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Linking Farmers with Markets: the Case of Cocoa

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Abstract

'Supply-chain management' means very little to most smallholders — they are concerned with managing their farms, saving sufficient for their own needs and selling any surplus for the best price they can get. Their contact with 'markets' is often limited to dealing with a produce collector, or to sales at the local 'fresh market'. Limited contact with markets probably means that growers have little awareness of product suitability, quality or choice of crop. While crop choice is often dictated by what other local growers find profitable, crops in demand can quickly become 'surplus to requirements'. In the case of cocoa, however, global demand is strong at present, and growers in Asia can earn good incomes from the crop. Cocoa is a crop of the developing world, while chocolate is largely consumed in the developed world. In Indonesia, a large smallholder cocoa industry has developed in Sulawesi over the past 20 years, while in Papua New Guinea (PNG) there has also been a major shift from plantation to smallholder production. Cocoa has been a good source of income to smallholder farmers for meeting financial commitments such as school fees in these countries, but this may not be assured in the longer term. As communities continue to develop, greater focus on 'linking farmers with markets' might be the key to sustainable income generation from cocoa. This paper describes some characteristics of the cocoa industries in Indonesia and PNG, discusses the key issues for sustainability of their industries, and describes research and development initiatives that aim to improve smallholder incomes.

Cocoa fortunes Indonesia is currently the third-largest producer of cocoa with about 20% of global production (Table 1), mainly of bulk cocoa based on

Forastero hybrids. Papua New Guinea (PNG) produces only 2% of the world crop, but supplies a niche market of 'fine' cocoa based on Trinitario × Amazonian hybrids. Global demand for cocoa is strong, and supply projections suggest potential shortfalls in supply. As a consequence, interest in overcoming deficiencies in supply has become stronger amongst chocolate manufacturers and government agencies in developed countries (such as USA), where local farms produce milk and sugar, which are also used in chocolate manufacture. While global demand for cocoa is strong, threats such as the potential for market oversupply by emerging future producers such as Vietnam, and a decline in demand due to the use of non-cocoa fats in chocolate manufacture, heighten the need for producing countries to have greater market focus in planning research and development (R&D).

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Table 1. Cocoa bean production (Mt) in the Americas, Africa, Indonesia, Malaysia and Papua New Guinea, 1996–2003. Source: FAO STAT (2004).

Country/region	Year							
	1996	1997	1998	1999	2000	2001	2002	2003
Africa	2,144,525	1,940,505	2,169,731	2,136,463	2,344,348	2,048,042	1,891,396	1,892,396
Americas	571,117	575,282	540,750	474,320	435,270	456,566	561,659	471,726
Indonesia	350,800	329,700	430,800	442,700	465,700	380,900	450,000	450,000
Malaysia	120,071	106,027	90,183	83,700	70,200	58,000	47,661	47,661
Papua New Guinea	36,000	40,000	29,800	35,600	46,800	38,800	45,000	42,000

Cocoa in Indonesia

In Sulawesi, an industry involving more than 300,000 smallholders has developed since the 1980s. Key drivers in the development of the industry have been the improvement of land access, the settling of transmigrants and the experience of returnees from Malaysian cocoa plantations bringing farming knowledge and seed. The Sulawesi industry supplies ‘bulk cocoa’ used for cocoa butter. Annual production is over 300,000 tonnes, 90% of this by smallholders. Smallholder yields average 800–1000 kg/ha, as compared with 1800 kg/ha on plantations, but smallholder input costs are lower (Bedford et al. 2002).

The main factors affecting productivity include:

- weather extremes
- pest (particularly the cocoa pod-borer moth (CPB), *Conopomorpha cramerella*) and disease losses
- labour shortages
- restricted access to finance and high interest rates (Bedford et al. 2002).

Industry characteristics

- Labour requirements in Indonesia are higher than those of the West African producers. Labour is needed throughout the year during establishment, but the requirement falls to 80–90 days/per year/ha in established but non-bearing plantings, and to 30 days/ha when trees are bearing (although the last-mentioned input may not be sufficient for optimal maintenance). As a consequence, a family of 2–4 can care for a 2–4 ha farm.
- Rainfall patterns allow harvesting throughout the year, so labour requirements for harvesting are higher than in the West African industry.

