

Final Report

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Glossary of Key Terms

BOPGA	Bialla Oil Palm Growers Association
CIF	Cost, Insurance, Freight
CPO	Crude Palm Oil
CWG	Commodities Working Group, PNG
DAL	Department of Agriculture & Livestock, PNG
EBIT	Earnings Before Interest and Tax
EU	European Union
FFA	Free Fatty Acid
FFB	Fresh Fruit Bunch
FOB	Free On Board
GoPNG	Government of Papua New Guinea
H&S	Health and Safety
HOPGA	Hoskins Oil Palm Growers Association
HOPL	Hargy Oil Palm Limited
LC	Letter of Credit
LSS	Land Settlement Scheme
MT	Metric Ton
NBPOL	New Britain Palm Oil Limited
NIOPGA	New Ireland Oil Palm Growers Association
OPGAs	Oil Palm Grower Associations
OPIC	Oil Palm Industry Corporation, PNG
OPRA	Oil Palm Research Association, PNG
PGK	PNG Kina
PIP	Public Investment Program, GoPNG
PK	Palm Kernel
PKE	Palm Kernel Expeller
PKO	Palm Kernel Oil
PMV	Public Moving Vehicle
POPA	Palm Oil Producers Association
POPGA	Popondetta Oil Palms Growers Association
PoR	Payout Ratio
PPV	Palm Product Value
R&M	Repairs and Maintenance
ROIC	Return on Invested Capital
RSPO	Roundtable Sustainable Palm Oil
SADP	Smallholder Agriculture Development Project, PNG
SH	Smallholder
VOP	Village Oil Palm

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1 Summary of Findings

This report presents the findings of the review of the Fresh Fruit Bunch (FFB) price formulae and is the final deliverable of this World Bank funded project. This review is the result of rigorous consultation, information gathering, collation and analysis.

The requirement to engage all stakeholders was an important factor in the review in light of a thirteen year gap in independent, structured and meaningful consultation on the FFB pricing in the palm oil industry in Papua New Guinea (PNG).

Accordingly, the consultation process entailed two rounds of provincial visits to Hoskins, Bialla, Popondetta and New Ireland project areas. Relevant stakeholders were given an opportunity to participate in this review.

Currently the FFB Price Formula is used to determine a Payout Ratio (PoR) as the basis for sharing revenue between smallholder growers and millers. The PoR is the mechanism intended to assist smallholder suppliers recover their full cost of production plus an equitable share of any profit that is earned on the sale of their fruit.

1.1 Key Conclusions

The key conclusions drawn as a result of this review were as follows:

- The current FFB Price Formula used to determine a PoR as the basis for sharing revenue between smallholder growers and millers is considered to provide an appropriate, equitable and transparent framework for the PNG palm oil industry. Within the overall framework, as more participants enter the industry and growing areas expand it may be appropriate to use relevant input variables specific to different regions resulting in regional specific PoRs;
- While the underlying rationale of using a ratio of grower cost of production and cost of milling to calculate the PoR has little apparent economic logic, it is comparatively simple to understand, transparent and entails the use of data that is readily available and verifiable;
- This review demonstrates that the current arrangements do not favour the milling company over the smallholder grower with growers receiving 63% and millers 37% of the profit available from milling grower fruit at a 57% PoR using 2012 costs and palm oil price. Analysing PoRs in the range of 55% to 59% of Palm Product Value (PPV) also resulted in smallholders receiving greater than 50% of profits from milling;
- The equity in the current arrangement is supported by the fact that there is no evidence that the millers are making returns above the global industry average and in fact returns are at the low end of the range of returns reported by comparable companies;
- While alternative models for sharing revenue would be available whereby growers would be provided with the opportunity to receive a price more directly related to the market price of palm oil, grower representatives do not favour growers being effectively exposed fully to market risk. In addition the introduction of a new model would require significant consultation and while current arrangements can be regularly reviewed to ensure they remain equitable, the rationale for change is not compelling; and
- Improvement in grower productivity and upgrading the road and transport infrastructure would significantly improve grower returns. Grower frustration particularly in regard to transport infrastructure tends to escalate the tension between the smallholders and milling companies beyond normal commercial boundaries of competing financial interests (as in other palm oil markets).

1.2 Recommendations

It is recommended that:

- the current FFB Price Formula continue to be used to determine the PoR for sharing revenue between smallholder growers and milling companies across the PNG palm oil industry, noting that there may need to be a review of the appropriateness of a single PoR as new milling companies and operating models emerge;
- the FFB Price Formula be reviewed at least every 5 years with an initial review after 3 years to ensure changes in costs of production and industry models are appropriately reflected and future reviews should continue to analyse both the respective costs of production and the equitable sharing of milling profits;
- the current PoR of 57% remain in place at least until the next review;
- the framework for the FFB PoR calculation be adopted so that the application of the formula is consistent and able to be independently audited. Audits should occur no less frequently than every two years. The industry should consider the findings of the FFB Price Formula Application Audit & Review, and adopt and document FFB Price Formula Guidelines. Additionally, the industry will need to determine how best to formally agree and adopt the framework and the recommendations relating to formula elements;
- immediate attention be given to assisting growers improve their productivity and further work be undertaken to quantify the economic benefit of improving transport infrastructure and how the improvements might be delivered and funded; and
- definitive quantification of smallholder costs and productivity be undertaken prior to any further reviews as the variability of smallholder costs and productivity is a material issue to consider.

2 Introduction

2.1 Scope of Work

The Smallholder Agriculture Development Project (SADP) is a rural development project funded by the World Bank and designed to encourage further and sustainable economic growth and enhance community participation and local governance in the rural areas of two oil palm growing provinces (West New Britain and Oro Province).

As part of its remit to improve smallholder productivity, SADP is assisting the oil palm industry to review the pricing mechanism in place between the smallholder growers and the oil palm millers and implement annual audits of the pricing system. A fair and transparent pricing mechanism is an essential element of a successful industry.

The current mechanism determining the profit sharing between smallholders and the palm oil milling companies is a FFB price formula.

The existing FFB Price Formula is based on a PoR to share the profit from palm product sales equitably between the FFB supplier and the FFB processor. The PoR is determined by a comparison of the relative costs of production of smallholders and milling companies and their relative break-even points. The PoR is applied to the Free on Board (FOB) FFB value to give a mill gate price that is further reduced by FFB transport cost and various levies to give the final farm gate price payable to the smallholder.

There have been two previous reviews of the FFB Price Formula in its current format. The last review was commissioned in 2001¹ (the “2001 Review”) under a previous World Bank funded project (The Oro Smallholder Oil Palm Development Project).

After each review the FFB Price Formula was endorsed by a Commodity Working Group (CWG). The basis of the calculation of the price payable to smallholders for FFB is not well understood but is generally accepted by all industry stakeholders. There are continuing pressures from the smallholders for a review and update of the formula.

Accordingly the World Bank has agreed to fund an FFB Price Formula Review and Audit under SADP.

The FFB Price Formula Review and Audit will review the existing price formula; report on the operation of the mechanism since the last review and recommend changes that would improve the operation of the pricing formula, with the aim of ensuring that a transparent and equitable pricing formula is in place and applied by each palm oil milling company.

Furthermore, since the FFB price is calculated by the FFB buyer, it should be subject to periodic independent verification. Therefore in conjunction with this review of the formula, annual audits of the FFB price paid to smallholders will be undertaken.

The Oil Palm Industry Corporation (OPIC) is the implementing agency on behalf of the Government of Papua New Guinea (GoPNG).

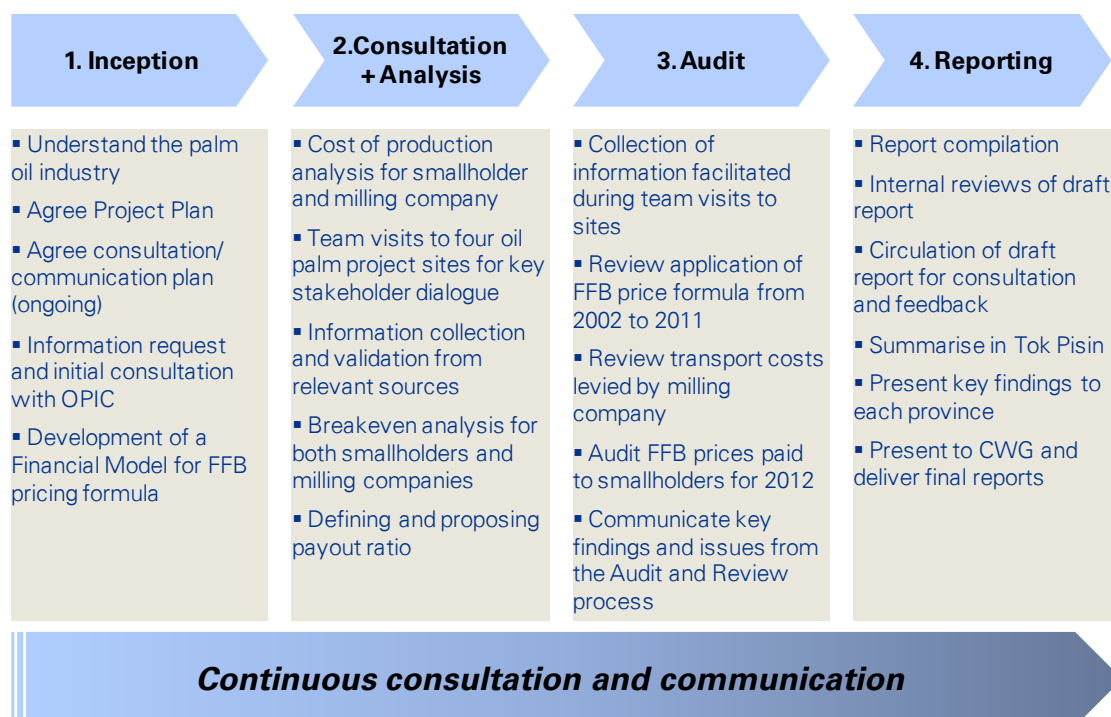
The full Terms of Reference for the Review of the FFB Price Formula and Audit (herein after referred to as the “Project”) are set out in Appendix A – Terms of Reference.

¹ Burnett, D & Ellingson, D 2001, *Review of the Oil Palm Fresh Fruit Bunch Pricing Formula*, Papua New Guinea

2.2 Approach

KPMG was appointed to undertake the Project and commenced work on 2 September 2013. The approach was developed to meet the TOR set by OPIC and the World Bank and is presented in the diagram below.

Diagram 1 – Approach undertaken by Review Team



The project was undertaken in two related but discrete work streams supported by common information gathering and consultation processes:

- review of application of the FFB price formula from 2002 to 2011 and audit of 2012 FFB price paid; and
- review of the FFB Price Formula.

The findings of the first work stream are contained in a report delivered to OPIC titled “FFB Price Formula Application Audit & Review: 2002 – 2011 Formula Application Review & 2012 Audit Findings” in December 2013.

This report presents the findings of the Review of the FFB Price Formula and represents the final project deliverable and is the result of a rigorous consultation, information gathering, collation and analytical process spanning several months.

The requirement to engage all stakeholders following a thirteen year period without structured consultations on the FFB pricing was an important factor in the Review. Accordingly, two rounds of Provincial consultations were undertaken by the Review Team in West New Britain, Oro and New Ireland. Other provinces were not included in the scope of this review.

The first provincial visit entailed engaging milling companies and grower associations at Hoskins, Bialla, Popondetta and New Ireland in October and November 2013. The primary aim of the mission was to collect and analyse quantitative and qualitative information relating to the costs of production for milling companies and smallholders.

Details pertaining to the site visits are contained in the Inception Report that was delivered to OPIC in November 2013.

The second round of provincial visits took place in March 2014 and involved the Review Team workshopping the methodology used to undertake this review, present initial findings, and take comments and feedback from the smallholders. Workshops were conducted in Kimbe, Bialla, Popondetta, Lakurumau (New Ireland) and Port Moresby.

Major stakeholders were given the opportunity to give input throughout various stages of the Project. Refer to the table below.

Table 1 – Report inputs from relevant stakeholders

Stakeholder	Input
Milling Company	- Factual accuracy and relevance of the information provided in the report; - Commercial sensitivity of information prior to progressing draft review process to other stakeholders; and - General comments and feedback.
Oil Palm Industry Corporation (OPIC) and World Bank.	Multiple reviews and clearance of the draft prior to public discussion and consultation in the provinces.
Grower Associations and Smallholder Farmers	Multiple opportunities to provide input during each provincial visit by the Review Team. This included workshops, public forums and meetings with Oil Palm Grower Association (OPGA) Executive at respective project sites which entailed comprehensive dialogue regarding matters relevant to the scope of this review. Refer Appendix B – Table of Smallholder Concerns
Commodities Working Group (CWG)	OPIC were not able to arrange meetings with CWG or Department of Agriculture.

The KPMG review team (the “Review Team”) comprised the following members.

Name	KPMG designation	Project Position
Troy Stubbings	Managing Partner / Advisory Partner	Team Leader
Dan Khaisir	Advisory Analyst	Analyst
Jacob Jamieson	Advisory Executive	Financial Modeller
David McDougall	Specialist Consultant (recently retired Senior Partner)	Project Review Leader

A detailed account of the methodology can be found in Appendix C – Methodology.

3 Background

In undertaking the FFB Price Formula Review it was important to understand the structure of the industry, recent trends, burning issues (domestic and international) and the development of the FFB Price Formula currently in place. It was critical for the Review Team to gain such insight to develop industry context. Some of the Review Team's high level observations are outlined in the ensuing paragraphs.

3.1 Industry Structure

The palm oil industry in PNG employs a Nucleus Estate-Smallholder (NES) operating model. Under this model, smallholders play an important role in the production of FFB by the industry. Smallholder production augments FFB grown on central plantations that are operated by milling companies who process all FFB, market and ship the oil and other related products to local and global markets.

The volume of smallholder blocks and hectareage vary across locations. Historically, the size of smallholder blocks was determined by means of acquisition. Generally, land was acquired through either of the following means:

- **Land Settlement Scheme (LSS)** - 99 year state-leased land for growers settled from other provinces in PNG; and
- **Village Oil Palm (VOP)** – resident customary land holders who voluntarily participated in growing oil palm for commercial gains.

Hoskins and Bialla in West New Britain have the highest number of smallholders. The table below shows the number of smallholder blocks and total smallholders hectares by location.

Table 2 – Smallholders blocks and hectare as of December 2012

Project Location	No. Of Smallholder Blocks	No. of Hectares
Hoskins	7,501	27,421
Bialla	3,529	12,990
Popondetta	5,707	11,870
New Ireland	1,523	2,518

Source: Milling Companies

3.1.1 Oil Palm Grower Associations

Oil Palm Grower Associations (OPGAs) operate in each of the above locations as per the *Oil Palm Industry Corporation (OPIC) Act 1992*. OPGAs act on behalf of growers in dealing with issues in the domestic industry. The Review Team engaged with the following OPGAs throughout the course of the review with the assistance of OPIC:

- Hoskins Oil Palm Growers Association (HOPGA);
- Bialla Oil Palm Growers Association (BOPGA);
- Popondetta Oil Palm Growers Association (POPGA); and
- New Ireland Oil Palm Growers Association (NIOPGA).

3.1.2 Smallholder FFB collection

The logistics involved in getting smallholder fruit to the milling company is not insignificant. As per standard industry practice, growers must harvest their crop fortnightly in order to achieve optimal yield. Harvesting can take up to three or four days. Typically farmers coordinate harvesting in line to pre-determined collection schedules.

FFBs are stacked on the roadside, weighed (pending fleet capability) and then transported to the mill. At some locations such as Popondetta and New Ireland (and in some cases Bialla) farm-to-mill transport is performed by a contractor.

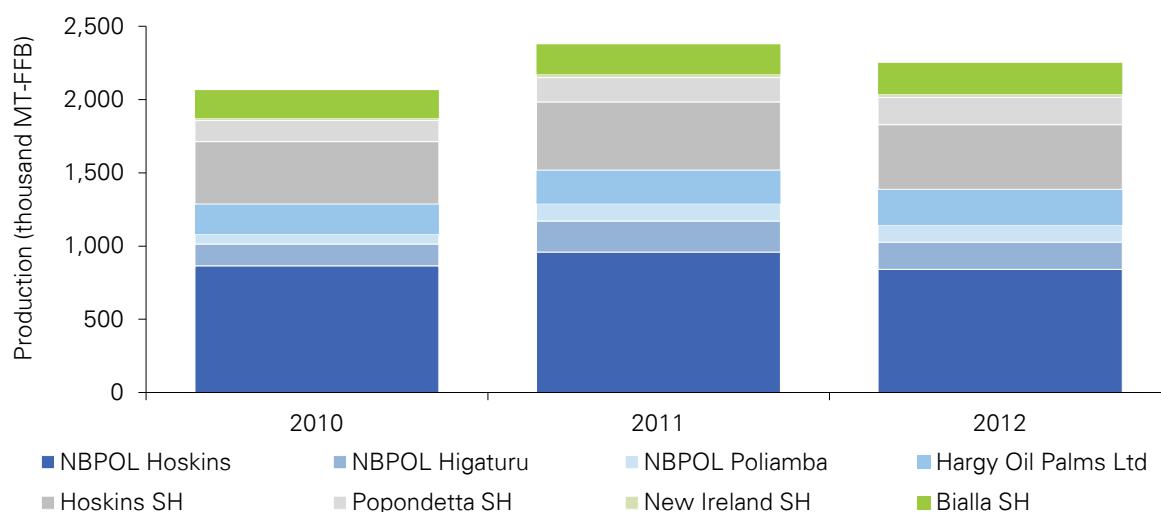
Ideally, roadside collections at each location occurs consistently with a two week FFB harvest cycle although it was observed by the Review Team that this was contingent on other factors such as road conditions and weather. Payment of FFB collected from smallholders is coordinated by milling companies and is generally processed fortnightly.

Growers face some significant challenges which directly impact their productivity and therefore profitability. These issues are discussed in more detail in ensuing sections.

3.2 Industry performance

The production of FFB over the last three years is shown in the below chart.

Chart 1 – Total MT-FFB produced by Milling Companies and Smallholder Growers during 2010 and 2012



Source: Milling companies

Chart 1 illustrates the following:

- Low-high-low production trend for the three year period ending 2012;
- 2010 total production exceeded 2 million MT-FFB in which NBPOL West New Britain and the Hoskins smallholder growers represented 42% and 21 % respectively of total production;
- Total production in 2011 climbed to above 2.3 million MT-FFB which was attributable to increased production by milling companies and smallholders alike;
- Total production fell marginally in 2012 to c. 2.2 million MT-FFB. All NBPOL locations fell in productivity, the most notable being West New Britain by 12.26% (c. 117 thousand MT-

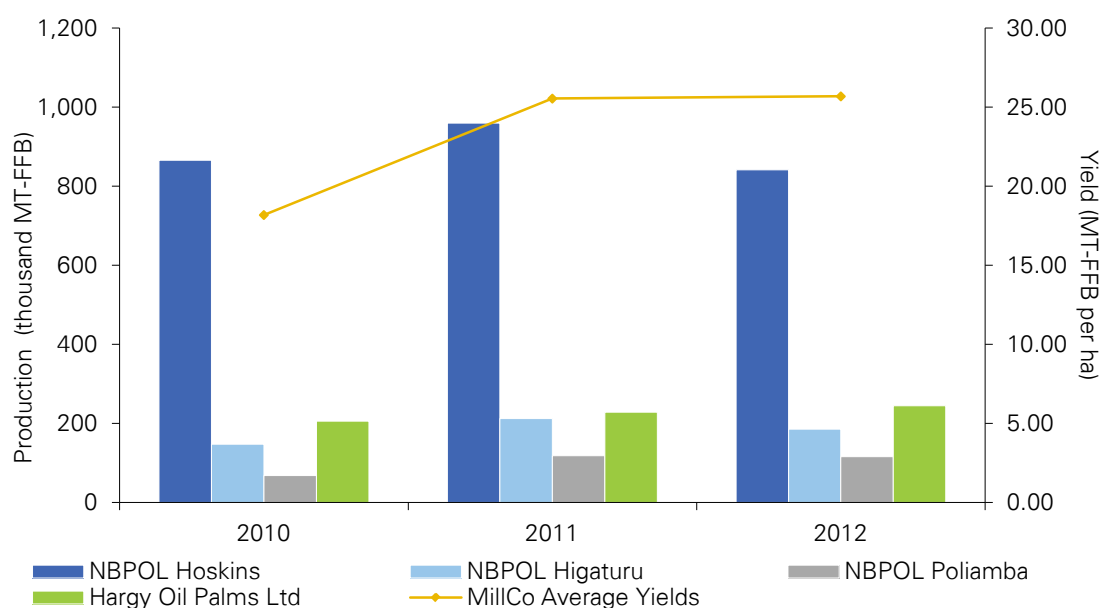
FFB). This fall may have been attributable to high rainfall that year in Hoskins as outlined in the 2012 NBPOL Annual Report; and

- For the three year period ending 2012, NBPOL West New Britain and Hoskins smallholders contributed the most MT-FFB to total production, supplying 40% (c. 2.6 million MT-FFB) and 20% (c. 1.3 million MT-FFB) respectively.

