



# Service Delivery Model Analysis

Okomu OPC, Nigeria  
Public case report

*July 2021*



## Introduction of IDH and the SDM analysis

### Importance of Service Delivery

Agriculture, including forestry, plays a key role in the wellbeing of people and the planet. 70% of the rural poor rely on the sector for income and employment. Agriculture also contributes to climate change, which threatens the long-term viability of the global food supply. To earn adequate livelihoods without contributing to environmental degradation, farmers need access to affordable high-quality goods, services, and technologies.

Service Delivery Models (SDMs) are supply chain structures that provide farmers with services such as training, access to inputs, finance, and information. SDMs can sustainably increase the performance of farms while providing a business opportunity for the service provider.

A solid understanding of the relation between the impact on the farmer and the impact on the service provider's business brings new strategies for operating and funding service delivery, making the model more sustainable, less dependent on external funding, and more commercially viable.

### About this study








To accelerate this process, IDH is leveraging its strength as a convener of key public-private partnerships to gain better insight into the effectiveness of SDMs. IDH developed a systematic, data-driven approach to understand and improve these models. The approach makes the business case for service delivery to investors, service providers, and farmers. By further prototyping efficiency improvements in service delivery, IDH aims to catalyze innovations in service delivery that positively impact people, planet, and profit.

### Thanks

IDH would like to express its sincere thanks to The Okomu Oil Palm Company (Okomu) for their openness and willingness to partner through this study. By providing insight into their model and critical feedback on our approach, Okomu is helping to pave the way for service delivery that is beneficial and sustainable for farmers and providers.



## This SDM analysis, part of a IDH and IFDC collaboration, will inform the design of an inclusive, sustainable and commercially viable smallholder palm oil program managed by Okomu in Edo State, Nigeria

	NI-SCOPS <sup>1)</sup>	2SCALE <sup>2)</sup>
About the program	National Initiative for Sustainable and Climate Smart Oil Palm Smallholders (NI-SCOPS) is a partnership between Solidaridad and IDH to support stakeholders to meet the Paris Agreement commitments. It focuses on productivity (Mt FFB/ha/year), Adaptation (uptake of adaptive and innovative practices) and Mitigation (land cover change)	2SCALE is an incubator and accelerator program that manages a portfolio of public private partnerships for inclusive businesses in agro-food sectors and industries. 2SCALE focuses on the Protein & Animal products, Staple Crops, Fresh Produce and Oil Seed sector in specific countries in West and East Africa
Purpose	Palm oil producing landscapes will become more economically robust and socially just, while protecting and restoring valuable natural resources leading to reduction of greenhouse gas (GHG) emissions from agriculture and land use change	2SCALE aims to contribute to food security & nutrition, sustainable and inclusive economic growth and stability in Africa <ul style="list-style-type: none"> <li>○ Improve access to nutritious food for 1 million consumers</li> <li>○ Improve livelihoods of 750,000 smallholders</li> <li>○ Develop inclusive business with 5,000 MSMEs</li> <li>○ Scale over 60 public private partnerships</li> </ul>
Ways of working	NI-SCOPS aims to make the concept of climate smart agriculture operational in six Nigerian states in the oil palm belt. In parallel, local governments are supported with development and implementation of conservation plans to protect, and where necessary restore, critical ecosystem values.	2SCALE works with inclusive business champions (agribusiness SMEs or farmer producer organizations) and supports the development of agribusiness clusters (ABCs) and their integration in competitive and inclusive value chains, targeting African food markets, with a specific focus on the bottom of the pyramid (BoP)
Partners	  	   

1) <https://www.idhsustainabletrade.com/ni-scops/>; 2) <https://www.2scale.org/>

## Chapter overview

Throughout the report, you can click the corresponding icons on the left of each page to be taken to the first page of that chapter



### 1. Executive Summary

- Situation and purpose of the analysis
- Main findings, recommendations and potential next steps



### 2. Recommendations

- Overview of recommendations
- Supporting arguments and analyses



### 3. Annex

- Context of the SDM
- Strategy of Okomu
- Farmer income
- Underlying assumptions



# 1. Executive summary





## Seeking to source 200,000 Mt FFBs from SHFs in an inclusive and sustainable way, Okomu and partners will need to roll-out an effective, affordable and commercially viable service and sourcing model

### Situation

- Nigeria consumes 1.4 million Mt of palm oil annually. With national production at 0.95 million Mt, the remaining 0.5 million Mt is imported from Asia. As the population and consumption per capita increases, but production levels remain stagnant, there will continue to be a supply deficit. To support local production and substitute imports, the Nigerian government banned the import of refined palm oil, among other measures.
- Okomu, located in Edo state, is one of the four largest palm oil producers in Nigeria. They operate two palm oil mills, processing 200,000 Mt of Fresh Fruit Bunches (FFB) per year from their own plantation into 40,000 Mt of crude palm oil (CPO). In a second location Okomu is constructing two new mills to expand processing capacity to 80,000 Mt CPO, requiring them to increase supply to 400,000 Mt FFB.
- Due to the land tenure system, the nearby typical forest ecosystems and threat of sparking conflicts with surrounding communities, Okomu's ability to expand their own plantations is limited. At the same time, there is a significant number of (prospective) oil palm smallholders located nearby Okomu's mills. As such, Okomu aims to integrate 5,000 smallholder farmers (SHFs) into their supply chain to fulfil their processing capacity needs while investing in the local economy.

### Complication

- However, productivity of SHFs (3 - 10 Mt of FFB per hectare per year) is only about 25% of the productivity on estates (15 - 20 Mt of FFB per hectare per year) and extraction rates are low. This is a result of 1) a lack of access to high quality seedlings (especially the Tenera hybrid), 2) a lack of application of (crop specific) fertilizers, 3) a lack of knowledge of best practices, 4) old, low-yielding trees, and 5) a lack of access to suitable financial/credit services.
- Moreover, low yields and incomes lead SHFs to focus on increasing the area under production since they are unable to increase the production per hectare. This accelerates deforestation and loss of biodiversity and increases carbon emissions and the impact of climate change in the region.
- Finally, Okomu has limited existing relationships with any SHFs, nor do they have a solid service and sourcing infrastructure in place, all the while access to many farms is poor.
- In order to increase SHF yields sustainably, SHFs need to 1) be able to access inputs, services and markets, 2) be trained to apply Good Agricultural Practices (GAP), 3) have improved access to their farms as well as the trees on those farms and 4) become eligible for long-term replanting loans to increase long-term productivity, quality and profitability. At this point it is unclear how the sourcing from, financing of and service provision to SHFs can be most effectively organized and financed, and how long-term sustainability can be guaranteed.
- Therefore, this SDM analysis aims to answer the question: ***"How can Okomu source 200,000 Mt of FFB from smallholder farmers by implementing a commercially viable outgrower model with 5,000 SHFs by year 2030, while improving community livelihoods and limiting deforestation?"***

## Directly sourcing from smallholder farmers, while improving their business case with the provision of services, provides a strong business opportunity for Okomu, due to revenue increase and cost reduction