- Producers can be owner–farmers, sharecroppers or farm managers.
- There are few co-operatives or farmer groups.
- Most producers sell semi-dry beans of 15–20% moisture to village collectors.
- The industry has a fairly efficient marketing system, fostered by the marketing policies of the Indonesian Government, but there are few incentives to improve quality. Industry middlemen have limited knowledge of handling, quality and storage.
- Indonesian cocoa sells for a lower average price than cocoa from Ghana and Côte d’Ivoire (which produce ‘fine’ cocoa), but Sulawesi cocoa farmers earn a higher percentage (70%+) of ‘free-on-board’ (FOB) prices.
- Recent trends in the industry include the growth of primary processing in producing countries, e.g. the PT Effem (Masterfoods) processing factory in Macassar, Sulawesi, and multinationals now dominate the trade (declining from 60 national traders in 1998 to 2 in 2000, with 11 international trading companies).
- As a ‘bulk’ cocoa supplier, the provenance of cocoa at grower level is less important, and processors can address the quality issue of low or no fermentation, but the real quality problem is the physical quality of cocoa, specially the percentage waste (placenta and flat beans, small beans and clumps due to CPB infestation, and contaminant residues may also become a problem) (Bedford et al 2002).
Although processors can address minor quality defects through blending and processing technology, there is the risk that the mean quality can become too low, for example when CPB damage becomes excessive.

In summary, there is little traceability of product (cf. horticultural produce), grower–trader relations are often short-term, quality and reliability of volume have not been high enough to favour long term links, and chain members may be tempted to add foreign matter to boost weight. While the quality of bulk cocoa is important, managing it is complex and the Indonesian value chain for cocoa is less suited to the introduction of ‘quality improvements’ than are those for the horticultural industries (Bedford et al. 2002).

Critical issues for industry improvement in Indonesia

- Product supply needs to be more reliable (in quality and quantity).
 - Losses due to pests and disease need to be reduced.
 - Cocoa butter levels in cocoa beans need to be improved.
- Any new inputs for crop improvement must not be too labour intensive, as labour is already in short supply.
- Strategies for improving grower returns through improved production and quality are needed. Sulawesi farmers already have the highest percentage of world cocoa price and the cocoa pipeline is very efficient with very low margins for the intermediary collectors/traders.
- In dealing with these issues, chocolate manufacturers are important drivers.

Some 85% of the cocoa from Sulawesi, worth US\$140 million in 2000, goes to the USA, but the CPD has destroyed 40% of recent crops and reduces quality in the remainder.

Research and development

The Indonesian Government has placed high priority on extension and implementation of R&D in the last few years, while devolving more responsibility to the provincial level. The Balai Pengkajian Teknologi Pertanian (BPTP) centres have the charter of extending and developing all forms of agricultural technology in regional areas. Cocoa, after rice and other subsistence food crops, is the most important crop in Sulawesi and has underpinned a large part of the recent economic development. In tandem with BPTP, the Dinas Perkebunan provide the provincial extension service for small-scale plantations. While cocoa R&D is centred at the Indonesian Cocoa and

Coffee Research Institute (ICCRI) in Jember, Indonesia, investment in infrastructure and resources in Sulawesi has been strengthened (for example, the BPTP facility in Kendari). This investment is complemented by the following suite of international development initiatives which seek to overcome major industry constraints.

ACDI/VOCA SUCCESS Alliance project.¹ (USAID funded)

This initiative focuses on integrated farmer training, information exchange and applied research on pest control (regular harvests etc.) in the Sulawesi cocoa industry. Between 2000 and 2002, more than 10% of Sulawesi cocoa farmers were trained, crop losses for trained farmers dropped by 30%, and farmer incomes rose by more than US\$500 p.a.

In a second stage of the SUCCESS Alliance there is a new focus on quality, farmer organisation and leadership. Under the Alliance, PT Effem (Masterfoods) Sulawesi started to buy small quantities of cocoa directly from smallholders, and private sector partners have agreed to buy cocoa worth more than US\$10 million p.a.

The project has a spillover activity in the Philippines and is also planning work in Vietnam. In Indonesia, challenges for the Alliance include:

- accessing locally proven germplasm and technologies
 - there are good opportunities for synergy with ACIAR initiatives (see below)
- assuring some carryover of experience when the Alliance ends. Options include:
 - maintenance of links with processors
 - continuing to build local extension and information dissemination capacity
 - fostering farmer organisations.