3.2.1 Milling Company Performance – Production vs Yield

The performance of the milling company plantations is described in the following charts and commentary.

Chart 2 – Milling Company FFB production and average yields during 2010 and 2012



Source: Milling Companies

Chart 2 illustrates the following:

- All estates experienced a low-high-low production trend for the three years ending December 2012;
- Collectively the milling companies produced c. 1.3 million, 1.5 million and 1.4 million MT-FFB over this period;
- NBPOL Hoskins contributed to 64% of total milling company production (c. 2.6 million MT-FFB from 2010 to 2012);
- Poliamba experienced a significant rise in production although this was immaterial in terms of relatively to total milling company production; and
- Average yearly yields climbed steeply from 18.19 MT-FFB per ha in 2010 to 25.55 MT-FFB per ha in 2011, before stabilising at 25.69 MT-FFB per ha in 2012. The sharp rise between 2010 and 2011 was attributable to improved Poliamba performance.

The milling companies demonstrate an apparent focus on improving extraction rates through a combination of milling infrastructure investments and process improvements, together with improved agronomy to increase the FFB quality. The following table highlights the trends in extraction rates since 2006

Table 3 – Average Annual Palm Oil Extraction Rates from 2006 to 2012

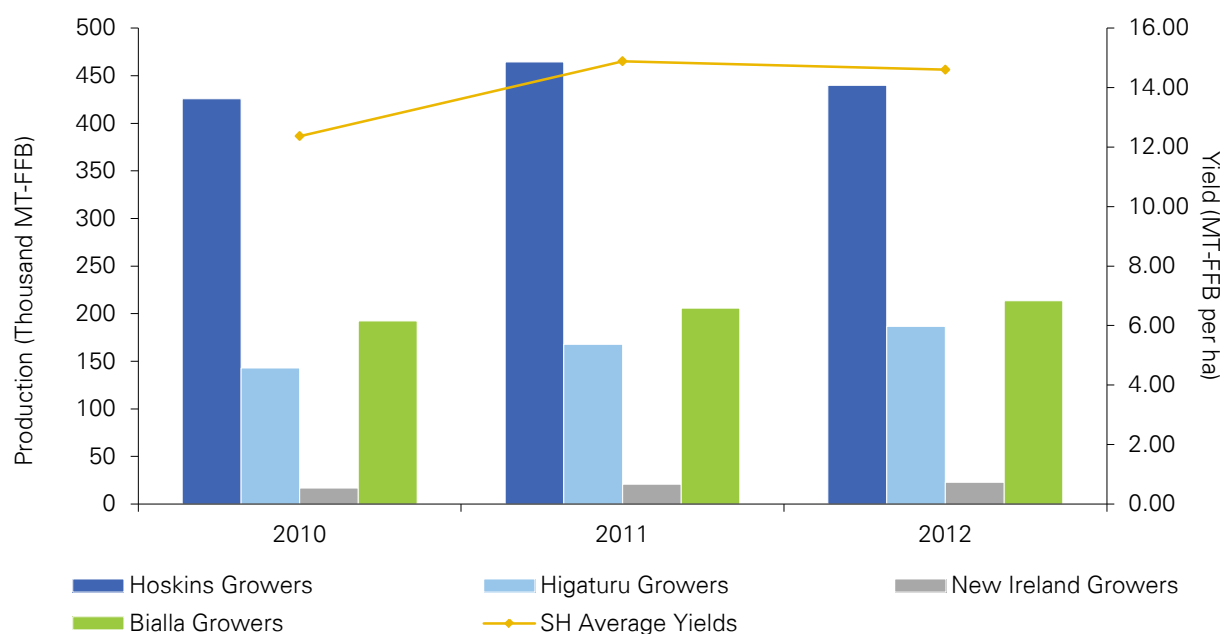
	Hargy Oil Palms Ltd	NBPOL Hoksins	NBPOL Higaturu	NBPOL Poliamba
2006	22.28%	22.29%	22.29%	18.51%
2007	22.31%	22.31%	22.31%	20.80%
2008	22.56%	22.56%	22.56%	20.82%
2009	23.02%	22.91%	22.91%	21.08%
2010	22.99%	22.95%	22.95%	20.84%
2011	23.23%	22.85%	22.85%	20.97%
2012	23.11%	22.75%	22.75%	20.98%

Source: Milling Companies

3.2.2 Smallholder Performance – Production vs Yield

Smallholder production from 2010 to 2012 is captured in the chart below.

Chart 3 – Smallholder FFB Production and Average Yields during 2010 and 2012



Source: Milling Companies

Chart 3 illustrates the following:

- With the exception of the growers in Hoskins, smallholder production in Bialla, Popondetta and New Ireland increased over the three year period ending December 2012²;
- Total smallholder production for this period totalled c. 2.5 million MT-FFB. Production by year ranged between c. 0.78 million MT-FFB in 2010 and c. 0.86 million MT-FFB in both 2011 and 2012;

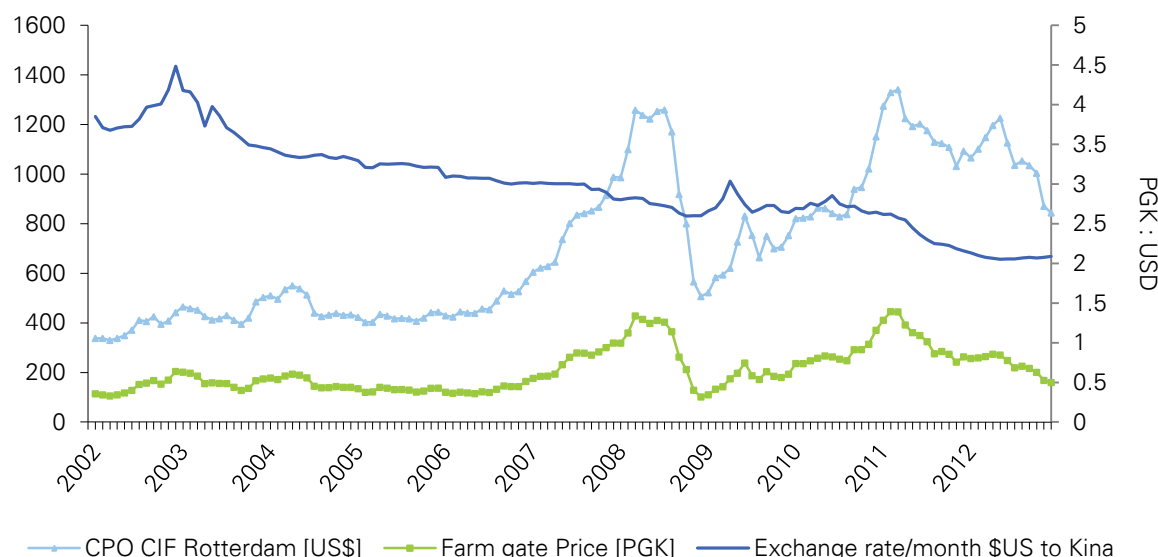
² Note a change of ownership of Higaturu and Poliamba from CTP Holdings to NBPOL in May 2010. The Review Team was advised this may impact the accuracy of smallholder data in 2010 and 2011.

- Hoskins growers produced 55% (c. 1.3 million MT-FFB) of total smallholder MT-FFB for the three year period; and
- Yields averaged 12.37 MT-FFB per ha in 2010, 14.89 MT-FFB per ha in 2011, and 14.60 MT-FFB per ha in 2012. This compares to milling companies' low of 18.19 MT-FFB per and high of 25.69 MT-FFB per ha for the corresponding period.

3.3 Price

While price for palm oil has trended upwards over the last decade, the declining USD to PGK exchange rates (i.e. the PGK strengthened due to PNG LNG) has meant that the stakeholders' net returns in PGK terms were dampened. The following graph highlights the impact that the declining USD has had on farm gate prices.

Chart 4 – Effect of exchange rate on FFB Farm Gate price



Source: (a) Milling companies (b) www.oanda.com

It is important to note that this effect impacts both the smallholders and the mills, with PNG milling companies reporting lower levels of profitability than milling companies in other parts of the world.

An analysis of NBPOL financial performance with some global peers is provided in Appendix D – Return on Invested Capital Benchmarking.

3.4 FFB Price Formula

3.4.1 The Formula

The FFB Price Formula is the mechanism used to set the price paid to the smallholder grower for their fruit by the palm oil milling company.

The objective of the FFB Price Formula is to set a price that enables the smallholder grower to recover their full cost of production plus an equitable share of any profit that is earned on the sale of their fruit.

As set out in the TOR, there is strong interdependence between the milling companies and the smallholders in that the smallholder volumes assist mills operate at efficient capacity, and

thereby assist achieve optimal productivity and economies of scale. Palm oil products and by-products derived from estate and smallholder production are delivered to world markets by the milling company.

The existing FFB Price Formula is based on a sharing of PPV between the FFB grower and the mill processor using a PoR currently set at 57:43. The PoR is determined by a comparison of the relative costs of production of smallholders and milling companies and their relative break-even points.

Each month a “PPV” is determined from the current world price for palm products. At each milling company the value of the world price is adjusted for actual or rolling average freight, exchange rate, and extraction rates, to determine an FOB value per ton of FFB at the mill gate. The mill gate price is further reduced by FFB transport cost and various levies to give the final farm gate price payable to the smallholder.

3.4.2 Evolution of FFB Pricing and Reviews

This review will be the fifth of its kind. Reviews were undertaken in 1990, 1996, 1998 and 2001.

The 2001 review by Burnett and Ellingson recommended increasing the PoR from 55% to 59% to the smallholder. This review focussed primarily on the costs of production of smallholders versus the plantation and recommended a PoR in the same proportions as costs.

The following table shows the evolution of the FFB price and formula.

Table 4 – The development of the FFB Price Formula

Year of Report publication	Key Feature(s) of the Price Formula
1990 – First Review	Relatively complex and subject to continued variations in application.
1996 – Second Review	Palm Oil Producers Association (POPA) introduced a simpler formula aligned to FFB pricing methodologies in other countries.
1998 – Third Review	- First inclusion of NES Schemes; - Approach adopted was to establish respective Costs of Production for smallholders and milling companies and apply these against respective FFB production to determine the break-even point for each party; - The respective break-even costs were then used to determine a PoR for application in the FFB formula; and - Recommendation for new values for sales costs and recalculated Crude Palm Oil (CPO) and Palm Kernel Oil (PKO) extraction rates.
2001 – Fourth Review	- This review had a primary focus of reviewing smallholder costs of production; and - The higher increase in smallholder costs over milling costs gave rise to the recommendation to increase the FFB PoR to 59%.

4 Review of the FFB Price Formula

4.1 Introduction

As detailed in Appendix A – Terms of Reference the FFB Price Formula has two primary objectives which are for smallholders to:

- recover their full cost of production; plus
- derive an equitable share of any profit that is earned on the sale of their fruit.

This concurs with the 2001 Review and is also consistent with Heaslip and Maycock 1990³ who state:

“... the generally accepted concept of (Nucleus) Estate and Smallholder development schemes is that the estate derives its profits from a combination of:

- *mainly, its own operations;*
- *secondly, an additional profit from milling farmers’ production (but at a much lower level than that from its own crop); and*
- *thirdly, the further benefits of reduced processing costs and increased mill profitability from the economies of scale resulting from the additional throughput.”*

The formula should achieve an equitable outcome over a time period that takes into account commodity price and currency exchange fluctuations.

In this context, profits from milling are the appropriate level to be considered for sharing. This is in line with practices across other primary industries (e.g. sugar) where growers and millers share the upside and downside of market and production risk.

In undertaking this review the Review Team began by utilising the methodology adopted in the last review and accepted by growers and millers whereby the PoR is determined by a comparison of the relative costs of production of smallholders and milling companies and their relative break-even points and then applied to the FOB FFB value at mill gate after adjustment for transport and other costs.

The analysis involved the following steps:

- review costs of production and break-even point for smallholders based on FFB yields;
- review costs of milling based on past 3 years (2010 to 2012) from detailed management reports from the four selected mills;
- review the equity and reasonableness of cost of production profit sharing based on existing FFB PoR of 57%; and
- test the equity and reasonableness of cost of production profit sharing based on scenario modelling key variables.

Compared to the 2001 review, this review has benefitted from:

- an increase in the sophistication of the management accounting of the plantation companies;
- increased access to information from milling companies; and

³ Heaslip, J & Maycock, J 1990, *Consultants Report to the Working Group for the Review of The Oil Palm Fresh Fruit Bunch Pricing Formula*, Agricultural Development Services, Singapore.

- increased transparency of the industry with NBPOL and SIPEF being public entities in well regulated markets.

Accordingly, the analysis has been extended beyond break-even costs to consider the profit an “average” mill and smallholder are likely to make under different conditions. This then enables a comparison of whether there is an equitable distribution of profits under different price/cost scenarios as well as how profitable a PNG miller is likely to be compared to its global peers.

The Review Team also analysed the variance in milling profits across the four companies within the Project scope to consider the need for company or mill specific PoRs. The three NBPOL companies have minimal variation arising from varying FFB volumes of production (e.g. Poliamba has a higher unit cost per MT-FFB due solely to its lower volumes to absorb fixed costs). The Hargy Company has slightly lower costs of production, but the variance is not considered to be material enough to justify individual consideration rather than an industry wide PoR.

The Review Team notes that as there are new entrants to the palm oil milling industry, consideration may need to be given in future reviews to the suitability of an industry wide FFB PoR being adopted or the introduction of a different formula, as new entrants may have significantly different cost models.

To undertake the analysis, the Review Team developed a Model to provide the analytical platform in order to:

- establish the costs of production for the smallholders and milling companies;
- determine milling revenues, costs and profits arising from operations;
- review the share of milling profits that smallholders and milling companies derive under the current FFB PoR; and
- perform sensitivity analysis across a range of scenarios on key variables.

The 2001 Review focused on establishing the costs of production with little evidence of reviewing the sharing of profits.

This Review adopts an increased focus on quantifying and analysing the profit sharing in excess of cost recovery to assist all stakeholders to fully understand the impact of oil prices, currency and yield on the FFB price and consequential economic outcomes for smallholders and milling companies.

The Model developed includes the following modules:

- General inputs;
- Milling cost inputs;
- Grower cost inputs;
- Calculation sheet;
- Scenario parameters;
- Scenario analysis functionality; and
- Outputs including tables and charts that are used to form the basis of the Review’s analysis.

The Model calculates the following:

- Mill profits post tax, pre-finance and also Returns on Invested Capital (ROIC); and
- Smallholder break-even ratio and profits.

Extracts of these input and calculation schedules are included in Appendix E – Payout Ratio and Profitability Analysis Modelling.

The assumptions underlying the input variables are set out in following sections.

4.2 Cost of Production Analysis

4.2.1 Summary of 2001 Review Cost of Production Build-Up

It is necessary that an understanding of the 2001 Review cost of production build-up is established so that there is a comparable analysis, with any changes to methodology being clearly understood.

Detailed workings and outcomes from pages 32 to 36 of the 2001 Review are summarised in the following table.

Table 5 – Summary of detailed workings and outcomes from the 2001 FFB Price Formula Review

2001 Review		PGK / MT-FFB	Relative proportion of costs
Mill costs		45.18	41%
Small grower costs		65.40	59%
Small Holder Costs		Mill Costs	
Equipment costs	14.00	Company overheads	12.91
Labour	13.00	Direct milling costs	15.40
Fertilizer, herbicides	9.65	Depreciation	12.91
Transport	17.00	Tax	0.00
Total Levies	4.75	Total Mill	45.18
Housing	4.00		
Finance	3.00		
Total Smallholder	65.40		

Source: KPMG Analysis

KPMG has analysed the total costs of production and allocated the costs into line items so as to support a comparative analysis with this review. A detailed listing of the smallholder cost build-up is tabulated below.

The costs included in the 2001 Review entailed all costs of producing smallholder FFB and converting smallholder FFB to saleable product ready to ship.

Table 6 – Smallholder cost build-up used in 2001 FFB Price Formula Review

Labour Costs	
- Land clearing including: - Survey - Underbrush - Chainsaw supervision - Burning / stacking - Planting including: - Cover-crop - Stick-lining - Hole digging / planting - Fertilising	- Maintenance including: - Ring weeding - Inter-row weeding - Fertilising - Harvesting paths - Harvesting
Material Costs	
- Chainsaw hire - Cover crop seed	5" chisel - Sharpening Stone

• Seedlings (incl transport) • Fertiliser • Bush knives • Grass knives • Files • Spade • 3" chisel	• Sickle • 6 m single harvest pole • 8 m single harvest pole • 12 m single harvest pole • Harvest nets • Wheelbarrow
Housing Costs	
• House	• Water Tank
Unit Costs	
• FFB Transports Costs • OPRA Levy • OPIC Levy • Grower's Fund	• Loan Establishment + Maintenance Fees • Interest Charges • Land Rent • Growers' Association Fee

The 2001 Review incorporated housing and finance charges as a change to the 1998 review.

The detailed workings supporting smallholder cost of production are extensive in the 2001 Review; however the workings supporting milling company costs of production are limited due to commercial sensitivities.

For the milling company the costs included in the 2001 Review cost build-up are summarised in the table below.

Table 7 – Milling Company cost build-up used in 2001 FFB Price Formula Review

Direct Milling Costs	
• Factory labour • Materials • Equipment	• Contractor costs • R&M • Laboratory costs • Effluent disposal
Indirect Milling Costs	
• Factory o/heads including: – General mill R&M; – Water supply; – Staff costs; – Factory office costs; – Transport + vehicles (excl FFB transport costs); and – OHS and Training. • Smallholder Affairs Department • Depreciation (noting that this amounts to 45-60% of total company depreciation due to high capital cost of processing, storage and bulking terminal facilities)	• Allocation of company general charges: – Excl those general charges not incl specifically in factory overheads; and – 40 - 45% applied after management consultation • Cost of working capital - K2.52 a realistic opportunity cost adopted after: – Smallholder payment terms 15 days after FFB collection; – Store Oil for 30 days on average; – LC Terms of 45 days; and – Pay freight within 7 days shipping.
Forwarding Costs (mill to FOB)	
• Transport from mill to bulking terminal • Pipelines • Palm Kernel (PK) and Palm Kernel Expeller (PKE) bagging • Storage tanks • Dry cargo warehouse facilities	• Port laboratory costs • Port charges • Local agent charges • Stevedoring

4.3 Smallholder Cost of Production (2013)

The 2013 Review approach to estimating smallholder costs of FFB production is summarised as follows:

- consultations with each OPGA executive team plus Chairpersons of area divisions;
- submissions received from OPGAs setting out smallholder cost of production. It should be noted the Review Team did not conduct any field studies to validate smallholder submissions as doing so was beyond the scope of this review;
- submissions on smallholder costs received from milling company smallholder division, invariably a smallholder grower employed by the company;
- analysis by the Review Team on normalising and deducing a fair and reasonable cost of production build-up from smallholder analyses (refer Appendix F – Cost of Smallholder FFB Production);
- the inclusion of a cost for family labour (which remains a difficult factor to consider). The quantum (effectiveness) of accounted labour in the first instance was significantly overstated to benchmarking provided from the estate management, smallholder division and OPIC. The smallholders also submitted a rate of K2.50 per hour exceeding the minimum wage rate of K2.29 per hour which was appropriate to the review and consultation period;
- average FFB yield for smallholders of 20 MT per hectare to compute costs per MT FFB;
- structuring sensitivity analyses around smallholder costs of production and FFB yields given that there is no formal and audited reporting of smallholder inputs, as compared to milling companies; and
- We have analysed smallholder costs as average current costs rather than using a mode based on estimating future costs around the lifecycle and productivity of the palm as adopted in the 2001 Review. This approach was adopted because this review is intended to consider the existing industry in which the vast majority of smallholders are established businesses such that start-up expenses are sunk costs. We have included the cost of seedlings to recognise the cost for smallholders of continually renewing the palms (i.e. did not adopt a cost proportional approach).