### Improve the business case

#### Improving the business case for existing and prospective palm oil SHF

- **To source 200,000 Mt of FFBs from smallholder farmers**, while improving community livelihoods, Okomu should screen the farmers who want to join the SDM. The screening serves as a check to see whether the SHFs match certain minimum criteria (e.g., willingness to sell to Okomu and within 50 km radius of Okomu's mills, possession of a bank account, and being member of a farmer organization). Besides, the screening enables Okomu to understand the farmers' needs, mitigate risks, identify which farmers are eligible for financial services, and group farmers based on the age and status of their palm oil trees. The current age and conditions (need for rehabilitation and rejuvenation) of palm stands are key farm characteristics to determine three farmer segments (Productive, R&R, and Prospective – farmer). As such, these farmer segments differ in farm-size, yield, and service needs.
- Subsequently, Okomu will need to provide tailored services in the form of GAP training and access to high quality inputs and seedlings, and develop facilities to increase access to affordable and timely finance, to:
  - **Productive farmers**, who have an operational plantation with young mature oil palm trees, can increase their 10-year average income to \$4,000 (up from \$3,150) via a productivity service package consisting of GAP training, access to high quality inputs, and access to harvesting labor
  - **R&R farmers**, who have an operational plantation with old mature oil palm trees and a need to rehabilitate and rejuvenate their plantations, and who can increase their 10-year average income to \$2,900 (up from \$2,100) via an R&R service package consisting of GAP training, access to high quality inputs, access to finance to rejuvenate and rehabilitate the plantations, and access to harvesting labour
  - **Prospective farmers**, who develop a new plantation, are projected to make a 10-year average loss of \$230 due to a negative income in the first 5 years. In year 6 they have a positive net income of \$1,300 which gradually increases in the long-term, via a planting service package consisting of GAP training, access to high quality inputs, access to finance to establish the palm oil farm, and access to harvesting labor. A substantial investment of 3,100 \$/ha is required to achieve these results, which is earned back after 13 years.
- Overall, based on this 10-year average, Productive farmers are able to earn an income from palm oil amounting to 79% of the living income benchmark (R&R farmers: 55% and Prospective farmers: -17% (35% on 20-year average)).

### Develop scalable SDM

#### Develop and scale an efficient service delivery and sourcing infrastructure (1/2)

- **To fulfil the capacity of 200,000 Mt FFB per annum by 2030**, Okomu should materialize their developed roadmap and collaborate with other palm oil value chain partners, while tailoring the implementation of service provision, and monitoring outcomes of provided services based on lessons learned and data-collected over time. To reach the sourcing volume, Okomu needs to source from 3,338 farmers and 31,707 Ha land, assuming an average farm size of 10.5 ha for existing farmers and 4.0 ha for prospective farmers.

## Collaboration with other value chain partners provide the opportunity to mitigate the increased the need to mitigate risks around sustainable production, protection of forest, and inclusion of communities

### Develop scalable SDM

#### Develop and scale an efficient service delivery and sourcing infrastructure (2/2)

- Besides, Okomu is able to meet its sourcing target by 2030 with between 3,500 and 5,000 farmers, cultivating oil palm on between 32,000 and 20,000 hectares of land depending on the assumed yields and farm sizes.
- Furthermore, by implementing a cost-effective service package, efficient service delivery through 20 cooperatives, and a sourcing infrastructure with 3,338 SHFs, Okomu is able to reach its sourcing targets by 2030, and secure an increasing amount of FFB with high oil content, which increases processing efficiency and decreases processing costs. All gains outweigh the costs of transportation and service provision directly from and to SHFs.
- Based on a 10-year average, the total cost of servicing and sourcing from Prospective farmers is the highest (135 USD/Mt FFB) compared to Productive farmers (107 USD/Mt FFB) and R&R farmers (109 USD/Mt FFB). The cost of service provision per Mt FFB is mainly driven by high transportation costs (13 USD/Mt FFB) and procurement and processing costs (90-100 USD/Mt FFB). For prospective farmers, the low initial yields of their maturing trees lead to low volumes, thereby inflating the cost per Mt FFB.
- While on a 10-year projection a reduced share of prospective farmers is required to yield an increased net income, with productive farmers providing an annual income of 3,384 USD/year for Okomu (R&R 2,869 USD/year, and Prospective 872 USD/year), the high-quality maturing trees of the Prospective farmers are pivotal for Okomu to secure its sourcing volumes in the future.

### Act on PPI risks

#### Act on PPI risks and opportunities in the region

- The integration of smallholders into Okomu's value chain brings about both risks and opportunities to the sustainability of production, protection of forests, and inclusion of communities. Therefore, Okomu should develop potential measures to mitigate against risks or tap into opportunities that impact the business case for Okomu, communities, and the landscape
- Sustainability of production is pressured with the increase of fertilizer usage and decrease of biodiversity on mono-crop palm oil plantations. Besides, the improved business case might motivate farmers to expand their farms, pressuring high conservation value areas (HCV-areas) and further degrading forest soils.
- Therefore, Okomu is advised to define interventions between service coalition partners to ensure effective production, protection, and inclusion within the region. The collaborations will further strengthen Okomu's understanding of how to directly source from smallholders by tapping into expertise, and will enable Okomu to develop appropriate interventions to mitigate PPI risks and to ensure a proactive data-driven SDM approach. Okomu is recommended to implement an inclusive and fair data MIS system that enables identification of and acting on risks and opportunities.



## To ensure the long-term viability and sustainability of the outgrower model, the priorities to focus on are financing with sustainability requirements, fertilizer on credit and moving towards regenerative agriculture

Recommendation	Actions required to execute this recommendation	Type of actor most strongly positioned for driving the service	Service providers and/or other stakeholders to work with	Support required? • No support (executed by SDM Operator itself) • Support (financial, material, technical, other)	Next step to be taken
<b>High priority</b>					
Financing with sustainability requirements (inc. location and max. land size of newly planted plots)	Establish finance facility for farm on-lending in collaboration with the national bank and/or impact investment funds.	<ul style="list-style-type: none"> <li>Financial service providers (FSPs)</li> <li>Investment funds consultant</li> <li>Okomu</li> </ul>	<ul style="list-style-type: none"> <li>National bank</li> <li>Impact Investment funds</li> </ul>	<ul style="list-style-type: none"> <li>Technical support to establish finance facility</li> <li>Analytical support to establish credit scoring segments and requirements</li> </ul>	<ul style="list-style-type: none"> <li>Determine sustainable financing requirements as starting point of negotiations with FSPs.</li> </ul>
Fertilizer on credit	Establish administration system and farmer accounts to ensure adequate accounting of fertilizer offtake and repayment.	<ul style="list-style-type: none"> <li>Tera Agric</li> <li>Okomu</li> <li>Golden fertiliser</li> </ul>	<ul style="list-style-type: none"> <li>IITA and/or NIFOR can do plant tissue analysis to inform fertilizer recommendations</li> </ul>	<ul style="list-style-type: none"> <li>No support, as service is executed by Okomu as service providers and hired personnel within the SDM</li> </ul>	<ul style="list-style-type: none"> <li>Ensure awareness and trust from SHF to offtake fertilizer and clear communication on requirements</li> </ul>
Move towards regenerative agriculture	Determine diversification portfolio of crops to sustain soil fertility, decrease chemical input usage, and increase income resilience.	<ul style="list-style-type: none"> <li>Okomu</li> <li>2Scale</li> <li>IDH</li> </ul>	<ul style="list-style-type: none"> <li>Local off takers</li> <li>Local markets</li> <li>Soil testing service provider</li> <li>Knowledge partner</li> </ul>	<ul style="list-style-type: none"> <li>Knowledge and capacity building on crop diversification</li> </ul>	<ul style="list-style-type: none"> <li>Develop understanding of possible crops to diversify with based on market demand and farm/soil characteristics</li> </ul>

## 2. Recommendations



## Farmers need to be screened and segmented before they join the SDM. Subsequent tailored service packages will support them in optimizing the performance of existing and newly developed farms

### Recommendation 1: Improving the business case for existing and prospective palm oil SHF

Pillar 1

1.A

Implement a screening and segmentation approach to select eligible farmers and tailor services to farmers' needs

1.B

Provide a complete productivity enhancing service package to maximize yields and incomes of existing farms

1.C

Provide (re)planting services and corresponding suitable loans to unlock full yield and income potential in the long run

1.D

Explore improvements to the service and sourcing package to further increase farmer incomes



## Before providing high-cost, high-risk services to farmers, it is essential for Okomu to screen and select eligible farmers to mitigate risks of low service adoption, low loyalty and high risk of default