¹ ACDI/VOCA was formed in 1997 by the merger of Agricultural Cooperative Development International (ACDI) and Volunteers in Overseas Cooperative Assistance (VOCA). The merger blended ACDI’s systemic, long-term approach to development and VOCA’s people-to-people volunteer activities. ACDI (first known as the International Cooperative Development Association) was formed in 1963 by major US cooperatives and farm credit banks to assist cooperatives in developing countries. ACDI eventually grew into an international technical and management assistance organisation with rural finance, natural resource management and agribusiness capabilities <<http://www.acdivoca.org/acdivoca/acdiweb2.nsf/whoware/history?opendocument>>.

Pest Reduction Integrated Management (PRIMA)

The main aim of the PRIMA project (under Netherlands Government funding) is to assist a group of 900 Sulawesi farmers on a 1000 ha area to improve their production and quality of cocoa by using an integrated management approach. Development of a quality cocoa pipeline, with training of farmers and traders on grading and cocoa quality, is also a very important part of this project. The most efficient methods for biological control of CPB are also being tested. One component of this approach is the rehabilitation of plantations by side grafting with CPB-resistant cocoa clones, aiming at improved production and quality. The project is not undertaking primary collection of putative resistant material — this is being undertaken in a parallel ACIAR project, and some of the most promising locally selected clones from the ACIAR trial will be re-tested in the field trial in PRIMA project area in Noling, near Palopo, Sulawesi. In this way, the superior agronomic characteristics and pest and disease resistance of clones will be confirmed and budwood multiplied. Budwood from the ACIAR selected clonal materials will then be made available for the farmers trained on integrated management in the PRIMA project.

ACIAR support

ACIAR project PHT/2000/102, 'Selection for improved quality and resistance to *Phytophthora* pod rot, cocoa pod borer and vascular-streak dieback in cocoa in Indonesia', in Sulawesi began 2000, after the start of ACDI-VOCA SUCCESS Alliance project and before the start of the PRIMA project. The project focuses on evaluation of germplasm with putative pest or disease resistance or improved quality, collected from across Indonesia by Dinas Perkebunan personnel (Isiwanto et al. 2003). The project has stronger links with Indonesian agencies than do the ACDI-VOCA and PRIMA initiatives and emphasises:

- evaluation of local selections with resistance to pod borer, disease (*Phytophthora* pod rot and canker caused by *Phytophthora palmivora* and vascular streak dieback (VSD) caused by *Oncobasidium theobromae*), and higher cocoa butter and bean size
- farmer participatory side-grafting of bearing trees with grower/adviser selected superior material
- improvement of *Phytophthora* pod rot and VSD control.

The project is linked to and complements the other initiatives.

Potential impacts of the ACIAR project include:

- risk reduction if lines with resistance to one or more pests are identified
- lines may give more cocoa butter, less shell
- growers will be able to move to improved cultivars through side grafting
- there is likely to be an interest from manufacturers to source cocoa from improved clones.

Summary and conclusions

The Sulawesi cocoa supply chain is very efficient, with farmers receiving probably a larger share of the selling price than any other cocoa farmers around the world. There are few intermediary collectors and trader intermediaries, and they make relatively low profits. Nevertheless, quality (as percentage waste, flat and small beans, and the lower fat percentage in such beans, which are a result of the CPB infestation) is critical. Manufacturers can play a key role in overcoming these problems. Probably the best solution would be to introduce differential pricing. Differential pricing would encourage farmers to produce better-quality cocoa. This way, farmers could increase their incomes and manufacturers would obtain more cocoa of the preferred quality standard.

The other element of quality improvement and income generation is to reduce losses through improved, pest-and-disease-resistant planting materials (as is being investigated in the ACIAR project), and training of farmers in integrated pest management (as in the SUCCESS Alliance and PRIMA projects).

The Indonesian cocoa industry and the R&D programs that support it have many of the elements critical to sustainability: a crop with a well-identified market, and strategies to reduce losses and improve productivity. The challenges will be to foster wide adoption of improved cultivars, and to encourage adherence to control measures recommended for pod borer and diseases. Given the labour shortages, and the costs and extension challenges associated with encouraging farmers to use other control methods, resistance is a good option for sustainable crop improvement, with the larger market for 'bulk' cocoa remaining as a better option than 'fine' cocoa. For industry improvements to be sustainable, links between farmers and manufacturers that enable adequate income improvements to cover increased costs

of management, will be critical. The strong commitment by some manufacturers to participatory R&D offers hope that this will happen.

