# Opportunities for Increasing Productivity & Profitability of Oil Palm Smallholder Farmers in Central Kalimantan

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Menopang Pembangunan Berkelanjutan

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**ABOUT US**

**Palangkaraya Institute for Land and Agricultural Research (PILAR)** is a research foundation that supports local experts, researchers, and students at the University of Palangkaraya to conduct analysis on land use optimization in Central Kalimantan. PILAR has a particular focus on supporting the development of high-productivity, sustainable oil palm, while conserving valuable ecosystems in Central Kalimantan. The results of PILAR analyses are used to develop recommendations for local policymakers and business investors.

**Climate Policy Initiative (CPI)** works to improve the most important energy and land use policies around the world, with a particular focus on finance, through in-depth analysis on what works and what does not. CPI works in places that provide the most potential for policy impact including Brazil, China, Europe, India, Indonesia, and the United States. In Indonesia, CPI partners with the Ministry of Finance and Palangkaraya Institute for Land-use and Agricultural Research at the University of Palangkaraya in Kalimantan. CPI is supported by a grant from NORAD for the Central Kalimantan PALM project.

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# Executive summary

The Governments of Indonesia and Central Kalimantan have ambitious targets to both grow the palm oil sector and improve environmental quality by reducing deforestation. On the production side, this includes a national target to increase crude palm oil (CPO) production to 40 million tonnes annually by 2020, and a provincial plan to triple the oil palm production area in the same time frame. On the protection side, there is a goal to reduce emissions by 26% at the national and provincial level, primarily by reducing deforestation. To achieve these dual economic and environmental goals, increasing productivity throughout the oil palm value chain and ensuring plantations are located on suitable lands will be essential.

Smallholder farmers are an important part of the picture. In Central Kalimantan, they currently manage an estimated 15% of the planted palm oil area. However, given the ambitious sectoral growth targets, coupled with the regulatory requirement[1] that 20% of oil palm should be smallholder managed, the plantation area managed by smallholder farmers is expected to expand rapidly between now and 2020. This report begins to explore options for increasing productivity and profitability of smallholder farmers in Central Kalimantan, to align this growth with Indonesia's economic, environmental and development goals.

Smallholder farmers in Central Kalimantan have a variety of different industrial organisation models, which impact their productivity, profitability, and risk exposure. These models can be separated into two basic types: 1) independent smallholder farmers and 2) smallholder partnership farmers, which vary between different levels of collective organisation, from individual or one-to-one partnerships with oil palm companies, to farmer groups and institutionalized cooperatives. This study examines three company-smallholder farmer partnership models in Central Kalimantan as well as independent smallholder farmers, to extract lessons that could inform the development of guidelines for improving smallholder farmer productivity through strengthened organization of farmers and the establishment of best practice company-community partnerships.

**We find that, as the plantation area managed by smallholder farmers grows, there are opportunities to improve productivity and farmer benefits within all models that we examined, particularly for individual partnership and independent farmers. Specifically, our analysis suggests that:**

- **The cooperative plasma model that we studied was highly successful in managing both production and market risks.** It reaches the highest yields in the survey sample, at 95% of yield potential. The ability to spread risks across cooperative members is an important advantage of the cooperative;
- **The company-managed plasma model also produced high yields.[2]** For the company-managed model, high yields combined with efficient operating cost management contributed to strong profitability per hectare;
- **There is most scope to improve productivity and profitability for the individual partnership model**, which is only achieving 52% of its potential yield and the lowest profits for farmers of the models sampled.
- Additional analysis by IPB suggests that independent smallholders consistently display lower yields than plasma farmers - up to 50% lower.[3] Qualitative analysis conducted through our study also highlighted the high exposure of **independent smallholder farmers to a wide range of legal, supply, production and market risks**.

1 Article 58 under new Plantation Act Law Nr. 39 of 2014.

2 Concerns about low fertilizer application for immature plants were noticed, however cannot be confirmed in the absence of historical data.

3 Bogor Agricultural University, 2012, Reducing agricultural expansion into forests in Central Kalimantan- Indonesia: Analysis of implementation and financing gaps.

**Overall, the study findings provide a strong case for larger scale, more integrated smallholder plantation management.** Both the cooperative and company-managed plasma models contribute to better performance in terms of yields and profitability per hectare. Both models allow for better planning and more efficient management, while also mutualizing risks among a larger pool of members.

**The cooperative model tends to be more advantageous to smallholders**, as it provides a greater array of benefits and they retain greater control over the plantation. However, field interviews suggest that institutional weaknesses, lack of financial transparency and budget accountability can be barriers to the emergence of successful cooperative models.

## KEY FINDINGS FOR COOPERATIVE MODELS

Transparency and accountability are key prerequisites for cooperative production to be effective. Our analysis suggests that support from the company partners' operations personnel in building the cooperative's management capacity, including developing operating procedures, reporting mechanisms, transparency and accountability can help to establish more effective plantation management and administration practices, which is perceived as a key success factor by participating farmers. In addition, oversight from the lending bank during the development and payback period, through regular audits, also contributed to high levels of transparency and accountability.

> **A word on methodology**
>
> Our data samples were collected in four districts of Central Kalimantan: Kotawaringin Timur, Kotawaringin Barat, Seruyan, and Katingan. Quantitative data on the main productivity and cost drivers for each of the smallholder models was compiled through University of Palangka Raya-led field surveys of smallholder farmers at the selected sites. Qualitative questions were included in the field survey to explore business risks and value chain issues for each model. Focus group discussions were held at each of the field site to benchmark survey results. Analysis was then conducted on the data set, the results of which are detailed in Chapter 4.

## KEY FINDINGS FOR COMPANY-MANAGED MODELS

Company-managed production models are generally cost effective and efficient. With the right institutional settings, they can also provide a viable model for reconciling local communities' welfare and efficient land use. This model of partnership can benefit the company, which retains control over management and value chain, as well as smallholders, who receive benefits for leasing their land.

Efforts to strengthen transparency and accountability mechanisms, and address any land ownership issues would help ensure that this model delivers inclusive benefits and does not contribute to social conflicts in the region. Plasma schemes were initially developed as a model to raise the capacity and productivity of local smallholder farmers. Under the company-managed model, it is questionable whether it contributes to this or the original goal of improving farming practices.

## IMPLICATIONS

Growing pressure for sustainable palm oil production has resulted in many companies involved throughout the oil palm value chain taking on significant sustainability commitments.
To achieve these goals, it will be critical to increase productivity throughout the value chain, in order to reduce pressure for expansion into forest areas to meet economic and production targets of the business sector and governments. Given smallholder farmers manage such a significant portion of oil palm plantations, increasing their productivity and integration into value chains, coupled with ensuring their plantations are located on environmentally suitable lands, is of increasing importance. Otherwise, important gains in sustainability made by companies may be offset.

Our analysis identifies opportunities to improve productivity and profitability for smallholder farmers through a combination of strengthening agricultural practices and improving the organisational models of farmers to better manage risk and maximise benefits. We propose two streams of follow up work, to support the development of successful smallholder models:

- **Case studies on cooperative models:** a series of case studies on cooperative models to better understand the factors for establishing a successful cooperative, including examining value chain integration strategies, scale, capacity requirements, legal and institutional settings and governance mechanisms to provide optimal productivity, risk management, transparency, and accountability.
- **Toolkit for model selection:** it is likely that there is not a 'one-size-fits-all' model for smallholder production. As such, we propose to develop a toolkit to assist smallholder farmers determining the most suitable model and important partnership and governance features for their circumstances. The model will take into account economic, social and environmental features for communities that have already opted to engage in oil palm activities as part of their development planning.

These case studies and tool kits will support communities engaged in oil palm production, as well as governments and business, in meeting their economic, development and environmental goals, including:

- **For communities:** this will enable choices about best organizational model for communities engaged in oil palm, better manage risks, increase benefits retained locally (including economic, social and environmental), and support improved agricultural practices and market access
- **For business:** this will reduce community conflict, help to manage supply chain and reputational risks, ensure business sustainability gains are not offset by smallholder expansion into important ecosystems, and increase business certainty for downstream actors
- **For governments:** this will support sectoral economic growth targets, promotion of rural livelihoods and improved environmental outcomes at scale.

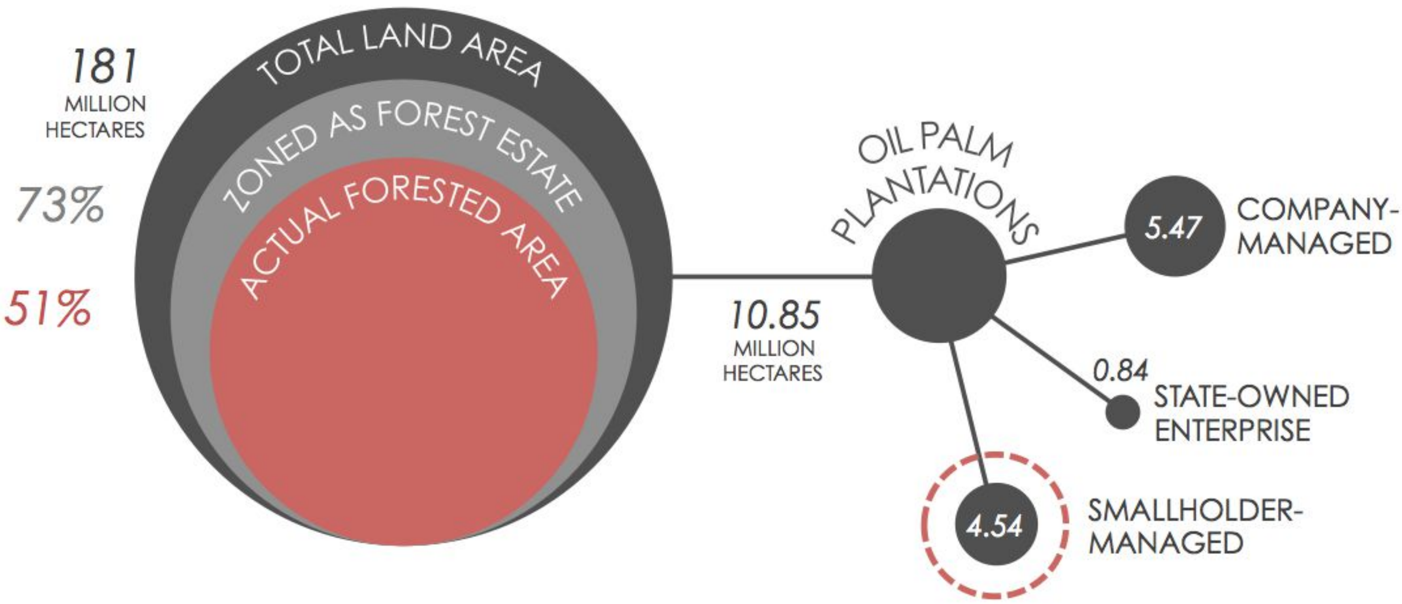
## CONTENTS

# 1. Introduction

Reconciling economic and environmental goals in the land-use sector is a high priority for Indonesia, which is both the world's largest oil palm producer, and is also home to 10% of the world's tropical forests. Currently, oil palm plantations cover approximately 5% of Indonesia's land area, and are one of the most profitable agricultural crops throughout much of Indonesia. Palm oil is the third highest export,[4] and the agriculture sector contributed approximately 12% of Indonesia's GDP in 2013.[5] Further, strong global demand for palm oil, which is projected to increase, is creating a powerful incentive for the oil palm industry to expand production, sometimes threatening and encroaching on high conservation value environmental areas. Increasingly, the ability to guarantee sustainability of products using palm oil is becoming paramount to larger multi-national buyers who produce consumer products.