### Requirements

- Within a 50 km radius of Okomu's mills
- In possession of a bank account
- Basic numeracy
- Be a member of some form of farmer organization
- Willingness to sell FFB to Okomu
- Willingness to receive technical support



### Engagement (1 week)

- Okomu contacts farmer organizations to get in touch with individual farmers
- Farmers can indicate their interest to join the program by filling in a form
- Okomu's field staff visit the farm for fruit type identification and to map the location and borders of their land using GPS



### First training & sourcing (2 weeks)




- Farmers receive their first 2-day training from Okomu, which focuses on fruit type and quality
- After completion of this training, farmers receive an off-take agreement from Okomu
- Okomu and the farmer agree on a first day for harvesting and collection
- Okomu and farmers sign a sourcing and service contract



### Sourcing and support (ongoing)

- Farmers receive training on different topics, in order of importance
- Farmers receive multiple services based on their specific needs
- The FFB is collected at the farm-gate and weighed on scales that are approved by the Standards Organization of Nigeria
- A quality and ripeness check is done at the farm-gate by Terra Agric

## Farmers need different support depending on the current age of their palm stands. The average tree age determines whether they need short-term productivity support or long-term R&R and/or planting services

Farmer segments*	 Productive farms	 Ageing farms	 Prospective farms
<b>Characteristics</b>	Young mature oil palms, requiring productivity-enhancing services	Fully mature palms with declining yield curves	To be developed plot, requiring planting support
<b>Average tree age</b>	7 years	15 years	N/A
<b>Current average yield</b>	7 Mt FFB/ha	9 Mt FFB/ha	0
<b>Maximum yield</b>	12.5 Mt FFB/ha	12.5 to 19 Mt FFB/ha**	19 Mt FFB/ha
<b>Average plot size</b>	10.5 ha	10.5 ha	4 ha
<b>Services</b>			
<b>Access to markets</b>	Road access clearing, lorry rent & transport		
<b>Training</b>	Technical & organizational, business & record keeping, safety & health, digital finance		
<b>Inputs</b>	Herbicides, pesticides, fertilizer		
	Tenera seedlings		
<b>Labor &amp; equipment</b>	Land preparation, chain saw & excavator rent, tools & PPE		
<b>Post-harvest services</b>	Post-harvest services		
<b>Access to finance</b>	Fertilizer loan		
	Rehabilitation loan		
	(Re)planting loan		

### Farmer segmentation

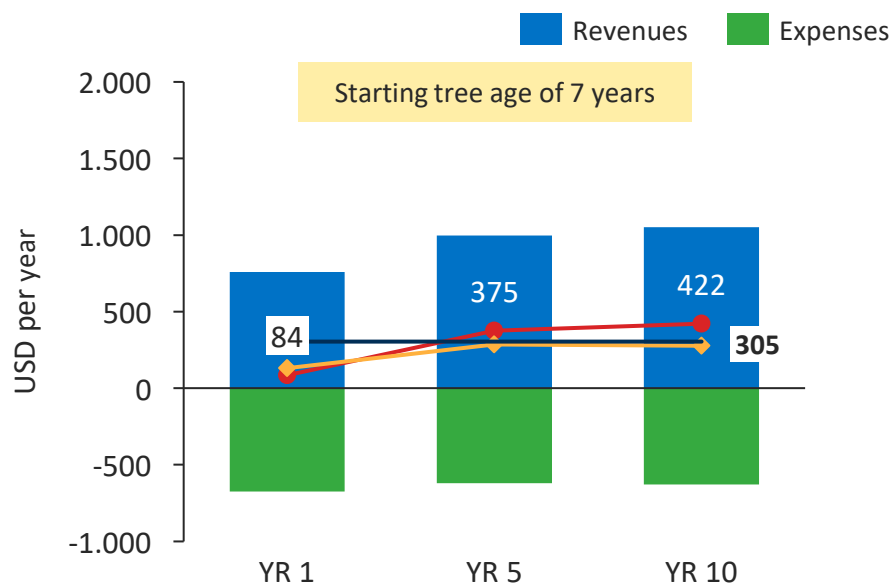
- Three service packages are defined based on the specific needs of representative groups of farmers
- The age of the trees is the main driver informing the services farmers need
- For most farms, there is an immediate need to clean up the farms, restore the soils, rehabilitate the trees and reduce post-harvest losses
- Additionally, ageing and prospective farms are in need of (re)planting services coupled with long-term finance. These services require the largest investments from Okomu with the longest time horizon of returns

\*Assumptions shown are average baseline conditions; within each farmer segment tree age, yields and plot sizes vary

\*\* With current tree compositions, farms can obtain a maximum yield of 12.5 Mt FFB/ha. When ageing farms are properly replanted, they can potentially obtain a maximum yield of 19 Mt FFB/ha

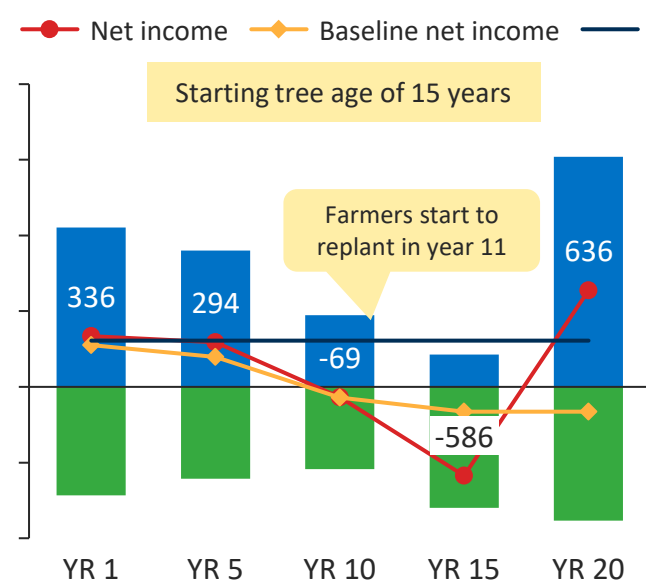
## Farmer incomes can be slightly increased in the short run, but investments in service provision are needed. (Re)planting can secure long-term profitability, but is risky due to the long-term nature and required loans

Productive farm P&L (USD/ha)



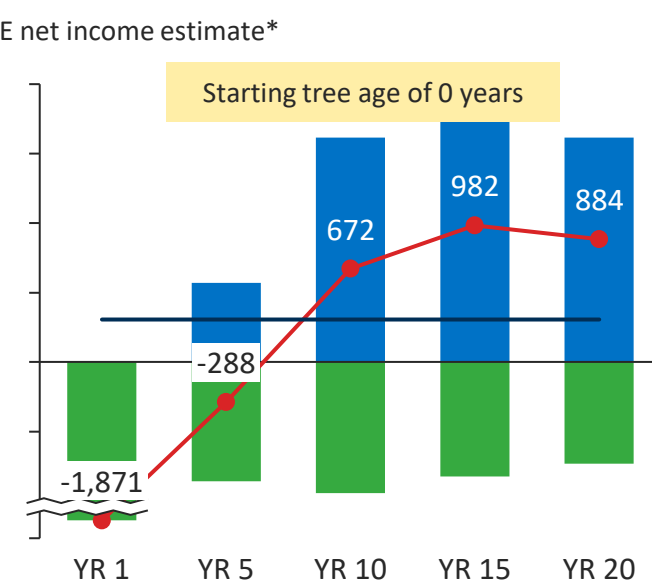
- Via currently planned services like training and input provision, short-term productivity can be increased
- Investments in the provision of these services seems to be justified by an additional cumulative income of 800 \$/ha in the first 10 years

Ageing farm P&L (USD/ha)



- Trees aged 24 years and above are no longer profitable, necessitating investments in replanting of 2,800 \$/ha
- Affordable long-term financial products are required to enable farmers to make these investments

Prospective farm P&L (USD/ha)



