necessarily demonstrate loyalty to their service providers at harvest time.

Financing needs for smallholders are often modest. A hand-operated pulping machine costs about PNK 1,000 (nearly US\$ 400) and 2500 seedling trees (required to replant one hectare at common local density) can cost about PNK 1500 (nearly US\$ 600). Nevertheless, these sums are well below the thresholds considered by commercial banks. There are however some sources for smaller-scale financing that could be appropriate for smallholders. These include the Department of Commerce and Industry's credit lines and retailers such as Nationwide Microbank, PNG Microfinance Ltd., and even the National Development Bank that has recently established a

micro-finance offering (from as little as PNK 500 using a group solidarity approach). Most formal operators have limited resources and presence in rural areas. Informal lending activities are quite common, particularly among clan and tribal members. This is vital since reports indicate that banking service fees for cashing checks or maintaining accounts can be costly.⁴⁶

One private scheme offers an option to larger farmers who lack financing (and perhaps skills) to operate successfully. It involves a firm with technical expertise and market contacts offering to provide farm rehabilitation, management, and marketing in exchange for a majority equity stake in the farm. Farmers receive a wage and, if and when the enterprise is profitable, a share of the 'dividends'. This serves to distribute the risks and rewards between the investors and the farmers. However, to function equitably such schemes require the utmost clarity between the partners' obligations, full transparency, and the option of effective legal recourse should either party not adhere to the bargain.

Social structures in coffee

The existing **social structures and market constraints are likely to restrict any large expansion of production** in the near to mid term. Quite simply, many small producers do not prioritize more coffee production and the incentives appear to be insufficient to alter that, given the price received for their coffees. Change is possible but is unlikely to be immediate and will require strong incentives.

Food production and social obligations clearly take precedent for most smallholders over the investment and labor requirements to significantly increase yields of coffee. While further improving their food security and income would be welcome, doing so by attempting to stimulate more production has been ineffective and may not be the most appropriate means.⁴⁷

The soundest strategy is likely to be two-pronged: improving technology for better productivity and quality without significantly increasing labor or the amount of land needed while also working to reduce costs of production and marketing. If this is done in an environmentally and socially sustainable manner and linked with private enterprise, especially mills and exporters, the sector should see a healthy improvement in its profitability and in its competitiveness and market reputation.

⁴⁶ Global Development Solutions (2008) notes that major commercial banks in the main producing area run out of cash and that farmers without bank accounts are charged as much as 10% of the value when cashing a check. For those with an account, the monthly service charge ranges between 2% to 3%.

⁴⁷ For example, PNG never met its previous NADP Planning target of 2M bags by year 2000 and in fact did not increase at all from its prior annual averages.

4. SWOT Analysis

The PNG coffee sector has some distinct assets to build on and yet there are important areas to be addressed if it is to improve. This section is not a comprehensive list of all the coffee sector issues. It builds on the earlier information above and is designed to provide a concise assessment of the key issues that are vital and point to where interventions can leverage the most impact.

Strengths of the Sector

PNG coffee is typically part of a **diversified** smallholder production landscape that spreads overall risk and reduces the danger of abandonment during periodic low prices or difficult times.

The growing conditions and available varieties facilitate the **potential for more high quality production**. Several noted quality-oriented buyers are actively increasing their purchasing of better PNG coffees.

A **good institutional governance** body (CIC) accomplishes general oversight, research and extension, and provides some sector transparency via its information and analysis. Policies, regulations and taxation are reasonable. Though generally respected, there is nonetheless room for improvement in its roles and effectiveness. (See Threats)

Weaknesses

Much of the coffee farming sector sees coffee production as a cash opportunity when that is necessary, rather than a professional vocation, and may therefore be less motivated to improve.

The generally **inadequate incentives for quality production** dampen the overall value and restrict the international competitiveness of the sector.

Expected **high production costs** are due primarily to low yields, prolonged harvests (labor), and high costs of marketing, though the actual costs are not well documented.

The sector does not have **adequate knowledge generation and dissemination** of the socio-economic factors affecting coffee and only modest dissemination of **market intelligence** including current (adjusted) prices. Basic data such as number of producers, land area and yields are not available.

It is difficult to access affordable **financing** including for farm inputs such as new planting materials, pulping equipment, and fertilizer.

Inadequate infrastructure, particularly access roads and good wet mills, not only increases production and marketing costs, but also reduces the overall quality of the coffees.

Strategic **policy planning** and investment is not fully integrated with the different sectoral institutions (CIC and private sector as well) and coordinated by them.

Opportunities

Some professional plantations and larger block holders serve as an **agro nucleus** offering market linkages and a demonstration effect for surrounding smallholders. This model has difficulties since smallholders cannot afford the production methods using external inputs and monocrop management of the larger, better capitalized holdings. However, it can facilitate improvements for smallholders who link with the more capable operators in terms of better quality cultivation, improved harvest and post-harvest processes, and marketing.

The increasing interest and efforts toward **smallholders organizing effectively** are being met by new services and training options from CIC, NGOs, Fair Trade proponents and others to address persistent reasons for past failures (see “Producer organizations” in section 2 above).

Levels of income can be reasonably increased through improved cultivation practices and tree renewal to improve the economic value produced per hectare with only modest extra investment.

Some of the larger **exporters act as service providers** engaging with some of their supplying farmers to offer supports that range from cultivation technology to inputs and credit.

There are some comparative advantages in the production of **high quality** and also **sustainably certified coffees** that can offer meaningful differentiation (i.e. Rainforest Alliance, Fair Trade, Organic, Utz Certified, and Starbucks C.A.F.E. Practices) and there is interest among exporters as well.

Some unique *terroir* and flavor profiles may provide an opportunity for the development of one or more **Geographical Indications** (see International Markets section above).

Threats

Theft in rural areas reportedly contributes to higher costs of production (frequent harvests and security) and considerable losses. Given the emerging macro scenario with mining operations siphoning security personnel and high rates of scholastic drop outs, the situation may worsen. Theft or public security is the most frequently cited constraint in the surveys done for this report.

Land tenure issues inhibit investment in coffee or other perennial crops, especially from outside the community. Purchasing or leasing land and its use as collateral for financing is made difficult with only a small percentage of the land being registered.

CIC by acting as a market participant and a market regulator diminishes its credibility as a neutral institution. Operating commercial farms or a marketing co-op may be a valid form of providing income or services but ought to be a separate operating concern.⁴⁸

⁴⁸ If it is to operate farms with the CIC name, it ought to at least operate them as state of the art learning facilities. A brief inspection noted a model of production that would not apply to most smallholders nor inspire them. The farm had relatively low yields, less than ideal tree conditions, and the use of unsustainable practices including the regular application of very undesirable agrochemicals such as paraquat.