A table listing the items used to compute the smallholder costs of production in the 2013 review is shown below.

Table 8 – Smallholder Cost of Production build-up used in 2013 FFB Price Formula Review

Labour Costs	
• Harvesting • Upkeep including: – Weeding – inter-row and circle – Fertiliser Application	• Upkeep (cont'd) – Slashing/ Grass-cutting – Pruning
Equipment Costs (incl OHS and seedlings)	
• Wheelbarrow • Harvesting Pole • Harvesting Sickle • Net • Harvesting Chisel • Aluminium Clamp • Wheelbarrow tube • Tyre Pump	• Grass knife • Bush knife • Sharpening Stone • Flat File • Spade • Spanner, Pliers and screw drivers • Gum Boots • Seedlings

Fertiliser and Herbicide Costs	
• Ammonium Nitrate	
Other Costs	
• FFB Transports Costs • OPRA Levy • OPIC Levy	• Land Rent

Throughout the consultation and analysis phase, numerous stakeholders provided information pertaining to the cost of production of a “diligent farmer”. Submissions were received from respective OPGAs and the estates.

Key points relating to cost profiles include:

- OPIC could only provide information relating to the cost of labour⁴. In order to establish an annual cost per ha Base Case, the Review Team determined the cost of equipment, fertiliser and land rent from a combination of independent research and information received during stakeholder consultations;
- Information submitted by the OPGAs varied considerably. Accordingly, KPMG used weighted averages to compute a consolidated cost for labour, equipment and fertiliser and herbicides; and
- As a point of reference, the estate estimated smallholder costs of production based on plantation work and productivity benchmarks.

The costs are shown in the table below. Refer to Appendix F – Cost of Smallholder FFB Production for submitted smallholder cost profiles.

Table 9 – Summary of Smallholder Cost of Production expressed in PGK per hectare

Annual Costs in PGK / ha	2013 Review Base Case	2013 Smallholder Cost Submission	2013 Estate Cost Submission	2001 Review ^a
Primary inputs into Production				
Equipment (incl OHS + seedlings)	130.59	215.01	99.80	504.63
Labour	1,154.16	2,065.02	467.16	468.59 ^b
Fertilisers and herbicides	336.00	387.43	320.00	347.84
	1,620.75	2,667.46	886.96	1,321.06
Transport & Levies	1,043.20	1,350.44	891.48	783.98
Costs not associated with Production				
Land Rent and Housing	80.00	783.13	-	252.32
Living costs (personal)	-	921.25	-	-
	80.00	1,704.38	80.00	252.32
Total Smallholder Costs	2,743.95	5,722.28	1,858.44	2,357.36

^a Expressed in 2013 terms using an index of 209.57% based on IMF estimates of inflation

^b The minimum wage rate has increased from K5.50 per day to K2.29 per hour

Source: (a) OPIC, OPGAs, Milling Companies and independent research (b) 2001 Review (c) KPMG Analysis

⁴ OPIC, PNG OPRA, CTP Holdings, NBPOL, Hargy Oil Palm & Ramu Agri-Industries [undated], *Smallholder guide to growing successful and profitable oil palm*.

In arriving at the Review Base Case, adjustments were made to consider (1) the link between inputs and outputs including optimal and mutually exclusive labour inputs, and (2) optimal tool and equipment life and utilisation. The following adjustments were made by the Review Team:

- **Labour** - Manual weeding and herbicide application inputs were treated as mutually exclusive. As such, the Review Team adopted the cost to manually weed on the basis that this practice is more reflective of current smallholder practice in PNG;
- **Equipment** - Given labour profiles were premised on optimal yields, equipment relating to palms younger than 7 years were deemed inappropriate thus omitted from the cost of production (e.g. costs relating to chisel). Additionally, equipment costs relating to the application of herbicides were omitted;
- **Land Rent and Housing** - the Review Team does not consider housing costs for family accommodation to be a commercial requirement or need for FFB production on smallholder plots where housing already exists irrespective of producing FFB or not; and
- **Finance** - Finance costs have been excluded from both the milling company and smallholder, because financing is a commercial decision for the individual entity which is a separate consideration to the profitability of the underlying business. This approach accords with analysis on milling companies being undertaken at operating income levels i.e. pre-financing, post tax. Additionally, smallholders obtain tools on credit at nil interest.

4.4 Smallholder Production Yields

The 2001 Review adopted an average production yield of c. 17 MT/ha for smallholder production. The milling companies noted concern that adopting a low production yield against a cost of production profile that supports optimal (higher) yielding production had the effect of overstating smallholder costs of production per MT of FFB.

The 2013 Review has considered smallholder production yield estimates as follows:

- 20 MT/ha adopted for Base Case – this represents an attainable mid-range yield for smallholders on a cost of production base that is also mid-range between satisfactory and optimal efficiency;
- 26 MT/ha adopted for Smallholder Cost submission – as the smallholders have costed in relatively high labour and other inputs it would then be expected that they attain optimal production yields as indicated by the milling companies in PNG and other markets. This also assumes that replanting is optimally managed to ensure the profile of palms remains productive; and
- 17 MT/ha adopted for Estate cost submission – the Estate has provided a cost estimate of smallholder production costs necessary to maintain the current production yields of 17 MT/ha by smallholders.

The 2013 FFB review computed smallholder costs of production are summarised in the following table.

Table 10 – Summary of Smallholder Cost of Production expressed in PGK per metric tonne

Costs in PGK / MT-FFB	2013 Review Base Case	2013 Smallholder Cost Submission	2013 Estate Cost Submission	2001 Review	2001 Review ^a
Equipment costs	6.53	8.27	5.87	14.00	29.34
Labour	57.71	79.42	27.48	13.00	27.24
Fertilizer, herbicides	16.80	14.90	18.82	9.65	20.22
Transport	45.59	45.59	45.59	17.00	35.67
Total Levies	6.57	6.35	6.85	4.75	9.95
Housing + Finance	-	-	-	7.00	14.67
Total Smallholder costs	133.20	154.53	104.61	65.40	137.06
Based on MT / ha yield:	20.0	26.0	17.0	17.2	17.2

^a Expressed in 2013 terms using an index of 209.57% based on IMF estimates of inflation

Source: (a) OPIC, OPGAs, Milling Companies and independent research (b) 2001 Review (c) KPMG Analysis

Using the cost estimates of the Review Base Case, smallholder costs of production (excluding housing and finance) have increased 2.3 times in nominal terms compared to the 2001 review estimate, with the majority of cost increase being labour per MT / ha increasing by more than 4.4 times from the labour costs in 2001. The minimum wage rate has increased from K5.50 per day to K2.29 per hour, together with material increases in labour content required (per smallholder submissions and OPIC estimates). Despite this it is interesting to note that in 2013 terms the change in overall costs is around 3%.

4.5 Milling Company Cost of Production (2013)

The 2013 Review approach to formulating milling costs of production is summarised as follows:

- consultations with each milling company executive team and collation of financial and operating data;
- analysis and summary of milling company management accounts to determine milling and associated costs to produce palm oil product for shipping, plus requested supporting further detailed analysis including allocation of overheads methodology;
- company by company review to analyse variability of cost structures so as to consider:
 - the continued appropriateness of adopting an all-industry FFB pricing model; and
 - the basis upon which to determine an all-industry model to maintain simplicity, consistency and fairness;
- reviewed the years ending 31st December 2010, 31st December 2011 and 31st December 2012 as an appropriate and representative timeframe of analysis to consider milling company cost build-up on as it:
 - captures a period of low-to-high-to-low oil price cycle; and
 - all companies from 2010 onwards had adopted enhanced financial and operating systems - inflation adjusted financial data for 2010 and 2011 for each company;
- determined that 2012 cost build-up data for each milling company was the latest independently audited information available thus was the most relevant cost basis to adopt;
- adopted weighted average of companies (by palm product produced) to determine PNG industry values (i.e. Hoskins, Bialla, Popondetta and New Ireland in order of weightings);

- included tax in milling costs because tax is an unavoidable cost borne by the mill. The 2001 review did not include tax because their analysis was based on a “break even” scenario, at which the mill makes no profit and does not pay tax. We have based our analysis on an average or typical scenario where the industry is currently operating so we are able to determine a tax amount that approximates tax paid by an average mill for 2012. Tax is calculated at 30% on EBIT. The inclusion of tax is important for analysing different revenue scenarios because tax is paid by mills but not typically by smallholders whose income falls below the taxable threshold; and
- Sensitivity analyses around milling costs of production is not considered relevant as the analysis is founded on integrated and audited reporting of company inputs, noting that the Review Team did not audit the accuracy of cost coding and allocations within each expense or revenue line beyond face value reporting.

A table listing the items used to compute the milling companies’ cost of production in the 2013 review is shown below.

Table 11 – Milling cost build-up used in 2013 FFB Price Formula Review

Company Overheads	
NBPOL companies reporting structures have clear categorisation of overheads that are not direct operating costs of estates and milling. From these overhead costs not readily identifiable to operating centres, apportionment has been undertaken on the basis of Executive head counts by operating centres.	Hargy’s reporting structure captures overheads that are not direct operating costs of estates and milling. From these overhead costs not readily identifiable to operating centres, apportionment has been undertaken on the basis of equal proportions across estate, milling and commercial operations.
The weighted average value of overheads apportioned to milling operations is 34%. It should be noted that all companies have improved accounting systems since 2001 to prepare operational reporting.	
Direct Milling Costs	
• Factory labour (incl mill executives); • Materials; • Equipment; • Contractor costs; • R&M; • Laboratory costs; • Effluent disposal; and	• Factory o/heads including - – General mill R&M; – Water supply; – Staff costs; – Factory office costs; – Transport + vehicles (excl FFB transport costs); and – OHS and Training
Exclusions from 2001 Review: • Smallholders Affairs departmental costs pertaining to direct smallholder management in lieu/support of OPIC are recovered through FFB Transport charges so are not included in Milling Company costs of production; • Cost of working capital are excluded as analysis is pre-financing costs; and • Forwarding costs (mill to FOB) are considered in the FFB calculations in the Freight costs to convert from CIF to FOB prices so are not included in Milling Company costs of production.	
Depreciation	
As per line items in management reporting, drawn from detailed asset registers	
Tax	
Tax is calculated at 30% on EBIT. Dividend withholding tax has not been considered relevant as the analysis is based on business earnings and not net earnings to owners.	

The milling costs for the PNG milling industry computed by the Review Team are summarised in the table below.

Table 12 – Summary of milling costs expressed in PGK per metric tonne

Costs in PGK / MT-FFB	2013 Review Base Case	2001 Review	2001 Review ^a
Company overheads	29.30	12.91	27.06
Processing Costs	45.86	15.40	32.27
Depreciation	19.44	12.91	27.06
Tax	19.02	-	-
Total Mill	113.62	41.22	86.39

^a Expressed in 2013 terms using an index of 209.57% based on IMF estimates of inflation

Source: (a) Milling Companies (b) 2001 Review (c) KPMG Analysis

Milling company costs of production (excluding tax) have increased 2.4 times in nominal terms since the 2001 review and 1.15 times in 2013 terms.

4.6 Costs of Production Weighting – Smallholders and Milling Company (2013)

The following table summarises the base case costs of production for the milling companies against the variable smallholder costs of production and also the weighting of costs.

Table 13 – Summary of the base case costs of production for mill against the variable smallholder costs of production

	2013 Review Base Case	2013 Smallholder Cost Submission	2013 Estate Estimate of Smallholder Costs	2001 Review
Total Smallholder costs (PGK / MT-FFB)	133.20	154.54	104.62	65.40
Total Milling Costs (PGK / MT-FFB)	113.62	113.62	113.62	45.18
Smallholder Proportion of Costs	54.0%	57.6%	47.9%	59.1%
Milling Proportion of Costs	46.0%	42.4%	52.1%	40.9%

Source: (a) OPGAs (b) Milling Companies (c) KPMG Analysis

These cost of production values represent the PPV required for each party to breakeven.

The 2013 cost of production weightings for smallholders ranges from a high of 57.6% under the cost assumptions provided by the OPGAs to a low of 47.9% on cost estimates submitted by the milling companies.

The 2001 Review adopted the cost of production weightings as the basis for FFB PoR. That is, if smallholders receive 59% of the PPV they should recover costs of production (i.e. K65.40) plus an equitable share of profit. The equitable share of profit was not quantified or analysed in the 2001 Review.

For this reason in the following sections we have analysed the projected profits of both parties, as well as the relative profitability of the milling companies, to determine whether a given PoR is equitable.

4.7 Milling Profits Analysis

Compared to the 2001 review, this review has benefitted from:

- an increase in the sophistication of the management accounting of the plantation companies;
- better access to information from milling companies; and
- increased transparency of the industry with NBPOL and SIPEF now listed.

Accordingly, we have extended the analysis of the industry beyond break even costs to consider the profit an average mill and smallholder is likely to make under different conditions. We can then compare:

- whether there is an equitable distribution of profits under different price/cost scenarios and at different PoR numbers; and
- how profitable a PNG miller is likely to be compared to its global peers. This analysis is useful because it recognises the volatility of the price for palm oil as well as the reality that millers must operate in a global environment and must make a reasonable return on capital invested.

4.7.1 Base Case

A base case was established using the weighted averages of cost of production information supplied by mills and smallholders (refer previous sections).

A base case was necessary (rather than using data specific to each region) in order to maintain the confidentiality of the millers' commercially sensitive information concerning their cost structures. A base case also enables a review of the sensitivity of various inputs and their comparative impact on the farm gate price.

Details of the Base Case inputs are set out in Appendix E – Payout Ratio and Profitability Analysis Modelling.

Based on the variable inputs the model calculates:

- Mill profits post tax, pre finance and also ROIC; and
- Smallholder break-even ratio and profits.

Extracts of the model calculation sheets for the base case are in Appendix E – Payout Ratio and Profitability Analysis Modelling.

4.8 Base Case Profitability Analysis

The base case profitability analysis output from the Model is shown in the table the below.

Table 14 – Base case profitability analysis of smallholder and mill at 57% PoR

31 Dec 2012 Baseline		Base Case
CPO Price (CIF)	USD MT	813.00
Exchange rate	PGK / USD	0.49
FFB (mill gate)	PGK / MT-FFB	209.43
Value of EU rebate	PGK / MT-FFB	6.07
PoR	%	57.00%
ROIC	%	8.29%
Smallholder costs	PGK / MT-FFB	133.20

Smallholder profit	PGK / MT-FFB	76.24
Smallholder profit proportion (vs mill)	%	63.2%
Mill profits	PGK / MT-FFB	44.37
Mill profit proportion	%	36.8%

Source: (a) OPGAs (b) Milling Company (3) KPMG Analysis

At the PoR of 57% and using the revenue assumptions adopted for the base case, smallholders receive 63.2% (K76.24 / MT-FFB) of the total profits compared to the milling company receiving 36.8% (K44.37 / MT-FFB) of total profits available from milling.

Increasing revenue scenario at 57% PoR

Table 15 below shows the effect on revenue for higher revenue scenarios. The “High revenue” scenario is based on the highest palm oil price over the previous three years and a simultaneous fall in the value of the kina to the lowest level it has reached over the previous three years.

Table 15 – Base case scenarios (increasing revenue)

31 Dec 2012 Baseline		Base Case	Increased revenue scenarios		
			High revenue	Palm Oil Price +10%	FX -10%
CPO Price (CIF)	USD MT	813.00	1,292.00	894.30	813.00
Exchange rate	PGK / USD	0.49	0.35	0.49	0.44
FFB (mill gate)	PGK / MT-FFB	209.43	520.36	234.14	232.70
Value of EU rebate	PGK / MT-FFB	6.07	10.29	6.79	6.07
PoR	%	57.00%	57.00%	57.00%	57.00%
ROIC	%	8.29%	38.97%	10.73%	10.59%
Smallholder costs	PGK / MT-FFB	133.20	133.20	133.20	133.20
Smallholder profit	PGK / MT-FFB	76.24	387.16	100.95	99.51
Smallholder profit proportion (vs mill)	%	63.2%	65.0%	63.7%	63.7%
Mill profits	PGK / MT-FFB	44.37	208.56	57.42	56.66
Mill profit proportion	%	36.8%	35.0%	36.3%	36.3%

Source: (a) OPGAs (b) Milling Company (3) KPMG Analysis

The FFB formula and PoR at 57% favours smallholders’ profit share in an increasing FFB rate environment, because the mill pays a proportion of its profit in tax. Smallholder share of milling profits exceeds 63% in each increasing revenue scenario. Smallholders are earning profits in addition to cost recovery in the order of PGK76 to PGK387 per MT-FFB under the above scenarios. It should be noted that these profits are in addition to smallholder wages included in the smallholder cost build-up calculations.

When the world price of palm oil increases by 10% it increases smallholder profit from PGK76.24 to PGK100.95 per MT-FFB. When the PGK weakens against the USD by 10% it increases smallholder profit from PGK76.24 to PGK99.51 per FFB-MT. These movements have the same impact on milling company profitability.

A measure of the reasonableness of profit earned by the milling company is that the ROIC only exceeds 10% in the scenarios only when the FFB mill gate price paid to smallholders exceeds PGK230 / MT-FFB.

Decreasing revenue scenario at 57% PoR

Table 16 below shows the effects on revenue for lower revenue scenarios. The “Low revenue” scenario is based on the palm oil price falling to the lowest level it has reached over the previous three years and a simultaneous strengthening in the value of the kina to the highest level it has reached against the US dollar over the previous three years.

Table 16 – Base case scenarios (decreasing revenue)

31 Dec 2012 Baseline		Base Case	Decreased revenue scenarios		
			FX +10%	Palm Oil Price -10%	Low revenue
CPO Price (CIF)	USD MT	813.00	813.00	731.70	791.00
Exchange rate	PGK / USD	0.49	0.53	0.49	0.49
FFB (mill gate)	PGK / MT-FFB	209.43	190.39	184.72	202.62
Value of EU rebate	PGK / MT-FFB	6.07	6.07	5.36	5.88
PoR	%	57.00%	57.00%	57.00%	57.00%
ROIC	%	8.29%	6.41%	5.85%	7.62%
Smallholder costs	PGK / MT-FFB	133.20	133.20	133.20	133.20
Smallholder profit	PGK / MT-FFB	76.24	57.20	51.52	69.43
Smallholder profit proportion (vs mill)	%	63.2%	62.5%	62.2%	63.0%
Mill profits	PGK / MT-FFB	44.37	34.32	31.32	40.78
Mill profit proportion	%	36.8%	37.5%	37.8%	37.0%

Source: (a) OPGAs (b) Milling Company (3) KPMG Analysis

The FFB formula and PoR at 57% favours milling company profit share marginally in a decreasing FFB rate environment because the mill pays a proportion of its profit in tax. Smallholder share of milling profits continues to be in the order of 62% to 63% in each decreasing revenue scenario. Smallholders are earning profits in addition to cost recovery in the order of PGK51 to PGK69 per MT-FFB under the above scenarios. It should be noted that these profits are in addition to smallholder wages included in the smallholder cost build-up calculations.