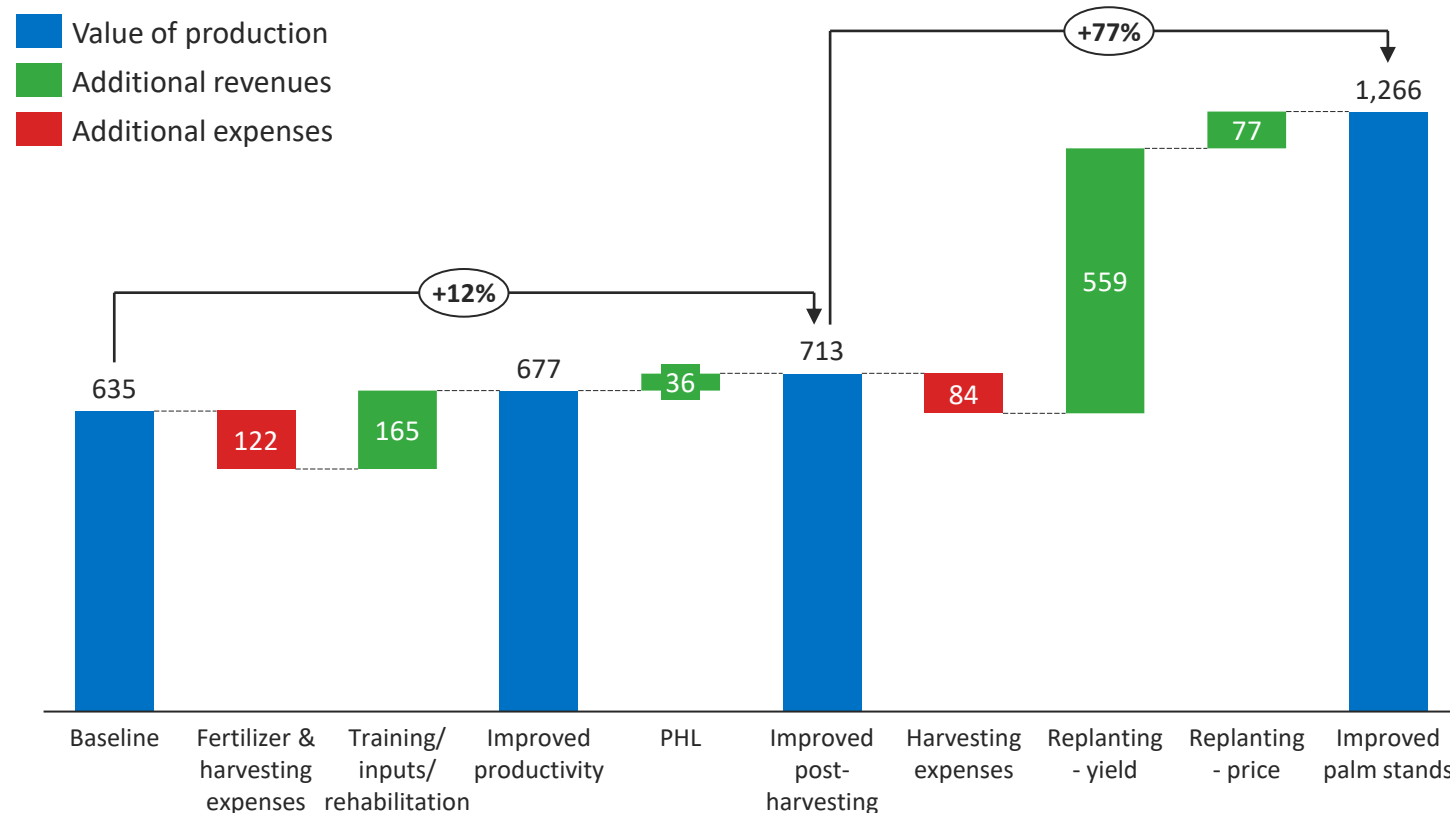
- With upfront investments of 3,100 \$/ha, prospective farmers need affordable, long-term loans with appropriate repayment terms
- However, loans are expensive for farmers and risky for lenders (limited collateral, long time horizon, revenues are not assured)

\* The 2SCALE net income benchmark was taken from an extensive survey carried out by Foremost Development Services. It assumes an average farm size of 10.5 hectares, an average tree age 12.7 years and an average yield of 10.3 Mt FFB/ha



**With productivity and profitability gains, farmers can increase their value of production by 12% to 713 \$/ha/year. When replanting, farmers can increase this value with another 77%, to 1,266 \$/ha/year**

### Net income for different farm conditions and net income drivers (USD/ha/year)\*



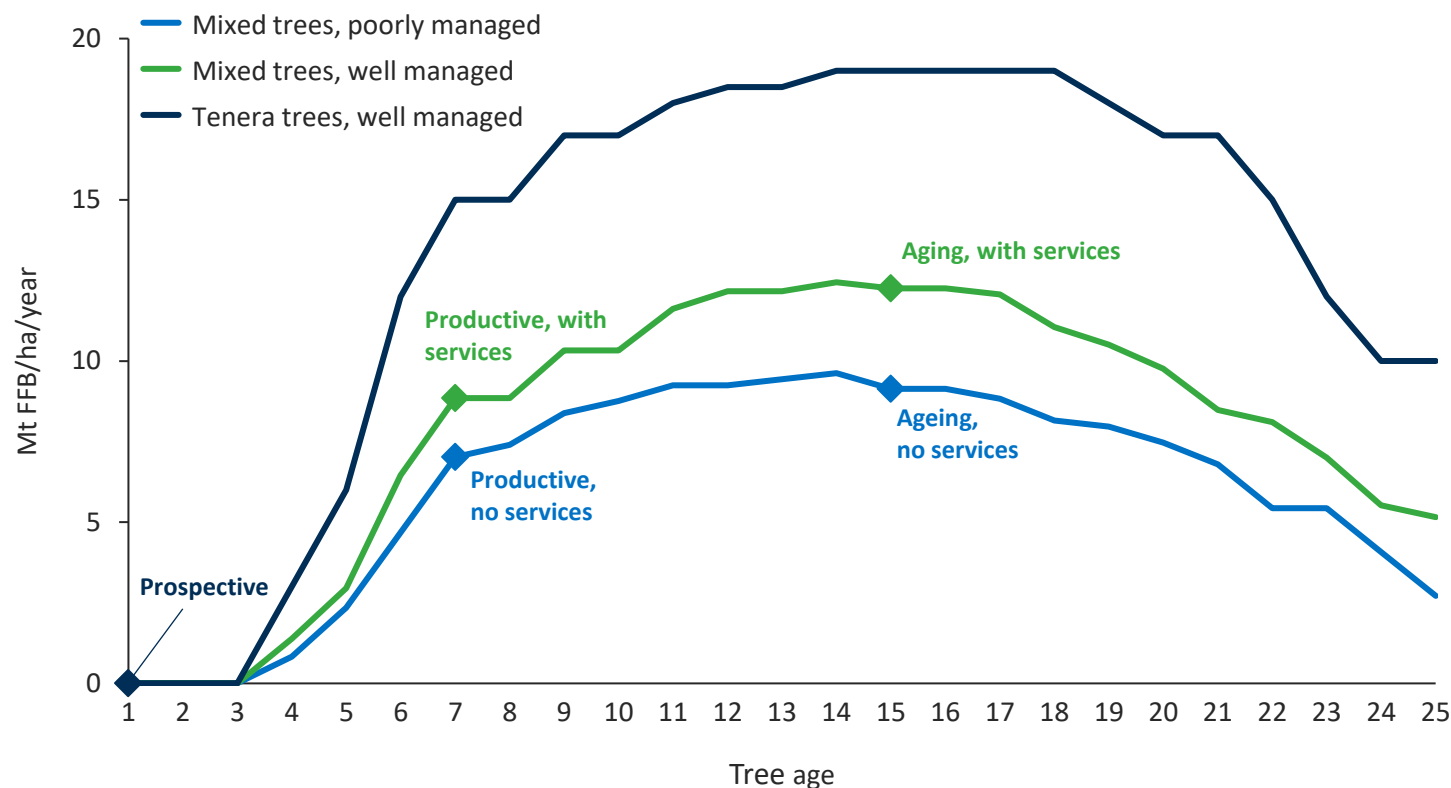
### Productivity and profitability gains