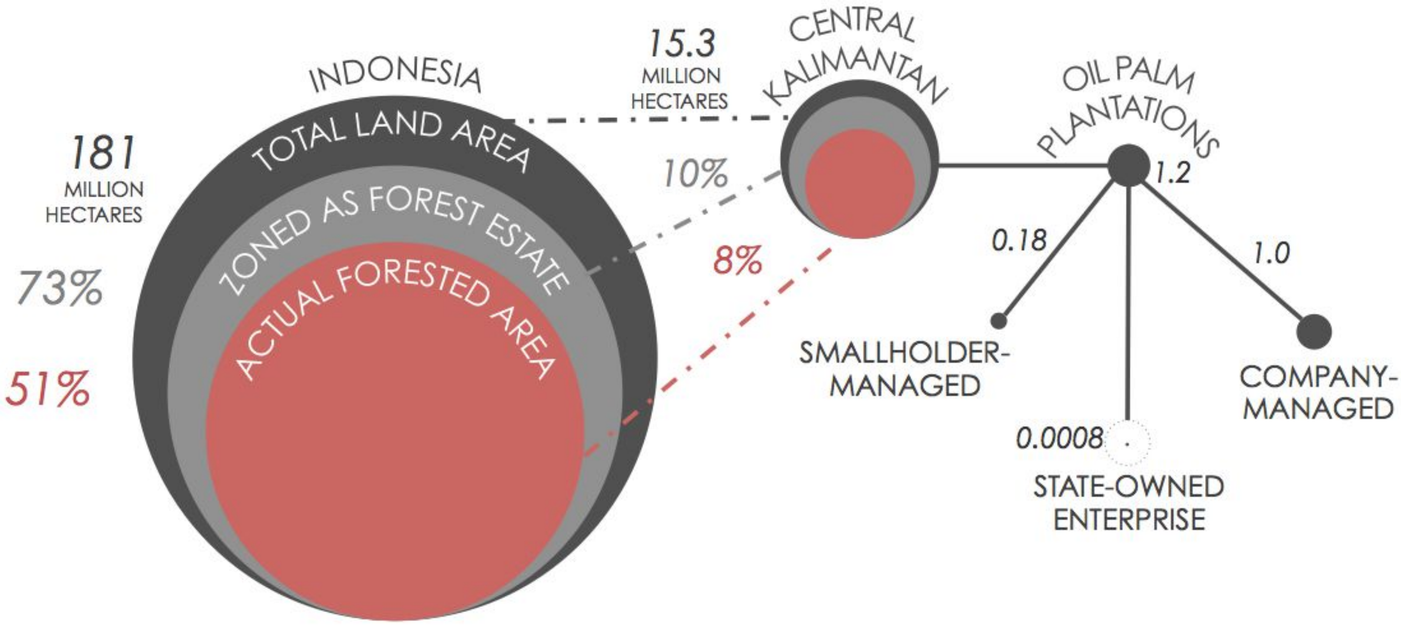
Hence buyers are looking to oil palm plantations in their supply chain to deliver high-productivity, sustainable palm oil. However, plantation managers are not a homogenous group. They range from larger-multinationals, state-owned enterprises and small-medium enterprises to smallholders.

This study is part of a series of analyses undertaken by the Palangka Raya Institute for Land-use and Agricultural Research (PILAR) and supported by Climate Policy Initiative looking at the oil palm value chain and land management practices in Central Kalimantan. We aim to support government, business, and community actors in the oil palm value chain to increase productivity to meet economic production goals, while also increasing protection of valuable ecosystems and delivering local benefits. In this study we focus on smallholders, who at the national level manage more than 40% of Indonesia's oil palm plantations.




4 Ministry of Trade, January – September 2013.

5 BPS, 2014




## 1.1 Central Kalimantan Context

Central Kalimantan's economy is particularly dominated by the agricultural sector, with 67% of the population living in rural areas and agriculture contributing 28% of its GDP. Of this, oil palm plantations contributed approximately half, or 14% of Central Kalimantan's total GDP in 2013,[6] while the province of Central Kalimantan contains 10% of Indonesia's oil palm plantations. According to the BPS, smallholders manage approximately 15% or 181,136 hectares of the total 1,168,451 hectares of oil palm plantation in Central Kalimantan in 2013.[7] Private companies manage the remaining 85% of Central Kalimantan's existing plantations.
There are an estimated 85,000 smallholders,[8] amounting to an average of approximately 2 hectares per smallholder farmer.

Potential for oil palm expansion is still relatively high in Central Kalimantan. To support the Government of Indonesia's national goal of 40 million tonnes of CPO by 2020, the Central Kalimantan government is planning to triple plantation area to reach above 3.5 million hectares by 2020. In addition, Article 58 under new Plantation Act Law Nr. 39 of 2014 sets a minimum of 20% of the total land bank to be managed by smallholders. Therefore by 2020, smallholder plantations would need to increase approximately four-fold if the regulation and the area growth targets are fulfilled.

However, Central Kalimantan also holds 10% of Indonesia's forests, and, these forests are shrinking with deforestation, mostly caused by plantation expansion, forest fires, and illegal logging. The average rate of deforestation in the region has been 1,900 km2 per year from 1996 to 2012.[9] Local communities' livelihood strategies mostly rely on forest resources and agriculture. This implies that determining ways in which to protect forests while meeting economic goals in Central Kalimantan is critical for these communities' development.

It should be highlighted that there is scope to accommodate oil palm plantation expansion without compromising environmental protection goals, for example through the conversion of an estimated 3.3 million hectares of suitable degraded lands.[10]

6 GRDP central Kalimantan 2004-2013 , BPS Provinsi Kalimantan Tengah

7 Central Statistical Agency, BPS, 2014, Stat Kelapa Sawit 2013 Available at http://www.bps.go.id/webbeta/website/flipping_publikasi/stat_kelapa_sawit_2013/indexFlip.php

8 Tree Crop Estate Statistics of Indonesia 2012-2014

9 http://www.gcftaskforce-database.org/CarbonAccounting/CentralKalimantan

10 Gingold, Beth, A. Rosenbarger, Y.I. K. D. Muliastra, F. Stolle, I. M. Sudana, M. D. M. Manessa, A. Murdimanto, S. B. Tiangga, C. C. Madusari, and P. Douard. (2012) "How to identify degraded land for sustainable palm oil in Indonesia." Working Paper. World Resources Institute and Sekala, Washington D.C. Available at http://wri.org/publication/identifyingdegraded-land-sustainable-palm-oilindonesia

## 1.2 About this study

Through the Central Kalimantan Production – Protection Initiative, PILAR and CPI are partnering with government and businesses in Central Kalimantan to develop a plan and model for sustainable oil palm production that can help to increase agricultural productivity throughout the oil palm value chain, while protecting natural resources and delivering benefits to local communities.Under this initiative, CPI is supporting PILAR to conduct research and analysis on production and protection issues for a multi-stakeholder working group that was established by the Governor to help deliver the Government of Central Kalimantan's vision to optimize land use and build a sustainable palm oil sector. Initial research is identifying the most relevant sectors, actors, and opportunities that could become agents of change. We have identified preliminary opportunities to adjust how land resources are allocated and how fiscal policies can incentivize more sustainable behaviour, as well as to adapt business models to increase local agriculture productivity and mechanisms for sharing benefits more equitably among government, business and community actors.

This study looks at opportunities for improving agricultural productivity through improved business models, particularly for smallholder farmers. We begin with the methodology used to assess smallholder business models in Central Kalimantan. We then describe the forms of partnership models in Chapter 3. In Chapter 4, we summarize our analysis of the scale, operating costs, yields, and profits of each smallholder farmer model. In Chapter 5 and 6, we draw conclusions around the opportunities for strengthening company – community partnership and independent smallholder farmer models, respectively, before ending with overarching conclusions and recommendations in Chapter 7.

# 2. Methodology

## 2.1 Model Identification

The aim of the study is to identify the main types of smallholder production models in Central Kalimantan, describe how they operate, profile production practices and effectiveness, and provide a cost and productivity benchmark for each model.

Preliminary scoping discussions with local experts and stakeholders allowed us to identify the three partnership production models mentioned above.

## 2.2 Sample selection

In order to cover each of the four production models identified, survey samples were selected in Kotawaringin Timur, Katowaringin Barat, Seruyan, and Katingan. These districts were selected due to their high numbers of oil palm plantations, and their relative contribution to Central Kalimantan's Fresh Fruit Bunches (FFB) production. These districts' GRDP[11] heavily rely on palm oil – up to 40-50%. Further, based on PILAR land use analysis, these districts still have high potential for conducting land swaps to mitigate deforestation risk. A target of 30 respondents across five sites was set (three different partnership models and two independent sites), hence 150 respondents in total.[12]

## 2.3 Survey design

Survey questionnaires and analytical models were developed to compile quantitative data on the main productivity and cost drivers for oil palm plantations. Qualitative questions were also added to explore business risks and supply chain issues for each model considered.

## 2.4 Training for surveyors

Expert analysts from GreenWorksAsia provided a series of trainings for the surveyors participating in Program PILAR (UNPAR bachelor students in their final semester). The training focused on building a strong understanding of the oil palm value chain, key performance and cost drivers, and training surveyors in using questionnaire and input templates. A simulation exercise was conducted to assure that surveyors understood the data objectives.

11 Gross Regional Domestic Product

12 To be noted that two samples of independent smallholders were excluded from the quantitative analysis

## 2.5 Data collection and compilation

Data collection was conducted between July and September 2014. Focus Group Discussions (FGD) held with local farmers and community leaders in the days prior to conducting the field surveys. The FGD was intended to facilitate surveyors follow up interviews, but also to try and establish reference of benchmark values on key indicators such as yield and fertilizer use, in order to identify outlier data. The FGDs also allowed surveyors to explore some key supply chain issues and business risks. In the case of the cooperative and company-managed plasma schemes, production data was compiled respectively from the cooperative's and inti-company's production reports.

## 2.6 Data analysis

The first step consisted in identifying outlier data, discussing data validity, and reconfirming key data points, notably in relation to yields.

Subject matter experts, primarily agronomists and plantation managers, developed a potential yield projection for each category of seedlings, soil type, and age profile as a reference to identify outlier data. Based on the planting year recorded, it was assumed that seedlings from the previous year were used. It should be noted that the potential yield value refers to the yield potential of specific seedlings, planted in suitable soil condition and under good management practices. Yield values above 120% of that potential yield are considered outlier/unreliable. This is a standard method utilized to assess production performance in corporations' plantation estates. Normally, smallholders produce significantly lower yields than corporate estates. The probability of reaching 100% of the yield potential is small and 120% is deemed unrealistic. Analysis of primary data underlined important limitations in the data collection process. Most of the yield data reported by respondents was considerably above the 120% threshold, up to 60% in certain data sets. The study team was not able to conduct field verification of yields, and as such outlier data was excluded from quantitive analysis component of this study and only qualitative results were used in those instances.

In order to analyze plantation management practices and productivity drivers, inputs (labour, fertilizer, pesticides and herbicides) were compared

Table 1: Field trips and data collection exercise

| | TRIP 1 | TRIP 2 | TRIP 3 | TRIP 4 | TRIP 5 |
|---|---|---|---|---|---|
| DATE | 15-19 July 2014 | 13-17 August 2014 | 1-5 September 2014 | 10-13 September 2014 | 23-27 September 2014 |
| RESPONDENTS | 20 (10 were not producing yet) | 30 | 30 | 30 | 30 |
| MODEL | Individual Partnership | Cooperative | Company-managed Plasma | Independent Smallholders | Independent Smallholders |
| DISTRICTS | Kotawaringin Barat | Kotawaringin Barat | Katingan | Kotawaringin Timur | Seruyan |

to benchmark values developed by subject matter experts. This analysis allowed us to put yield findings into perspective and identify potential for yield improvements or improved efficiency.