5. Sector Strategy and Key Elements Project Design

This final chapter builds on the understanding of the preceding chapters to focus on the core issues and selective investments that would leverage the most results. To be effective and to have lasting impact, any coffee sector strategy in PNG must consider the needs of the average producer's multi-dimensional reality. One of the principal reasons noted for the limited success of growth and development efforts in the last three decades has been the failure to adequately take into account some of the specific conditions⁴⁹ and motivations⁵⁰ of the coffee sector. Many do not necessarily seek to maximize coffee yields and, as the CIC acknowledges, integrate other important priorities such as food crops and socio-cultural commitments into their decisions.

This report suggests a set of strategic approaches that coincide with the CIC's current "Strategic Plan 2008-2018" in terms of the intent to improve public-private extension, increase overall associativity in the sector, focus on demand-driven research, and to improve incomes. However, this report proposes something different in terms of market-oriented strategy. Looking toward PNG's advantages in areas of differentiation it seems clear that a 'quality versus quantity' approach will be more effective than the Strategic Plan 2008-2018 objective of raising production to 2 million bags per year. This new approach aligns fully with directions now being discussed internally by the CIC itself.

Any investments need to take into account PNG's competitive advantages, particularly to participate in the higher value segments of the markets. That will require a measure of re-orientation at several levels and not only building on the successes of the industry but also addressing some of the underlying impediments that have so far prevented PNG from achieving its potential. The private sector firms involved in farming, processing and exporting must be an integral part of any solution.

A **vision of the results achievable** over five years would necessarily be somewhat modest since it will serve to establish the necessary underlying framework for long term development. As such, it will need to be process-oriented as much as it is outcome-oriented. This approach may yield few spectacular outcomes such as greatly increased production⁵¹ but it is vitally necessary in order to build the capacity and the sectoral institutionality or groundwork on which coffee producers and the industry can thrive in the future. Improvement could be measured broadly as the 3 mutually supportive goals of: 1. Increased export revenue; 2. Improved livelihoods; and 3. Sustainability. Further key objectives are outlined in Table 5.1.

⁴⁹ For example a good portion of the coffee research had been focused on issues that were not a priority of smallholders who comprise 4/5 of the sector. These include the atypical monoculture and purchased inputs model.

⁵⁰ Nearly all of the 86 industry leaders and stakeholders interviewed note that farmers have their own, often distinct, priorities that must be considered prior to embarking on any project or intervention. This is echoed in several reports including one that states that after a decade of considerable donor support for coffee improvement systems that had little impact, it was noted that farmers were already previously satisfied with their existing coffee production system and less than 15% cared to adopt new techniques. (SMEC 1998; p.48).

⁵¹ overall exports increases of 5% are quite plausible with the proposed scenarios (that equates to 50,000 bags per year or nearly US\$ 8 million in incremental export revenue annually)

Table 5.1 Suggested Results Framework for the mid-term

Area	Result
General	<ul style="list-style-type: none"> ▪ Producer revenue share consistently averaging above 70% of FOB. ▪ Quality improvement of 15% as measured by export shifts upward at least one grade notch i.e. from a Y to a better grade
Institutions	<ul style="list-style-type: none"> ▪ Participatory policy formulation processes led regularly (at least bi-annually) by CIC with all stakeholder representatives substantively involved ▪ Information usefully customized to target audience (producer, co-op, trader, processor, exporter) and widely accessible ▪ Sustainability Management plan operating and informing sector of optimal sustainability choices leading to doubling of sustainable certification exports ▪ Groups including associations and cooperatives fostered so as to incorporate 10% of all smallholders
Extension and Training	<ul style="list-style-type: none"> ▪ Participatory public-private extension cost-effectively reaching at least 7% of farmers and avg.10% reduction in marketing costs or improvement in yields of participants ▪ Application of appropriate technologies (i.e. soil management and tree maintenance) among more than 50% of cooperative members receiving training ▪ Improved training for service providers granted on merit basis to well-performing extension agents, and scaled or graded to different levels of achievement-qualifications from village level to expert and accredited by National Apprenticeship and Trade Testing Board (NATTB). ▪ Monitoring and evaluation system effectively gauging the ongoing impact of training and performance of Service Providers
Finance	<ul style="list-style-type: none"> ▪ Established-improved microfinance services in coffee areas to reach x % of producers. ▪ Producer organizations trained in financial literacy/management and microfinance principles (90%)
Infrastructure	<ul style="list-style-type: none"> ▪ Market access costs/time reduced substantially (30%) for at least 40 communities not in close proximity to maintained roads. ▪ Quality improvements due to improved access to wet mills ▪ Quality improvements due to improved equipment (particularly pulping and wet mills) ▪ Environmental benefits resulting from eco-friendly equipment and environmentally sound methods (husk recycling, etc.) used by 25% of co-op members. At least five wet mills upgraded to low-water and clean effluent

Having a strategic impact on the sector will require more than a project it will require a commitment to a long-term process. Therefore, this report recommends prioritizing possible interventions and focusing on those that will realistically leverage the most improvement in producer livelihoods and their sustainability. Four prime areas of focus emerge:

1. Institution building

- market information
- producer groups and associations
- sustainability

2. Extension and training

- demand-driven
- cost-effective
- performance-oriented

3. Finance

4. Infrastructure

- directly affecting market access, efficient marketing, and quality.

This section offers outlines of each focus area.

1. Vital institutions

In the conditions of PNG, characterized by a difficult operating environment (lack of roads, limited know-how, etc.) developing effective institutions that can persist in providing support and services to farmers, even after projects close, could be the single most critical component of long-term success. At the forefront of course is the CIC. It has a basic structure to manage the sector but it could use support and capacity building in some key areas.

In addition to the CIC, a more local-level of institutionality is also necessary and that is likely going to be in the form of associations, NGOs or cooperatives. Many of these will need considerable support to achieve real functionality, transparency, and representativeness. Partnering with other experienced institutions for investments that range from trade finance (FAST) and technical assistance for certified sustainable producers (SCAN) to community-oriented animal transport (Heifer International - Women in Livestock Development), allows for a decentralized development to emerge.⁵² It is on these fundamentally localized structures that a lasting and equitable growth can occur.