- To increase productivity, expenses initially rise due to increased fertilizer use (NPK, MOP, Kieserite, SSP and Borate) and harvesting labor expenses
- The effect of the fertilizer in combination with rehabilitation and training is expected to lead to a production increase of 1.8 Mt FFB/ha
- Decreasing post-harvest losses with 0.4 Mt FFB/ha leads to a higher marketable surplus per Mt of production, resulting in a profitability gain
- When farmers replant, they have another gain both in terms of higher yields (due to planting only Tenera trees and optimal planting density) and higher prices (due to planting only Tenera trees, for which the FFB price is 54% higher than Dura prices)
- Okomu is aiming to get farmers RSPO certified in the future, potentially further improving their profitability if RSPO premiums would be paid out

\* The productivity gains and profitability gains are derived from comparing productive farmers without services (baseline) with productive farmers with services, in the first year of the SDM. This comparison does not consider the costs of a service fee, the one-off costs for rehabilitation or financing expenses emerging from fertilizer and rehabilitation loans. The replanting gains are derived from comparing these farmers with a prospective farmer with an equal average tree age (which is 7 years). This comparison with prospective farmers does not consider potential financing expenses emerging from planting loans.

**With the right services, farmers can increase their yields with an average of 35%. When (re)planting with the preferred tree type at the optimal density, yields can increase with an average of 134%**

### Average yield curves\* (Mt FFB/ha/year) and starting point per segment



### Average yield curves

- Current yields are low since farms have a suboptimal tree composition\*, low planting density and trees are not properly taken care of
- By rehabilitating existing trees, using more fertilizer and applying GAP, farmers can increase their average yield by 35% during the productive lifetime of the trees
- New plantations are planted with 100% Tenera trees at a higher planting density (160 trees/ha instead of 143 trees/ha). This is required to obtain the maximum yield potential
- When farmers with ageing farms start replanting (with Tenera trees at the optimal density), the replanted plots can also realize this maximum yield curve

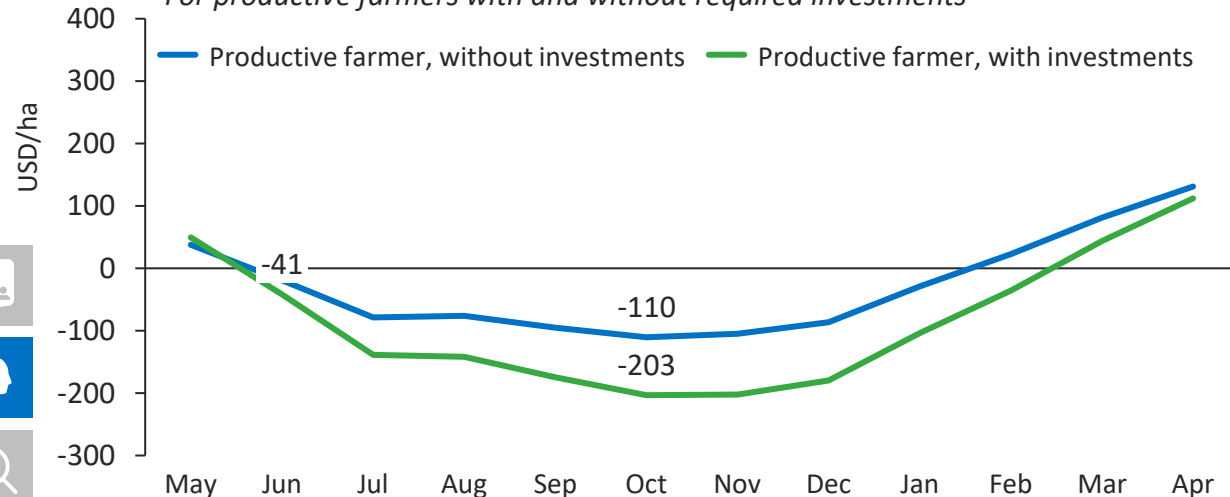
\* The average yield curves are constructed based on the tree composition of a farm, assuming that farms consist of 21% Dura trees, 55% Tenera trees and 24% non-producing trees (Pisifera or other)<sup>1</sup>. An overview of all yield curves per tree type can be found [in the annex](#).

Sources: 1) 2SCALE Value Chain Study (2021)

## The cumulative cash flow shows the difficulties farmers face during the season, hindering necessary investments to boost short-term productivity. Suitable loan products are key in overcoming these challenges

### Cumulative cash-flow without loans (USD/ha)

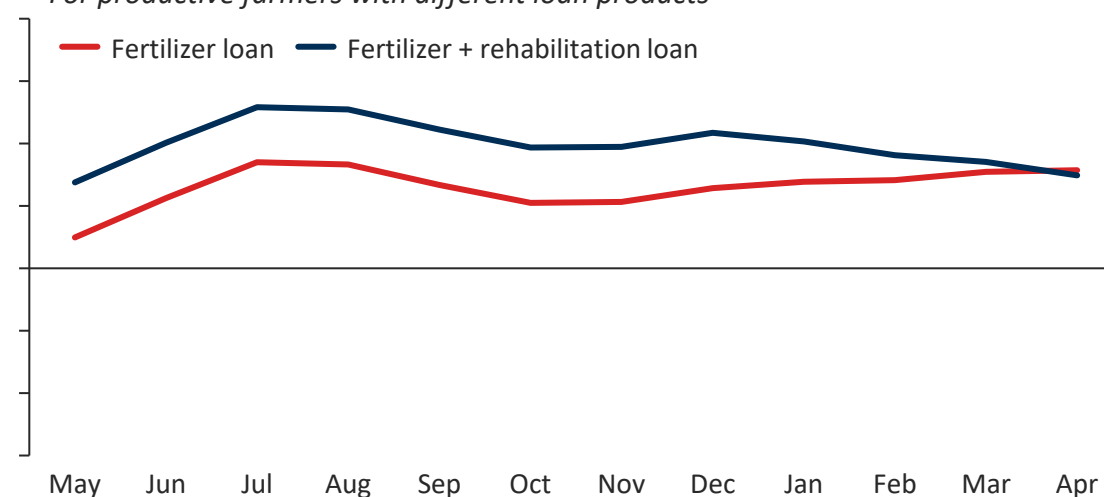
For productive farmers with and without required investments



- To increase short-term productivity, investments in rehabilitation (\$89/ha in May) and fertilizer (\$308/ha divided over June and July) are required. This would worsen farmers' cash flow position and leave them cash-strapped from June until October
- These months of negative cash-flow demonstrate the need for affordable and timely loans to smoothen the cash flow throughout the year