When the world price of palm oil decreases by 10% it decreases smallholder profit from PGK76.24 to PGK51.52 per MT-FFB. When the PGK strengthens against the USD by 10% it reduces smallholder profit from PGK76.24 to PGK57.20 per MT-FFB. These movements have the same impact on milling company profitability.

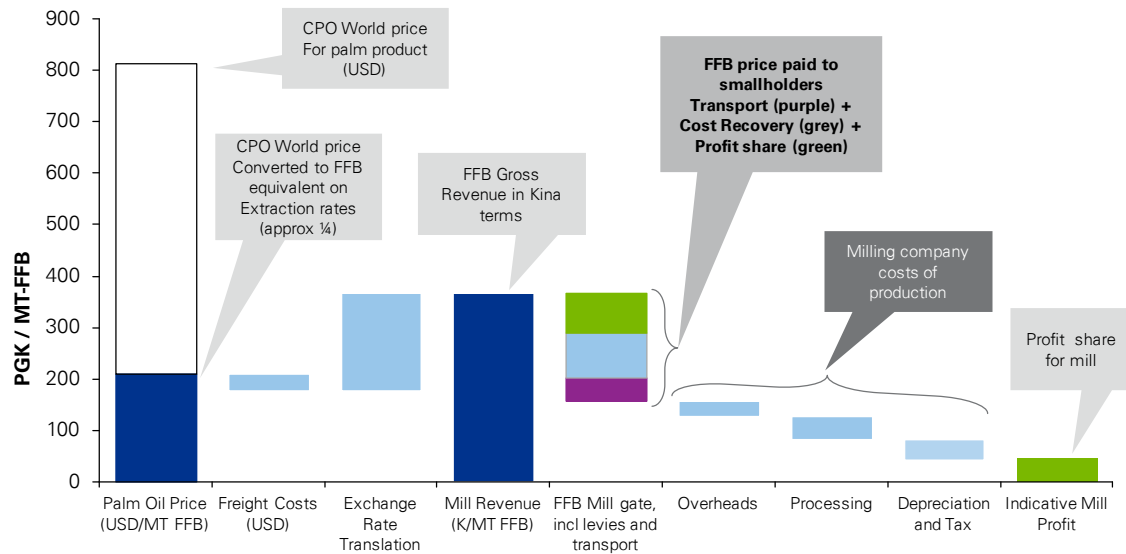
In such a decreasing revenue scenario, milling company ROIC falls to below 10%.

The review modelling of profitability sharing over and above FFB production costs is important in that it demonstrates that the PoR has within its construct both the recovery of production costs plus a share of milling profits to the smallholders.

During the smallholder consultations it was apparent that the constituent factors and related costs from the production of FFB through to palm oil products ready to ship was not understood to any meaningful level, somewhat understandably given the commercial complexity of the industry.

The following waterfall chart sets out the constituent factors within the base case scenario of crude palm oil. The first stack shows the revenue available per tonne of FFB compared to the world price for CPO (i.e. the extraction rate). The mill revenue stack in blue is based on Kina, with the following stacks showing how costs compare to mill profit.

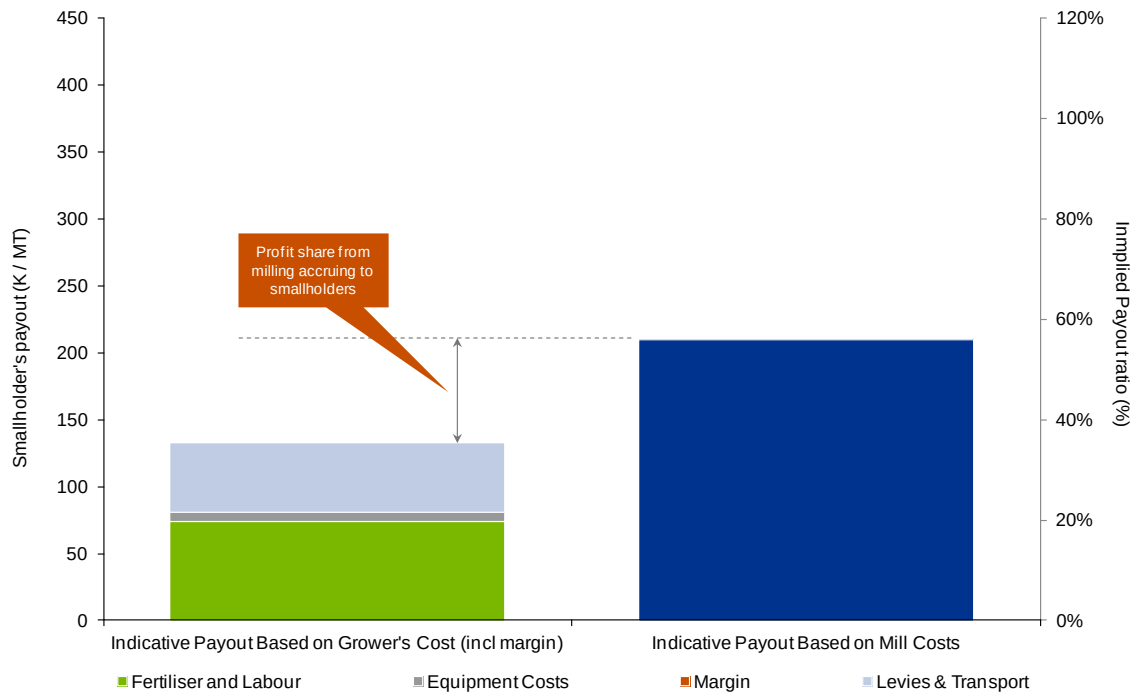
Chart 5 – Revenue and Milling Cost Waterfall for Crude Palm Oil



Source: KPMG Analysis

In the following chart the solid blue stack depicts the FFB price paid compared to the smallholder cost of FFB production in the multi-layered stack. The difference in stack scale is the FFB profit accruing to the smallholder.

Chart 6 – Grower Costs and FFB Mill Gate payout comparison (base case)



Source: KPMG Analysis

4.9 Scenario Analysis – Variable PoR Ranges

We have modelled the effect of changes on smallholder and mill company profits and company ROIC using different PoRs.

4.9.1 55% PoR Range

The tables below show a 55% PoR under the same increasing and decreasing revenue scenarios used earlier under the current 57% PoR.

Increasing revenue scenario at 55% PoR

At a reduced PoR of 55% on the base case variables and increasing revenue scenarios, the smallholder profit ranges between 58% and 62% of that available from milling. Refer to the table below.

Table 17 – 55% PoR scenario (increasing revenue)

31-Dec-2012 Baseline		Base Case	Increased revenue scenarios		
			High revenue	Palm Oil Price +10%	FX -10%
CPO Price (CIF)	USD MT	813.00	1,292.00	894.30	813.00
Exchange rate	PGK / USD	0.49	0.35	0.49	0.44
FFB (mill gate)	PGK / MT-FFB	202.08	502.10	225.93	224.54
Value of EU rebate	PGK / MT-FFB	6.07	10.29	6.79	6.07
PoR	%	55.00%	55.00%	55.00%	55.00%
ROIC	%	9.25%	41.35%	11.80%	11.65%
Smallholder costs	PGK / MT-FFB	133.20	133.20	133.20	133.20
Smallholder profit	PGK / MT-FFB	68.89	368.90	92.73	91.34
Smallholder profit proportion (vs mill)	%	58.2%	62.5%	59.5%	59.4%
Mill profits	PGK / MT-FFB	49.52	221.35	63.17	62.38
Mill profit proportion	%	41.8%	37.5%	40.5%	40.6%

Source: (a) OPGAs (b) Milling Company (3) KPMG Analysis

Decreasing revenue scenario at 55% PoR

Under the decreasing revenue scenarios, profit proportions for smallholder growers from milling ranges between 55% and 58%. Refer to the table below.

Table 18 – 55% PoR scenarios (decreasing revenue)

31 Dec 2012 Baseline		Base Case	Decreased revenue scenarios		
			FX +10%	Palm Oil Price -10%	Low revenue
CPO Price (CIF)	USD MT	813.00	813.00	731.70	791.00
Exchange rate	PGK / USD	0.49	0.53	0.49	0.49
FFB (mill gate)	PGK / MT-FFB	202.08	183.71	178.24	195.51
Value of EU rebate	PGK / MT-FFB	6.07	6.07	5.36	5.88
PoR	%	55.00%	55.00%	55.00%	55.00%
ROIC	%	9.25%	7.29%	6.70%	8.55%
Smallholder costs	PGK / MT-FFB	133.20	133.20	133.20	133.20
Smallholder profit	PGK / MT-FFB	68.89	50.52	45.04	62.32
Smallholder profit proportion (vs mill)	%	58.2%	56.4%	55.7%	57.7%

Mill profits	PGK / MT-FFB	49.52	39.00	35.86	45.76
Mill profit proportion	%	41.8%	43.6%	44.3%	42.3%

Source: (a) OPGAs (b) Milling Company (3) KPMG Analysis

4.9.2 59% PoR Range

The table below shows a 59% PoR under the same increasing and decreasing revenue scenarios used earlier under the current 57% PoR.

Increasing revenue scenario at 59% PoR

At an increased PoR of 59% on the base case variables and increasing revenue scenarios, the proportion of smallholder profit from milling ranges between 67% and 68%. Refer to the table below.

Table 19 – 59% PoR scenarios (increasing revenue)

31-Dec-2012 Baseline		Base Case	Increased revenue scenarios		
			High revenue	Palm Oil Price +10%	FX -10%
CPO Price (CIF)	USD MT	813.00	1,292.00	894.30	813.00
Exchange rate	PGK / USD	0.49	0.35	0.49	0.44
FFB (mill gate)	PGK / MT-FFB	216.78	538.62	242.36	240.87
Value of EU rebate	PGK / MT-FFB	6.07	10.29	6.79	6.07
PoR	%	59.00%	59.00%	59.00%	59.00%
ROIC	%	7.33%	36.58%	9.65%	9.52%
Smallholder costs	PGK / MT-FFB	133.20	133.20	133.20	133.20
Smallholder profit	PGK / MT-FFB	83.58	405.42	109.16	107.67
Smallholder profit proportion (vs mill)	%	68.1%	67.4%	67.9%	67.9%
Mill profits	PGK / MT-FFB	39.23	195.78	51.67	50.95
Mill profit proportion	%	31.9%	32.6%	32.1%	32.1%

Source: (a) OPGAs (b) Milling Company (3) KPMG Analysis

4.9.3 Decreasing revenue scenario at 59% PoR

Under the decreasing revenue scenarios, the proportion of smallholder profit ranges in the 68% mark (refer to Table 20).

Table 20 – 59% PoR scenarios (decreasing revenue)

31-Dec-2012 Baseline		Base Case	Decreased revenue scenarios		
			FX +10%	Palm Oil Price -10%	Low revenue
CPO Price (CIF)	USD MT	813.00	813.00	731.70	791.00
Exchange rate	PGK / USD	0.49	0.53	0.49	0.49
FFB (mill gate)	PGK / MT-FFB	216.78	197.07	191.20	209.73
Value of EU rebate	PGK / MT-FFB	6.07	6.07	5.36	5.88
PoR	%	59.00%	59.00%	59.00%	59.00%
ROIC	%	7.33%	5.54%	5.00%	6.69%

Smallholder costs	PGK / MT-FFB	133.20	133.20	133.20	133.20
Smallholder profit	PGK / MT-FFB	83.58	63.88	58.00	76.54
Smallholder profit proportion (vs mill)	%	68.1%	68.3%	68.4%	68.1%
Mill profits	PGK / MT-FFB	39.23	29.64	26.79	35.80
Mill profit proportion	%	31.9%	31.7%	31.6%	31.9%

Source: (a) OPGAs (b) Milling Company (3) KPMG Analysis

In closing, the analysis suggests the following:

- An equitable split of total profit from milling is achieved over a range of different PoR numbers; and
- Current cost and revenue numbers indicate the share of milling profit for smallholders is in excess of 50% when using a PoR between 55% and 59%.

4.10 Other Profit Sharing Influences

It is also important to note that the price of palm oil in PGK terms, which neither mill companies nor smallholders can influence, is a much more important factor in each party's profitability than the PoR number.

The 2001 Review when determining the increased PoR for smallholders indicated that the benefit of the 3.85% and 6.4% EU duty exemptions⁵ for CPO and PKO respectively accrued solely to the benefit of the milling companies at that time. The 2013 Review team note that the EU duty exemptions are currently being duly shared with smallholders, and should continue to be shared with smallholders for as long as the milling company realises such exemptions.

The 2013 Review has included these EU duty exemption benefits into the analysis of FFB pricing, noting that such benefits are worth in excess of PGK6 per FFB MT to the smallholders irrespective of the PoR value.

Roundtable Sustainable Palm Oil (RSPO) is a commitment and investment made by the milling companies under review to sustainable business practices. The investment in RSPO provides, in simple terms, increased and differential market access to customer markets (like Europe) that many other global competitors cannot access to sell products. A small premium via a rebate is earned by the milling companies.

Across each of the locations we note that RSPO premiums are excluded from the FFB calculations due to the irregularity and minimal values. However, the audit process has identified that the milling companies are passing on the benefit of the RSPO premiums to the smallholders on an annual basis and an additional payment is made to smallholders in January of each year.

The 2013 Review has excluded the RSPO premium benefit from its analysis except to note that the benefit is being passed on to smallholders.

The impact of road infrastructure on smallholder profits is considered in the following section.

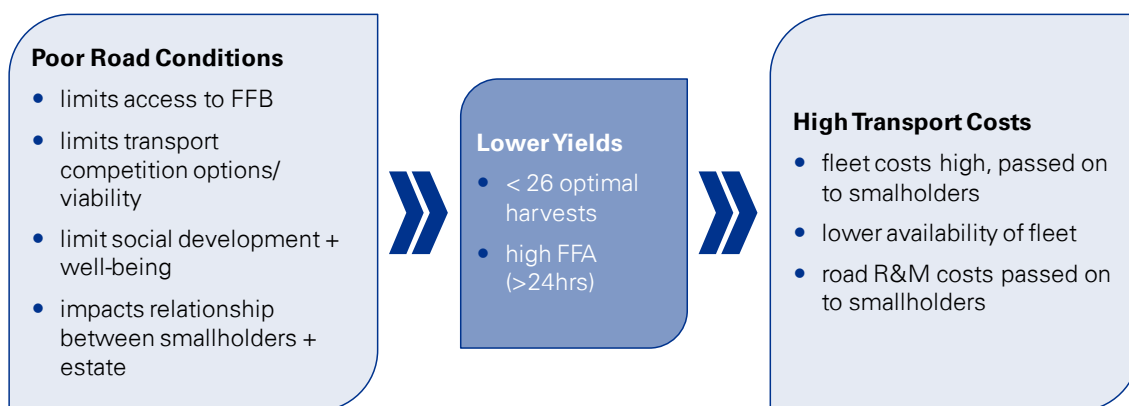
⁵ EU Duty exemptions accrue to PNG simply as signatories to the Lome Convention, and not to do with RSPO or other investments.

5 Key Determinants of Smallholder Net Profitability (other than PoR)

The PoR factor, extraction rates and FOB palm product prices give rise to a Farm Gate price that returns to the smallholders a recovery of costs of production and transport costs to mill gate plus a profit margin.

Throughout the Review consultations and many prior oil palm industry related studies it is highly obvious that the poor condition of road and bridge infrastructure in the smallholder precincts has a major negative impact on the profitability of smallholders and the milling companies.

Diagram 2 – Road condition impact on smallholder profitability



5.1 Road Infrastructure

The impact of poor smallholder road connectivity is well documented and underscored in particular by:

- SADP which had c. 70% of its funding targeted on road connectivity and resultant increase in smallholder productivity; and
- the SADP Road Maintenance Trust Fund Initial Design and Options Report (2013) had a specific focus on smallholder road connectivity.

With the Model developed for this 2013 Review it is possible to quantify the negative impact poor road infrastructure has on smallholder returns.

The Review Team has developed its analysis based on the OPIC submitted PIP Grant Application in June 2013 in which K70 million funding was requested for road improvement initiatives in West New Britain and Oro province oil palm areas. Key performance improvement metrics from road infrastructure improvements included:

- reduction in missed harvests of > 50% from 2012 baseline; and
- 20% reduction in FFB transport price from 2012 baseline.

In the 2013 Review model these metrics have been included as having a smallholder production yield of 26 MT/ha instead of 20 MT/ha, and transport costs have been reduced by 20% from K45.60 per FFB-MT to K36.50 per FFB-MT.

Table 21 – Smallholder profits lost to road connectivity

31-Dec-12 Baseline		Base Case	Roads Improvement
CPO Price (CIF)	USD MT	813.00	813.00
Exchange rate	PGK / USD	0.49	0.49
FFB (mill gate)	PGK / MT-FFB	209.43	209.43
Value of EU rebate	PGK / MT-FFB	6.07	6.07
PoR	%	57.00%	57.00%
ROIC	%	8.29%	8.29%
Smallholder costs	PGK / MT-FFB	133.20	105.65
Smallholder profit	PGK / MT-FFB	76.24	103.78
Mill profits	PGK / MT-FFB	44.37	44.37
Incremental Smallholder Profit (PGK / MT-FFB)			27.54
Smallholder FFB Tonnage in 2012			850,000
Smallholder Profits Lost to Road Connectivity (PGK)			23,411,997

The modelling indicates that a K70 million investment by the State of PNG in smallholder road infrastructure could potentially result in additional profit of c. K23m per annum being earned by the smallholders through increased FFB production sold to the mill, and paying lower costs of transport to service providers.

The Review Team believes that some of the tension between smallholders and milling companies would reduce if smallholders were empowered (enabled) by government and road infrastructure to be more productive and received the resultant improved returns for their efforts and costs.

5.2 FFB Production Yields

Smallholder production yields are influenced by a few (semi-)controllable primary factors:

- effective management of the land and trees (agronomy and labour efficiency); and
- transport infrastructure.

World commodity prices and foreign exchange movements are uncontrollable factors.

During the review consultations it was apparent that smallholder production yields were highly variable, causing certain smallholders to have more concern with FFB pricing than other smallholders. The reasons for such variability are many and well understood by the smallholders, OPIC and the Estate managers, and is not specifically an issue for this review. However the 2013 Review model can quantify how the variable FFB production yield impacts smallholder costs of production and profitability as per the following table.

Table 22 – FFB production yield impacts on smallholder costs

	17 MT/ha	20 MT/ha (Base case)	24 MT/ha	26 MT/ha
Smallholder costs (PGK / MT-FFB)	147.35	133.20	119.82	114.68
Smallholder profits (PGK / MT-FFB) (in excess of cost recovery)	62.08	76.24	89.61	94.75

Determining an equitable FFB PoR should be premised on an acceptable and attainable FFB Production yield target, more so than an under-performing FFB production yield target. The base case modelling has adopted 20 MT/Ha FFB production as a reasonable and attainable yield target upon which to assess the PoR value.

“Poor smallholder yields represent opportunity costs of unrealised potential on a number of aspects:

- *Smallholder income earning capacity is lowered;*
- *The company misses out on potential capacity from increased raw material throughput which could lower its unit costs of milling FFB;*
- *With higher milling costs smallholders receive less favourable prices for their FFB sold to the companies under the FFB pricing formula;*
- *The State loses potential tax revenue from corporate tax on profits and dividends; and*
- *The provincial governments lose potential tax revenue from the VAT and derivation grants if provincial exports are lower than they could be with more productive oil palm smallholders.”⁶*

5.3 FFB Transport Costs

FFB transport costs have been modelled in the base case at K45.60/ MT FFB being the weighted average of FFB transport costs at 31 December 2012, noting that New Ireland province has a different FFB transport model to other provinces. FFB transport costs represent a significant loss of net earnings for smallholders and understandably a major cause of frustrations between smallholders and milling companies.