- a. **Policy Planning.** The CIC's Strategic policy planning capacity must be integrated with other relevant sectoral institutions such as DAL and better coordinated with the private sector for more effective development. Better mechanisms to collect and integrate the views of the private sector and other important stakeholders could improve their currently limited participation in policy fora. More reliable information made available on such

⁵² These three non-profit NGO groups all are committed to creating lasting local capacity: FAST is the Financing Alliance for Sustainable Trade and SCAN is Sustainable Commodity Assistance Network. More on both in Annex 1

basic issues as productivity or costs of production would facilitate better policy choices; the sector needs a comprehensive National Coffee Census.

- b. **Efficient Resource Allocation.** The CIC has some monitoring and evaluation capacity but would benefit from support for an institutional analysis of its resource allocation in order to better apportion them to its priorities. For example, resources currently go to quality controls that may be more effectively achieved using simple risk assessment models wherein top exporters shipping to established clients and having no record of failures or deception could gradually be exempted except for random checks and thereby eliminate the need for the majority of the sample testing currently undertaken.⁵³ Conversely, there is only minimal capacity within the CIC staff to support co-op development due in part to limited resources for that area.
- c. **Information Flow and Trade Facilitation.** The CIC gathers a considerable amount of information as evidenced by its quarterly reports made available to the industry. However, its effectiveness as a source of knowledge could be significantly improved by:
 - modernizing the dissemination to more channels beyond print (electronic and media)
 - delivering it faster or on demand before it becomes dated (Nov 2008 report still not delivered in late March of 2009 and none of the info is on the website)
 - expanding the recipients (currently very limited) for at least some parts of its information such as market intelligence or trends
 - conducting polls of stakeholders to ensure that the information included is actually relevant to them
- d. **Fostering associativity and cooperatives** will likely require more than current CIC in-house capacity to source and manage the delivery of such necessary services. These include: organizational capacity, business management skills, participatory processes, conflict management, and financial literacy (accounting), etc. The actual delivery ought to increasingly be shifted into the hands of other skilled public or private agents ranging from NGOs and associations to private contractors.
- e. A **Sustainability Management plan** will make information available on many sustainability options and show the actual costs and benefits of adopting various sustainability initiatives such as Organic, Fair Trade or Rainforest Alliance.⁵⁴ It is important to facilitate the necessary sector capacity regarding: the pros and cons of different initiatives; the adaptation processes; and certification issues. The broad expertise of a COSA approach could be adopted to provide an understanding of sustainability and its mechanisms in order to improve stakeholder decision making and reduce the costs of adopting sustainability approaches.⁵⁵ More on COSA in Annex 1

⁵³ The top 6 exporters account for nearly 90% of total exports.

⁵⁴ For a sampling, see: Seeking Sustainability online at: <http://www.dgiovannucci.net/publications.htm#SeekingSust>

⁵⁵ The Committee on Sustainability Assessment (COSA) is a consortium of international organizations that works with national and local institutions to offer them a detailed grasp of producers' full costs and benefits involved in adopting diverse sustainability initiatives. It has developed approaches to measuring both direct and indirect costs and benefits of the sustainability standards and gauge them at not only their economic effectiveness but also at the social and

2. Demand-driven Extension mechanisms and applied R&D

In order to attain better coffees and improved livelihoods, PNG needs to invest in innovative and cost-effective mechanisms for extension and applied research. To be effective, such efforts must reach producers with the services that they are interested in and do so at an appropriate cost-benefit value.

The focus needs to be on:

- a. Identifying the relevant and desired applied research (not just in PNG) to bridge the gaps in vital knowledge for farmers
- b. Establishing a training system for public and private service providers that is rewarded based on their performance
- c. Adapting a low-cost extension delivery system for effectively reaching a significant number of producers

Applied research

Farm research must be collaborative with farmers and researchers developing, managing and assessing jointly the on-site trials and experiments. It is apparent that socio-cultural factors influence farming decisions as much as economic ones and there is not enough understanding of these. Thus, in addition to research on farming and natural resource management, further investigations into socio-cultural aspects of rural communities need to be considered. This is particularly relevant to understanding decision making processes, gender issues, and better identifying constraints and opportunities to developing functioning and sustainable co-operatives. In addition, some key areas should be explored further, particularly those cross-cutting into other sectors such as mixed farming with horticulture products. These can include areas such as appropriate intercropping or low-cost/low-labor methods of composting to encourage closed loop systems of fertilization.

Extension delivery system

There are several effective ways of providing extension support. Various private sector firms, particularly those with milling and exporting capacity offer some extension services to select growers. Organized grower associations can offer technical advice. Professional farms or nucleus estates can also act as service providers (i.e. Obihaka, Carpenter, and Sihereni). The DAL via its Provincial-District offices also offers some services to coffee farmers. The CIC is the main provider of coffee extension and has refined and tested several approaches in recent years. A combination of efforts and partnerships can leverage the knowledge and access that already exist so that the most appropriate approach is applied to each situation. What is vital is that extension services be demand-driven and performance-oriented with clear systems of ongoing M & E to determine effectiveness during a project.

environmental aspects as well. Its purpose is to foster the efficient uptake of sustainability methods and avoid poor choices where certain of these are inappropriate for farmers though that may otherwise not be evident until after years of development. See www.iisd.org/standards/cosa.asp

After several years of development and refinement of its participatory rural appraisal and planning (PRAP), the CIC's extension model satisfies some of the key requirements of an effective extension delivery system: it is **locally relevant and demand driven**. However it is still relatively expensive in its present form and so it is important to undertake measures to improve cost-effectiveness. Among the better options are:

- Applying the **streamlining and cost cutting measures** to CIC's demand driven contracting approach, outlined in Table 3.2 (above)
- Introducing the use of modified versions of the **Village Extension Worker (VEW)** model especially for less accessible producers
- Fostering **associations or co-ops** to take up some of the necessary interface with individual farmers thus making the participatory rural appraisal and planning process more effective and more efficient
- Developing more **collaborative actions between CIC and private service providers** such as exporters particularly in extension and training to more effectively reach a wider group and link producers to the market

Further field investigation will be necessary to more empirically determine the combination of approaches that are most effective. It will be important for extension services to increasingly move into the private domain in order to survive public resource constraints, however, there is likely to be an ongoing role for public intervention with the poorest producers. Taking into account the reported success of the VEW model used in other sectors, a modified coffee sector VEW program could provide a much-needed village based presence, even in remote areas. VEWs service their own and possibly surrounding communities, and provide regular reports in exchange for a modest stipend (FPDA offers about PKN90 per month – US\$ 35)). A recent NZAID external assessment survey noted that the program identifies respected farmers who provide an important and functional link between FPDA and the served community.