### Cumulative cash-flow with loans (USD/ha)

For productive farmers with different loan products



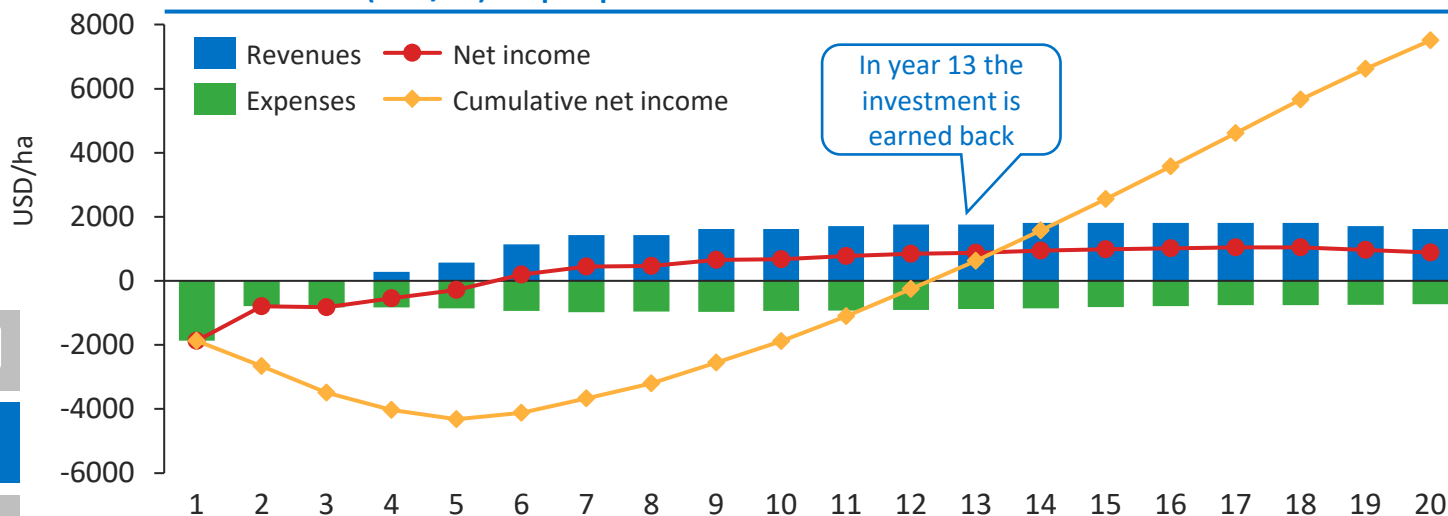
- A loan to cover all fertilizer expenses would cost \$21 in interest expenses (3.1% of total) and improves the farmer's cash position
- This could be supplemented by a loan at a financing cost of \$8/year to cover the one-off rehabilitation expenses in May
- A combination of these loans (\$397/ha) allows farmers to have enough cash at hand at the right time. This would result in total financing expenses of \$29 (4.3% of total expenses), but previous slides have shown that this investment pays off in subsequent years

The one-off rehabilitation loan is disbursed in full in May and paid back in four installments in January to April. The disbursement of the recurring fertilizer loan is split equally over June and July and is paid back in five installments from January to May. Both loans have an interest rate of 9% per annum, which boils down to 0.75% per month. An overview of all assumptions can be found [in the annex](#).



## After significant upfront investments, new farmers start to earn a positive net income from year 6 onwards. A planting loan, which is repaid in 16 years, allows farmers to avoid a negative cash flow

Profit and loss (USD/ha) for prospective farmers



### Assumptions

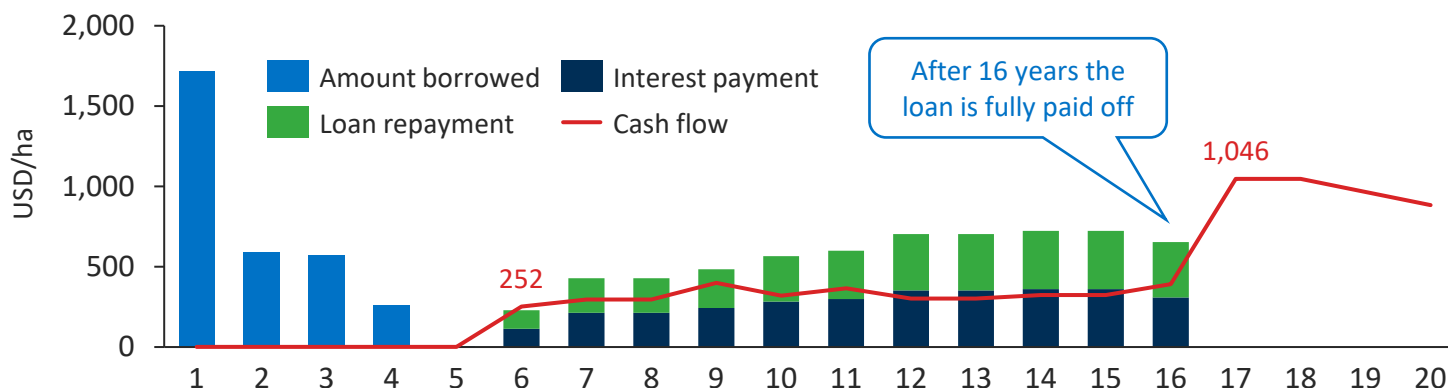
Total amount borrowed	USD 3,135
Interest	9% per annum

### Outcomes

Years until repayment	16 years
Years to break even	13 years
Total interest paid	USD 3,099
Average interest paid	USD 282 per year

An overview of all assumptions can be found [in the annex](#)

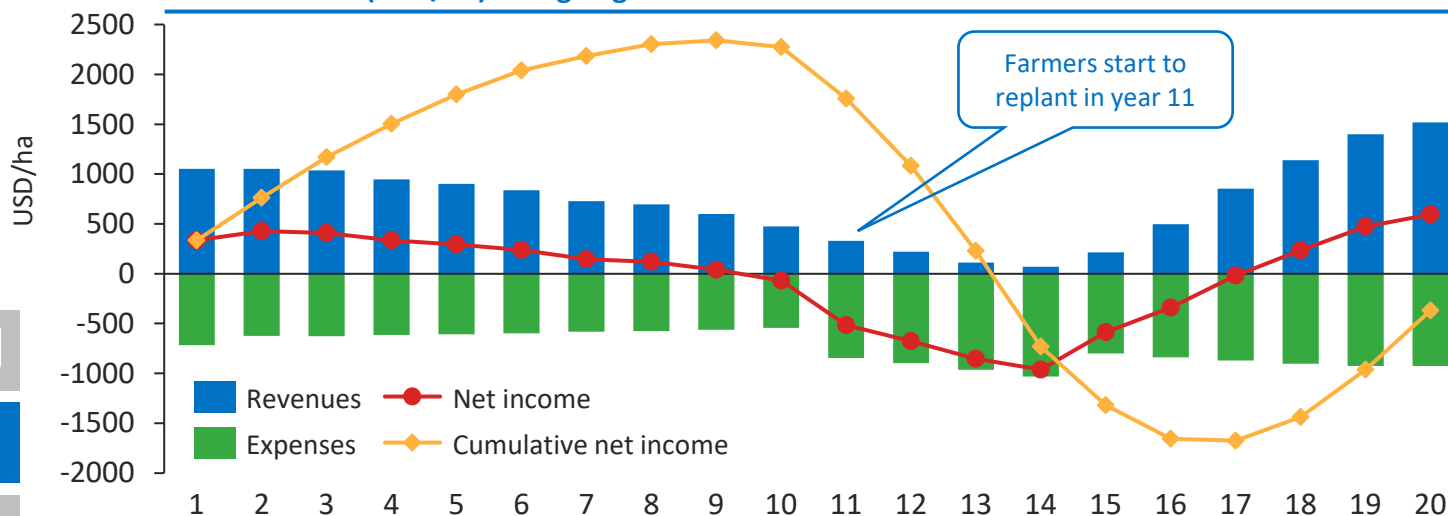
Cash flow and loan repayment (USD/ha) for prospective farmers



- Newly planted oil palms start producing fruits from year 4 onwards, but the cultivation only becomes profitable from year 6 onwards
- A tailor-made loan product that recognizes the long-term nature of palm oil is needed to support farmers during the start-up phase
- The high investments and expensive financing pose a risk to farmers, lenders and guarantors since future yields and revenues, and therefore the ability to repay, are not assured

**After the productive years, oil palms need to be replanted to secure long-term profitability. Farmers might be able to save for this during the productive years, otherwise a replanting loan can offer a solution**