As highlighted in the previous section the poor state of smallholder road infrastructure causes this to be a largely uncontrollable factor for both smallholders and milling companies.

The poor road infrastructure also gives rise to a very real barrier to entry for alternative and competitive FFB transport providers. Those smallholders who operate public transport services (e.g. Public Moving Vehicles) have a real understanding of the operational and financial challenges of a road transport business in rural PNG. Whilst USG Ltd charge K35/ MT FFB in Oro Province it needs to be noted that the financial viability of their independent business is marginal and largely sustained from providing FFB collection services to the Estate in addition to the primary business focus of smallholder collections.

Consultations indicate that the FFB transport model is understood and acceptable to smallholders, other than the cost factor. The three larger milling companies own and operate a fleet of hook-lift trucks specifically for smallholder FFB collections, together with a smallholder affairs operational team that has a primary focus on FFB collection management and also agronomy support.

The 2013 Review has focused on how these milling company controlled FFB collection services are accounted and passed on to smallholders. The Audit scope of the Project has tested whether the milling companies have correctly charged FFB transport costs to smallholders.

The Review Team notes that the milling companies have implemented Fleet Management operating systems in the past several years. This allows the tracking of costs by each vehicle and therefore the ability to transparently allocate direct vehicle costs specific to smallholder FFB collection. During the review process the milling companies identified a few measures that would benefit the smallholder’s FFB transport cost allocations (i.e. reduce the cost proportion). These changes to FFB transport cost allocations will be implemented forthwith by the milling companies and structured into future audits of the FFB transport allocations.

It is also important to note that lower FFB yields increase the transport costs on a per MT-FFB basis as the cost of trucks driving to each location per the roster is simply spread across a lower pay load, meaning unit costs are higher.

⁶ NRI Report No. 2666, Review of the Oil Palm Fresh Fruit Bunch Pricing Formula, November 2001, Burnett & Ellingson (page 10)

6 Alternative FFB payout bases (models)

6.1 Milling costs plus margin model

The Review Team modelled a cost plus margin FFB price formula which set the FFB price by beginning with palm product revenue for FFB, and subtracting agreed milling costs plus a margin or additional amount to reflect the mill's need to return a profit. Smallholders would then keep any difference.

The margin could be set by reference to the costs or by reference to the amount needed for the mill to make a return on invested capital. It would need to be increased by inflation on an annual basis and reviewed regularly to determine whether the mechanism was still reflective of mill costs.

The base case modelling indicated a milling margin of between 35% and 40% would be required by the mills to approximate the same returns under a 57% PoR formula. This analysis is presented in table 23 below.

At face value this would benefit smallholders because they would be able to keep any improvements in the FFB price from an increase in the price of palm oil, and mills would benefit from the certainty of receiving a revenue stream and covering their costs.

Feedback from the milling companies and OPIC was not supportive for such a model as they suggested that a similar model was previously in place giving rise to the "negative" returns to smallholders when palm product revenues dropped too low.

Table 23 – Milling cost plus margin analysis

Margin		20	30	35	40	50	60	70
Revenue per FFB	K / MT FFB	367.42	367.42	367.42	367.42	367.42	367.42	367.42
Milling costs	K / MT FFB	113.62	113.62	113.62	113.62	113.62	113.62	113.62
Mill margin	K / MT FFB	22.72	34.09	39.77	45.45	56.81	68.17	79.53
FFB (cost plus margin)	K / MT FFB	231.08	219.72	214.04	208.36	197.00	185.63	174.27
FFB (Defined ratio)	K / MT FFB	209.43	209.43	209.43	209.43	209.43	209.43	209.43
ROIC	K / MT FFB	4.25%	6.37%	7.43%	8.49%	10.61%	12.74%	14.86%
Payout ratio	%	62.89%	59.80%	58.25%	56.71%	53.62%	50.52%	47.43%

Margin for Target ROIC		5	7.5	10	12.5	15	20
Revenue per FFB	K / MT FFB	367.42	367.42	367.42	367.42	367.42	367.42
Milling costs	K / MT FFB	113.62	113.62	113.62	113.62	113.62	113.62
Mill margin	K / MT FFB	26.76	40.14	53.53	66.91	80.29	107.05
FFB (Margin for Target ROIC)	K / MT FFB	227.04	213.66	200.28	186.90	173.52	146.75
FFB (Defined ratio)	K / MT FFB	209.43	209.43	209.43	209.43	209.43	209.43
Payout ratio	%	61.79%	58.15%	54.51%	50.87%	47.23%	39.94%

Margin		20	20	20	40	40	40	60	60	60
Base revenue	K / MT FFB	367.42								
High/medium/low	K / MT FFB	404.16	367.42	330.68	404.16	367.42	330.68	404.16	367.42	330.68
Milling costs	K / MT FFB	113.62	113.62	113.62	113.62	113.62	113.62	113.62	113.62	113.62
Mill margin	K / MT FFB	22.72	22.72	22.72	45.45	45.45	45.45	68.17	68.17	68.17
FFB (cost plus margin)	K / MT FFB	267.82	231.08	194.34	245.10	208.36	171.62	222.38	185.63	148.89
FFB (Defined ratio)	K / MT FFB	230.37	209.43	188.49	209.43	209.43	209.43	209.43	209.43	209.43
ROIC	K / MT FFB	4.25%	4.25%	4.25%	8.49%	8.49%	8.49%	12.74%	12.74%	12.74%
Payout ratio	%	66.27%	62.89%	58.77%	60.64%	56.71%	51.90%	55.02%	50.52%	45.03%

Margin for Target ROIC		5	5	5	10	10	10	15	15	15
Base revenue	K / MT FFB	367.42								
High/medium/low	K / MT FFB	404.16	367.42	330.68	404.16	367.42	330.68	404.16	367.42	330.68
Milling costs	K / MT FFB	113.62	113.62	113.62	113.62	113.62	113.62	113.62	113.62	113.62
Mill margin	K / MT FFB	26.76	26.76	26.76	53.53	53.53	53.53	80.29	80.29	80.29
FFB (cost plus margin)	K / MT FFB	263.78	227.04	190.30	237.02	200.28	163.54	210.26	173.52	136.77
FFB (Defined ratio)	K / MT FFB	230.37	209.43	188.49	209.43	209.43	209.43	209.43	209.43	209.43
ROIC	K / MT FFB	5.00%	5.00%	5.00%	10.00%	10.00%	10.00%	15.00%	15.00%	15.00%
Payout ratio	%	65.27%	61.79%	57.55%	58.64%	54.51%	49.45%	52.02%	47.23%	41.36%

Source: KPMG Analysis

The analysis demonstrates that at the current PoR the mills are not making excessive returns at the expense of smallholders. As shown by the comparative analysis of returns earned by companies with significant interest in oil palm production and marketing provided in Appendix D – Return On Invested Capital Benchmarking the estimate ROIC in the base case using the 57% PoR is at the lower end of the range of returns earned by the comparable companies analysed.

6.2 Consideration of other country FFB pricing models

Previous reviews have emphasised the difficulties in making direct comparisons between other countries and PNG due to many variables including:

- There are significant agronomic differences between countries including lower extraction rates (lesser mill capability and smallholder inputs), lower yields (soils and smallholder inputs) and variable planting material;
- Larger Asian oil palm growing countries have highly competitive markets with mills competing for FFB, whilst noting that FFB quality acceptance is more stringent than PNG with FFB regularly rejected at mill gate;
- The supply chain from grower to milling company has variable models, with some countries like Malaysia having an extensive pool of licensed dealers to collect FFB and transport expediently to the mill (noting such dealers are reported as negatively influencing the quality of exported CPO by engaging in buying of FFB without quality controls);
- There are significant differences in the cost structure between PNG and other countries with arguably more effective infrastructure (transport), cheaper infrastructure (power) and a larger available labour pool (in addition to cost and productivity differences in labour); and
- There are differences in ease of access to cost effective milling equipment and infrastructure (other countries do not have a requirement to ship and import construction and maintenance expertise).

The Review team sourced, through private sector contacts, FFB mill gate payout calculation sheets for both Indonesia and Malaysia, as a web search failed to yield information in adequate detail to provide insight into FFB payout calculations in countries that use smallholders to produce oil palm.

The analysis of PNG, Indonesia and Malaysia FFB mill gate pricing, as set out in table 24 suggests that all three countries adopt an approach founded on the same base commercial logic of as demonstrated in the following diagram and table.

Diagram 3 – Road condition impact on smallholder profitability



A face value review of the formula components as set out in the following table cannot be solely relied upon to determine comparability. A review of literature indicates that transparency and accountability over what costs and variables are included in a FFB mill gate price calculation is paramount to the effectiveness of the smallholder and milling company relationship and supply chain equilibrium. Refer to the table below.

Table 24 – Mill Gate Price analysis – PNG, Indonesia and Malaysia

Line #	Formula Component	PNG	Indonesia ^a	Malaysia ^b
1	Finished Product (C.I.F)	CPO + PKO - C.I.F Rotterdam (Oil World source) PKE - Australia contract	C.I.F n/a - F.o.B base	C.I.F n/a - F.o.B base
2	EU Premium Benefit	CPO + PKO (sold into EU market)	n/a - domestic market	n/a - domestic market
3	Shipping Costs	CPO + PKO + PKE (actual costs)	n/a - domestic market	n/a - domestic market
4	Exchange Rate	Agreed FX rate to adopt	Nil transparency on FX rate	Nil transparency on FX rate
5	Finished Product (F.O.B)	CPO + PKO + PKE (1+2-3) x 4	CPO + PK (no PKO or PKE) Selling price of previous weeeek	CPO + PK (no PKO or PKE) Avg. MPOB Peninsular quoted price
6	Taxes	n/a	All taxes incurred in the sales.	Cess MPOB
7	Marketing	Incl. in shipping costs (line 3)	Based on actual costs.	n/a
8	Net FOB of Finished Product	n/a	(5 – 6 - 7)	Avg. MPOB Peninsular quoted price
9	Transport to port	Incl. in shipping costs (line 3)	Based on actual costs.	Based on actual costs.
10	Net Price of Finished Product at POM/Tank	(1 + 2 - 3) x 4	8 - 9	8 - 9
11	Yield	36 month rolling average	Actual OER/KER of previous week, or estimates based on age of palms	% applied - unknown basis
12	Equivalent Value in FFB Mt	10 x 12	10 x 12	10 x 12
13	Percentage of sales	n/a	Average volume of (local) sales during previous week.	n/a
14	Average FFB Mt value at POM/Tank	12	12 x 13	12
15	less: Processing costs	n/a - factored into Payout Ratio	Based on total processing costs of the company the previous week.	value applied - unknown basis
16	less: Depreciation	n/a - factored into Payout Ratio	Calculated in proportion of the POM value minus residual value, based on the processing capacity (with an economic life of 15 years).	n/a

17	less: Administration	n/a - factored into Payout Ratio	Maximum 10% of FFB value at the POM weighbridge	n/a
18	Payout Ratio variable	0.57	n/a	n/a
19	FFB Mill Gate Price	14 x 17	14 – 15 – 16 - 17	14 – 15 – 16 - 17
20	Value of the "K" index	Equiv. To Payout Ratio	19 ÷ 14	n/a

Source: (a) SIPEF sourced FFB calculation sheet (b) KPMG Malaysia sourced FFB calculation sheet – both unable to be verified for accuracy and integrity.

The 2013 Review provides transparency to the costs to market and costs of milling (processing) variables on which the FFB PoR is derived.

It should also be highlighted that the reviewed PNG milling companies calculate palm product value for growers on the value of processed PKO and PKE, noting that in Indonesia and Malaysia growers have their PPV calculated on PK value only i.e. the growers in Asian countries do not receive the finished product value benefit as PNG growers receive.

7 Application of the FFB Price Formula

As a result of having better access to the milling companies and the information supporting the FFB Price Formula a key outcome of the 2013 Review is that a Framework to manage and apply the FFB Price Formula has been determined through a consultative process. This should facilitate effective adoption by the milling companies.

The 2001 Review recommendations were not fully or formally adopted, largely due to a lesser level of consultation. The lack of formal adoption by the millers and industry of an agreed and clearly defined Framework inhibits the ability to conduct effective audits of the application of the FFB Price Formula.

A Framework to calculate FFB Price at Mill Gate is provided, as well as a Framework to provide transparency and accountability by the milling companies on post-Mill Gate factors⁷ including FFB Collection costs and other deductibles. The industry will need to determine how best to formally agree and adopt the framework and the recommendations relating to formula elements.

7.1 Mill Gate Price Formula Framework

The following recommendations are made to guide the milling companies and the industry for calculating the FFB Mill Gate pricing. Upon adoption the milling companies would then be required to (re)structure and align all supporting calculation sheets to facilitate regular accountability audits.

Table 25: Proposed Mill Gate Price Formula Framework

Formula element	Recommendation
Frequency of calculations	To reflect current practice and frequency of export shipments it is recommended that FFB calculations continue to be performed on a monthly basis. Milling companies are to publish the FFB Price by the 7 th day of each month and that price is applicable to all FFB purchases until the following months' price is published. Publish means to notify smallholders in the current adopted practice within the milling companies or by whatever means deemed effective by the milling companies in consultation with each OPGA.
World market prices – Finished Products	It is recommended that the use of <i>Oil World</i> market prices be formally adopted as part of the framework. Consistent with current practice it is recommended that the monthly average rate published by <i>Oil World</i> is used in the FFB calculation, as sourced from www.oilworld.biz .
Duty exemptions	To reflect current practice it is recommended that inclusion of the EU duty exemptions (where applicable for sales into the EU) be formally adopted as part of the FFB calculations. It is recommended that this be separately disclosed on the published monthly FFB Price calculations.
RSPO Premium	Where RSPO premiums are received by the milling companies it is recommended

⁷ Post-Mill Gate factors in the Review sites include FFB collections and levies that in many other oil palm countries are not managed by the milling companies but are required of milling companies in PNG by the smallholders and Government.

Formula element	Recommendation
	that the benefit of these RSPO premiums is passed back to the smallholders. Consistent with current practice it is recommended that this is calculated and paid separately on an annual basis through the pay slip process without a need to be formally included in the FFB price calculations (given the relatively small values per smallholder and resultant administration costs if done more than annually). The milling companies are to establish an accountable process for passing these RSPO premiums to smallholders.
Costs to Market	It is recommended that inclusions for Costs to Market and the calculation method be defined and formally adopted as part of the framework. It is recommended that Costs to Market reflect actual costs incurred by the milling companies with the following elements suggested for inclusion: • cost of transport from the mill to the wharf; • shipping and insurance costs; • demurrage and other PNG influenced shipment costs; and • sales commission percentage rate applied to CPO and PKO prices. Consistent with the current treatment it is recommended that Costs to Market reflect actual costs incurred for each shipment on a one month trailing basis.
Extraction rates	It is recommended that the method for determining extraction rates at each mill be defined and formally adopted as part of the framework. Current acceptable practice is that the extraction rate is based on a 36 month rolling average basis. It is recommended that the industry work toward a 12 month rolling average to reflect milling, agronomic and yield changes that occur more dynamically. A transition plan will need to be considered and managed.
Exchange rates	It is recommended that the average monthly mid-point of the buy-sell spread be used for the exchange rates rather than the current practice of using a month end mid-point of the buy-sell spread. This will align with adopting the world market prices of oil on a monthly average basis. It is recommended that ANZ's PNG Treasury department be the source of the average monthly mid-point of the buy-sell spread as they transact the majority of oil palm trades in PNG.
PPV (Equivalent value in FFB-MT)	It is recommended that the current PPV calculation formula and practice continues, noting the adoption of elements as recommended above respectively.
FFB PoR	The FFB PoR as agreed by the industry (being 57% at the time of the 2013 Review) continues to be applied against the PPV to calculate the Mill Gate Price per FFB-MT for smallholders.

7.2 Post-Mill Gate Price Accountability Framework

The following recommendations and observations are made to guide the milling companies and the industry for managing and providing accountability of the post-Mill Gate factors including FFB Collection costs and other deductibles. Upon adoption the milling companies would then be required to (re)structure and align all supporting calculation sheets to facilitate regular accountability audits.

Table 26: Proposed Post-Mill Gate Price Accountability Framework

Post-Mill Gate element	Recommendation / Observation
FFB Collection Costs	As each reviewed milling company has invested in a Fleet/Workshop management system it facilitates enhanced accountability of direct costs for each vehicle and machine dedicated to FFB Collection. It is recommended that direct FFB Collection costs include the following: • direct vehicle and machine costs as accounted for by the Fleet/Workshop systems for all FFB Collection assets. This should include all workshop spares, repairs, modifications and other items, fuel and attributed labour of the workshop staff; • depreciation of vehicles and machines dedicated to FFB Collection accounted for separately; • transport contractor costs duly accounted for; • smallholder department costs directly attributable to managing the logistics of FFB Collection; and • scale management and repair costs should be separately accounted for and apportioned to FFB collections. Investments in FFB collection weight management systems should be duly accounted for (i.e. depreciated). For direct FFB collection costs it is recommended that actual costs incurred are passed on using a three month rolling average basis. It is recommended that indirect FFB Collection costs include the following: • Indirect fleet performance costs including salaries of drivers, workshop management, workshop administration and depreciation of workshop administration assets should be apportioned to FFB Collection on a transparent and rationale basis. This apportionment to be calculated by adopting a percentage allocation on an annually reviewed basis in March each year (following annual account completion). It is recommended that these costs are passed on using a twelve month rolling average basis; and • Road maintenance costs on non-Estate roads directly attributable to facilitating FFB Collection should be separately accounted for and agreement established with growers as to how to treat such costs. In regard to fertilizer delivery costs it would seem more appropriate that such delivery costs are charged directly to the grower acquiring the fertilizer and recovering such costs as part of the usual trade supply arrangements.
1% VAT added to Farmers Payout	As per section 29(6) of the VAT Act 1998 and guidance from VAT Tax Technical Rulings - "Where a VAT registered buyer of primary produce buys directly from a producer who is not registered for VAT, the buyer may increase the price paid by 1%, which is deemed to represent the VAT paid by the producer when purchasing agricultural inputs. The buyer when lodging his VAT return is then entitled to claim an additional input credit equal to the 1% amount he has paid the producer during the month."
OPRA Levy	Accountability of how OPRA funds are utilized is subject to a different review process to be initiated by smallholders if/as required.
OPIC Levy	The grower association representatives on the OPIC Board could improve accountability of receiving such levies from the milling companies to mitigate concerns on accountability of the milling companies. Accountability of how OPIC funds are utilized is

Post-Mill Gate element	Recommendation / Observation
	subject to a different review process to be initiated by smallholders if/as required.
10% VAT on OPIC Levy	The milling companies are duly passing on to OPIC the 10% VAT collected on behalf of OPIC. OPIC is then responsible for VAT accountability to the IRC.
Sexava Levy	The origins of this Levy seem to be known to all stakeholders. It is evident that the milling companies and the grower associations need to reconvene and determine an agreed Levy process and framework to suit current circumstances of each site and/or industry viewpoint.

7.3 FFB Price Calculation Summary – Formatting Improvements

The 2013 Review team have made suggestions to the milling companies and OPIC in regard to reformatting the FFB Price calculation summary that is published monthly. The suggestions were focused on improving transparency and understanding of the FFB Price formula elements.

Feedback from the smallholder forums also highlighted the need for the milling companies to review the alignment of Payslips to the Mill Gate Price formula worksheet and post-mill gate deductions.

The milling companies have taken these suggestions on board.