Although yield data on the individual Partnership scheme sample were assessed as unreliable, analysis of upkeep and cost data was in line with subject matter experts' benchmarks and considered usable. Therefore, it was decided to use the FGD's yield benchmark (11.8 tonnes FFB / hectare) as the source of yield data, as data from respondent interviews were varied and included outliers.

# 3. Partnership Models

## 3.1 Overview: Smallholder Farmer Partnership Models

Within the smallholder category, farmers are not a homogeneous group and significant differences exist between different smallholder production models. According to existing literature and our own observations, current smallholder yields in Central Kalimantan have a wide range, from 7[13] to 20 tonnes of fresh fruit bunches[14] per hectare. As such, there is significant scope to prioritize improving smallholder productivity to meet economic and production goals.

Smallholders can be divided into independent and partnership farmers. Partnership programs are any smallholder farmers associated with a core "inti" plantation, collectively or individually. Partnership schemes vary between different levels of collective organisation, from individual partnerships with oil palm companies, to farmers groups and institutionalized cooperatives. However the low yields from individual partnerships indicate lower productivity and profitability than other partnership models studied. According to Yahya and Basyaruddin (2015)[15] one of the conditions and challenges faced by the smallholders, independent of age, is that more often than not farmers are not able to fully implement good agricultural practices (GAP) and good farm management practices (GMP). Existing research and literature has also established that independent smallholders remain significantly less productive than smallholders working through a partnership with inti-companies[16]. The qualitative analysis conducted through this study also highlighted the high exposure of independent smallholder farmers to a wide range of legal, supply, production, and market risks.

For instance many small independent farmers have developed their palm oil in non-contiguous plots depending on where they happen to own land, and they cannot afford land near an inti plantation or have joined partnerships. This is because firstly, many smallholders were encouraged by government led plasma partnerships with farmers with little land (2 Ha), low skills, and limited access to market, to develop new oil palm plantations on previously forested land. This scheme was a response to the limitations of the transmigration program, during 'big bang' decentralisation in early 2000. Further, weak governance and poor enforcement to meet requirements for plasma-inti integration led to relatively lower private plasma development. Therefore, such smallholder development hasn't been planned or integrated into companies' supply chains. Given the gap between smallholder partnerships and independent smallholders, the comparative aspects of this study focus on the differences in the various partnership models rather than comparing partnerships with independent smallholders. We aim to identify key features, best practices and highlight key strengths and weaknesses of each partnership model.

Three main partnership models existing in Central Kalimantan are examined, namely 1) Cooperative Plasma Scheme, 2) Individual Partnership Scheme and 3) Company-managed plasma scheme. The analysis focuses on key productivity and profitability drivers that drive benefits in terms of yields, but also profits for smallholders. Considering the higher-risk profile of smallholder farming compared to risks faced by companies operating at a relatively larger scale, discussion on production models also assesses the effectiveness of each model to mitigate risks.

13 Bogor Agricultural University, 2012, Reducing agricultural expansion into forests in Central Kalimantan- Indonesia: Analysis of implementation and financing gaps.

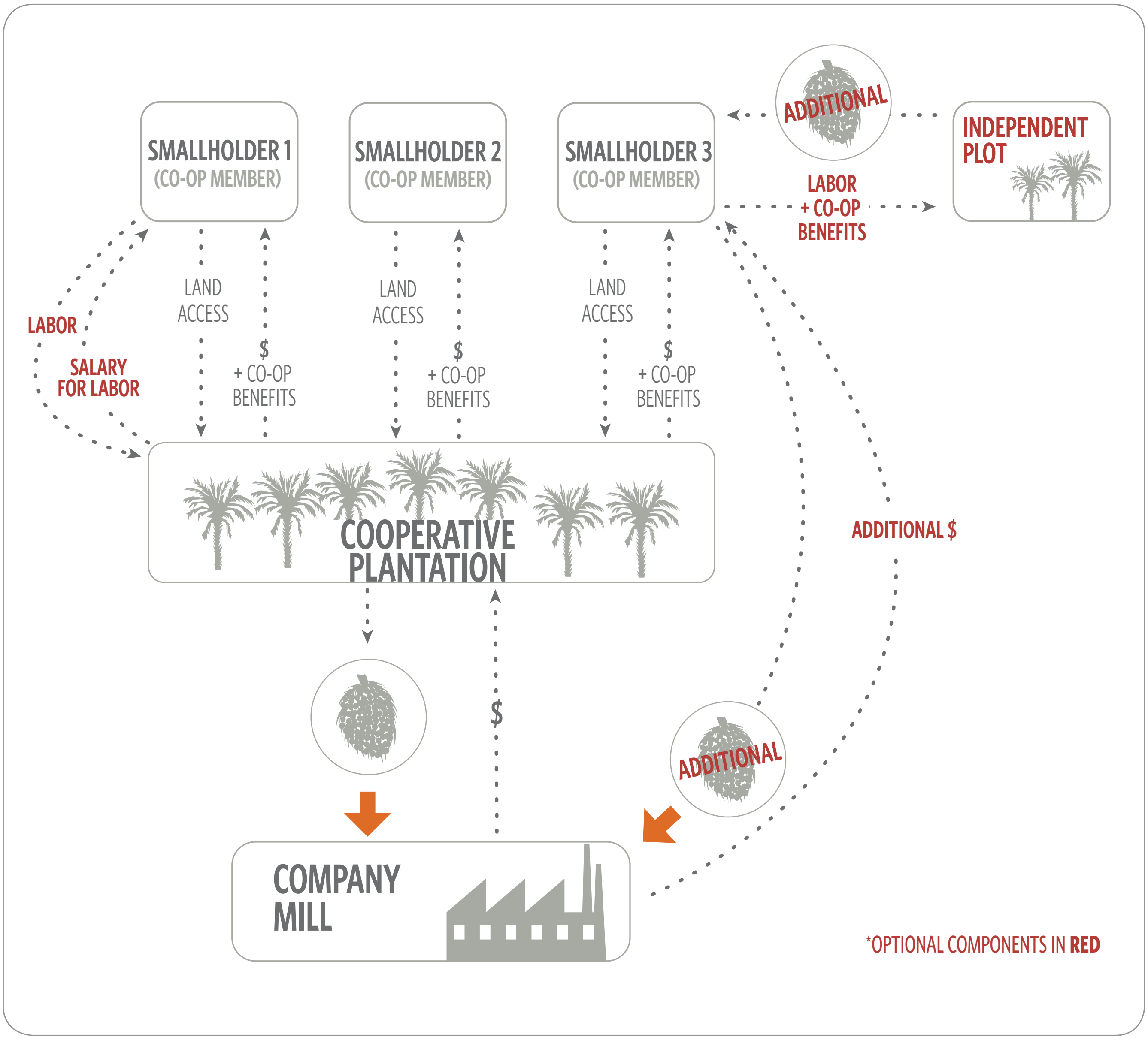
14 Survey results for the Cooperative Plasma Scheme

15 Yahya, Sudirman and Basyaruddin, Darmansyah. 2015. Capacity Building for the Farmer. Discussion paper for the Working Group Meeting on Sustainable Palm Oil initiative of the Ministry of Agriculture on March 10 to 11, 2015. Jakarta.

16 Bogor Agricultural University, 2012, Reducing agricultural expansion into forests in Central Kalimantan- Indonesia:Analysis of implementation and financing gaps.

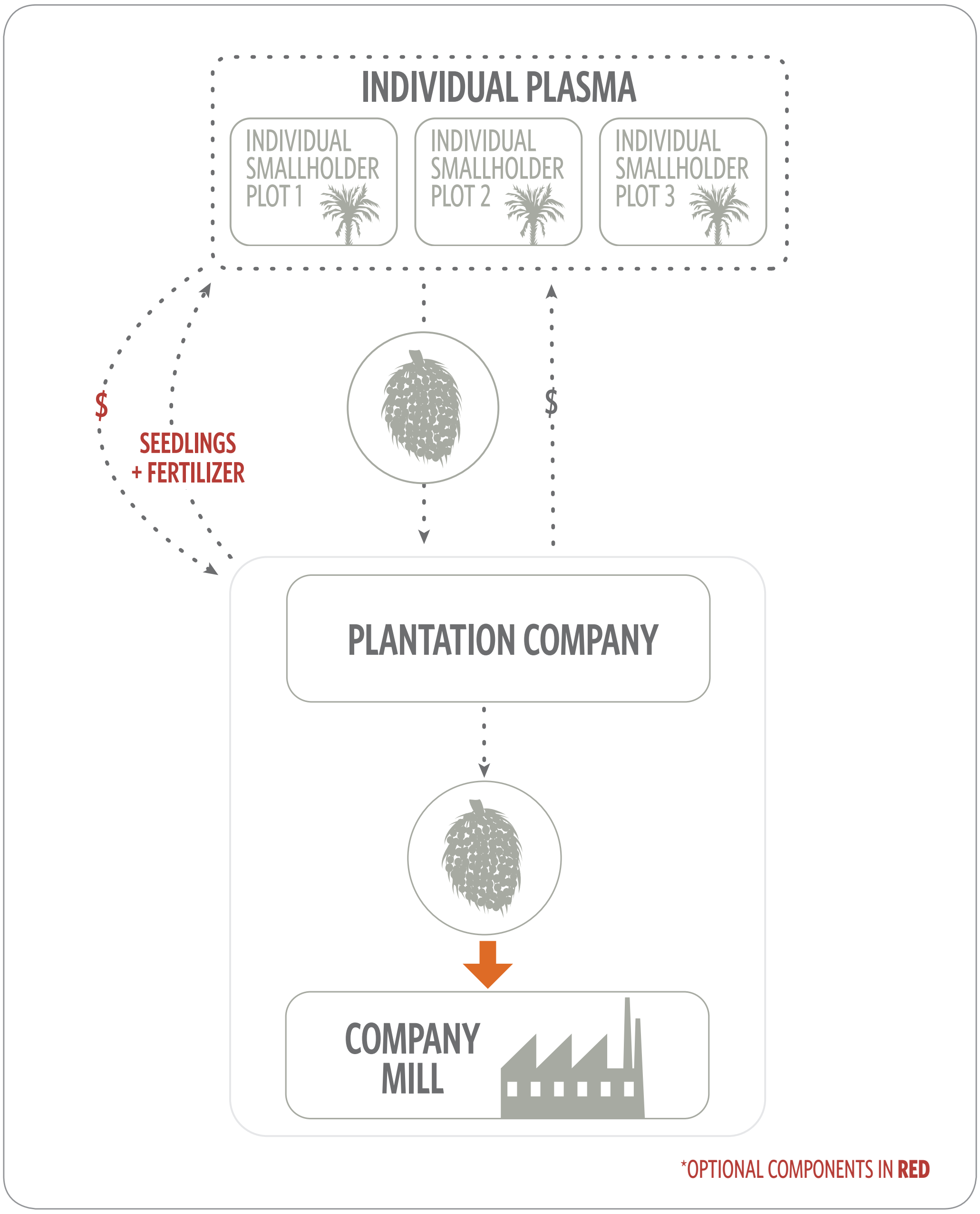
### 3.1.1 COOPERATIVE PLASMA SCHEME

In the cooperative plasma scheme, smallholder farmers manage the whole plasma plantation collectively, pooling their land plots into a shared plantation. The farmers share profits and risks. Like the other two models, they sell FFB to the inti-company. Farmers can work on the plantation for salary, as well as receiving their profit share as members, and they can also manage their own independent plots alongside the plantation, with benefit of accessing seedling, fertilizer and selling to mill through the cooperative.