Training system for service providers

A cadre of qualified service providers and qualified VEWs could be trained in a number of topics that relate to coffee production and thereby be equipped to provide a relatively wide range of assistance in cultivation, harvesting, soil management and fertility. Several other themes have recently emerged as areas of training with value and high demand:

- **Financial and business management** not only for simple bookkeeping but also for the business management aspects of coffee production, processing and marketing.
- **Communication and conflict resolution** since conflicts between and within tribal groups can have a devastating effect on communities and economic development prospects and need to be addressed.
- **Natural resource management** and waste management practices that relate to coffee production and processing, in particular to waste water from wet mills.

Because **participatory rural appraisal and planning** is a key component of the contracting out process that ensures it is demand-driven, and since it can be more effectively carried out by

contracted service providers rather than CIC staff, a small group of qualified facilitators or service providers need to be trained in running participatory workshops.

The support for associativity, also suggested as part of an institutional support initiative, is an important component for extension work. Similarly, other social structures such as NGOs or church groups can be usefully integrated to reduce the lack of trust that plagues much of the sector.

Monitoring and evaluation is expected to be contracted out to assess both the training performance of contracted service providers and the eventual impact of the efforts undertaken.

One important area of endeavor remains largely unanswered: How can viable partnerships with private firms or nucleus farms best be structured in order for them to cost-effectively interface with producers for services such as market access, quality improvement, and capacity to meet emerging industry standards (i.e. traceability, Good Agricultural Practices and various certifications)?

3. Access to affordable financing

Both large and small operations need better financial services in PNG. Larger operators must hire labor and purchase inputs. Small and medium farmers are unlikely to have funds to invest in new planting materials, pulping equipment, and fertilizer to attain better quality. Few farmers have the means to secure training, certification, or on-farm investments in order to improve sustainability and facilitate differentiation.

Microcredit, starting with revolving funds that depend on community or clan security, perhaps through the fortification of functioning associations or co-operatives, can be an effective method of building the basic capacity required to eventually access larger and more formal credit.

Contracting with an existing financial institution to expend their network to provide credit can help ensure that transaction costs are reduced. Access may thus also be improved and there is an opportunity to start with savings services first to build basic financial literacy. However, for lending to work the products offered would have to be specifically tailored to the needs of agriculture.

a. Financing production and investments

A range of financing options will be necessary to stimulate the necessary on-farm investments and even the seasonal financing for inputs, harvest, processing, and for co-ops to secure timely payments to members in order to get their coffee and meet their shipping obligations. Many will only require modest sums so development of microcredit approaches will be pivotal.

One of the options is to pursue the existing dialogue with Nationwide Microfinance on expanding their services in coffee areas. They had established an MOU to work with the CIC but this has not yet been acted upon. The smaller scale nature of microfinance means that smaller operators can also participate and establishing seed funds with training could also be viable for areas where more formal institutions such as Nationwide Microfinance may not be willing to

expand.

Trade finance can be one of the most effective ways to improve the sector. In at least some cases, there may be scope to generate public-private partnership between financial institutions, coffee exporters and producer groups to facilitate access to affordable trade finance. This is particularly useful during the main harvests. For those producer groups that elect sustainable practices, the members of the Financing Alliance for Sustainable Trade⁵⁶ are available to provide preferential financing in collaboration with a broad network of supportive buyers around the world.

b. Warehouse Receipts Schemes⁵⁷

One of the longer term options is the establishment of warehouse receipts operations that can create more liquidity in the sector, particularly for small to medium operators that do not have lines of credit. Coffee or other commodities can be physically stored in secure bonded warehouses and a receipt issued that specifies the amount, grade, and quality of the commodity deposited. This permits financial institutions to verify the value of the product and use this receipt as collateral. This can facilitate low-cost financing to domestic mills, exporters, and even co-ops holding coffee for shipment. There are also added benefits:

- the ability to safely store coffee without concern for larceny or deterioration
- fast access to financing and a way to build a financial reputation with a lending institution
- can also serve other commodities that can be graded and valued
- offers possibility to time the market if desired

Warehouse Receipts require:

- A legal framework, including a traceable registry that guarantees the product to the holder of the receipt and makes it easy for the receipt holder to efficiently enforce rights to the commodity.
- Physical Warehouses of a caliber that can be secured and monitored to ensure that the quantity and quality parameters of the inventories are maintained and guaranteed
- Insurance or an indemnity fund to cover possible failures and instill confidence.

4. Market access infrastructure

There is a great need to provide or rehabilitate critical **infrastructure**, particularly market access roads and even processing facilities that can make a substantial difference in both quality and costs of production. Improved infrastructure will reduce costs of marketing, may improve quality and increase participation in the market. Access offers other socio-economic benefits not limited to marketing other crops. Access to schools and healthcare are among the corollary advantages.

⁵⁶ FAST has 129 members from 26 different countries that arrange financing. See: www.fastinternational.org or contact their Director: Noemi.Perez@fastinternational.org

⁵⁷ For a discussion of this tool see: Warehouse Receipts: Facilitating Credit and Commodity Markets. Giovannucci, Varangis, Larsen. 2000. The World Bank. Available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=952596

However, given limited funds it will be important to target the investments with the greatest socio-economic impact. As such, rather than on small stretch of road, it would be better to offer more basic access (2 wheel vehicles, footpaths, river crossings, animal transport, cable transport, etc) to a larger group of communities and partner with them for maintenance that is more plausible than expecting their maintenance of a primary or national road.

- a. The number one, nearly universal desire of the sector is for improved roads. The same desire is also echoed in a recent survey of hundreds of fruit and vegetable farmers in the Highlands. This does not refer to new roads but simply the maintenance of existing feeder roads and bridges. There is no study of the specific costs that this lack of infrastructure adds to marketing but it is likely significant and the CIC estimates that sometimes as much as 40% of the coffee in some areas does not make it to market.⁵⁸ If correct, this astounding number translates to not only lost export revenues but also to diminished livelihoods.
 - i. Innovative options could provide considerable improvements at low cost. One of these is donkeys. Donkeys have reportedly been tried on a small scale by missions in some areas of the country and it is not clear why they are not more widespread. None of the farmers were adverse though two mentioned that they perceived most animals as food.
 - ii. Cable gondola systems have been used in other countries to overcome difficult terrain. They offer low-cost and even superior transport (smooth and fast) with minimal maintenance requirements. The issue could be security, but this is no different and perhaps less of an issue than with the roads because product moves faster and requires potential thieves to then move it via footpaths if removed from the cables. Guards can also travel the underlying access paths if necessary.
- b. There is a need for ecological wet mills in a number of regions to permit better quality processing, diminish environmental contamination, and to reduce the need to immediately transport cherries.
 - i. As a supplement, where co-ops are insufficiently organized to manage a wet mill, hand pulping equipment (not actually infrastructure) will meet some of the need.
- c. The option of renewable energy was not identified as a big priority in the coffee areas. This may be because few are familiar with the options or because the needs are not critical. The CIC is currently beginning testing of this approach. If wet mills are installed, the provision of renewable energy would make them more viable and less costly to operate. There is a brief WB paper serving as a guide on the basics of scoping out this topic for project investment.⁵⁹