8 Concluding Observations and Recommendations

8.1 Key Conclusions

- The current FFB Price Formula used to determine a PoR as the basis for sharing revenue between smallholder growers and millers is considered to provide an appropriate, equitable and transparent framework for the PNG palm oil industry. Within the overall framework, as more participants enter the industry and growing areas expand it may be appropriate to use relevant input variables specific to different regions resulting in region specific PoRs;
- While the underlying rationale of using a ratio of grower cost of production and cost of milling to calculate the PoR has little apparent economic logic, it is comparatively simple to understand, transparent and entails the use of data that is readily available and verifiable;
- This review demonstrates that the current arrangements do not favour the milling company over the smallholder grower with growers receiving 63% and millers 37% of the profit available from milling grower fruit at a 57% PoR using 2012 costs and palm oil price. Analysing PoRs in the range of 55% to 59% of PPV also resulted in smallholders receiving greater than 50% of profits from milling;
- The equity in the current arrangement is supported by the fact that there is no evidence that the millers are making returns above the global industry average and in fact returns are at the low end of the range of returns reported by comparable companies;
- While alternative models for sharing revenue would be available whereby growers would be provided with the opportunity to receive a price more directly related to the market price of palm oil, grower representatives do not favour growers being effectively exposed fully to market risk. In addition the introduction of a new model would require significant consultation and while current arrangements can be regularly reviewed to ensure they remain equitable, the rationale for change is not compelling; and
- Improvement in grower productivity and upgrading the road and transport infrastructure would significantly improve grower returns. Grower frustration particularly in regard to transport infrastructure tends to escalate the tension between the smallholders and milling companies beyond normal commercial boundaries of competing financial interests (as in other palm oil markets).

8.2 Recommendations

It is recommended that:

- the current FFB Price Formula continue to be used to determine the PoR for sharing revenue between smallholder growers and milling companies across the PNG palm oil industry, noting that there may need to be a review of the appropriateness of a single PoR as new milling companies and operating models emerge;
- the FFB Price Formula be reviewed at least every 5 years with an initial review after 3 years to ensure changes in costs of production and industry models are appropriately reflected and future reviews should continue to analyse both the respective costs of production and the equitable sharing of milling profits;
- the current PoR of 57% remain at least until the next review;

- the framework for the FFB PoR calculation be adopted so that the application of the formula is consistent and able to be independently audited. Audits should occur no less frequently than every two years. The industry should consider the findings of the FFB Price Formula Application Audit & Review, and adopt and document FFB Price Formula Guidelines. Additionally, the industry will need to determine how best to formally agree and adopt the framework and the recommendations of formula elements;
- immediate attention be given to assisting growers improve their productivity and further work be undertaken to quantify the economic benefit of improving transport infrastructure and how the improvements might be delivered and funded; and
- definitive quantification of smallholder costs and productivity be undertaken prior to any further reviews as the variability of smallholder costs and productivity is a material issue to consider.



Appendices

Appendix A – Terms of Reference

A.1 Background

The Smallholder Agriculture Development Project (SADP) is a rural development project funded by the World Bank and designed to encourage further and sustainable economic growth and enhance community participation and local governance in the rural areas of two oil palm growing provinces (West New Britain and Oro Province).

As part of its remit to improve smallholder productivity, SADP is assisting the oil palm industry to review the pricing mechanism in place between the smallholder growers and the oil palm millers and implement annual audits of the pricing system. A fair and transparent pricing mechanism is an essential element of a successful industry.

A.2 Project Components

The SADP has the following two components:

- Component 1 – Smallholder Productivity Enhancement. The component supports: (a) planting additional oil palm blocks (up to 2,500 ha) along existing provincial access roads through infilling of land still available within the areas covered by oil palm infrastructure in response to smallholder demand; (b) the upgrading (reconstruction) and restoring of provincial access roads to existing smallholder oil palm blocks (at least 190 km), and maintaining all existing and upgraded roads used for oil palm fruit collection, with the establishment of sustainable financing mechanisms for road maintenance; and (c) enhancement of smallholder productivity through improved extension services.
- Component 3 – Project Implementation and Institutional Support. OPIC takes overall responsibility for project management, coordination and performance of the two components of the project. Implementation of Component 1 is undertaken through OPIC and its field offices with the support of the milling companies and of the PNG Oil Palm Research Association (PNGOPRA).

A.3 FFB Price Formula

There is a strong interdependency between smallholders and palm oil milling companies. The palm oil milling companies have limited access to land for their own estates and need smallholders to provide the volume of Fresh Fruit Bunches (FFB) to use mill capacity efficiently and expand to reach appropriate economies of scale. Smallholders completely depend on the palm oil milling companies to process their FFB and, in most cases, to collect their FFB. The companies, to varying extent, also provide other services such as interest free loans for planting and re-planting, supply of tools and fertilizer at cost, occasional emergency road repair, and other extension services. The companies market the palm oil and by-products derived from the smallholder and estate production. The companies use OPIC in most of their dealings with smallholders, and match the smallholder contribution of the OPIC levy to cover its operation costs.

A satisfactory mechanism to ensure appropriate profit sharing between smallholders and the palm oil milling companies is in place, consisting of an FFB price formula. There have been two previous reviews of the FFB price formula in its current format. The last review was commissioned in 2001 under a previous World Bank funded project (The Oro Smallholder Oil Palm Development Project).

After each review the FFB price formula was endorsed by the Commodity Working Group and adopted by the entire PNG industry. The basis of the calculation of the price payable to smallholders for FFB is not well understood but is generally accepted by all industry stakeholders. There are continuing pressures from the smallholders for a review and update of the formula

The existing FFB price formula is based on a payout ratio to share the profit from palm product sales equitably between the FFB supplier and the FFB processor. The payout ratio is determined by a comparison of the relative costs of production of smallholders and milling companies and their relative break-even points. The price of FFB must be equitable to both buyer and seller if the industry is to thrive and smallholder developments continue. The purchase of FFB must be sufficiently profitable to the companies to justify their continued support for existing smallholders and for potential new smallholder development.

Each month a "palm product value" is determined from the current world price for palm products and that value is disseminated by the Palm Oil Producers Association to all of the milling companies. At each milling company the value is adjusted for actual or rolling average freight, exchange rate, and extraction rates, rendering an FOB value per ton of FFB. The FOB FFB value is then apportioned between the smallholder and the milling company through a "payout ratio". The payout ratio is applied to the FOB FFB value to give a mill gate price that is further reduced by FFB transport cost and various levies to give the final farm gate price payable to the smallholder.

A.4 Review of the FFB Price Formula and Audit

The cost of purchasing FFB from smallholders is the largest single cost of production for the FFB processors. For nearly 25,000 smallholders in PNG FFB revenue is their livelihood. The price paid for FFB is therefore of critical importance to both the supplier and the buyer.

The FFB Price Formula Review and Audit will review the existing price formula; report on the operation of the mechanism since the last review and recommend changes that would improve the operation of the pricing formula, with the aim of ensuring that a transparent and equitable pricing formula is in place and applied by each palm oil milling company.

Furthermore, since the FFB price is calculated by the FFB buyer, it must therefore be subject to periodic independent verification, and it is proposed that in conjunction with this review of the formula annual audits of the FFB price paid to smallholders will be implemented.

OPIC will engage a consulting firm to independently assess and review the current FFB price formula and payout ratio and make recommendations for changes, if any, including the rationale for such changes.

The selected firm will carry out the inaugural audit on the FFB price for the year 2012.

The primary objective of the FFB Price Formula is that the smallholder supplier should recover his or her full cost of production plus an equitable share of any profit that is earned on his fruit. The payout ratio is the mechanism by which the smallholder recovers cost of production and earns an equitable profit.

It is important that the review of the FFB Price Formula be conducted in a transparent and consultative way, ensuring an opportunity for relevant stakeholders to provide input at relevant junctures. The consultant will assist the client to communicate the results of the review and to assure stakeholders that the review process has been carried out with integrity and professionalism.

A.5 Specific Tasks

Understand the PNG Oil Palm Industry

The consultant will familiarize him/herself with the industry and the specific businesses at the four nucleus estate project locations; Hoskins, Bialla, Popondetta, and New Ireland.

Review of Cost of Production and Payout Ratio

Currently there is some confusion and misconception surrounding the Payout Ratio (PoR). Simply stated, the PoR is the factor that is applied to the FFB value enabling the smallholder to recover his full cost of production and receive an equitable share of the profit from the sale of his processed fruit. The processor shares in the profit on smallholder fruit because the processor adds significant value to the finished product and if the processor doesn't share in the profit then it has no incentive to mill smallholder fruit.

The consultant will assist OPIC to clarify and formalize the determination of the PoR. The consultant will first analyse historical costs and recommend definitions for costs of production. Then the issue of "equitable share of profit" will be documented. Finally the consultant will make recommendations for formalizing the determination of the PoR:

- The consultant will recommend a definition of the elements to be included in the smallholder cost of production.
 - Cost elements will include the costs of production inputs; labour, materials and tools, but may also include other appropriate costs such as a land usage charge, debt service charges, etc. Cost will be the normal expected cost for a reasonably diligent supplier at actual input factor price during the period. Multi-year costs to be apportioned.
 - The consultants' recommendation will be based on a detailed analysis of all available data sources including the collection of primary data from a representative sample of smallholder blocks in the four designated project areas and consultative meetings with primary producers in each area. Primary producers may include executive members of growers associations or other smallholder growers selected by the consultant or other growers selected by the consultant in consultation with OPIC or the growers associations. The consultant should review the findings and recommendations of the 2001 FFB price formula review and he/she should generally review costs, and changes in the industry cost structure, subsequent to the 2001 review.
- The consultant will recommend a definition of the elements to be included in the processor cost of production.
 - Cost elements will include the direct or marginal cost of labour and material inputs required to convert supplier FFB into saleable palm products at the port of shipment but may include other appropriate costs such as an allowance for capital and working capital. Cost will be the average cost of three of four plantation entities under review. The four entities are: NBPOL - Hoskins, Hargy, NBPOL – Poliamba and Higaturu Oil Palms. Multi-year costs to be apportioned.
 - The consultants' recommendation will be based on a detailed analysis of accounts data from the individual milling companies and consultative meetings with the companies' management. The details of individual company cost accounts will be documented in the consultants' working papers but will not be available to the public due to commercial confidentiality requirements. The consultant should review the findings and recommendations of the 2001 FFB price formula review and he/she should generally review costs, and changes in the five companies cost structures subsequent to the 2001 review.
- The consultant will analyse the relative costs of production and breakeven points based on his recommended definitions as above. Using this analysis the consultant will document the issues relating to the fair and equitable sharing of profit.

- The consultant will propose a formal definition of the PoR that will be understandable and transparent to all stakeholders and that will be auditable on an annual basis.

Review of the FFB Price Formula 2002 – 2011

In the FFB Price Formula calculations are made to estimate the value of the smallholder fruit based on its value after processing. The consultant will review and assess these calculations for the period 2002 – 2009.

- 1) The consultant will form an opinion on whether the price formula has been correctly and consistently applied during the period 2002-2011, at each of the five project locations. Material errors or omissions will be documented and reported by project location.
- 2) The consultant will review the calculation of FFB transport costs charged to the smallholders by the milling companies and form an opinion on whether these charges have been reasonably calculated and applied. Material errors or omissions will be documented and reported by project location.
- 3) The consultant will make recommendations on changes to the FFB price formula that would improve the operation of the formula, with the aim of ensuring that a transparent and equitable pricing formula is in place and applied by each palm oil milling company at each project location and specifically that the formula fairly estimates the processed value of smallholder fruit.

Presentation of the Review of the FFB Price Formula and Payout Ratio

- The consultant will report in a concise and simple way:
 - The methodology used in assessing the relative costs of production, payout ratio, and price formula
 - The recommended definitions for cost of production.
 - The issues to be considered when assessing the fair and equitable sharing of profits. One issue that may be considered is RSPO premiums.
 - The recommended method for periodically determining the appropriate payout ratio with worked examples for the year 2012.
 - The consultants' confirmation that the price formula has been correctly and consistently applied over the period 2002-2011 or alternatively a summary of material differences including a quantification of the effect of errors or omissions.
 - The consultants' recommendations for changes to the FFB Price Formula, if any, including the rationale for such changes.
- This draft report will be discussed with the processor companies regarding their confidentiality requirements before release. The client, IDA, and DAL will then review and clear the draft for public discussion.
- The draft report will be translated into Tok Pisin and summarized in a graphic presentation package. The consultant will deliver the report and presentation at public forums in Kimbe, Bialla, Kavieng, Popondetta and Port Moresby where the stakeholders will have opportunity to discuss the methodology, rationale, and recommendations made. The forums will be open to the general public, including all oil palm smallholders. The consultant will advertise the public forums in two newspapers and on NBC radio at least two weeks prior to the meetings.
- Following public consultations the report, including a summary in Tok Pisin, will be finalized and widely distributed to growers associations and other stakeholders. A review period of four weeks will be allowed for written submissions to be returned to the consultant. All written submissions will be delivered, together with the final report, to the GoPNG, Commodities Working Group (CWG). The consultant will present the report to the CWG.
- The client, Oil Palm Industry Corporation, will ensure that all stakeholder comments are considered and, as appropriate, incorporated in the final report. OPIC will be responsible for

submitting the final report and submissions to the CWG for endorsement. Following the report submission OPIC's responsibility in the matter will cease.

Audit Criteria and Materiality

Concurrently with tasks A through C, the consultant will collect audit evidence regarding the FFB price paid to smallholders in 2012. Audit criteria and materiality limits will be agreed with the client.

Audit and Report for the Year 2012

The consultant will carry out an audit of the FFB price paid to smallholders for the year 2012.

- The auditor will review the definition of cost of production and payout ratio in light of any significant changes in the business during the period.
- The auditor will undertake an audit of the relative costs of production and the payout ratio for the period and form an opinion on whether there has been a material change that warrants a change in the payout ratio for the coming year.
- The auditor will undertake an audit of the application of the FFB price formula and form an opinion on whether the formula has been applied correctly and consistently for the period at each of the five locations.
 - In consultation with the client, determine materiality criteria for errors and omissions in the calculation of FFB price for the period.
 - Using representative sampling, examine the calculation and payment of FFB price at the five project locations.
 - Determine if the FFB price formula has been correctly and consistently applied during the period.
 - If there are material errors in the application of the FFB price formula the estimated monetary value of the errors will be documented and reported.
- Review the calculation of transport costs charged to the smallholders.
 - The cost of transporting FFB from the smallholder blocks to the mill is estimated by the milling companies at each location and recovered from the smallholders as a deduction from the farm gate price. The consultant will audit this estimate at each of the five project locations and form an opinion on the accuracy of the estimate within materiality limits to be determined in consultation with the client.
 - Material errors or omissions will be documented and reported by project location.
- The auditor will prepare and agree an audit report with the client covering the period wherein the auditor will express his opinion on the above four dot points.

Appendix B – Table of Smallholder Concerns

Concern (lodged and implied)	Grower Association	Description of Concern	Suggested Actions and Recommendations by Grower Association(s)	KPMG Comments
Frequency of price formula review and audit of application of formula	- Hoskins - Bialla - Popondetta	- Concerns expressed by Hoskins, Bialla and Popondetta in which the review and application of the price formula were being conducted. - The Grower Associations understand such reviews are required bi-annually.	- Current price formula review to give consideration to changes in the industry that have occurred since the previous review undertaken in 2002. - Should the findings from the review indicate inequity against the growers resulting in a higher PoR in favour to the growers, then such differences are back-paid starting from the previous review. - It was suggested by HOPGA the review is conducted every 12 months. POPGA suggested every 5 years. - POPGA suggested the FFB Price Calculation is audited every 2 years.	- Noted by OPIC - Recommendations in Review Report
Local market conditions – monopsonies in the PNG market			The government to eradicate the current monopoly in the industry and invite other milling companies to come in and provide a healthy competition for the common good of the industry and also to ensure that sound business practices prevails.	New oil palm entrants exist – how smalholder models developed is site by site proposition. Establishing milling capacity requires prudent Business Case.

Benefits from downstream processing activities	Hoskins	It was implied smallholders are entitled to benefits further down the value chain. This includes a portion of economic benefits derived from the refinery and the bio-fuel facility.	Include in the price formula benefits from the other downstream processing activities including refining and bio-fuel generation (selling back to the local power grid). Benefits from such activities should be back-dated to when they were first realized by the Milling Company.	Milling profits (primary processing) considered being the appropriate level of profit and value add, rather than secondary and tertiary processing.
Independent verification of monthly calculation sheets	- Hoskins - Bialla - Popondetta	Growers seek verification from an independent party the monthly calculation sheets are being calculated correctly. This includes the CIF which differ from figures from Bank of PNG.	- Include in the Monthly Calculation Sheet CIF figures from the Bank of Papua New Guinea. - An explanation from the Milling Companies as to why they are not using CIF figures from Bank PNG. - FFB Monthly Calculations to be done by an independent person or institution.	Addressed in section 7 of Review report.
Cost to Market / Freight expenses	Hoskins	Concerns surrounding the Cost to Market costs i.e. justification of cost, magnitude of cost, exchange rate used, and accuracy of figure.	- Milling companies are requested to provide evidence of actual costs to substantiate cost on monthly calculation sheet. - Commodity Working Group to request confirmation from shipping companies for verification. - Ensure that actual figures for shipping and Cost to Market costs are disclosed for enhanced transparency. - Price formula to show separate calculation based on actual rates used. - POPGA suggested the Cost to Market expenses (incl. milling & shipping) be met wholly by the milling company.	Addressed in section 7 of Review report.

Extraction rates	Hoskins	Accuracy of extraction rates used on the monthly calculation sheet.	- Improved awareness amongst growers as to how extraction rates are derived every month including insight as to how local growers compare amongst their peers domestically, internationally and regionally. - Milling companies use actual extraction rates for one mill each month on a rotation basis between the four mills. - Any underpayment must be backdated to 2003 and paid to the growers.	Addressed in section 7 of Review report.
Exchange rates	Hoskins	Exchange rates for CIF values can't be verified with actual sales contracts.	- Show a separate calculation for CIF based on exchange rates used for sales invoice. - Increase growers' payment ratio to 100% until matters in question are resolved. - Favourable exchange rate gains during periods of prolonged currency depreciation must also be passed on to the growers and included and shown in the price formula calculations. - Benefits of hedging and forward sales contracts must also be passed onto the grower and is to be built and shown in the price formula.	Addressed in section 7 of Review report.
<u>Transport</u> Price differential – transport cost recovery vs fees to local transport contractors.	Bialla	- Price differential between cost of transport recovered from small growers and the cost of transport paid to outside contractors. - BOPGA research indicates a total difference of K2.7 million in 2008 and 2009.	On the assumption there are no additional costs incurred by the mill to manage contractors, ensure a consistent amount between what is being recovered from the smallholders and what the contractors are being remunerated.	Addressed in section 7 of Review report.
<u>Transport</u> Price fixing between NBPOL West New Britain and Hargy Oil Palms Ltd	Bialla	Any differences in transport costs between locations should be reflected on Monthly Calculation Sheet.	Any differences in transport costs between locations should be reflected on Monthly Calculation Sheet.	- Noted. - Addressed in section 7 of Review report.

Transport Savings from Green Revolution policy.	- Hoskins - Popondetta	FFB transport costs do not reflect savings on equipment and machinery purchased under the Green Revolution policy.	- NBPOL to demonstrate if cartage recoveries include savings enjoyed by the company under the green revolution policy of the National Government. - The National and Provincial Governments are to assist the growers to acquire and own fruit pickup trucks and lease them NBPOL at rates currently being paid to NBPOL.	Not relevant within Review period; progress with milling companies.
Transport			Transport cost must be shared on 50% basis	Addressed in section 7 of Review report.
General education and awareness of Price Formula	Hoskins	- Milling companies perceived to be misleading smallholder growers regarding the 57% PoR. - Perceived lack of transparency and price bullying by the milling companies due to the limited number of mills i.e. perceived monopsony.		Addressed in section 4 of Review report and second round consultations.
Disclosure of information – Milling Company Management Reports	Hoskins	Disclosure of information.	NBPOL is to provide information based on its management reports so that the growers would independently verify the integrity and honesty of amounts recovered for all deductions and levies and ascertain the fairness of the price being paid to the smallholder growers.	Addressed in section 4 of Review report and second round consultations.
Equity of PoR	- Hoskins - Bialla - Popondetta	- It is felt the current PoR of 57% is inadequate to meet the Formulas aims, which are to: - recover their cost of production; and - Share profits equitably between milling company and smallholder.	Recommendations made at varying stages of the consultation process to increase PoR between 59% and 100% of the Palm Product Value.	Addressed in section 4 of Review report and second round consultations.