### 3.1.2 INDIVIDUAL PARTNERSHIP SCHEME

In the individual partnership scheme, smallholder farmers manage their own plot of land individually. They sell FFB to the inti-company (usually large-medium conglomerate). They have the opportunity to buy seedlings and fertilizer from the plantation company.



### 3.1.3 COMPANY-MANAGED SCHEME

In the company-managed scheme, the inti-company directly manages the plasma plantation on behalf of the farmers. Farmers provide the company with access to the land and receive a share of the profits, which are distributed by the cooperative (note the only function of cooperative in this instance is profit distribution).

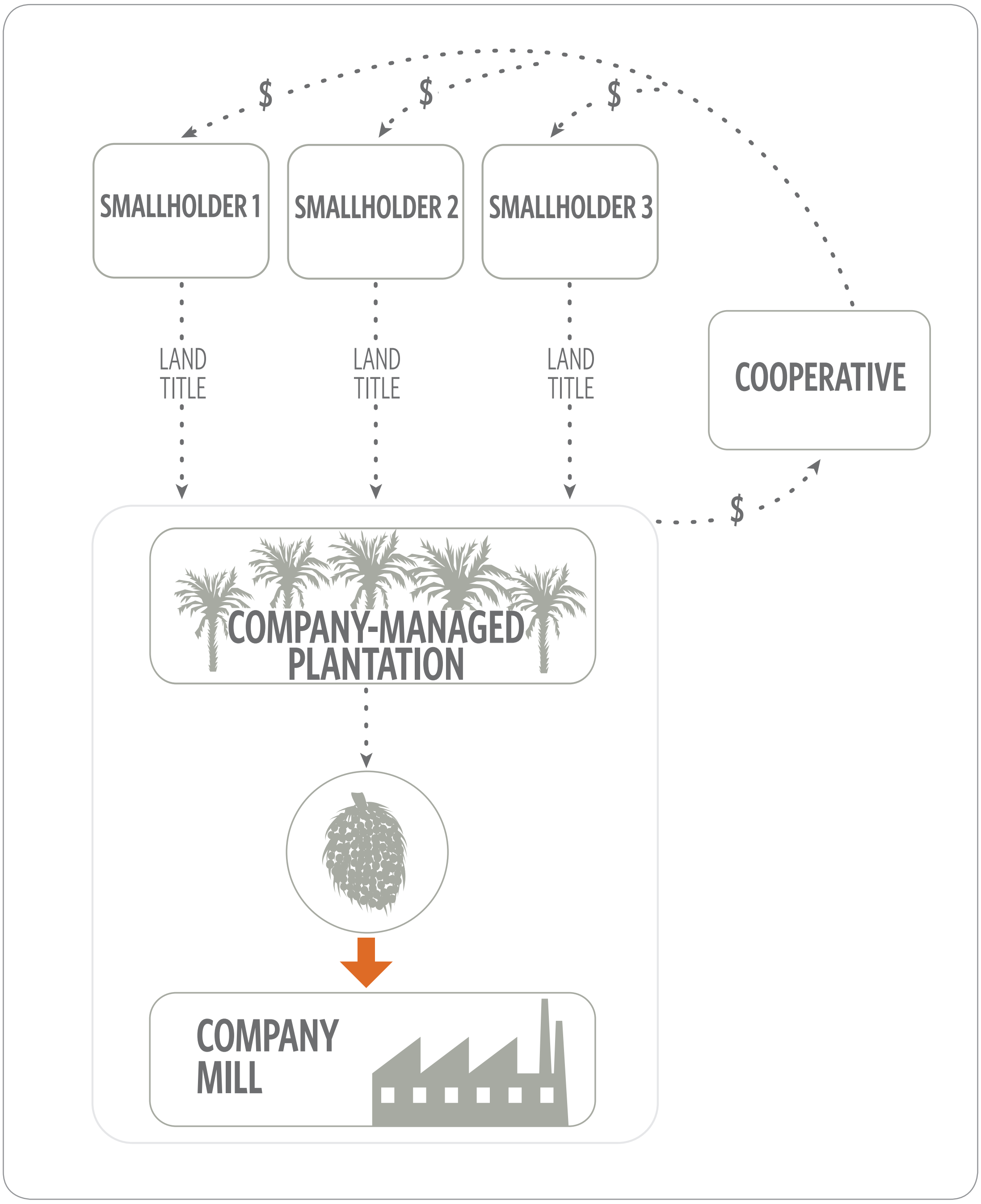


Table 2: Overview and comparison of 3 Partnership Models

| | COOPERATIVE | INDIVIDUAL | COMPANY-MANAGED |
|---|---|---|---|
| DISTRICT LOCATION | Kotawaringin Barat | Kotawaringin Barat | Katingan |
| YEAR STARTED | 1996 | 2007 | 1997 |
| PLANTED AREA | 1,018 Ha | 89 Ha | 325 Ha |
| NUMBER OF FARMERS | 515 farmers | 20 farmers | 108 farmers |
| INSTITUTIONAL SETTINGS | The cooperative is managed as a single production entity, each member/landowner contributing to and benefiting from the whole rather than only their plot of land. Members work as professional farmers, responsible for upkeep and harvest for the whole cooperative area, not limited to their own plot of land. | Individual holders of land certificates come together to join smallholder partnership. Inti- company sets minimum group size of 10 farmers per group.<br><br>Each farmer is responsible for the management of their own plot of land and production. | After securing a customary land certificate (Surat Adat) from the local community leader, landholders relinquish title and control to the inti- company. They do not function as farmers and have no responsibility for management or production.<br><br>There is no limitation over land area applied. A cooperative exists for financial purpose only in distribution of income to smallholders |
| FINANCE | Plantation development is financed through a Kredit Koperasi Primer untuk Anggota (KKPA), a credit facility guaranteed by and channelled through the inti-company to the cooperative. Loan grace period: 4 years. Land certificates used as bank collateral.<br><br>Banks play a key role in ensuring best management and transparent practices through quarterly audits and disbursing credit based on work plans agreed by the company and the planning unit of the cooperative. | Development funds are disbursed from the inti-company. Source of funds include banks and company balance sheet. Lower than market cost loans are repaid through revenue sharing on FFB sales. | Bank financing is arranged and managed by Inti-Company. The smallholder is not involved in financing.<br><br>All development and operational costs incurred by company are deducted from FFB proceeds. |
| FARMER INCOME DISTRIBUTION | A profit sharing agreement of 70/30 split for cooperative and company. After loan repayment, the Cooperative retains a profit share of 4% to cover its costs (eg for replanting, guarantee of minimum etc); the rest is distributed amongst members, and the cooperative guarantees a minimum of IDR 1.25 million per month/Ha to each member. | Farmers are paid 70% of their FFB sales while in payback period. Once repaid, they get 100% payment of FFB proceeds. | During the loan repayment period, plasma farmers retain only 20% of the generated value.<br><br>After loan repayment, 55% of the generated value is paid to landholders. |

| | COOPERATIVE | INDIVIDUAL | COMPANY-MANAGED |
|---|---|---|---|
| ADDITIONAL INCOME OPPORTUNITIES | Smallholders can work as professional farmers for cooperative and earn extra income, or manage additional independent plots. Other external income opportunities are also open as the smallholder is not required to be farmer. | Smallholder is required to manage his own plot to receive the benefits and participate.<br><br>In addition, he can plant other types of crops, or work other farmer's plantation during harvesting | There is no time required by landowners therefore there are many external income opportunities available. |
| VALUE CHAIN | Cooperative is responsible for procurement of input (seeds, fertilizer, production equipment, etc) to the transport and sale of FFB to the CPO mill. All activities/ operational costs are managed and recorded by the cooperative.<br><br>Upkeep, harvesting, and transportation are planned and organized at the Cooperative (Koperasi Unit Desa or KUD) level, for the whole cooperative plantation.<br><br>Transport: Fleet of 5 trucks deliver FFB to the CPO mill. This eliminates any dependence on intermediaries. | In addition to funding, Company provides training. Farmers are fully responsible to manage their own land. Partnership members can order inputs/maintenance material/fertilizer as a farmers group. The company provides fertilizer on credit against future delivery of FFB.<br><br>Transport: surveyed plots were located near the inti-mill (less than 5% rely on intermediaries for transportation to mill)<br><br>Contractual obligation to sell FFB to inti-company. | Inti-company is responsible for land clearing, plantation development, inputs and supply chain management, upkeep and harvest of FFB. |
| REPLANTING | The cooperative is responsible for replanting and has a replanting fund (The reserve fund acts as a price stabilisation mechanism to guarantee a minimum IDR 2.5 million monthly revenue to farmers. Around 16% of operating profits are being saved for replanting, which is planned to start within 5 years) that enables them to finance replanting without need for a further loan. | Individual farmers are responsible for replanting. It is likely that they will need to obtain a further loan from the company to finance the costs. | Company is responsible for replanting and will need to finance. The cost will be passed on to farmers and deducted from profits. |

# 4. Analysis of Partnership Models

## 4.1 Productivity and profitability of smallholder models

On the outset, comparison between the models finds that the individual partnership had the highest operating costs per Ha of all the three models with fertilizer accounting for more than 50% of the operating costs. The individual partnership site was experiencing some difficulties in reaching its optimal yield, and as a consequence, farmer profits were the lowest per ha of the models we analyzed. Whereas, the cooperative model, which was the largest in terms of scale analysed, achieved the highest yield, closest to the potential recommended and farmers received the highest profit per Ha.

The medium-scale company-managed model studied also performed well in terms of yield, although there was room to improve to close the gap between yields and the optimal yield for the seedling type. The operating profit was considerably higher than the individual partnership model, coming in just behind the cooperative.

The following section assesses these three models individually and examines how yields, scale and operating costs impact smallholder profits in further detail. It also gives insights on how different models arrangements share risk, and allocate income or take home pay for the smallholders.