⁵⁸ This often cited figure is difficult to track but appears to have emerged from a 2006 CIC survey of coffee held at about 30 airstrips in the highlands, the survey being in preparation for the Government's wholesale air freighting action – that never took off. However, it was anecdotal evidence (from two different community leaders) that up to 60-70 percent of coffee in the remote areas doesn't reach the market.

⁵⁹ http://papers.ssrn.com/sol3/papers.cfm?abstract_id=996766

- d. One centrally located, bonded warehouse (if warehouse receipts are a project component) of a caliber that can be secured and monitored to ensure that the quantity and quality parameters of the crop inventories are maintained and guaranteed along with annual operating and security costs.

Conclusion

Addressing these needs will require a plan that effectively involves many of the key stakeholders. After The Coffee Sector Strategy Workshop held at Goroka in June of 2009, the CEO of the CIC, Mr. Ricky Mitio and the Deputy Secretary of DAL, Mr. Francis Daink joined with the World Bank to sum up the conclusions of these findings and of the inputs from stakeholders:

- The priorities identified are in line with the directions of the NADP and the Coffee Strategic Plan.
- Supporting work on quality, differentiation, farmer groups' mobilization, extension, and institutional strengthening are the priorities in order to promote the growth of the coffee sector and keep it competitive.
- There is a consensus on the need for “better rather than just more coffee” to drive growth. There is strong support for more work on differentiation and quality.
- There is also a consensus on the need to provide adequate incentives for farmers to make coffee an attractive and remunerative industry
- Partnerships between different stakeholders in the public and the private sector are needed in all areas.

~ end ~

Appendix 1. Three Keys to a Sustainable Commodity

Integrating COSA, SCAN, and FAST into a program can help to effectively handle many of the sustainability issues: an important area where capacity is lacking. The Committee on Sustainability Assessment (COSA) provides necessary baseline data for yields, productivity, profitability, market constraints, etc. It also enables the sector to determine under what conditions a certain sustainability initiative will benefit producers and where another may be better or perhaps none at all so that a lot of time and money is not wasted and so that people do not get frustrated with certification mechanisms that do not work for them (research indicates that it happens frequently).

This process also contributes to improved institutional capacity because COSA serves to train PNG institutions and also creates trained individuals to later potentially do inspections for certifications (by registering with one of a number of certification agencies). Such local skills can be used to also help set-up the necessary Internal Control Systems that facilitate certifications and reduce costs for producer groups.

The Sustainable Commodity Assistance Network (SCAN) partners are a number of SCAN participating international NGOs, etc. that are a useful component for PNG efforts since they: a) bring solid expertise about certifications to the table ensuring better project outcomes; b) know what they are doing and so are pretty effective in getting producers cost-effectively into sustainability; and c) become partners in the process, sometimes contributing some of their own resources, and thus aligning with the objective of any productive partnership project.

The Financing Alliance for Sustainable Trade (FAST) represents more than a hundred partners that build capacity among producer groups to acquire financing and to manage it. This innovative and award-winning method of integrating trade financing into supply chains for sustainable commodities represents the third important link for sustainable commodities to expand and thrive.

These three groups all form part of the Sustainable Commodity Initiative and apply for cocoa just as well.

Appendix 2. Partner efforts

Various agencies are working on related areas that could serve as partners for some PPAP investments. A representative sampling is shown below

Table A4.1

WHO	WHAT	2009	2010	2011	2012	2013	2014	2015
ACIAR with CIC	Smallholder socio-economic survey	X						
	Appropriate processing and drying technology		X	X	X			
	Coffee management methods		X	X	X			
NARS	Soil fertility		X	X	X	X	X	
NZAID with NDAL	District agricultural planning	X	X					
ACIAR with FPDA	Marketing of Sweet Potato ⁶⁰	X	X					
ARDSF	Agriculture innovative grant scheme	X	X	X				

It is apparent that socio-cultural factors influence farming decisions as much as economic ones and there is little understanding of these. Thus, in addition to farming and natural resource management research, further investigations into socio-cultural aspects of rural communities need to be considered. This is particularly relevant to understanding decision making processes, gender issues and identifying constraints and opportunities to developing functioning and sustainable co-operatives.

⁶⁰ this sweet potato marketing project looks at crucial alternative income generating opportunities for smallholders including coffee farmers

Appendix 3. Soil Fertility Assessment – Research and Development

Project Title: Managing soil fertility for sustainable production of coffee and food crops in mixed farming systems in the PNG highlands

Authors: John Bailey and Debbie Kapal (NARI, Highlands Programme, Aiyura)

Background: Mixed farming with coffee and food gardens in fairly close proximity is common throughout much of the PNG highlands. These mixed farming systems, however, are increasingly facing problems of sustainability. The population of the highlands region is increasing by 3% each year and placing pressure on the land resource to produce extra food and cash income to support the burgeoning rural populace. Simultaneously, the productivity of food crops such as sweet potato (the main staple crop), appears to be declining owing to a reduction in soil fertility linked to a progressive shortening of fallow rejuvenation periods (Allen et al. 1995; Sem 1996; Bourke 2005). These fallowing periods have declined from several decades to less than one year (Sem, 1996; Bourke, 2005), and this shortening of the time needed for soil rejuvenation is also affecting the production of vegetable and cereal crops which have high requirements for N, P, K, Ca, Mg and S. Chemical fertilizers, although not often used in food gardens, are frequently used to support coffee production. Unfortunately, the increased cost of fertilizers world wide means that small holder producers are no longer applying fertilizer supplements needed to keep their coffee gardens productive, and in such a scenario it is likely that soil fertility in these gardens will also decline quite rapidly unless alternative supplies of nutrients are found. Coffee production in small holder blocks is increasingly low and many blocks are being neglected due to low return (Kapal, *pers. comm.*). There is pressing need, therefore, for research to investigate the nutrient dynamics and requirements of mixed coffee-food crop farming systems and to develop low-input innovative methods for maintaining soil fertility and sustaining production. Such options include the use of improved fallow, using fallow species such as legumes (which enrich the soil with N), wild Mexican sunflower (which provides a P-rich compost or mulch) (Kendall and van Houten, 1997; Sanchez, 2002), wild Piper (which has the capacity to abstract K from the subsoil to give a K-rich compost or mulch) (Hartemink, 2001). Fallow biomass could be used as compost or mulch in both coffee and food gardens. Coffee cherry pulp, which is very rich in K, the nutrient most limiting to sweet potato production in the highlands (Bailey et al, 2009), could also be used to supplement the K requirements of both food crops and coffee (d’Souza and Bourke, 1986). Finally, local liming materials, which are present in gigantic rock outcrops in parts of the highlands, could be used to raise soil pH and cause the release of organically combined N and P from soils making it available to crops, as well as supplying additional Ca (needed by vegetables).