Profit and loss (USD/ha) for ageing farms



#### Assumptions

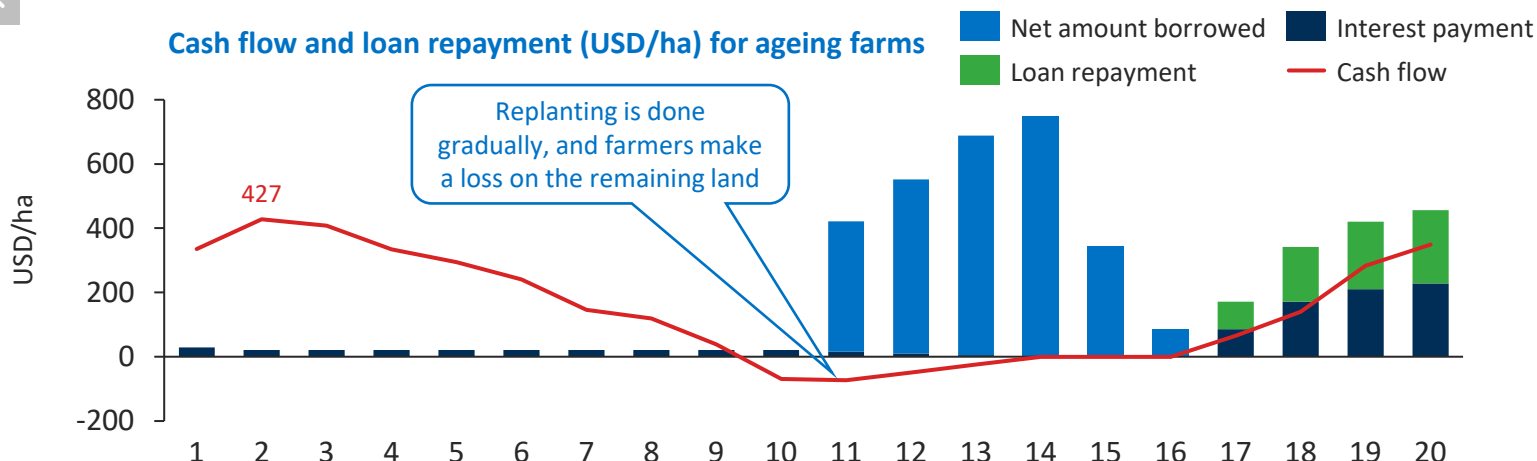
Tree age when replanting	25 years
Replanting rate	25% per year

#### Outcomes

Years until repayment	16 years
Years to break even	11 years
Total interest paid	USD 2,677
Average interest paid	USD 243 per year

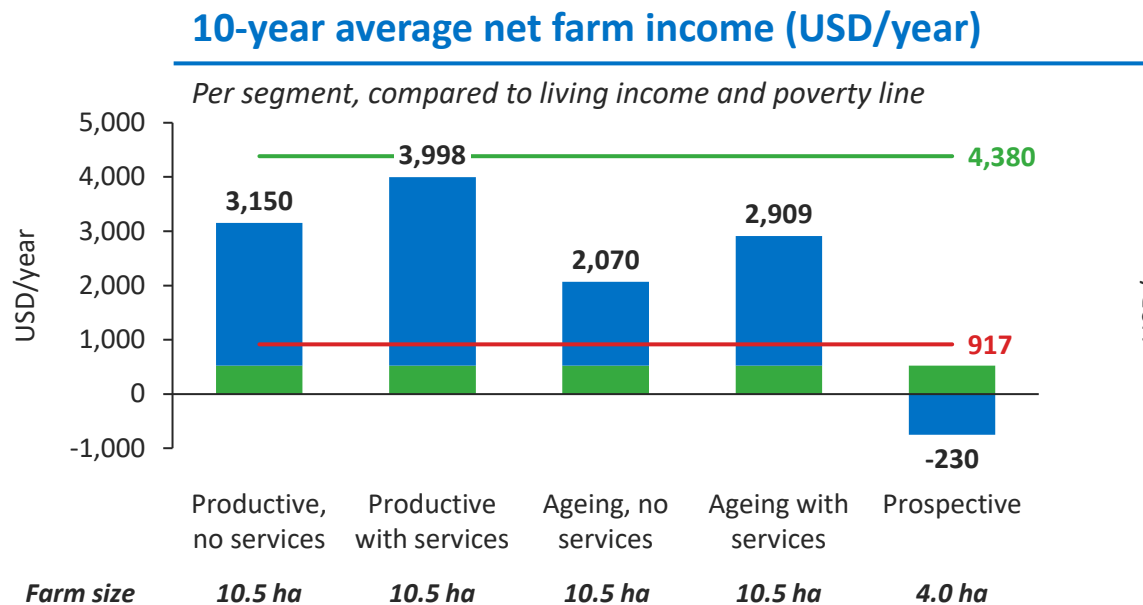
An overview of all assumptions can be found [in the annex](#)

Cash flow and loan repayment (USD/ha) for ageing farms

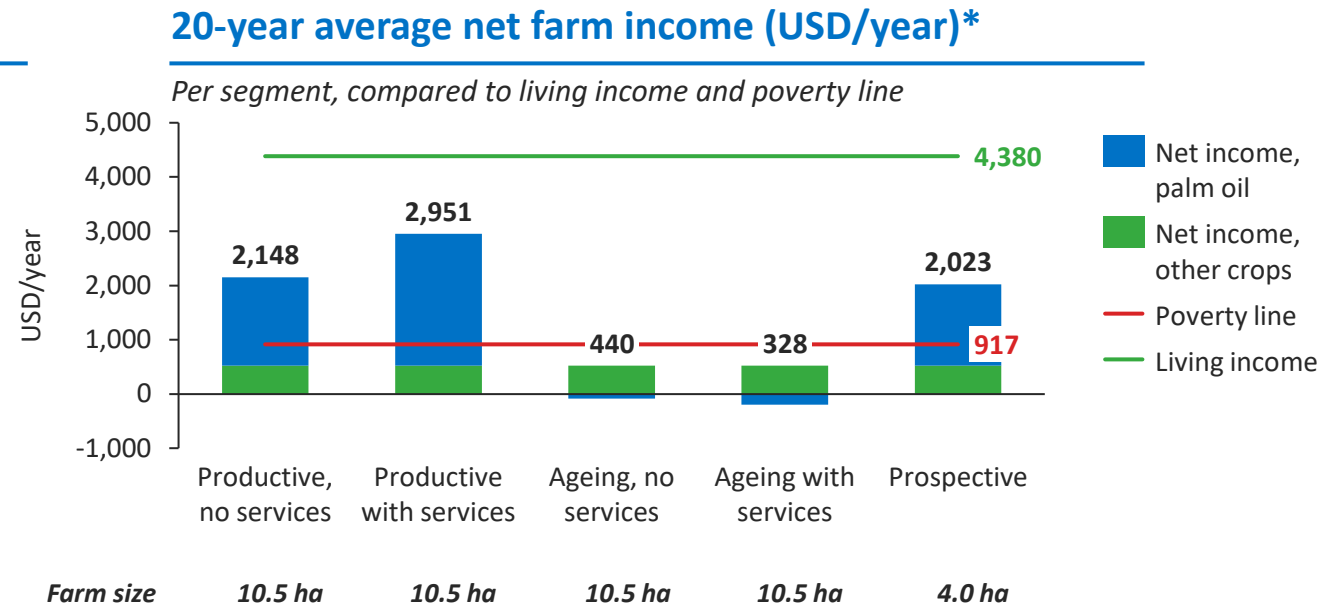


- Oil palm yields start to decline when they are 19 years old, and cultivation becomes unprofitable at the age of 24 years
- To ensure long-term productivity and profitability, farmers replant their farm with 25% per year when the trees are 25 years old
- The positive cash flow generated during the productive years might enable farmers to save for this investment, otherwise a replanting loan is needed

**Existing farmers can earn a 10-year average annual income between \$2,070 and \$3,998 (47-91% of LIB<sup>1</sup>). On the long-term prospective farmers earn relatively well, first having to overcome years of no income**



- Although none of the farmers make a living income based on the 10-year average, Productive farms with services earn a living income or higher in years 5 to 10 and Ageing farms with services earn a living income or higher in year 2 and 3
- The negative average income for prospective farmers is a result of the high initial investment costs and low initial yields. Their income is positive from year 6 onwards



- Based on the 20-year average net farm income, most farmers seem to be worse off\* except for prospective farmers
- With only 38% of the land size of the other segments, net income is 21% higher on average for a similar tree age
- However, their business case is risky. High investments and expensive financing are needed which take a long time to be earned back, while future yields and revenues are not assured

\* With the current assumptions, Productive farmers (with and without services) have a negative net income in year 18 to 20 and Ageing farms without services have a negative net income in year 10 to 20. These outcomes put downward pressure on the 20-year averages, but it should be noted that this does not properly reflect reality since farmers will likely not continue farming if it is loss-making. Ageing farms with services and prospective farms also have years of negative net income (10 to 16 and 1 to 5 respectively) but this is due to (re)planting and therefore a more realistic scenario.