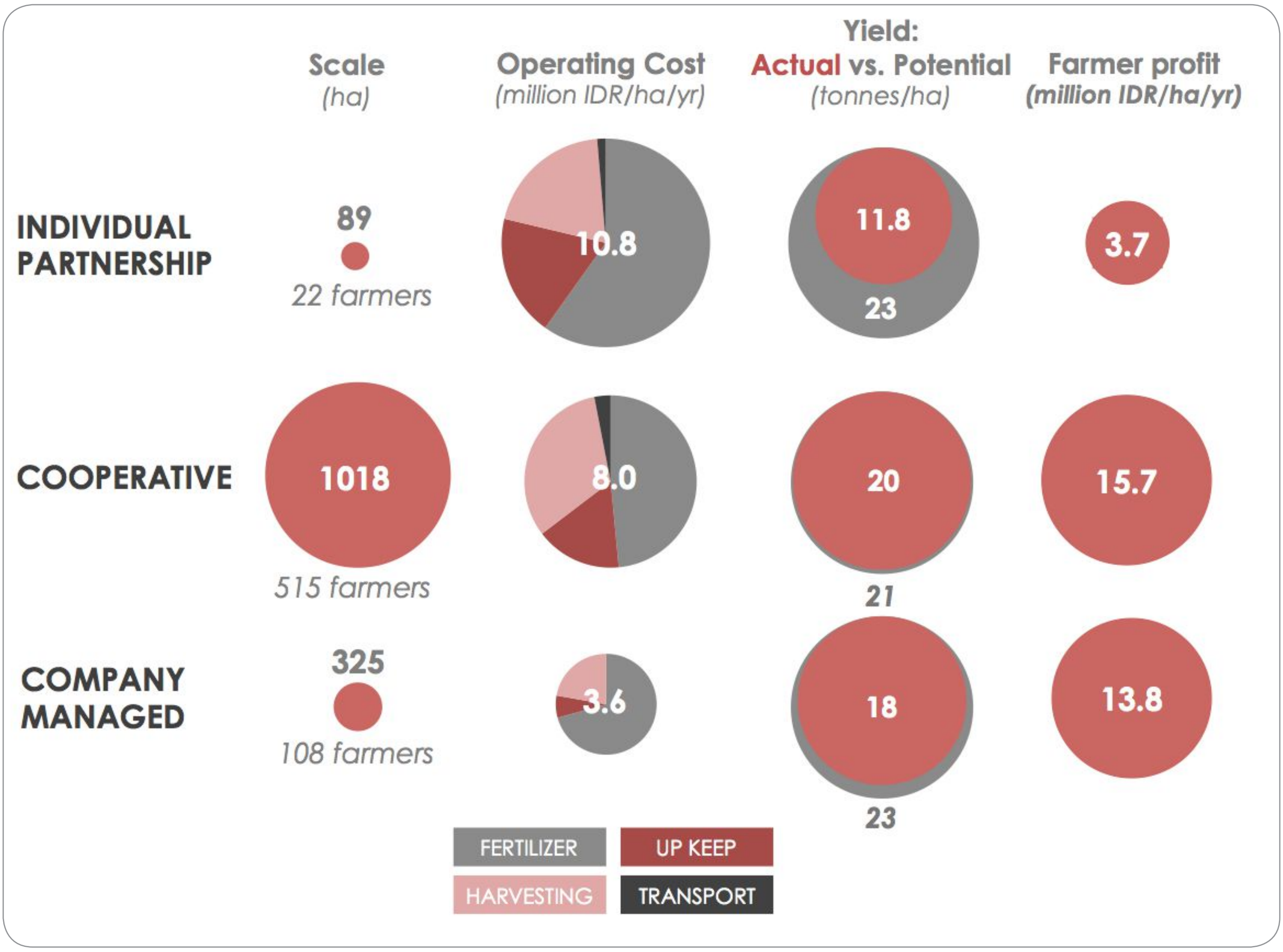


Table 3: Overview Smallholder Models' Revenues, Costs and Profitability[1]

| | COOPERATIVE (IDR/HA/YR) | INDIVIDUAL (IDR/HA/YR) | COMPANY-MANAGED (IDR/HA/YR) |
|---|---|---|---|
| REVENUES COLLECTED | 24,326,683 | 14,561,407 | 25,090,088 |
| TRANSPORTATION COSTS | 267,225 | 1,214,805 | * |
| HARVESTING COSTS | 2,585,296 | 1,902,857 | 808,719 |
| FERTILIZER COSTS | 3,840,665 | 5,880,858 | 2,535,475 |
| UPKEEP COSTS | 1,262,341 | 1,800,766 | 261,351 |
| OPERATING PROFIT | 16,371,156 | 3,762,121 | 21,484,544 |

* The financial statements do not include transportation costs separately. Transportation costs are included in other cost components

1 Referring to the results in 2013 over the range of one year.

### 4.1.1 INDIVIDUAL PARTNERSHIP

**Yields and Scale:** Yield averages 11.8 Tonnes per Ha for the scale of 4.04 Ha/farmer. Actual reported yields reached only 52.4%[17] of the potential yield profile for the type of seedlings used, which is low considering there is no shortage of fertilizer or good seedlings. In fact, the survey data showed that fertilizer application is higher than the good practice benchmark for both mature and immature plantations. The data collected does not allow for a conclusion about the reason behind lower performance,[18] but lower yields may reflect inappropriate fertilizer use or lower fertilizer use during an immature stage. It should be acknowledged here that there is a high level of uncertainty regarding yield data.[19]

**Costs:** Labour inputs for upkeep and cultivation are significantly below benchmark standards, and could contribute to high harvesting costs. [20] Operational costs are driven upwards due to the high fertilizer costs. The achieved income is only a fraction of the optimal yields possible despite the quality seedlings planted.

**Profits:** The profit is less than one third compared to profits achieved in other models and stands at 3.762.121 IDR/ Ha/ year. With an average plantation size of 4.45 Ha per farmer, each farmer's income is IDR 1.4 million/month, still significantly below minimum wage.

There are clear economic disadvantages to individual partnership and lack of economies of scale, which notably impact investment in supportive infrastructure including buying fertilizer at scale, and risk management (risk is mutualized among smallholders) considering they are individual entities.

### 4.1.2 COOPERATIVE PLASMA

**Yields and Scale:** With an average plantation size of 1.98 Ha per farmer, the cooperative plasma model yields the highest FFB tonnage of the samples studied, with 20 Tonnes/Ha/Yr, demonstrating highly efficient plantation management. Our analysis of production data indicates that appropriate fertilizer use supports strong yields.

**Costs:** Labour input for upkeep and cultivation was significantly below benchmark standards contributing to increased cost of harvesting. Relative to the benchmark costs, harvesting costs were high. Available data suggests that low labour input in upkeep is compensated by higher upkeep through material costs, i.e. utilisation of more pesticides and insecticides. Moreover, the cooperative benefits from lower transportation costs as it benefits from economies of scale.

17 Productivity compared against benchmark set by Subject Matter Expert and producer of seeds of the same age. In this analysis it is assumed that the type of seed used is Bibis produced in the year prior to the year of planting.

18 The difference in productivity needs to be investigated more deeply, by analyzing historical data fertilization, and also the suitability of fertilization through soil testing and fertilizer types.

19 This data collected which was collected through field surveys contained a large amount of outliers, compared to credible datasets for the cooperative and the company-managed plasma, which were obtained directly directly. Instead, to maintain credibility and consistency in the data analysis, the average yield recorded in the FGDs has been used, even though this is relatively lower than input data collected.

20 Harvesting costs and yields are two different things. Low upkeep costs do not impact yields significantly, but make the actual harvesting logistically more challenging, hence more expensive.

**Profits:** The cooperative plasma model has strong operating profits, which reached over IDR 16.3 million per Ha/year with the smallholders being able to retain over 96% of the operating profit and with cooperatives selling price of FFB as the highest of all the models. The cooperative set aside IDR 2.65 billion of reserves in 2013, equivalent to 15.92% of the years' distributed profits. This reserve is intended to compensate for any potential drop in future profitability by guaranteeing cooperative members a minimum income of IDR 2.5 million[21]/month. After loan repayment profits are distributed evenly amongst members. The cooperative retains around 4% of the profits to cover its operational expenses. In 2013, each member received the equivalent of around IDR 2.6 million per month in profit sharing, up to IDR 3.1 million including non-cash benefits (reserves and replanting fund). The reserve fund acts as a price stabilisation mechanism to guarantee a minimum IDR 2.5 million monthly revenue to farmers. Around 16% of operating profits are being saved for replanting, which is planned to start within 5 years. The cooperative management is currently studying the best option for replanting: extracting Vs injection to remove old trees, best seedling option, plantation design, etc.

Although cooperatives had the best yield and coverage for risk exposure, with stronger integration into the supply chain, there is room to benefit from further cost efficiencies and profit margins. However, strong and transparent accountability systems have been identified as a key success factors for the cooperative model.

### 4.1.3 COMPANY-MANAGED

**Yields and Scale:** With an average plantation size of 3.10 Ha per farmer, the survey data shows that adequate fertilizer use is supporting good yields, at 18 tonnes/Ha. This is almost 85% of potential yield compared to the benchmark.

**Costs:** The company managed model benefits from economies of scale and integrated supply chains with harvesting and upkeep costs 50%-70% less than the other models. It is only using 37% of recommended fertilizer usage, and 20% of labour usage as per the benchmarks, but company data suggest that there is no significant impact on harvesting or material upkeep cost.

**Profits:** High yields combined with low upkeep costs support strong operating profits. Profits were the highest of the sample, hence the company-managed model appears to be the most effective for profitability with almost 86% profit margins. However, fertilizer application for immature plants, at 0.2kg per tree is insufficient and raises concerns about the future yield performance of immature plants representing more than half of the smallholder area.

With an average of 3 hectares per smallholder, each member will receive around IDR 15 million per year[22] during the payback period, equivalent to less than IDR 1.26 million per month, significantly below the province's minimum wage. However this payment is simply a rental fee and landholders can take up other employment.

Although the profit margin is high, there is still room for cost efficiencies on scale and integrated supply chain efficiencies that could increase profitability even further. However, this model struggles to protect and benefit smallholder livelihoods compared to the cooperative model. After bank loan repayment, landowners retain 55% of value declared by the company, around IDR 1.15 million per Ha per month, just slightly less than the cooperative farmers. However, the pay-back period of 16 years is relatively long, and hence, over a 25-year productive period, the average monthly income per Ha – around IDR 680 thousand - would remain more than 40% below that of cooperative farmers.

21 This is more than the minimum wage in Central Kalimantan which is 1,896,367 IDR per month and slightly higher than the minimum decent living wage of 2,254,000 IDR per month. Price fluctuation is a key issue for smallholder farmers, hence this acts like stabilization mechanism

22 This refers to the 3 per ha during the payoff period, source: Data key points for benchmark and costing (farmer profit before payoff, per year and per ha) * 3 in the Annex.


### 4.1.4 OPPORTUNITIES TO INCREASE PRODUCTIVITY

There were opportunities in all models to increase productivity and profitability. In particular individual partnerships have the potential tp double their yield, while the company-managed model also has significant room for improvements.

Further time series analyses would be needed to suggest how to improve the yields, for example on past year's practices, or in fertilizer use, or on the chemical characteristics of the soil, etc. These further analyses may also need further investigation, soil testing, and fertilizer testing.

In terms of labour inputs, all three models were well below the recommended inputs for their types of seedlings. For the cooperative and company managed models, the input was only 30% and 20% of recommended labour input respectively. The low labour input was largely compensated by other inputs as these models still performed relatively highly against their potential yield. But for the individual partnership, the low labour input was not sufficiently compensated for. For this model, reaching the optimal labour input may help to address the yield performance. This highlights opportunities in factor efficiencies with the company managed and cooperative models, which could further benefit from production efficiencies.

In terms of fertilizer use, the individual partnership was using 25% more than the recommended fertilizer inputs. This was contributing to higher operating costs, but did not seem to be supporting good yield performance. The other two models were inputting below the recommended fertilizer, but achieving relatively good yield performance, and as such the reduced fertilizer was a cost savings in terms of operating costs. Further investigation is required to understand why individual partnership farmers use more fertilizer but achieve very low yield while company-managed plasma achieve high yields with very little input and to explore opportunities for yield improvement.

Table 4: Model Profiles for Yield, Labour & Fertilizer

| | YIELD (% OF POTENTIAL) | LABOUR (% OF RECOMMENDED) | FERTILIZER USAGE (% OF RECOMMENDED) |
|---|---|---|---|
| INDIVIDUAL | 52% | 47% | 125% |
| COOPERATIVE | 95% | 30% | 69% |
| COMPANY- MANAGED | 85% | 20% | 37% |

## 4.2 Risk management

The following table compares the risks between the three smallholder partnership models studied. The cooperative model provides the greatest ability to manage risks for smallholder farmers, with the individual partnership model being the most risk exposed.