Smallholder cost of production (including price floor)	- Hoskins - Bialla - Popondetta	- It was implied the price formula did not give sufficient consideration (and resultant coverage) to the cost for a smallholders to produce a ton of FFB. The OPGAs implied it cost between K200 and K300 to produce one metric ton. - Further, it was suggested consideration could be given to additional costs associated with family, village, community and clan obligations. These include funeral, bride price, community projects and costs to commute, extended family support.	- POPGA suggested a monthly calculation sheet and pay slip similar to what had been in the past in which smallholder costs of production were detailed based on standardized costs of production. - Suggested price floor of K200 FFB per MT.	Addressed in section 4 of Review report and first and second round consultations.
Macroeconomic challenges	Hoskins	Increased cost of living.	It was implied the formula should consider and factor CPI and the increased general cost of living.	Addressed in section 4 of Review report and second round consultations.
Roundtable Sustainable Palm Oil (RSPO) Benefits	Hoskins	RSPO benefits are not being passed onto the growers.	RSPO premium price benefits must be passed on to the growers and is to be built in and shown in the price formula as the growers and OPIC are part of NBPOL's RSPO certification.	Addressed in section 7 of Review report.
European Union Rebates	Hoskins	European Union tax exemptions are not being passed onto the growers.	- European tax exemptions on oil exports are benefits that should also be passed on to the growers and is to be included and shown in the price formula. - Tax exemptions offered in overseas ports together with other CIF benefits should also be built into a as benefit package to the grower.	Addressed in section 7 of Review report.
PoR by location	Hoskins	There should not be a blanket PoR for all locations in the country.	In light of the varying cost profiles across locations in PNG, it is suggested a PoR is determined by location including, if entitled, benefits from downstream processing activities (as previously recommended by HOPGA).	Addressed in section 4 of Review report and second round consultations

Smallholder Affairs – Financial Literacy and Education	Hoskins	Smallholder Affairs – Profitability of growers.	- Milling companies provide separate monthly management accounts for smallholder production figures, similar to its own monthly account. - To keep growers abreast with information, NBPOL must establish and maintain separate cost and revenue accounts in its books of accounts to determine profitability of smallholder dealings with the company. NBPOL should table reports to the local planning committee similar to what OPIC is doing.	Industry matter to consider how much private enterprise is called on to fulfill the role of Government (and OPIC).
Government presence	Hoskins	Presence of Government (National and Sub-national)	- The national and provincial governments to support the growers to establish their own mill should the Milling companies fail to comply with grower demands. - Local Level and Provincial government, the national government and OPIC to be involved from the initial stages of any future developments by NBPOL. - An office for oil palm to be commissioned within DAL, similar to other tree crops. This should be a priority within the department as we are currently the largest export revenue earner in the agriculture sector. - In light of oil palm being PNG's biggest export commodity crop, the government to increase its participation in the industry. - New market entrants as facilitated by the national government to enhance market competition and liberalize trading.	- Establishing milling capacity requires prudent Business Case. - A matter for Government. - Comments within section 5 of Review report.
Increased smallholder business opportunities	Hoskins	Benefits from spin-off activities	Growers to be encouraged to participate in spin-off activities e.g. transporting FFB to mills across all domestic oil palm locations.	An industry matter to continue to work through.

Legislative framework	Hoskins	Review the OPIC Act	- Including provisions in the OPIC Act to ensure: - The price formula is reviewed as required by law; - Compliance by milling companies back pay any monies owed to the growers.	An industry matter to continue to work through.
Small scale milling capacity	Hoskins	Mini-estates	Mini estates must be encouraged to own and operate their own mini mills to enable them to participate in downstream processing and sell value added products instead of FFB.	An industry matter to continue to work through.
Grower Association Levy	- Hoskins - Popondetta	None expressed – requests and recommendations made by respective OPGAs	Inclusion of Grower Association Levy in the Monthly Calculation Sheet.	An industry matter to continue to work through.
Price fixing between NBPOL West New Britain and Hargy Oil Palms Ltd	Bialla	Any differences in transport costs between locations should be reflected on Monthly Calculation Sheet.	Any differences in transport costs between locations should be reflected on Monthly Calculation Sheet.	- Noted. - Addressed in section 7 of Review report
Price differential – transport cost recovery vs. fees to local transport contractors.	Bialla	- Price differential between cost of transport recovered from small growers and the cost of transport paid to outside contractors. - BOPGA research indicates a total difference of K2.7 million in 2008 and 2009.	On the assumption there are no additional costs incurred by the mill to manage contractors, ensure a consistent amount between what is being recovered from the smallholders and what the contractors are being remunerated.	Addressed in section 7 of Review report
Industry regulator	Bialla	There is no industry regulator in Papua New Guinea to adopt and enforce standards as necessary.	- OPIC should adopt role as the industry regulator for Oil Palm in PNG. - The above should be enacted by law.	An industry matter to continue to work through.
Tax Credit Scheme - transport infrastructure (roads)	Bialla		Crop can only be increased with good roads. We need money to fix our roads for fruits to be evacuated to the mill. Increase tax credit with Hargy Oil Palms from 1.5% to 10%.	Comments within section 5 of Review report.

Processing of FFB – separation of fruit from smallholders and milling companies	• Bialla	• On the assumption there are two separate processing lines and profit pools to draw from in processing smallholder and milling company FFB, the milling company is drawing 43% of the grower's profits to cover the cost of their operation, accordingly resulting in grossly inequitable profit sharing.		• Addressed in section 4 of Review report and second round consultations
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Appendix C – Methodology

C.1 Phase 1 – Inception

This phase was critical to the project's success both in completeness of information and establishing access to data and knowledge holders. The consulting team's key objective in this phase was to expeditiously develop a comprehensive and in-depth understanding of the industry, stakeholders' operations and processes, and the pricing model presently used to determine the FFB price.

Dialogue with milling companies and grower associations was initiated with the assistance of OPIC. This interface was crucial in terms of developing a deeper understanding of the integral economic drivers that lever the mill company and smallholder.

Phase 1 further involved utilising KPMG Brisbane resources in designing a financial model to assist the cost analysis, which was integral to the FFB review. Model construction occurred parallel to the consultation process.

C.2 Phase 2 – Consultation and Analysis

It was critical the Review Team was able to access data and information efficiently. This phase entailed significant consultation with key stakeholders including but not limited to milling companies and smallholders.

The Review Team was required to travel to Hoskins, Bialla, Popondetta and New Ireland for two sets of consultation. The first round entailed information gathering and the second round involved the Review Team workshoping its initial findings through a series of fora. Other provinces were not included in the review scope.

C.3 Provincial Consultations 1 – Information Gathering

In recognizing the scale of the Hoskins project, this site was visited first by a large KPMG contingent in order to expedite a detailed (and collective) learning of key industry economic drivers. The size of the contingent progressively receded across site visits.

Some of the activities undertaken during the first series of provincial visits included:

- Establishing dialogue with milling companies and subsequently agreeing to confidentiality terms in accessing such information. This included understanding the potential social implications perceived should such information, when reported and presented back to other key stakeholders, have on the company and the industry in PNG.
- Visiting four project sites including Hoskins, Bialla, Popondetta and New Ireland. KPMG engaged in comprehensive dialogue with milling companies and smallholder grower associations. Details relating to these visits are covered in Section 4.
- Determine and understand the key economic and industry drivers directly and indirectly impacting the cost of production for both milling company and smallholder.
- Identify data sources; analyse available data including cost elements, changes to the industry cost structures; and determine information system capabilities including understand cross-divisional systems interface. This point was particularly important when designing the Financial Model.

- Through a process of meaningful engagement, identify any grievances (including where possible its cause) that underpin the existing profit sharing arrangement between smallholder and milling company.
- Analysis of harvest and yield performance based on tonnage, hectareage and other key performance metrics.
- Review and benchmark respective performances against comparable markets and companies where palm oil is a major industry.

C.4 Provincial Consultations 2 – Public Forum Workshops

Public fora were conducted in Kimbe, Bialla, Popondetta, Lakurumau (New Ireland) and Port Moresby to present the methodology, the rationale, and recommendations contained in an early draft of the report.

Growers gained an improved understanding of the construction of the formula including understanding the key levers that drive and ultimately determine the Palm Product Value. Feedback and comments were incorporated into the report, where appropriate, prior to the distribution of the report for further scrutiny.

Relevant stakeholders were engaged throughout the development of the model to ensure accuracy, validity as well appropriate buy-in.

C.5 Phase 3 – Audit

KPMG undertook an Audit in accordance with International Auditing Standards applicable to agreed-upon procedures engagements.

The procedures that were followed are summarised below:

- 2002 to 2011 formula application:
 - Across four sites being (Hoskins, Bialla, Popondetta and Lakurumau), assess the appropriateness of the application of the FFB formula for the period 2002 to 2011.
 - Perform recalculations of the FFB formula for the period from 2002 to 2011, including on a sample basis agreeing formula inputs back to supporting documentation.
 - Gain an understanding of the basis for transport costs for the fresh fruit bunch including recalculation of the charges applied to the FFB formula.
- 2012 formula application:
 - Across the same four sites assess the appropriateness of the application of the FFB formula for the year ended 31 December 2012.
 - Perform recalculations of the of the FFB formula for the year ended 31 December 2012, including on a sample basis agreeing formula inputs back to supporting documentation.
 - Check that smallholders have been accurately billed under the FFB formula.
 - Agree the payout ratio back to supporting documentation.
 - Verify transport costs and recalculate to check for accuracy for inclusion in the FFB formula.

C.6 Phase 4 – Reporting

The last phase of the project involved reporting and presenting to stakeholders the review of the FFB Price Formula and Payout Ratio. The reporting process entailed the following:

- Report preparation - synthesize findings and prepare draft for extensive initial internal review.
- Initial circulation of copies of the draft report to the milling companies for review and incorporate any relevant feedback.
- Summarize the key findings of the review into an executive summary to be translated into Tok Pisin.
- Summarize the key findings including the cost of production, breakeven points and payout ratio in graphic presentations.
- Pre-workshop awareness of fora prior to the Review Team being mobilised from Port Moresby.
- Presentation development - report summarized into graphical presentation.
- Present review findings and recommendation at each location.
- Develop presentation for Commodities Working Group (CWG) meeting.
- Presentation, deliver final report and written comments from public consultation to CWG.

This phase will require extensive consultations and review process between KPMG, the milling companies and OPIC. Further it will take into account considerable feedback from key stakeholders after circulation of the draft report.

Throughout the project, senior KPMG experts will be consulted to sense-check, quality review and validate findings and reports related to the project deliverables, including the financial model in which our analytical findings will be premised.

Appendix D – Return on Invested Capital Benchmarking

- During the past decade NBPOL and many other agri-industry companies have listed on international stock exchanges
- This provides an objective, transparent basis on which to analyse returns on capital of the Milling Companies
 - Are they being fair and reasonable (i.e. are they within a reasonable range to peer returns)?
 - Are they earning adequate returns to ensure continued financial support from shareholders and financiers that rely upon financial performance strength?
- This is not intended as an exhaustive or definitive analysis, but is intended to provide an indication of whether mill companies in PNG earn a rate of return that is similar to their international peers, or whether they have been earning abnormally high profits.
 - It should be noted that where companies undertake activities apart from milling (like NBPOL) it may not be an exact comparator.

Table of selected relevant peer organisations showing how NBPOL performs

Company	Domicile	Operations	ROIC			
			2009	2010	2011	2012
Golden Agri Resources	Singapore	Indonesia's largest vertically integrated palm oil plantation company.	4.59%	7.19%	8.19%	5.44%
First Resources	Singapore	Mid sized, fast growing planter with operations in Indonesia and exposure to biodiesel.		22.50%	26.45%	25.71%
Bumitama Agri Ltd	Singapore	Fast-growing Indonesian based oil palm planter.		19.64%	21.32%	21.56%
Indofood Agri Resources Ltd	Singapore	Vertically integrated Indonesian palm oil producer with significant plantation land bank.	17.82%	13.97%	16.53%	11.83%
IOI Corp.Bhd	Malaysia	An integrated plantation, with one of the highest yields in Malaysia, one of the largest oleochemical manufacturing capacities in the world.	16.03%	24.03%	23.17%	16.31%
New Britain Palm Oil Limited	PNG	Operates in oil palm, sugar and beef in PNG.	12.14%	14.65%	16.25%	4.10%
NPC Resources Bhd	Malaysia	Diversified investment company with significant exposure to oil palm plantations and mills.	21.62%	14.46%	14.73%	5.13%
Presco	Nigeria	Highly profitable African oil palm operator.	8.93%	24.54%	32.11%	45.23%
PT Astra Agro Lestari Tbk	Indonesia	Largest listed plantation in Indonesia (260,000 ha). Operates across palm oil products.	44.46%	42.92%	40.94%	35.71%
PT. BW Plantation	Indonesia	Primary activities are agriculture and oil palm plantations.	38.24%	37.33%	36.00%	13.90%

Sime Darby Berhad	Malaysia	A conglomerate with operations including oil palm, property investment and energy.	18.78%	17.49%	26.55%	22.50%
Socfinasia SA	Luxembourg	Invests in agro-industry in Asia with exposure to palm oil and rubber.	8.43%	9.08%	9.80%	5.70%
SIPEF	Belgium	SIPEF SA/NV is an agro-industrial company, which owns and operates palm, rubber, tea, banana and pineapple plantations			12.44%	6.17%
Average			19.11%	20.65%	22.67%	17.76%

Source: S&P Capital IQ, Global Public Company Snapshot, KPMG Analysis

- ROIC adopted as a variable to analyse reasonableness of Milling Company returns in various scenario modelling
- In comparing the PNG milling companies to global peers, we have considered 12 palm oil producing companies from different regions including Asia (primarily Malaysia and Indonesia) and Africa

Appendix E – Payout Ratio and Profitability Analysis Modelling

E.1 Base Case Inputs

General Inputs

The common factors for both milling companies and smallholders are entered into the General Inputs section of the model, determined and summarised as following:

- Rates for Kina/USD and oil prices adopted at 31st December 2012 (being the date of last audited financial information)
- Tax is assumed to be PNG resident company tax of 30%
- Freight is a weighted average of the milling companies
- Extraction rates are a weighted average of the milling companies
- The EU rebates are included as part of price benefits duly passed on to smallholders by the milling companies

Base Case		
General		
Tax rate	%	30%
Exchange Rate	PGK/USD	0.49
Crude Palm Oil Price	USD/MT	813.00
EU rebate	%	3.80%
Freight	USD/MT	124.01
Extraction Rate	%	23.19%
Palm Kernel Price	USD/MT	815.00
Freight	USD/MT	124.01
EU Rebate	%	6.40%
Extraction Rate	%	1.68%
Palm Kernel Extract Price	USD/MT	-
Freight	USD/MT	-
Extraction Rate	%	1.67%

E.2 Mill Inputs

Mill inputs are determined and summarised as following:

- Defined payout ratio has been selected as the basis for FFB price calculation (Fruit costs component of the mill costs can be estimated using one of the following three methods: Defined payout ratio, Target mill ROIC or Grower Cost)
- Company overheads (Milling indirect costs), processing costs (direct milling costs) and depreciation is a weighted average of the milling companies 2012 cost data (i.e. they are not current 2013 costs as such costs are not audited)
- Overheads (Indirect milling costs) apportionment based on analysis of apportionment policies of milling companies
- Capital invested is the weighted average of the milling companies.

Base Case		
Mill Inputs		
Basis for fruit price		Defined payout ratio
Pre-Defined Payout Ratio		57.00%
Company overheads	PGK / MT	321.40
Overheads apportioned to mill	%	34.35%
Processing Costs	PGK / MT	172.79
Depreciation	PGK / MT	73.25
Capital Invested	PGK / MT	2,016.77

E.3 Grower Inputs

Grower inputs are as per Section 4 of the main report.

Base Case		
Grower Inputs		
Equipment costs	PGK / ha	130.59
Labour	PGK / ha	1,154.16
Fertilizer, herbicides	PGK / ha	336.00
Yield	MT per ha	20.00
Margin %	%	0.00%
Add 1% VAT	PGK / MT-FFB	1%
OPRA Levy	PGK /MT-FFB	2.00
Sexava Levy	PGK / MT-FFB	1.50
OPIC Levy	PGK / MT-FFB	4.00
VAT on OPIC levy	%	10%
Transport	PGK / MT-FFB	45.59

E.4 Base Case Calculations

Mill Cost Calculation			
Revenue USD	USD / MT-FFB	178.20	<i>CPO plus PKO plus PKE revenue in USD</i>
Revenue	PGK / MT-FFB	367.42	<i>Converts USD revenue to Kina</i>
Company overheads	PGK / MT-FFB	29.30	<i>Company overheads in the proportion applicable to the mill</i>
Processing Costs	PGK / MT-FFB	45.86	<i>Converted from per MT of CPO+PKO+PKE</i>
FFB	PGK / MT-FFB	209.43	<i>Calculated value</i>
Total Operating Costs	PGK / MT-FFB	284.59	<i>Total costs, including FFB</i>
EBITDA	PGK / MT-FFB	82.83	<i>Revenue less costs</i>
Depreciation	PGK / MT-FFB	19.44	<i>Converted from per MT of CPO+PKO+PKE</i>
EBIT	PGK / MT-FFB	63.39	<i>EBITDA less depreciation</i>
Tax	PGK / MT-FFB	19.02	<i>EBIT multiplied by the tax rate (excludes tax losses)</i>
Operating Income (post tax)	PGK / MT-FFB	44.37	<i>EBIT less tax</i>
Total Invested Capital	PGK / MT-FFB	535.25	<i>Converted from per MT of CPO+PKO+PKE</i>
ROIC	%	8.29%	<i>Operating income divided by invested capital</i>
Payout Ratio	%	57%	<i>FFB price divided by revenue</i>

Grower Cost Buildup			
Equipment costs	PGK / MT-FFB	6.53	<i>Converted from per ha to per MT FFB</i>
Labour	PGK / MT-FFB	57.71	<i>Converted from per ha to per MT FFB</i>
Fertilizer, herbicides	PGK / MT-FFB	16.80	<i>Converted from per ha to per MT FFB</i>
Total Operating cost	PGK / MT-FFB	81.04	<i>Revenue less costs</i>
Add 1% VAT	PGK / MT-FFB	-1.33	
OPRA Levy	PGK / MT-FFB	2.00	
Sexava Levy	PGK / MT-FFB	1.50	
OPIC Levy	PGK / MT-FFB	4.00	
VAT on OPIC levy	PGK / MT-FFB	0.40	
Total Levies	PGK / MT-FFB	6.57	
Transport	PGK / MT-FFB	45.59	
Total Cost Mill Gate (including levies and VAT)	PGK / MT-FFB	133.20	<i>Operating costs plus transport charge plus levies</i>
Breakeven ratio (to cover grower costs)	%	36.25%	<i>Grower costs divided by revenue</i>
Smallgrower profit	PGK / MT-FFB	76.24	<i>Revenue less costs, incl freight</i>

It is important to note that the Break-even Ratio is different to an equitable Payout Ratio.