Cocoa in Papua New Guinea

Papua New Guinea (PNG) supplies just 2% of the world market, a tenth of that of Indonesian production. However, the 35,000 tonnes produced each year (mostly from East New Britain) is acidic, 'fine' cocoa, with most (80%) now coming from smallholder production. In contrast to Sulawesi, where under-fermented beans are sold for processing as bulk cocoa, PNG cocoa is fermented and dried locally. Papua New Guinea cocoa beans are recognised worldwide for the quality attributes that reflect their Trinitario origin.² However, they also have a reputation for some undesirable characteristics, such as excessive acidity, high shell content and smoky flavour (especially in smallholder produce), the latter a result of smoke contamination during drying or storage. In addition, the introduction of hybrids of inferior flavour led, in recent years, to a decline in the premium paid for PNG cocoa, with PNG's 75% 'Fine or Flavour' rating being reduced to 25%. Other dimensions of the industry include the following:

- yield averages are increasing (in East New Britain) from 300 kg/ha in 1989 to 620 kg/ha in 1999
- industry growth has been hampered by
 - the decline in the value of local currency
 - the civil unrest in Bougainville, one of the main production areas,
 - problems with weather, pests and diseases
 - volcanic eruptions
- Productivity has also been affected by the inefficiency of smallholder production and low levels of inputs.

PNG contrasts with Indonesia

- 'Fine' versus 'bulk' cocoa
- Diseases are the more serious problem in PNG versus the pod borer in Indonesia (CPB is not yet a problem in PNG)

² The original material, from early last century was Trinitario. Since the early 1980s and now, material distributed by CCRI has been Trinitario × Amazonian hybrids. There have been claims that this has diluted the Trinitario attributes. However, PNG cocoa is still sought by manufacturers for its' flavour attributes.

- as a subsistence crop, cocoa will provide some income even when neglected
- traditional land rights in PNG affect access
- lower literacy levels affect information access, extension and financial management
- high transport costs cut into profits
- civil unrest and natural disasters have had more adverse impacts
- less experience in repayment of microfinance affects credit availability to smallholders.

Nevertheless, PNG receives prices above world averages for its cocoa and, as in Indonesia, manufacturers have a strong interest in fostering improvement of the PNG industry: improvement of cocoa quality and ensuring that smallholder production is sustainable are key focuses of R&D.

Research and development

The PNG Government also places high priority on fostering improvement and expansion of the cocoa industry. Research and development is undertaken by the PNG Cocoa and Coconut Institute, formed in 2003 by the amalgamation of Cocoa and Coconut Research Institute and the Cocoa and Coconut Extension Agency (CCEA). Cocoa and Coconut Institute cocoa research is centred on East New Britain.

AusAID Cocoa Improvement Project 1992–1996

To re-establish and improve the quality characteristics of PNG cocoa beans, the PNG Cocoa and Coconut Research Institute (CCRI) started a R&D project in 1992, supported by the Australian Agency for International Development (AusAID) (the Cocoa Quality Improvement Project). The project investigated several aspects of fermentation and quality improvement:

- screening of germplasm for cocoa quality traits to improve the genetic base for quality cocoa production in PNG
- development of fermentation and drying methods to enable smallholders to increase their income through the sale of fermented, dried beans rather than wet beans.
- a review of the regulations for fermentaries and drying facilities in order to provide advice to the Cocoa Board of PNG on changes needed to enable smallholders to undertake these processes.

More recently, AusAID, in partnership with the United Nations Development Program (UNDP), has provided further support for the PNG cocoa industry

under initiatives for the rehabilitation of cocoa on Bougainville.

ACIAR Project PHT/1995/136 'Cocoa fermentation, drying and genotype × product quality assessment'

The ACIAR project³ was initiated in 1998 as a follow-on to the AusAID-funded activities at the Cocoa and Coconut Research Institute (CCRI). In collaboration with the Queensland Department of Primary Industries and the University of New South Wales, its objective was to complete assessment of an integrated approach to quality improvement involving changes to fermentation, drying and selection of cocoa varieties with superior flavour.

ACIAR later extended the project to (a) finalise evaluation of fermentaries and dryers, and to develop and implement technology transfer strategies, particularly in relation to the re-establishment of the industry on Bougainville, and (b) finalise participation in the International Cocoa Confectioners' Organisation (ICCO) collaborative project to establish the benchmark physical, chemical and organoleptic parameters that differentiate between fine and bulk cocoa. Papua New Guinea cocoa was compared with the industry bulk standard (West African) and with cocoa produced by other partners (Trinidad and Tobago, Ecuador and Venezuela).