Table 5: Risk Management of Smallholder partnership models

| RISKS | COOPERATIVE | INDIVIDUAL | COMPANY-MANAGED |
|---|---|---|---|
| PRODUCTION | • Single production unit (comprised of farmer plots contributed by members)<br>• Risk mutualized<br>• No insurance product available | • Each plot is a separate production unit<br>• Risk borne by individual farmers (as such highly vulnerable to external risks such as flooding, fire, pest or disease)<br>• No insurance products available<br>• Planning and financing of replanting | • Company holds risk<br>• However, if land becomes unproductive unlikely company will provide income to farmers – so risk is passed on |
| LEGAL | • Risk mutualized<br>• (12ha currently under dispute – but all members still receive benefits from active plantation) | • Risk borne by individual farmers | • Farmers highly vulnerable without valid land certificate |
| SUPPLY | • Distribution of subsidized fertilizer to smallholders in region has proved highly unreliable<br>• Group able to manage this risk by directly accessing fertilizer from suppliers owing to scale of their plantation<br>• Also able to invest in local infrastructure directly | • Fertilizer supply guaranteed by company<br>• Limited ability to improve infrastructure, as operating as individual plots and hence limited resources to invest in road maintenance and repair and water table management etc. | • Company responsable to access fertilizer and invest in infrastructure |
| MARKET | • Protected by company partner through guaranteed off-take<br>• Price fluctuations can impact, but established reserve fund to mitigate | • Off-take agreement with partner company, but highly sensitive to price fluctuations owing to scale | • Off-take guaranteed as company managed, but farmers remain sensitive to price fluctuations |

As a further illustration of risk exposure, we conducted two sensitivity analyses of farmer profits per hectare, the first with fluctuations in price and the second with fluctuations in yield. The prices of FFB (fresh fruit bunches) used for the analysis are set by the local government. The sensitivity analysis highlights the correlation between productivity and costs on one hand (Figure 1 below), and sensitivity to price and yield variation on the other hand (Figure 2 below). The higher the margin on operating profits, the lower the sensitivity to price and yields.

Figure 1

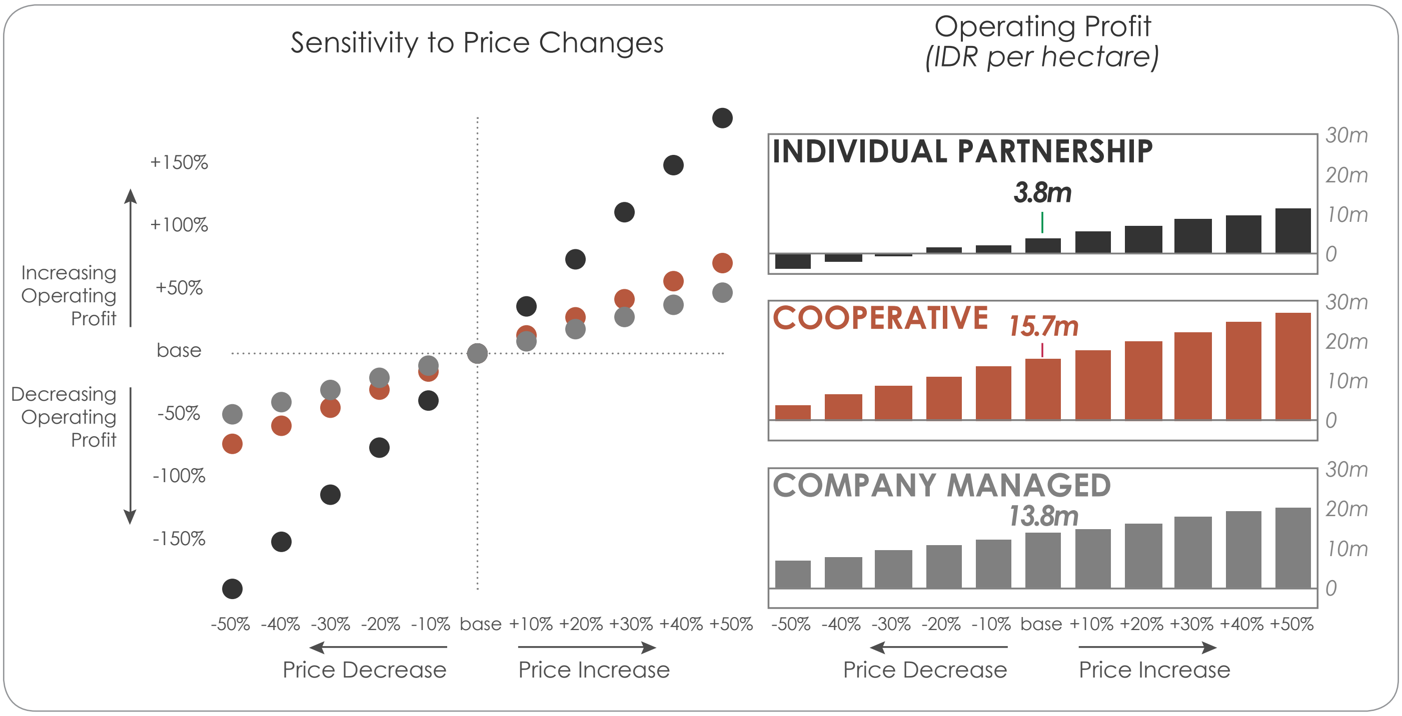
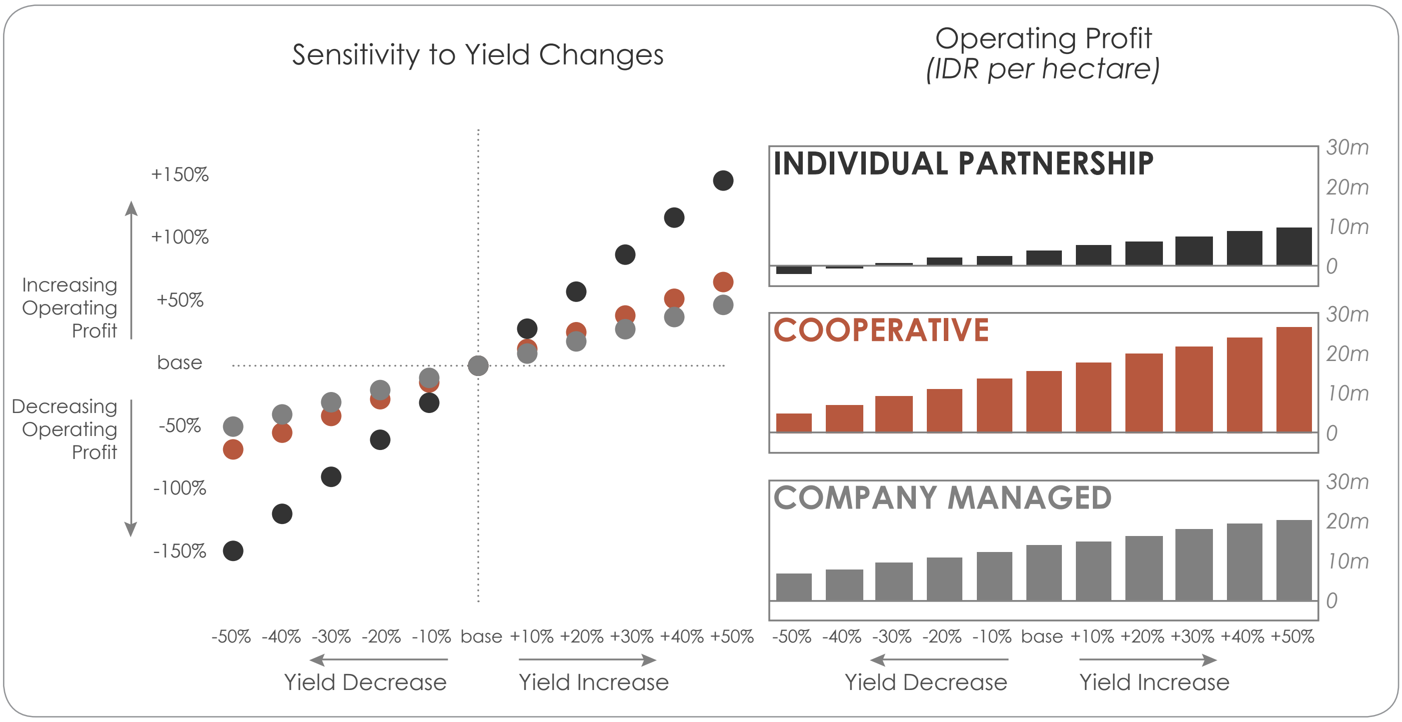



Figure 2



For the price sensitivity analysis, we aim to examine price impacts operating profits to see how different models are exposed to the risk of price volatility. The study finds that the individual partnership model is most sensitive to both increases and decreases in price. For example, a 30% price increase leads to 100% increase in profits (whereas the other two models increase by less than 50%). But likewise, a 30% decrease in price is more than 100% decrease in profits, taking the individual partnership model into the negative.

Mapped against actual profits, the analysis finds that the smallholder profits were highest in the cooperative model. Even with a 50% decrease in price, farmer profits under the cooperative model would be higher than the individual partnership's base profit. Hence the cooperative and company managed models out perform the individual partnership both in terms of actual profits and risk exposure.

For the second sensitivity analysis, on yield, we examine how a percentage increase in yield impacts operating profits to see how different models are exposed to the risk of yield volatility. The study finds a similar pattern and risk level for all the three models, however, because starting yields were again lower for the individual partnership model, its risk exposure and sensitivity to change is greatest. With a 30% increase in yields for the individual partnership model, profits increase by just below 100%, and with a 30% decrease in yields, profits decrease by nearly 30%. For both price and yield, the company-managed model is the least sensitive (hence least risk exposed, but also not as able to benefit from increases in price or yield). The cooperative performs well in both models, and as mentioned earlier has some unique risk management features through it's reserve fund that guard against the decreases in price or yield to protect farmers and provide more stable minimum profits throughout the plantation cycle.

**In summary, the individual partnership scheme, which features very low yields and high input costs, therefore a slim margin, is particularly sensitive to price and yield variations. The company managed scheme, which has the lowest operating costs and highest margin in the sample is particularly resilient to price and yield fluctuations. The cooperative scheme features the highest yields per Ha, but has significantly higher costs than the company managed plantation. This highlights the importance of cost management in building model resilience to yield and price fluctuations.**

# 5. Summary of Findings: Smallholder Farmer Partnership Models

This report finds a range of options for smallholder partnership models of which the cooperative model is the most beneficial for smallholder farmers in terms of more sustainable livelihoods, higher yields, higher revenue, improved access to marketing channels, and reduced risk exposure. Although the company-managed plasma model also provides higher revenues, access to markets, and reduced risk exposure, this model does not contribute to improved smallholder capacity by empowering farmers to the same extent as the cooperative model. However, while the cooperative model that was examined in this study was highly successful, there are numerous examples of failed cooperatives. Therefore, there is merit in exploring institutional settings and the prerequisites that make cooperatives successful. In the interim, there is also merit in considering how to improve value chain integration of smallholders within company models, and where and how each of the different models may work best or be most suitable (including individual partnership and independent models).

**Case: KUD Cooperative[23]**

One of the smallholder communities surveyed had tried to form a KUD[24] cooperative, which failed to provide the expected benefits to its members; lack of transparency allowed the KUD management to embezzle its members' funds, resulting in its disbandment. Based on our discussions, very few examples of smallholder cooperatives have been recorded in the region. As such, further analysis is required as to the requirements of establishing a successful cooperative, and also a toolkit to enable other organisational models to be pursued in circumstances where the foundations for a successful cooperative are not present.