Main Objectives:

1. Investigate nutrient dynamics and cycling within mixed coffee-food garden farming systems and determine which factors are most-limiting to sustainable production.
2. Conduct on-station trials to evaluate a combination of low-input, low-cost options for correcting nutrient deficiencies in mixed coffee-food garden farming systems including improved fallow, alternative legume species, hedgerow biomass composts and mulches, coffee cherry pulp mulch, and the use of local liming materials to ameliorate soil acidity and P deficiencies, and the limited use of chemical fertilizers.
3. Develop technology packages or options for sustaining coffee and food garden production in mixed farming systems under different soil and environmental conditions and evaluate their efficacy on-farm at pilot scale.
4. Conduct cost benefit analyses for each technology package/option

Time Frame: 4 years

Key Outputs:

1. Information on nutrient dynamics and nutrient factors limiting to mixed coffee-food garden farming systems in the PNG highlands.
2. Technology packages or options to help farmers produce coffee and a range of food crops in more sustainable and economical ways under different soil and environmental conditions.

Key Outcomes:

1. Enhanced incomes for small-holder farmers leading to improvements in health, education and standards of living in rural communities.
2. Improved food security for small-holder coffee growers in a scenario of climate change and global financial recession.

Approximate costs:

Approximately K713,000 over 4 years. This cost will include the cost of a vehicle to travel to experimental sites throughout the highlands, the costs of fuel and travel allowances & accommodation, the costs of materials and chemicals, the costs of 2 additional full-time technical staff members to assist with the research, the costs of chemical analysis needed to maximize understanding of nutrient dynamics, and the costs needed to conduct baseline studies and subsequently disseminate the results of the research.

K120,000 – Vehicle

K50,000 – Fuel and travel allowances (4 years)

K208,000 - Two full time technicians (4 years)

K70,000 – Materials

K150,000 – Chemical analyses

K50,000 - baseline studies and result dissemination

K65,000 – 10% office overhead charge

K713,000

References:

- Allen BJ, Bourke RM and Hide RL 1995 The sustainability of Papua New Guinea agricultural systems: the conceptual background. *Global Environ. Change* 5, 297-312.
- Bailey JS, Ramakrishna A and Kirchoff G 2009 An evaluation of nutritional constraints on sweet potato production in the highlands of Papua New Guinea using DRIS. *Plant & Soil* 316: 97-106.
- Bourke RM 2005 Sweet potato in Papua New Guinea: the plant and people. In *The Sweet Potato in Oceania: a Reappraisal*. Eds. C Ballard, P Brown, RM Bourke and T Harwood. pp 15-24. *Ethnology Monographs* 19, Oceania Monographs 56.
- D' Souza E. and Bourke, R.M. 1986b. Intensification of subsistence agriculture on the Nembi Plateau, Papua New Guinea 2. Organic fertilizer trials. *Papua New Guinea Journal of Agriculture, Forestry and Fisheries*, 34: 29-39.
- Hartemink, AE 2001. Biomass and nutrient accumulation of *Piper aduncum* and *Imperata cylindrical* fallows in the humid lowlands of Papua New Guinea. *Forestry Ecology and Management*, 144: 19-32.
- Kendall, B. and van Houten, H. (Eds) 1997. Using the Wild Sunflower *Tithonia*, in Kenya for Soil Fertility and Crop Yield Improvement. Nairobi: ICRAF, 11pp.
- Kapal, Philip, 2009. Small holder coffee farmer in Western Highlands Province, Papua New Guinea
- Sanchez, P.A. 2002. Benefits from agroforestry in Africa, with examples from Kenya and Zambia. *In: Agroecological Innovations – Increasing Food Production with Participatory Development*, Eds. N. Uphoff, Earthscan Publications Ltd, London. pp. 109-114.
- Sem G 1996 Land-use change and population in Papua New Guinea. In *Population, Land Management, and Environmental Change. The UNU global environmental Forum IV*. Eds. J I Uitto and O Akiko, The United Nations University, Tokyo, Japan.

Appendix 4. NGO support of coffee farmer organizations in the Highlands

Fairtrade recognises entrepreneurship and trade as the primary path to economic development and poverty eradication. It provides a mechanism of trade linkages and capacity building directed at small farmer commodity producers. It is a market-based model of international trade which ensures the payment of a fair price as well as social and environmental standards and investment in local communities.

Fairtrade Certification uses standard setting, supply chain certification, product labelling and consumer awareness-raising as means of promoting development objectives at the producer level. Fairtrade seeks to facilitate change by supporting people to get organized and thus providing more voice to the poor.

In PNG, a challenge to accessing Fairtrade is presented by producer group structures. There is no history or tradition of functioning organised small farmer organizations. Any existing cooperative structures are weak, leadership and management skills poor and are combined with governance issues stemming from a lack of accountability and trust. Farming groups in PNG tend to comprise essentially of extended families and clans that work through a system of relationships and respect.

Coffee farming communities in PNG have no access to finance, business or management skills. They are also characterised by their remote locations and farmer cooperatives often consist of a number of villages and clans with geographical challenges not only in getting their product to market but also in organising meetings of their members. Often there is conflict between clans and villages and the concept of democratic organizations is not necessarily applicable to these existing social structures. Despite these obstacles there are a number of Fairtrade Certified Producers operating in the region and these provide some good examples of these specific challenges.

The Crater Mountain Cooperative in the Mount Hagen conservation area is extremely remote and isolated. The cooperative consists of some 2000 coffee farmers and obtained Fairtrade certification in 2003. Similarly, the 2600 members of the Highlands Organic Agricultural Cooperative (HOAC) obtained Fairtrade certification in 2004 and are inaccessible by truck or car. These constraints limit their development potential. However, Fairtrade Certification has brought the growers together in a common cause of development through self-help. As such, they are making their best efforts to introduce community responsibility across a number of different clan areas.