The project has investigated the following key elements of quality improvement and industry development:

- fermentation process and time (smaller volumes of beans, shorter times) (Hollywood 1998)
- cocoa drying (A-framed solar collectors) (Hollywood et al. 1997)
- varieties with better 'PNG fine' flavour
- revision of cocoa industry regulations
- industry extension and uptake
- support for the Bougainville industry through testing of methodologies, particularly related to drying
- 'PNG' chocolate options
- benchmarking of PNG cocoa in an ICCO collaboration
- income generation for smallholders.

³ Funded under the ACIAR-AusAID Record of Understanding for PNG.

Table 1 summarises achievements to date and the factors that remain to be dealt with in order to realise the benefits of the current investment.

What are the key messages from the PNG research?

Smallholder issues

- *Fermentation.* Fermentation methods for small quantities of cocoa (down to 25 kg) have been developed. This means that virtually any size producer could ferment their harvest and produce a good quality cocoa.
- *Solar drying.* The original dryers distributed during the AusAID program had limited success due to severe maintenance problems. Most of the maintenance problems have now been solved and there is a need to ensure recommendations regarding construction are adhered to. Farmers also need to be encouraged to take greater ownership for acquisition and maintenance of drying units.
- In provinces or districts with similar rainfall to East New Britain Province, stand-alone solar dryers are an option, provided the maintenance recommendations are adhered to.
- For wetter provinces, combination solar/kiln dryers have been developed and test units distributed on Buka Island and Bougainville. These have proven a popular development with the local population. However, their long-term value will depend upon maintenance by users.

Quality issues

- The Cocoa Quality Laboratory of CCRI has developed good capabilities for quality assessment and sample throughput.
- Recommendations regarding fermentation procedures to improve quality attributes have been developed; e.g. by reducing fermentation times from 7 to 5 days, shell content is reduced by 2%, acidity of the cocoa is lower and flavour attributes improved (enabling distinctive 'PNG chocolate' to be made).
- With PNG export cocoa, successful participation in the ICCO project could enhance PNG's reputation as a producer of fine-flavour cocoas. Provided support from CCRI is ongoing, further improvements in fermentation and drying technologies and selection for flavour attributes in plant breeding could be expected.

Table 1. Cocoa quality improvement in PNG: issues, achievements and future needs.

Element of quality improvement	Key achievements	What needs to be done now?
Fermentation process and time	Smallholder technologies developed: for shorter fermentation times and smaller volumes of beans	Procedures for small-scale fermentation and the amended regulations need to be approved by the PNG Cocoa Board, and follow-up extension activities undertaken.
Cocoa drying	Small-scale, solar-drying technologies have proven useful for East New Britain	Recommendations regarding their construction, use and maintenance, and amendments to regulations need to be approved by the Cocoa Board and follow-up extension activities undertaken. Options for wetter areas require more work.
Varieties with better 'PNG fine' flavour	Large range of germplasm screened, and testing for quality incorporated into routine breeding. New release lines shown to have good 'PNG fine' flavour. Training of CCRI cocoa quality laboratory staff in cocoa quality assessment. Training for chemist in taste panel procedures.	CCRI should continue screening of breeding lines for quality traits. Resources and experience in taste panel evaluation should be established and maintained. This will reduce need for taste evaluation by manufacturers.
Cocoa industry regulations	Revisions to industry regulations drafted and presented to the Cocoa Board.	Board needs to formally consider and approve the revised regulations before cocoa produced with smallholder fermentation and drying technologies can be sold.
Industry extension and uptake	Training manual drafted. Extension personnel trained.	Manual needs to be updated to include recommendations for smaller fermentations, down to 25 kg, and the latest developments in solar-dryer construction. Need to increase commitment to extension and involve other groups (training institutions, NGOs) in training and implementation of the technology.
Bougainville industry rehabilitation	Support for United Nations Development program/AusAID installations	The PNG Cocoa Board needs to approve modified specifications on dryer size in cocoa regulations. Consideration should be given to distributing combination solar/kiln dryers (as a method of saving of firewood) and/or purely solar alternatives for drying in suitable weather conditions. PNG and donor agencies need to review future needs/sustainability of industry on Bougainville.
'PNG' chocolate	Distinctive flavour of 'PNG' chocolate demonstrated through collaboration with Masterfoods Australia.	An economic analysis should be undertaken of opportunities which could include: local marketing of products made from cocoa nibs, and links with a specialist manufacturer who might want to market 'PNG fine' chocolate to international markets.

Table 1. (Cont'd) Cocoa quality improvement in PNG: issues, achievements and future needs.