23 Source: FGD 11 September - Karang Sari, Parenggean, Kotawaringin Timur

24 Koperasi Unit Desa (Indonesian Village Cooperative System; rural savings and loan cooperatives)

## 5.1 Cooperative Model

Under the Cooperative scheme, the inti-company participates in building the cooperative management capacity and assists in developing operating procedures, reporting, transparency and accountability mechanisms to ensure effective plantation management practices and sound administrative management. In addition, involvement in oversight from the bank lending for smallholder plantation development during the development and payback period, through regular audits, also contributed to high levels of transparency and accountability. Shared risks among cooperative members are also an important advantage for individual members. Cooperative management has also allowed for learning and professionalization of farmers within the cooperative. However, establishing a successful cooperative model can be very challenging, and requires local community cohesion around common goals, values, and principles. Previous unsuccessful experiences (corruption of cooperative management) have impacted trust and confidence in cooperative models.

Further, an off-take agreement with the inti-company does and will protect farmers against market risks. The reserve fund does and will also provide a buffer to mitigate FFB price fluctuation and act as an income stabilization instrument. Finally, cooperative management also allows investment in infrastructure maintenance and development, contributing to keeping transportation costs in line and preventing supply chain disruptions of individual plots following road or irrigation canal damage.

## 5.2 Individual Partnership Model

In comparison, the Individual Partnership model also presents several advantages, notably supply chain security and credit opportunities for input procurement; the company will guarantee supply of seedlings and fertilizer to partnership farmers, even allowing deferred payments. An off-take agreement with the inti-company also protects the partnership farmers against basic market risks, however they are still sensitive to changes in yield.

While farmers under an individual partnership scheme are mitigated against supply and market risks, individual production models do not allow risks to be mutually shared. Partnership farmers remain vulnerable to production risks and FFB price fluctuation. Similarly, individual partnership farmers will have limited resources to invest in infrastructure maintenance and repair, and will face difficulties responding individually to infrastructure damage.

## 5.3 Company-managed Model

The Company-Managed scheme has clear advantages of integration into company's management, effective infrastructure maintenance and repair for effective supply chain and market risk management. Similar to the cooperative scheme, production risks are shared across the whole hectarage. Last, since the plantation is being managed by the company, smallholders will not have to spend time on upkeep or harvesting, and will be able to engage into alternative revenue generating activities.

Despite the obvious advantages, concerns about land rights legality, accountability, and data transparency to smallholders have to be highlighted. Management data and records are not made available to plasma smallholders or the financial cooperative. Moreover, over 25 years, financial benefits for smallholders remain significantly lower than under the cooperative plasma scheme.

Table 6: Comparison of partnership production models[25]

| | INDIVIDUAL | COOPERATIVE | COMPANY-MANAGED |
|---|---|---|---|
| AVERAGE YIELD (TONNES/HA/YR) | 11.8 | 20 | 18 |
| THE SELLING PRICE OF FRESH FRUIT BUNCHES (FFB)/KG (RP) | 1.216,33 | 1.393,89 | 1.234,02 |
| SALE REVENUE /HA/YEAR (RP) | 14.561.407 | 24.326.683 | 25.090.088 |
| OPERATING PROFITS (PER HA) | 3.762.121 | 16.371.156 | 21.484.544 |
| FARMER'S PROFIT (PER HA POST- SETTLEMENT) [26] | 3,762,121 | 15,682,711 | 13,799,548 [27] |
| PERCENTAGE OF OPERATING PROFIT RETAINED BY FARMER | 100% | 96% | 64% [28] |
| FARMER'S AVERAGE YEARLY INCOME (INCLUDING BENEFITS [29]) | 16,741,438 [30] | 28,141,180 [31] | 24,611,794 [32,33] |
| PROFIT MARGIN (OPERATING PROFIT/ REVENUE) | 26% | 67% | 86% |
| FARMER'S AVERAGE MONTHLY INCOME (INCLUDING BENEFITS) | 1,395,120 | 2.345.098 | 2,050,983 |
| FARMER'S AVERAGE MONTHLY INCOME PER HA (INCLUDING BENEFITS) | 313,510 | 1.172.549 | 681,614 |

25 Shaded areas in this table indicate profits which are retained by the company, however they are important as they reflect managementm efficiencies.
26 This refers to the Farmer Income after paying off the loan (IDR / ha / year). Source: in the annex.
27 Farmer income (profit) is associated with the operating profit (after deduction of operation cost), except for the company managed scheme, where it is governed by contract that states 55% from the total sales regardless of the value of operations cost.
28 For the company manage scheme, as per contract with smallholders, they receive 55% from the total sales.
29 This includes the cost of reserve and replanting. Please see annex for source.
30 Farmer profit after loan pay off (IDR/Ha/year)* Average Plantation Size per Farmer (4.45)
31 The calculation includes both profit before and after loan pay-off. The formula of average yearly income used is: { [Farmer Profit before loan pay off (IDR/Ha/year)*Loan Period*average plantation size per farmer] + [Profit after pay off (IDR/Ha/year) * period until replanting *average plantation size] } /(Total time period which is 25 in this case.
32 Profits are still shared among all members, based on the land they contributed, which is 2Ha per members, despite12Ha which are not producing as the risks and loss are mutualized amongst all members.
33 { [Farmer profit before loan pay off (IDR/Ha/year)*16*Average plantation size per farmer (3.01 ha)] + [ Farmer Profit after loan pay off (IDR/Ha/year)* (25-16) * Average plantation size per farmer (3.01 ha ) ] }/25

# 6. Independent Smallholder farmers

Independent smallholders consistently display lower yields than plasma farmers, up to 50% lower. The field study conducted in Kotawaringin Timur and Seruyan explored systemic challenges throughout the value chain for independent smallholders: access to quality seeds and fertilizer; access to finance; and access to markets.

The quantitative data on yields and production costs for independent smallholders was collected through field surveys, and contained many outliers compared to credible datasets for the cooperative and the company-managed plasma. Consequently, the discussion relating to independent smallholders in this report is focused on the qualitative data that was obtained through focus group discussions.

Focus Group Discussions highlighted that one of the major obstacles to improved productivity and risk management for independent smallholders is their ability to address systemic challenges, for instance access to finance and markets, which are difficult to address as an individual farmer at a small scale. The field study underlined insufficient financial transparency and management accountability as key obstacles for effective collective organizing. Cooperation between farmers remains limited, mostly focused on sharing costs for infrastructure repairs, on an ad-hoc basis.

## 6.1 Supply chain

Because independent smallholders are generally unable to secure reliable supply of fertilizer and quality seedlings, they are exposed to considerable supply chain risks. They are dependent on intermediaries or traders who access fertilizer and seedlings from companies or large suppliers on behalf of many individual farmers. They also generally pay much higher costs for these inputs, which increases their operating costs and reduces profits.

Limited access to quality inputs (mainly seeds and fertilizer) contribute to lower yields compared to partnership farmers who are able to obtain inputs from the inti-company's supply chain. Independent farmers stated that up to 50 trees per hectare, or more than one third of planted trees, failed to produce fruit. Respondents suggested suppliers are not providing genuine or high quality seedlings and fertilizer, which has significant impacts on farmer yields and productivity.

## 6.2 Access to finance

Independent smallholders are unlikely to access bank loans individually. In the absence of development capital (estimated IDR 35 million per Ha), they cannot afford to buy quality certified seedlings and rely instead on cheaper local nurseries with variable quality. Independent smallholders who participated in the survey also indicated that they commonly reduce the amount of fertilizer to immature oil palm trees, therefore impacting their future yield potential. Therefore, limited financial access to independent smallholders will contribute to lower yields. Further, many small independent farmers have developed their palm oil in non-contiguous plots because it depends on where they happen to own land as they do not have the finance to buy near inti plant.

## 6.3 Access to markets and supporting infrastructure

Field discussions have revealed that independent smallholder development was not only driven by local communities, but also by small scale local and national investors, working through local farmers to take advantage of the relatively low land prices in Central Kalimantan. As a consequence, smallholder development tends to be supply driven, developed without sufficient consideration of available market capacity.

The oil palm industry in Central Kalimantan is relatively integrated, with larger companies matching mill capacity to plantations. As a result, CPO mills have limited excess capacity to accommodate independent smallholder production.

Failure to integrate smallholder production into existing mills weakens independent farmers' leverage and allows companies to push FFB price lower through higher ratios of grading. In most cases, independent smallholders will rely on intermediaries to buy their FFB and spread processing among different local mills, taking a fee for transport and marketing. In the group surveyed, the intermediary fee reached 13% of the production's value. Obviously, the higher the uncertainty of market absorption of FFB then the higher the intermediary's fee.

## 6.4 Access to knowledge/extension services

Discussion with independent smallholders also highlighted strong demand for extension services, training and knowledge sharing on good farming practices. In particular, independent smallholders highlighted the need to better identify and deal with pest and disease.

## 6.5 Risk exposure

Independent smallholders are not able to spread and share risks or insure themselves against external risks, and therefore remain highly vulnerable to production loss and sustainable access to credit.

## 6.6 Conclusions

Independent smallholders face systemic challenges to productivity improvements, as well as greater exposure to a wide range of risks:

- Limited access to finance and supply chain inefficiencies contribute to low quality of input, notably seedlings and fertilizer, and therefore smallholders generate yields much lower than partnership smallholders who are integrated into inti-companies' supply chains.
- Poor integration with CPO mills and the supply chains mean independent smallholders face high market risks, which considerably weaken their bargaining position vis-à-vis FFB buyers and intermediaries.
- Lack of knowledge and capacity on plantation upkeep, notably pest and disease control tends to accentuate production risks.

Interviews highlighted institutional weaknesses, notably lack of value chain transparency and financial accountability as key blockages to the development of effective collective production mechanisms.

# 7. Conclusions and Recommendations

With company plantation development being increasingly regulated, as the industry looks to comply to legal Indonesia Sustainable Palm Oil (ISPO) and Roundtable of Sustainable Palm Oil (RSPO) requirements, managing smallholder development is important to ensure this development does not become a key driver of deforestation and offset sustainability gains made by companies. Smallholder farmers have, to date, largely operated outside certification standards, with few legal requirements applying to the development of agricultural production at this smaller scale. The Ministry of Agriculture, with support from UNDP, are taking steps to enable smallholders to be bought within the ISPO framework. We hope this study and planned follow up work can make a timely contribution to these efforts by helping to inform development of smallholder organisation models.

**Improved coordination and larger-scale smallholder business models would help smallholders to meet certification standards, improve efficiency, and achieve better integration into oil palm value chains. There are opportunities to improve productivity and farmer benefits within all models.**

Both the cooperative and company-managed plasma models feature strong performance in terms of yields and profitability per hectare and can be easily integrated into landscape-level planning, provide more efficient management structures, and mutualize risks among a larger pool of farmers. Of the two plasma models, the institutional and legal settings of the cooperative model tend to be more advantageous to smallholders and facilitate the delivery of a broader set of local development benefits beyond simple farmer profits.

In contrast, our analysis suggests that independent smallholder oil palm farming is economically inefficient, unable to reach the required scale to access input supply or markets, and is highly exposed to a wide range of risks. As such, organization of smallholders is important to achieve economies of scale, minimise risk exposure and deliver greater benefits to local farmers. Ideally, smallholder production should be matched with local milling capacity to ensure market outlets for farmers and economic efficiency.