Appendix F – Cost of Smallholder FFB Production

F.1 OPIC derived cost of Labour for 2 ha block

Description	How Often?	Man Days required per activity	Total Annual Input (md)	Average Input per ha per year (md)	Yearly Cost per ha (PGK)
Harvesting	14 days	3.0	78.0	39.0	714.48
Upkeep					
Circle Weeding	3 months	2.0	8.0	4.0	73.28
Weeding	3 months	2.0	8.0	4.0	73.28
Fertiliser Application	6 months	2.0	4.0	2.0	36.64
Pruning	6 months	2.0	4.0	2.0	36.64
Crop Inspection allowance	Monthly	1.0	12.0	12.0	219.84
Total			114.0	63.0	1,154.16

Assumptions

- Minimum rate of PGK2.29 per hour applied at 8 hours per day
- Yield of 20 MT-FFB per ha per year

F.2 Review Team determined cost of Labour for 4 ha block

Description	How often?	Assumptions	Total Annual Input (md)	Average Input per ha per year (md)	Yearly Cost per ha (PGK)
Harvesting	14 days	2 men x 3 md each per harvest x 26 harvests = 156 md per year.	156.0	39.0	714.48
Upkeep					
Weeding – inter-row & circle	3 months	2 men x 1 md x 4 weedings per year = 8 md per year.	8.0	2.0	36.64
Fertiliser Application	3 months	2 men x 1 md each x 2 applications per year = 4 md per year	4.0	1.0	18.32
Slashing / Grass-cutting	3 months	2 men x 2.5 md each x 4 slashes per year = 20 md per year	20.0	5.0	91.60
Pruning	6 months	2 men x 1 md x 2 prunes per year = 4 md per year	4.0	1.0	18.32
Total			192.0	48.0	879.36

F.3 Review Team determined cost of Equipment, Fertilisers and others for 4 ha block

Description	Usage	Cost per unit	Yearly Cost per ha (PGK)
Equipment Costs			
Wheel Barrow	1 unit per 4 years	300.00	18.75
Harvesting Pole	1 unit per 4 years	150.00	9.37
Harvesting Sickle	1 unit per 4 years	25.00	1.56
Net	1 unit per 2 years	180.00	22.50
Aluminium Clamps	1 unit per 4 years	15.00	0.93
Wheel barrow tube	1 unit per year	10.00	2.50
Tyre Pump	1 unit per 4 years	15.00	0.93
Grass Knife	1 unit per year	30.00	7.50
Bush Knife	1 unit per 3 years	30.00	2.50
Sharpening Stone	1 unit per 2 years	5.00	0.62
Flat File	1 unit per 3 years	10.00	0.83
Spade	1 unit per 10 years	40.00	1.00
Spanner, Pliers & screw drivers	1 unit per 10 years	40.00	1.00
Occupational, Health + Safety Costs			
Gum boots	2 unit per 3 years	40.00	6.67
			6.67
Fertiliser Costs			
Ammonium Nitrate [50kg]	2kg per palm x 120 palms per ha	70.00	336.00
Other Costs			
Seedlings	120 seedlings per ha per 20 year cycle	9.00	54.00
Total			1,346.05

Comments & Assumptions

- Minimum rate of PGK2.29 per hour applied at 8 hours per day
- Yield of 20 MT-FFB per ha per year
- PGK80 Annual Land Rent not considered by Review Team as cost of production.

F.4 NBPOL Estimated Smallholder Cost of Production

Description	How often? / Usage	Assumptions	Rate / Cost per unit	Yearly Cost per ha (PGK)	NBPOL Comments
Labour input					
Harvesting	Fortnightly	[1ha] 1 ton per man day @ average yield of 17 tonnes per ha per year	2.29	311.44	Plantations work on a figure of 1.5 to 2.00 tonne per md to the net. If we say a conservative 1 tonne per md for smallholders. A 4 ha block = 68 tonnes per annum. 68 tonnes x PGK18.32 = PGK1,245.76. 1245.76/4 = PGK311.44 per ha.
Upkeep					
Weeding - inter-row + circle	3 times per year	1 ha per man day x 3 rounds per year	2.29	54.96	The block requires 3 rounds of weeding per year. Generally smallholders do not weed. Plantations productivity varies from 0.5 to 1.0 ha per md in very young palms to 2 ha per md in tall palms. Let's say average of 1ha per md. PGK18.32 x 4 = K73.28 per round. x 3 = PGK219.84 per year /4 = 54.96 per ha.
Fertiliser Application	Yearly	[4ha] 2 man days per year	2.29	9.16	2 mds per year. K9.16 per ha per annum
Slashing / Grass-cutting	4 times per year	1 ha per man day x 4 rounds per year	2.29	73.28	Productivity of 1 ha per manday. This should be no more than the weeding cost given that the full are will not need slashing as it will be under shade from palms. If 4 rounds per year then a very generous cost per ha per year would be K73.28
Pruning	Twice per year	[4ha] 2 ha per md, 2 rounds per year	2.29	18.32	2 ha per md, 2 rounds per year = PGK18.32
				467.16	
Equipment					
Wheel Barrow	4.00	[4ha] 1 unit per 4 years	295.00	18.44	Wheelbarrow every 4 years and that generous. We are paying for its oil palm work nothing else. 4 years x 104 tons = it only moves 416 tons
Harvesting Pole - Short Extendable	22.00	[4ha] 1 unit per life of block	97.38	1.11	One extendable short pole and one extendable long pole for life of block
Harvesting Pole - Long Extendable	22.00	[4ha] 1 unit per life of block	145.64	1.66	One extendable short pole and one extendable long pole for life of block
Harvesting Sickle	5.33	[4ha] 3 units per life of block until need to replant	20.87	0.98	For this exercise either has a sickle or chisel cannot charge both at same time. Max Three

Description	How often? / Usage	Assumptions	Rate / Cost per unit	Yearly Cost per ha (PGK)	NBPOL Comments
					sickles will last the time required until moves to replant
Net	3.00	[4ha] 1 unit per 3 years	180.00	15.00	Think one net every 3 years as we are only talking about 104 tons per year. So at one ton per net it lifts 312 times in 3 years.
Aluminium Clamps	2.00	[4ha] 1 set per 2 years	10.00	1.25	One set every 2 or 3 years. Grower only harvests 26 times a year if rounds at 14 days
Wheel barrow tube	1.00	[4ha] 1 unit per year	10.00	2.50	One per year
Tyre Pump	5.00	[4ha] 1 unit per 5 years	15.00	0.75	1 every 5 years
Grass Knife	2.00	[4ha] 1 unit per 2 years	30.00	3.75	1 every 2 years
Bush Knife	2.00	[4ha] 1 unit per 2 years	27.00	3.38	1 bush knife per year
Sharpening Stone	2.00	[4ha] 1 unit per 2 years	5.00	0.63	One every two years
Flat File	2.00	[4ha] 1 unit per 2 years	10.00	1.25	One every two years
Spade	22.00	[4ha] 1 unit for planting only (once every 22 year plant cycle)	25.00	0.28	For planting only. Not normally accounted for - but include one for life of planting
Spanner, Pliers & screw drivers	22.00	[4ha] 1 set per life of planting	30.00	0.34	For repair of wheelbarrow and clamp fitting, One set for life of planting
				53.49	
Occupational, Health + Safety					
Gum boots	2.00	[4ha] 1 unit per 2 years	65.00	8.13	Not for spraying but general block work Ok for work in the block and foot protection. One set every 2 years
				8.13	
Fertiliser					
Ammonium Nitrate [50kg] x 20 bags @ PGK65.00	1.00	[1ha] 2kg per palm x 120 palms per ha	65.00	312.00	[4ha] PGK1.30 per kg x 2kg per palm x 120 palms per ha = PGK312 per ha per year
				320.00	
Others					
Seedlings [480palms x PGK7]	22.00	[1ha] 120 seeds per ha per 22 year cycle	7.00	38.18	Cost vary across location so allow PGK 7.00
Land Rent		LSS only	80.00	80.00	Applies to LSS blocks but not VOP blocks where it is own land. But leave in
				118.18	
Total					

Assumptions

- Labour rates based on PGK2.29 per hour and 8 hours a day.
- Labour inputs based on average smallholder yield of 17 MT-FFB

F.5 Consolidated Smallholder Cost of Production from Grower Associations

Description	Unit	Hoskins	Bialla	Popondetta	New Ireland	Average Cost
2012 Production	MT-FFB	439,806.10	213,669.10	186,579.91	22,832.51	-
Primary Inputs to production						
Equipment (Incl OHS and seedlings)	PGK / ha per year	162.50	93.76	293.00	1,724.00	215.01
Labour	PGK / ha per year	1,400.00	2,440.00	3,230.20	Not completed	2,065.02
Fertiliser, Herbicides	PGK / ha per year	262.50	326.88	550.00	2032.00	387.43
		1,825.00	2,860.64	4,046.20	3,756.00	2,667.47
Transport and Levies*						
Transport	PGK / ha per year	Not completed	1,000.00	Not completed	Not completed	1,000.00
Levies	PGK / ha per year	Not completed	150.00	Not completed	192.00	171.00
		-	1,150.00	-	192.00	1,171.00
Costs not associated with Production						
Housing	PGK / ha per year	-	20.00	3,112.50	-	783.13
Finance	PGK / ha per year	-	-	-	-	-
Living costs (personal)	PGK / ha per year	-	-	1,605.00	2,080.00	921.25
		-	20.00	4,717.50	2,080.00	1,704.38
Total	PGK / ha per year	1,825.00	4,030.64	8,763.70	6,028.00	5,542.84

* In Table 9, the Review Team adjusted the Transport and Levies to actuals for September 2013.

Review Team Assumptions

- Labour inputs based on smallholder yield of 17 MT-FFB

Weighting calculation table used for Consolidated Smallholder Cost of Production table above

Description	Unit	Hoskins	Bialla	Popondetta	New Ireland	Total
Smallholder MT-FFB produced	MT-FFB	439,806.10	213,669.00	186,579.91	22,832.51	862,887.52
Weighting by smallholder MT-FFB produced	%	50.97%	24.76%	21.62%	2.65%	100%
Weighting by smallholder MT-FFB produced [LABOUR ONLY]	%	52.35%	25.44%	22.21%	Not completed	100%

F.6 HOPGA provided Smallholder Cost of Production

			Month												
Cost	Unit price (PGK)	Unit	1	2	3	4	5	6	7	8	9	10	11	12	Total
Tools			-	-	-	-	-	975	-	-	-	-	-	-	975
Harvest Pole	230.00	Each						230							230
Wheelbarrow	300.00	Each						300							300
Sickle	30.00	Each						30							30
Clamp	5.00	Each						5							5
Chisel	20.00	Each						20							20
Knapsack	210.00	Each						210							210
Bushknife	20.00	Each						40							40
Grass Knife	10.00	Each						20							20
Spade	40.00	Each						80							80
Files	10.00	Each						20							20
Sharpening Stone	10.00	Each						20							20
Maintenance			-	-	330	1,455	-	330	-	-	330	-	-	330	2,775
Block Maintenance															-
Grasscutting	100.00	per 2ha			300			300			300			300	1,200
Fertilizer	65.00	bag + application				1,455									1,455
Herbicide Application					30			30			30			30	120
Harvest			600	600	600	600	600	600	600	600	600	600	600	600	7,200
Harvesting	100.00	per 2ha per harvest	600	600	600	600	600	600	600	600	600	600	600	600	7,200
Total			600	600	930	2,055	600	1,905	600	600	930	600	600	930	10,950

*Assumption done on a typical 6 ha block

*Cost of production per block per harvest is PGK444.23 per grower.

*This cost is normally met after the grower gets paid his FFB. Hence it is an immediate deduction from the growers take home pay

F.7 BOPGA provided Smallholder Cost of Production

	Cost Price	Unit	Cost/ Year		Cost/FN [26]
VARIOUS ACTIVITIES		[x FN]		[/26 FN]	
1] Harvester's Food 4 Plates @ PGK10 x 3 Man Days	120.00	26	3,120	26	120.00
2] Harvest 4men x 3m/days x 8 hrs/day x 2.50/hr	240.00	26	6,240	26	240.00
3] Upkeep - PGK100 per ha	400.00	1	400	26	15.38
4] Transport [80 tons/blk/yr x 50/ton FFB	4,000.00	1	4,000	26	153.85
5] Land Rentals	80.00	1	80	26	3.08
6] OPRA Levy - PGK2.00 x 80 tons [Average]	160.00	1	160	26	6.15
7] OPIC Levy - PGK4.00 x 80 tons	320.00	1	320	26	12.31
8] Pest (sexava) Levy - PGK1.50 x 80 tons	120.00	1	120	26	4.62
			14,440.00		555.38
VARIOUS ITEMS		Life span (years)			
9] W/barrow	284.56	10	28.46	26	1.09
10] H/pole	181.91	6	30.32	26	1.17
11] H/sickle	58.71	6	9.79	26	0.38
12] Nets	164.71	5	32.94	26	1.27
13] Chisel	23.55	5	4.71	26	0.18
14] Aluminium clamps	17.47	5	3.49	26	0.13
15] Gum boots	70.57	4	17.64	26	0.68
16] Glyphosate 360[5 litre]	147.98	3	49.33	26	1.90
17] Ammonium Nitrate [50kg] x 20 bags @ PGK62.91	1,258.20	1	1,258.20	26	48.39
18] Tyre Pumps	11.75	3	3.92	26	0.15
19] Knapsack sprayer [16 litres]	249.11	7	35.59	26	1.37
20] Grass Knife	6.03	10	0.60	26	0.02
21] Bush Knife	18.65	10	1.87	26	0.07

22] Sharpening Stone	2.41	7	0.34	26	0.01
23] Flat File	9.15	3	3.05	26	0.12
24] Overalls / SafetyClothes	82.50	8	10.31	26	0.40
25] Seedlings [480palms x K10]	4,800.00	25	192.00	26	7.38
			1,682.55		64.71
Cost in PNG KINA			16,122.55		620.10

Remarks

- Cost of production of 80 tons of FFB for an average 4 ha block per annum is PGK16,122.55
 - [common knowledge that an average 4 ha smallholder block produces 80 tons of FFB / year]
- Cost of producing about 3 tons of FFB for an average 4 ha smallholder block produces 8- tons of FFB / year
 - [cost of production per year /26 FN - PGK16,122.55 / 26 FN]
- Production per FN for 4 ha block is 3 tons. [prod for average 4 ha block / FN per year - 80 tons / 26 FN]
- Cost of producing 1 ton of FFB for an average 4 ha block is PGK206.67
 - [cost of prod per FN / average production per FN - 620/3]
- Cost of production per hectare per fortnight is K155.
 - [cost of production per FN / average ha / block - K620/4]

F.8 POPGA provided Smallholder Cost of Production

Cost of production for smallholder growers (4 ha block)																		
Labour Cost at 2 weeks per fortnight for a 4 hectare block																		
Description of work	Man power requirement	Rate	0	1	2	3	4	5	6	7	8	9	10	11	12	Total Amount	Comments / Assumptions	Review Comments
1 Circle weeding, upkeeping, spraying herbicide, fertilizer application, pruning	4 men x 3 days per week x 8 hours per day	2.20		457.60	457.60	457.60	457.60	457.60	457.60	457.60	457.60	457.60	457.60	457.60	457.60	5,491.20	PGK2.20 per 8 hrs x 7 days x 2 weeks = PGK123.20 per Fortnight	Rate used below minimum wage 7 day input assumption (i.e. 4 to harvest + 3 to upkeep) per man
2 Harvesting Fruits	4 men x 4 days per week x 8 hours per day	2.20		610.13	610.13	610.13	610.13	610.13	610.13	610.13	610.13	610.13	610.13	610.13	610.13	7,321.60	Total wages for 4 people = PGK123.20 x 4 = PGK493.80 per fortnight	
																12,812.80		

Cost of Production on a per tonne of FFB					
Description of Cost	Quantity	Rate/Cost (PGK)	Purchases per year	Total Annual	Comments / Assumptions
1 Tools					
Wheel Barrow	2	200	1	400	2 per year
Harvesting Pole	2	35	2	280	2 per year
Harvesting Chisel/hook	2	30	2	120	2 per year
Harvesting Nets	2	50	1	100	5 initially and 2 per year
Grass Knives	2	30	1	60	2 per year
Bush Knives	2	30	1	60	2 per year
Sharpening Stone Files	2	8	2	32	4 per year
Spade	2	25	1	50	2 per year
Spanner, Pliers & screw drivers	2	-	1		
2 Domestic Material/Equipment					
Lawn Mower	1	2,000	1	2,000	Initially & maintenance
Herbicide	20 ltrs	10	2	400	Rate per litre
Fertilizer	20 bags	45	2	1,800	Rate per bag
Portable Spray Tanks	1	70	1	70	Rate per tank
Fuel (kerosine/petrol/diesel)	5 ltrs	5	Fortnightly	650	Rate per litre
Portable generators & solar	1	2,000	1	2,000	Initially & maintenance
3 Building Materials & Valuable					
TV set	1	800	1	800	Initially & maintenance
Water Tank	1	3,000	1	3,000	Initially & maintenance
Timber & Cement Bags		2,000	1	2,000	Initially & maintenance
Iron roofing & accessories		2,000	1	2,000	Initially & maintenance
4 Occupational Health & Safety					
Protective Clothing	2 pairs		1		
Gum Boots	2 pairs		1		
Safety Goggles	2 pairs		1		
Face marks	2 pairs		1		
Hand gloves	2 pairs		1		
Helmet	2 pairs		1		
5 Food & Domestic Consumables		200	Fortnightly	5,200	
6 Education (school/project fees)		100	Quarterly	400	
7 Health, medical & insurance fees)		25	Monthly	300	
8 Transport Costs (PMVs/Bus Fare)		20	Fortnightly	520	
9 Compulsory levies					
OPIC		4			Per MT
OPRA		2			
Sexava		1			
POPGA		5			Per harvest
Transport		54			Per MT

F.9 NIOPGA provided Smallholder Cost of Production

Cost of Production on a per tonne of FFB						
No	Description of Cost	QTY	Rate/ Cost	No. of times per year	Total Annual	Comment
1.0 Tools						
	Wheel Barrow	2	110	2	220	Price fluctuates
	Harvesting Pole	2	75	2	150	Price fluctuates
	Harvesting Chisel	2	25	2	50	
	Harvesting sickle	2	34	2	68	
	Grass Knives	4	30	4	120	
	Bush Knives	4	24	4	96	
	Sharpening Stone Files	2	6	2	12	
	Spade	2	28	2	56	
	screw driver	2	10	2	20	
	pliers	2	37	2	74	
	shifting spanner	2	86	2	172	
					1,038	
2.0 Domestic Material/Equipment						
	Lawn Mower					We bear these costs but is not relevant to the cost of production
	Herbicide	1	1,567	1	1567	15% use herbicides
	Fertilizer	12	75/80	2	465	Price fluctuates
	Portable Spray Tanks	1	116	1	116	15% use knapsacks
	diesel	520L	4	26	2080	Diesel for 4x4 vehicles
	Portable generators & solar					We bear these costs but is not relevant to the cost of production
					4,228	
3.0 Building Materials & Valuable						
	TV set					We bear these costs but is not relevant to the cost of production
	Water Tank					We bear these costs but is not relevant to the cost of production
	Timber & Cement Bags					We bear these costs but is not relevant to the cost of production
	Iron roofing & accessories					We bear these costs but is not relevant to the cost of production
4.0 Occupational Health & Safety						
	Protective Clothing	2	38	2	76	Overalls
	Gum Boots	8	60	2	480	
	Safety Goggles	2	3	2	6	
	Face marks					
	Hand gloves	2	4	2	8	
	Helmet					
					570	
5.0 Food & Domestic Consumables						
						We bear these costs but is not relevant to the cost of production
6.0 Education (school/project fees)						
						We bear these costs but is not relevant to the cost of production

7.0 Health, medical & insurance fees)							We bear these costs but is not relevant to the cost of production
8.0 Transport Costs (PMVs/Bus Fare)							We bear these costs but is not relevant to the cost of production
9.0 Compulsory levies							We bear these costs but is not relevant to the cost of production
OPIC			4			80	Depends on the tons/farmer
OPRA			2			40	Depends on the tons/farmer
Sexava			1			20	Depends on the tons/farmer
NIOPGA			52			52	PGK2.X26 Fortnights
Transport							
						192.00	
						6,028.00	

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