Some specific ways in which these challenges can be addressed include the development of local entrepreneurial skills and organisational capabilities, via supporting processes of skill development, organisational capacity building, diversification and democratic governance. Fairtrade Certification provides the framework for the development of these skills and capabilities.

The Fair Trade Association of Australia and New Zealand (FTAANZ) is active in the region delivering training of trainers on standards and certification process that enables this information to be communicated to the farmers. Management of premium monies provides a reason for cooperative members to meet, get organised and develop good governance and accountability processes. FTAANZ can also facilitate business support and training through local and regional NGOs and support agencies.

Building farmers' organization into democratic structures, encouraging effective participation in community forums, instigating measures to curb bad agricultural practices and promote high environmental standards, providing fair and stable prices for farmers' products, and supporting local community development projects hold the key to the sustained reduction of rural poverty. The sustainable development of such village based economic activity creates an enabling environment for enterprise to flourish is the sort of initiative that should be supported.

Contributed by Steve Knapp, Executive Director FTAANZ

Appendix 5. Persons & institutions interviewed

Name and title	Organization
Port Moresby	
Francis Daink Dep. Secretary	Dept of Agriculture and Livestock
Harry Godfrid	Dept of Agriculture and Livestock
Brian Wapi, Policy DAL	Dept of Agriculture and Livestock
Rebecca Kiage,	Dept of Agriculture and Livestock
Peter McCrea	PPAP Coordinator
David F. Freyne, Attaché	European Commission Delegation to PNG, Solomon Islands and Vanuatu
Tony McDonald, Country Manager	ACIAR
Cathy Pianga, Assistant Country Manager	ACIAR
Paul Barker, Director	Institute of National Affairs
Rufina Peter, Rural Sector Coordinator, CIMC	Institute of National Affairs
John Varey, Informal Sector Coordinator, CIMC	Institute of National Affairs
Mike Jackson, Agriculture Director	WR Carpenter, PNG
Tom Diwai Vigus	Researcher
Damien Ase, Executive Director	Center for Environment Law & Community Rights
Eastern Highlands Province	
Ricky Mitio, Chief Executive	Coffee Industry Corporation CIC
Ellison Pidik, GM Industry Operations Division	CIC, Goroka
Abel Philemon, Special Projects Officer	CIC, Goroka
Jerry Huekwahin, Projects Officer	CIC, Goroka
Kessy Kufinale, Senior Economist	CIC, Goroka

Charles Dambui, Economist	CIC, Goroka
Bruce Tinai, Economist	CIC, Goroka
Brian Kuglame, Incentive Scheme Coordinator	CIC, Goroka
Tebi Naged, Exec Officer to CEO	CIC, Goroka
Potaisa Hombunaka, GM, Research and Growers Services Division	CIC, Aiyura
Fabian Api, Manager Growers Services Division	CIC, Aiyura
Anton Ningi, PFTEC	CIC, Goroka
Jenny Bekio, Mobile Extension Officer	CIC, Goroka
Nick Watson, Trade Manager	Monpi Coffee Exports Ltd
Joeri Kalwij, Monpi Sustainable Services Mgr	Monpi Coffee Exports Ltd
Russel Poka, Chairman	Keto Tapasi Association
Jon Edwards, General Mgr	PNG Coffee Exports
John Leahy, Processing Plant Mgr.	PNG Coffee Exports
Henry Ame, G.M.	Coffee Connections
Grant Jephcott, Export Mgr.	New Guinea Highlands Coffee (Neumann)
Michael Hannon	New Guinea Highlands Coffee (Neumann)
Terry Shelly, Owner	Nowek Coffee Ltd
Ian Matthews, GM	Goroka Coffee Roasters
Arakue Siagodo, Cluster leader	Asaro, Daulo dist, EHP
Nicholas Ello, Producer group leader and Provincial Grower Assn. representative	Kabiufa, Goroka dist, EHP
Solomon Tato, Provincial Deputy Administrator, Programme Management and Coordination	EH Prov Adminsitration
Gabriel Paita Highlands Regional Coordinator, Cooperatives	Department of Commerce & Industry
Robert Lutulele, Marketing Manager	Fresh Produce Development Agency

Sharon Edington	(consultant Uniquest)
Trevor Wilson	(consultant Uniquest)
Rex Kinder	(consultant Uniquest)
Rakesh Kapila, Programme Leader	NARI, Highland Centre, Aiyura
John Bailey, Soil Scientist	NARI, Highland Centre, Aiyura
Stephen Knapp, Exec Dir.	Fairtrade Labelling Australia and New Zealand
Jorg Rosenkranz,	FLO Inspector Southeast Asia & Pacific
Henry Braun, Country Director	CARE International in PNG
Thomas Oruga, Community leader	c/o CARE IPNG Pikosa Daulo Dist.
Helen Kua, PNG Rep	Australian Business Volunteers
Bernard Pilon, Highlands Rep	ARDSF/ AIGS
Mawe Gonapa, Director Highlands Region	NDAL
John Sari, Executive Officer	EHPACS
Bubia Muhuju, Programme Manager	EHDAL
Moi Warigi, Spices Unit	EHDAL
Daisy Kiniafa, Foods Crops Unit	EHDAL
Tella Loie, Bee Officer	EHDAL
Ekesu Margu, Manager	EHDAL/ SSCF
Charles Maika, A/Section Co-ordinator,	University of Goroka Agricultural Science Department
Bire Bino, Tutor,	University of Goroka Agricultural Science Department
David Seine, A/ Provincial Police Commander	EHP Police Force
Abraham Mufri, Chairman	EHSPA
Simbu Province	
Jerry Kapka, MD	Kongo Coffee Ltd
30 Directors of Co-ops, WHP, SP and EHP	