**Development of higher productivity smallholder organizational models must take place on environmentally suitable lands to deliver both economic and environmental goals.** Linking this analysis to CPI-PILAR's related analysis on high value ecosystems will be critical to ensure that both company and smallholder plantations on suitable lands.

## RECOMMENDATIONS FOR COOPERATIVE PRODUCTION MODELS

Transparency and accountability are key prerequisites for cooperative production to be effective. Our analysis suggests that support from the company partners' operations personnel in building the cooperative's management capacity, including developing operating procedures, reporting mechanisms, transparency, and accountability can help to establish more effective plantation management and administration practices, which is perceived as a key success factor by participating farmers. In addition, oversight from the lending bank during the development and payback period, through regular audits, also contributed to high levels of transparency and accountability.

## KEY FINDINGS FOR COMPANY-MANAGED MODELS

Company-managed production models are generally cost effective and efficient. With the right institutional settings, they can also provide a viable model for reconciling local communities' welfare and efficient land use. This model of partnership can benefit the company, which retains control over management and value chain, as well as smallholders, who receive benefits for leasing their land.

Efforts to strengthen transparency and accountability mechanisms, and address any land ownership issues would help ensure that this model delivers inclusive benefits and does not contribute to social conflicts in the region. Plasma schemes were initially developed as a model to raise the capacity and productivity of local smallholder farmers. Under the company-managed model, it is questionable whether it contributes to this original goal of improving farming practices.

## FOLLOW-UP ANALYSIS AND TOOLKIT DEVELOPMENT

The study highlights the advantages of a partnership system compared to independent farmers. These advantages include more sustainable livelihoods in terms of higher yield and revenue, improved access to marketing channels, and reduced risk exposure. With the existence of many independent smallholder farmers in Central Kalimantan, building a pathway to organize them into appropriate partnership schemes could deliver economic benefits to the community and local region. Both public and private actors would need to support this organization, including involvement of the private sector to develop technical capacity, value chain integration, and reduction of company-community conflicts. The government also has an important role, including linking smallholders with the ISPO, ensuring market regulation is aligned (including price setting for CPO), regulating how benefits are shared between government, business and community actors, managing spatial planning and resolving land rights and ownership issues.

For communities that choose to engage in oil palm and have suitable lands available from an environmental perspective, the choice of the appropriate smallholder organisation model will depend on a range of local factors. All of the models assessed have variations in form and come with their own merits and shortcomings.

Further analysis is needed on the circumstances when different models might be most suitable and the key features for success of each model so that it delivers the maximum benefits to the community, while meeting economic, environmental, other social goals. We propose further case studies on the key features of a successful cooperative, given the numerous examples of failed cooperatives in Indonesia. We also propose a toolkit to support model selection by companies and communities.

# Annex I – Breakdown of costs and benchmarks for smallholder farmer partnership models

## OVERVIEW OF PROFITABILITY FOR SMALLHOLDER PARTNERSHIP MODELS:

Figure 1: Cooperative Plasma's Scheme Profitability

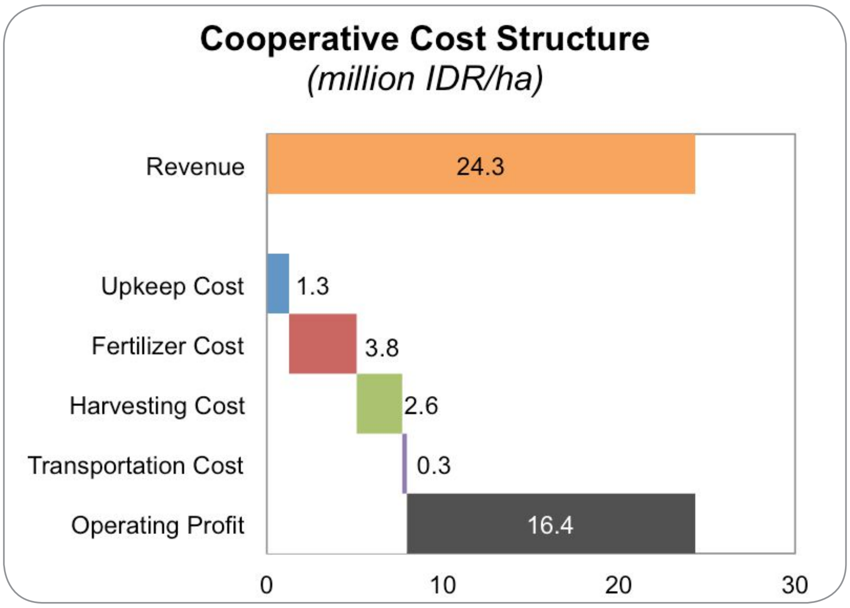



Figure 2: Individual Partnership's Scheme Profitability

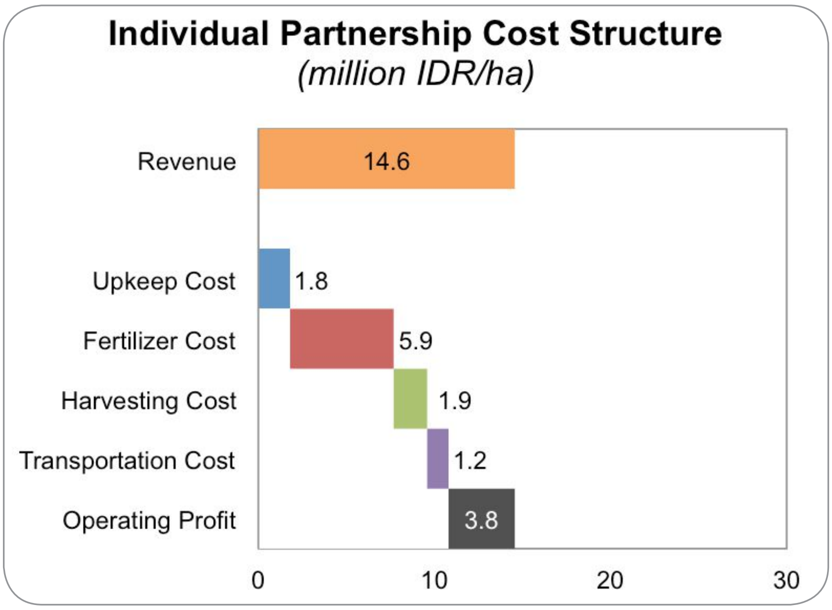


Figure 3: Company-Managed Plasma Scheme Profitability

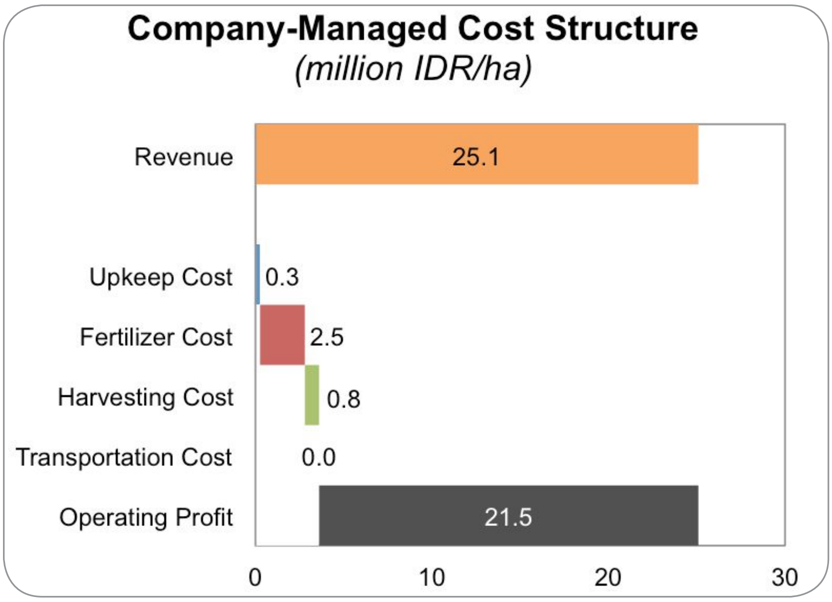



Table 7 Benchmarks for recommended inputs, & cost analysis[1]

| UPKEEP | COST (IDR/HA) | RECOMMENDED LABOUR (INPUT DAYS/HA) |
|---|---|---|
| MATURE PLANTATION | 2,400,000 | 36 |
| IMMATURE PLANTATION | 4,000,000 | 54 |

| FERTILIZER | COST (IDR/HA) | RECOMMENDED FERTLIZER (KG/TREE) | RECOMMENDED LABOUR (INPUT DAYS/HA) |
|---|---|---|---|
| MATURE PLANTATION | 7,000,000 | 8 | 4 |
| IMMATURE PLANTATION | 5,800,000 | 5 | 2.5 |

| HARVESTING | COST (IDR/KG) |
|---|---|
| HARVESTING | 80 |
| TRANSPORTATION | 50 |

1 The benchmark for input and cost analysis has been developed by Arghajata based on recommendations from Subject Matter Experts - Agronomists and former plantation managers.The benchmark for yields is based on data provided by seedling producers, broken down by type of soil and geographic location; in this case, we used data for mineral soil in Central Kalimantan

Table 8 Palm Oil Yield in Mineral-Soil in Kalimantan

| AGE OF PLANTATION (YEARS) | SEEDLING TYPE | | | | AVERAGE RECOMMENDED SELLING PRICE 2013 |
|---|---|---|---|---|---|
| | LONSUM (TONS/HA) | DAMI (TONS/HA) | SOCFINDO (TONS/HA) | MARIHAT (TONS/HA) | |
| 0 | - | - | - | - | |
| 1 | - | - | - | - | |
| 2 | - | - | - | - | |
| 3 | 11.0 | 11.4 | 7.0 | 8.8 | 1,002 |
| 4 | 19.0 | 19.4 | 18.5 | 15.0 | 1,105 |
| 5 | 23.0 | 26.4 | 21.1 | 21.1 | 1,207 |
| 6 | 24.0 | 25.5 | 21.1 | 22.0 | 1,227 |
| 7 | 23.0 | 23.8 | 20.2 | 21.1 | 1,261 |
| 8 | 23.0 | 21.1 | 19.4 | 20.2 | 1,331 |
| 9 | 23.0 | 18.5 | 21.1 | 18.5 | 1,349 |
| 10 | 23.0 | 20.2 | 21.1 | 20.2 | 1,396 |
| 11 | 23.0 | 22.0 | 21.1 | 21.1 | 1,396 |
| 12 | 24.0 | 22.9 | 22.0 | 21.1 | 1,396 |
| 13 | 24.0 | 22.9 | 22.0 | 22.0 | 1,396 |
| 14 | 24.0 | 23.8 | 22.9 | 22.0 | 1,396 |
| 15 | 23.0 | 23.8 | 22.9 | 21.1 | 1,396 |
| 16 | 23.0 | 22.9 | 22.0 | 21.1 | 1,396 |
| 17 | 23.0 | 22.0 | 22.0 | 21.1 | 1,396 |
| 18 | 23.0 | 22.0 | 21.1 | 20.2 | 1,396 |
| 19 | 23.0 | 21.1 | 21.1 | 19.4 | 1,396 |
| 20 | 23.0 | 21.1 | 20.2 | 18.5 | 1,396 |
| 21 | 23.0 | 20.2 | 19.4 | 17.6 | 1,411 |
| 22 | 22.0 | 20.2 | 19.4 | 17.6 | 1,387 |
| 23 | 22.0 | 19.4 | 18.5 | 17.6 | 1,387 |
| 24 | 21.0 | 18.5 | 17.6 | 16.7 | 1,387 |
| 25 | 21.0 | 17.6 | 16.7 | 15.8 | 1,387 |

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