Element of quality improvement	Key achievements	What needs to be done now?
ICCO 'Fine/Flavour Project'. Partner countries and commercial users of PNG cocoa are involved in 'benchmarking' fine/flavour criterion. ^b	Some progress has been made in 'bench-marking' PNG standard fine cocoa against other producers.	Ongoing support is needed for CCI participation in the current project. Future directions/needs will depend on progress made in current ICCO project.
Income generation for smallholders	This project has developed affordable options for smallholders to produce higher quality cocoa and potentially earn more income. In 2003–2005, a new ACIAR project will provide additional resources and effort in this area.	The Cocoa Board has to approve revised regulations before farmers can use project-developed technologies to produce and market cocoa.
International collaboration	Partnership initiated in ICCO project ^a International cocoa conference presentations made CCCRI staff participated in an ACIAR–Indonesia cocoa workshop in 2001, and discussions were held between CCRI and the Indonesian Cocoa and Coffee Research Institute (ICCRI) about fostering collaboration.	Collaboration in the current ICCO project could foster future links and funds. The profile of CCI in international cocoa R&D should be maintained. Links with Indonesia and other ASEAN cocoa producers (including Vietnam) should be fostered both for research gains (e.g in developing strategies for exotic pests such as cocoa pod-borer) and to enable the PNG industry to have a better understanding of future competition. CCRI should continue to foster good links with manufacturers.

Extension liaison

- This is the most critical and challenging issue to handle at the present time (resources, farmer linkages and security). There is a major need for a concerted effort for the recently merged CCRI and Cocoa and Coconut Extension Agency (CCEA), and the Cocoa Board, to deliver research outcomes to the field and foster adoption by farmers. Adoption of recommended procedures country-wide would automatically deliver an improvement in quality attributes of PNG cocoa (and thus reputation and income). The challenge will be in getting this message across.

Future ACIAR support

In parallel with the ACIAR support for research on cocoa fermentation, drying and genotype evaluation, another ACIAR project in PNG has promoted

options for income generation in the smallholder oil palm sector of PNG, including the increased participation of women in the industry through the 'Mama Lus Frut' card scheme. In recognition of the oil palm project achievements and of the opportunities for cocoa industry improvement described here, a new project funded by ACIAR (ASEM/2002/014) will focus on improving productivity and the participation of young people and women in the Papua New Guinea cocoa, coconut and oil palm industries. Partners in the project are Curtin University, CCRI/CCEA and the PNG Oil Palm Research Association.

The new project will capitalise on the oil-palm project interventions that led to significant increases in smallholder productivity. The new project aims to replicate such achievements in the PNG smallholder cocoa and coconut sectors. Researchers will also conduct an in-depth evaluation of a promising new

payment system (also arising from the earlier ACIAR project) for oil-palm smallholders at Hoskins, West New Britain, and seek to further adapt it for other smallholder oil-palm regions and for the smallholder cocoa sector in PNG. The project will promote the sharing of knowledge and expertise between the key smallholder extension agencies and research organisations in the three industries.

For the farmers of PNG to be better linked to markets, the most important issue is to enable them to ferment small quantities of beans harvested from hybrids that produce cocoa of superior flavour. There must also be a continuing effort to refine postharvest procedures suitable for farmer use and which would enable them to match manufacturers needs more closely and deliver superior product to traders, with a price premium paid for beans of superior quality. In this way, smallholders in remote locations would have the chance to improve their incomes while enhancing the quality and reliability of PNG cocoa. One option to consider is that proposed by local industry leaders in Bougainville — the concept of ‘cocoa traders’ as middlemen between growers and export companies. Traders would have their own transport and travel to villages both close to and distant from export outlets. This would, in theory, do away with problems farmers have in transport of crop to buying points, and the traders would also act as quality assessors, as they would wish to establish a good reputation for the product they handle, with the exporters. Under such a system, traders could also provide advice at the village/smallholder level, about such matters as what needs to be done to correct quality problems encountered (i.e. they would act as

extension people). Such an approach might also be suitable for other provinces and ensure that the PNG Cocoa Board developed policies that were in tune with industry needs.

In PNG cocoa, smoke contamination of cocoa is another problem that farmers should seek to solve through better dryer management. The ACIAR/AusAID collaborations have demonstrated a suitable option for regions such as East New Britain, but other options (such as combination dryers) are needed for areas that experience annual rainfalls above 2500 mm. Critically, Cocoa Board approval is also needed for the smallholder dryers. In managing smoke contamination, it also needs to be determined if dried beans are being further contaminated by cook-fires during household storage.

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