Western Highlands Province	
Joe Alu, PFTEC	CIC
Jack Wanto, Coffee Inspector	CIC
Napu Ratumu, Assist. Plantation Manager	CIC WHP research centre
Jorine Hetora, Field Attendant	CIC WHP research centre
James Koimo	Western Highlands Smallholders Coffee Growers Association
Ram Kumar, GM	Pacific Arabica Coffee Development Corporation
Paul Pora, MD	Highlands Arabicas Ltd
Max Kumbamong, MD	Maro Coffee Ltd
Patrick Bang, group leader	Rukum coffee plantation
Lae, Morobe Province	
Caroline Lemerle, Research Programme Manager, Agricultural Systems and Management	ACIAR (Australian Centre for International Agricultural Research)
Jonika Paulsen, Representative	Morobe NGO Kibung
Lukis Romaso, GM	Bris Kanda Inc
Raghunath Ghodake, Director General	NARI
Sergie Bang, Director Research	NARI
A. Ramakrishna, Research Programme Leader	NARI - Wet Lowlands Mainland
Workneh Ayalew, Research Programme Leader	NARI - Livestock
Abdul Halim, Head Agriculture Department	University of Technology
Teria Kevere, Director	Lutheran Development Service (LDS)
Beno Kamewo, Staff Development Officer	Lutheran Development Service (LDS)
Klaus Neumeier, Advisor	Lutheran Development Service (LDS)

Bibliography and References

- ACIAR (2008) Coffee R&D Workshop Notes, ACIAR, Melbourne, Unpublished documents
- ACIAR (2008). Assessing and extending schemes to enhance the profitability of the PNG coffee industry via price premiums for quality. Available at:
<http://www.aciar.gov.au/project/ASEM/2004/042>
- Batt, P. and Murray-Prior, R (2009) Assessing and Extending Schemes to Enhance the Profitability of the PNG Coffee Industry via Price Premiums for Quality, Final report, Australian Centre for International Agricultural Research, Canberra
- Bourke, R. and Harwood, T. (eds) (2009). Food and Agriculture in Papua New Guinea. Australian National University, Canberra.
- Bourke, R., B. Allen, P.Hobsbawn and J.Conway. (1998). Papua New Guinea: Text Summaries in series Agricultural Systems in Papua New Guinea Working Papers Nos. 1 and 2, Department of Human Geography, Research School of Pacific and Asian Studies, The Australian National University, Canberra
- Carrad, B. (1982) Economic Aspects of Smallholder Practices: Mixed Cropping of Food and Coffee in Proceedings of the Second Papua New Guinea Food Crop Conference, Department of Primary Industry
- Chang, C. (2006) Improving Marketing Efficiency, Postharvest Management and Value Addition of Sweet Potato in Papua New Guinea, Proposal, ACIAR, Canberra
- CIC (2008) PNG Coffee Strategic Plan 2008-2018, Coffee Industry Corporation, Goroka
- CIC (2008) PNG Coffee Strategic Plan 2008-2018, volume 2 Implementation Plan, Coffee Industry Corporation, Goroka
- CIC (2008) Coffee Report No. 74, Coffee Industry Corporation, Goroka
- Coelli, T. and Fleming E (2004) Diversification Economies and Specialization Efficiencies in a Mixed Food and Coffee Smallholder Farming System in Papua New Guinea in Agricultural Economics, Vol 32 pp 229-239, University of Queensland and University of New England, Australia
- Collett, G. (2008) Socioeconomic and Institutional Factors Influencing Smallholder Coffee Production in PNG. Unpublished paper
- Ghodake, R.D., Gaupu B, Guman K, Simin A and Kanua MB (1993) Intercropping of Coffee in the Highlands of Papua New Guinea: A Survey Report, Department of Agriculture and Livestock, Kainantu
- Giovannucci. D. (2005) Organic Agriculture and Poverty Reduction in Asia: China and India Focus, Thematic Evaluation, IFAD, Rome
- Global Development Solutions (2008) Assessing the Competitiveness of the Coffee Sector in Papua New Guinea: An In-depth Analysis Using the Integrated Value Chain Methodology. Unpublished report draft prepared for the World Bank
- Gonapa, M. (2004) Farmer Driven Extension Service Initiatives Using Experience in Simbu Province, paper presented at PNG Extension Seminar, Lae

- Hayfield, S. (1982) The Coffee Farming Systems Research and the Smallholders Crop Surveys in Proceeding of the Second Papua New Guinea Food Crop Conference, Department of Primary Industry
- Inu, S. (2007). Assessment of Smallholder Post-Harvest Technique. ACIAR Project Report (PNG PHT 017).
- Kindiwa, L. and Mullen B (2008) Village Extension Worker Review Report, FPDA, Goroka
- Leahy, J.H. (undated) Traditional Labour in PNG. Unpublished Paper, Lahamenegu, Goroka
- Leahy, J.H. (undated) Coffee and PNG Highland's Culture. Unpublished Paper. Lahamenegu, Goroka
- McLaren, P. (1999) Analysis of the Effects of Pruning and Intercropping on Profitability on Coffee Farms in Papua New Guinea, Occasional Paper 14, Tree Crops Policy Options Project in Papua New Guinea, University of New England, Armidale
- Mufri, A. (2008) Evaluation Report: EHPDAL Coffee Nursery Support Project, Eastern Highlands Provincial Division of Agriculture and Livestock, Goroka
- Murray-Prior, R., Batt, P., Dambui, C. & Kufinale, K. (2007). Improving quality in coffee chains in Papua New Guinea. Paper presented to the ISHS Conference: Improving the performance of supply chains in the transitional economies" September 23-27, 2007 in Hanoi, Vietnam,.
- NDAL (2007) National Agricultural Development Plan, National Department of Agriculture and Livestock, Konedobu
- NDAL (2006) National Agricultural Development Plan 2007-2016, Policies and Strategies, Volume I, Department of Agriculture and Livestock, Konedobu
- NDAL (in Press) Project Closing Report of the Smallholder Support Services Pilot Project, National Department of Agriculture and Livestock, Konedobu
- Onchoke, S. and E Fleming E (1997) Primary Export Performance in Fiji, Papua New Guinea and Solomon Islands in Strategic Issues in the Economic Development of Melanesian Agriculture, eds EM Fleming and JB Hardaker, Australian National University, Canberra
- Sengere, Reuben, Willie Susuke and Bryant Allen. (2008) The rehabilitation of coffee plantations in Papua New Guinea: the case of Obihaka. *Pacific Economic Bulletin* Vol.23(1) 85-98.
- Shelley, T.J. (1991) A Proposal for the Future Development of the Coffee Industry in the Eastern Highlands Province of Papua New Guinea. Unpublished proposal, Nowek Coffee Ltd
- SMEC (1998). Coffee Research Institute Review. Coffee Industry Corporation, Goroka, PNG. (see Collet where cited)
- Taidas, M. (1996) Coffee Based Farming Systems Research and Development Programme, Coffee Industry Corporation, Kainantu
- Wilson, T. and Hehona D (2008) Report on the 2008 FPDA Socioeconomic survey, FPDA, Goroka