Sources: 1) Living Income Benchmark, see [Global Living Wage \(2020\)](#)



## To further improve farmer incomes, and assuming yields already maxed out, Okomu and partners could work towards reducing fertilizer expenses and supporting farmers in increasing alternative incomes sources.

The net income of a productive farm with services amounts to \$ 2,418 in the first year of the SDM, excluding one-off rehabilitation costs

The table below shows the relative change that is needed (all else equal) for each of the income drivers\* to increase this income to the level of the living income benchmark. This benchmark is \$ 4,380, so an income increase of 81% is required

	Baseline assumption	Required value	Comment
<b>Farm size (Ha)</b>	10.5	17.45 (+66.2%)	All else equal, farm size is not the most efficient driver to increase incomes. Furthermore, plot expansion is not desirable from a sustainability point of view
<b>Average yield (Mt FFB/ha/year)</b>	8.9	11.38 (+28.5%)	Improving yields is the most efficient way to improve incomes and that is what Okomu should focus on. However, short-term yield improvements are limited, and long-term yield improvements through replanting require high upfront investments and take a long time to materialize
<b>Farm-gate price** (\$/Mt FFB)</b>	100 for Tenera 65 for Dura	129 (+28.5%) for Tenera 84 (+28.5%) for Dura	Farm-gate prices highly influence farmer income. Okomu intends to pay 130-155\$/Mt FFB at the farm-gate, although this depends on CPO prices. The maximum price they can pay is 11% of the CPO price they receive
<b>Cost of production – labor (\$/year)</b>	2,052	89.84 (-95.6%)	Labor costs would need to drop tremendously to reach a living income. Since skilled harvesting labor is scarce, farmers have little bargaining power. Labor gangs can support farmers to increase productivity and minimize labor costs
<b>Cost of production – fertilizer (\$/year)</b>	3,236	1,274.05 (-60.6%)	Fertilizer costs are a substantial share (53%) of total cost of production. Costs might be driven down through plant tissue analysis which increases efficiency of application, or by replacing fertilizer with alternatives nutrients
<b>Other income (\$/year)</b>	522	2,483.37 (+376%)	Non-palm oil income should increase significantly, something not fully within Okomu's control. Intercropping oil palms with legumes could increase other income, but no data is available to test the actual potential

\* The different income drivers influence the family income through the following simplified formula:  $\text{Total household income} = \text{Farm size} \times \text{Yield} \times \text{Price} - \text{Cost of production} + \text{Other income}$

\*\* The farm-gate price for Tenera and Dura are interlinked. The price for Dura FFB is defined as 65% of the price for Tenera FFB

**A roadmap is needed to reach predefined sourcing and sustainability targets. Subsequently a service delivery and sourcing infrastructure needs to be rolled out that must be continuously improved over time**

## Recommendation 2: Develop and scale an efficient service delivery and sourcing infrastructure

Pillar 2

2.A

Outline a roadmap with partners to meet the predefined sourcing and sustainability targets

2.B

Roll-out a cost-effective service package and efficient service delivery and sourcing infrastructure

2.C

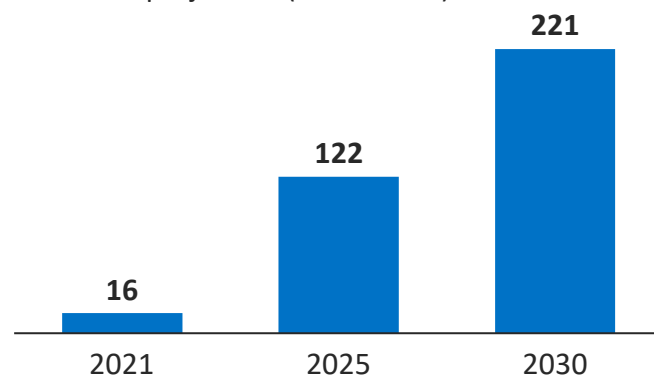
Optimize the impact of service provision on sourcing volumes and Okomu's profitability over time

## To achieve its sourcing targets of 221k Mt FFB by 2030, Okomu needs to work with around 3,338 farmers producing FFB on 31,707 hectares of land

### Projected sourcing volumes

Volume of Mt FFB/year ('000)

■ Initial projection (EOP Model)



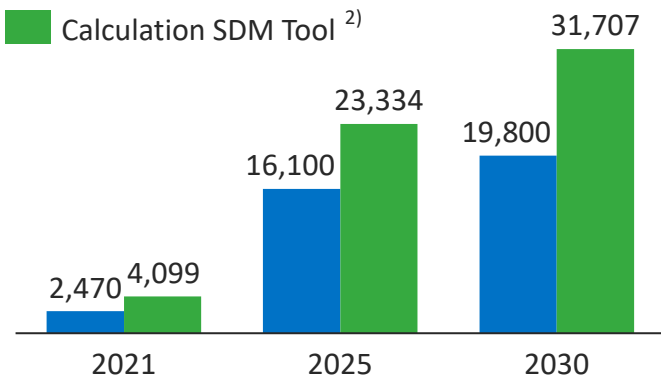
- Okomu aims to source around 110k Mt FFB by 2025, doubling to 220k by 2030
- Sourcing from existing farmers is rapidly ramped up to 122k by 2026 and 193k in 2030 to fill future mill capacity
- New plantings only materialize from 2024 onward, securing long-term supply

### Projected productive area

Area in hectares/year

■ Initial projection (EOP Model)<sup>1)</sup>

■ Calculation SDM Tool<sup>2)</sup>



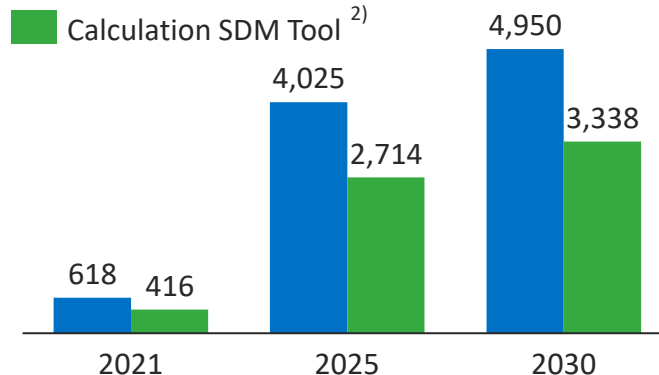
- 31,707 hectares of smallholder oil palm plantation is required to meet sourcing targets
- There is a clear opportunity to increase maximum yields from 9.6 Mt FFB/ha to 12.4 Mt FFB/ha for existing farms and 15 Mt FFB/ha for new farms, reducing relative pressure on land
- The 17% newly planted area is projected to supply 12% of sourcing volumes

### Projected number of farmers

# of farmers/year

■ Initial projection (EOP Model)<sup>1)</sup>

■ Calculation SDM Tool<sup>2)</sup>



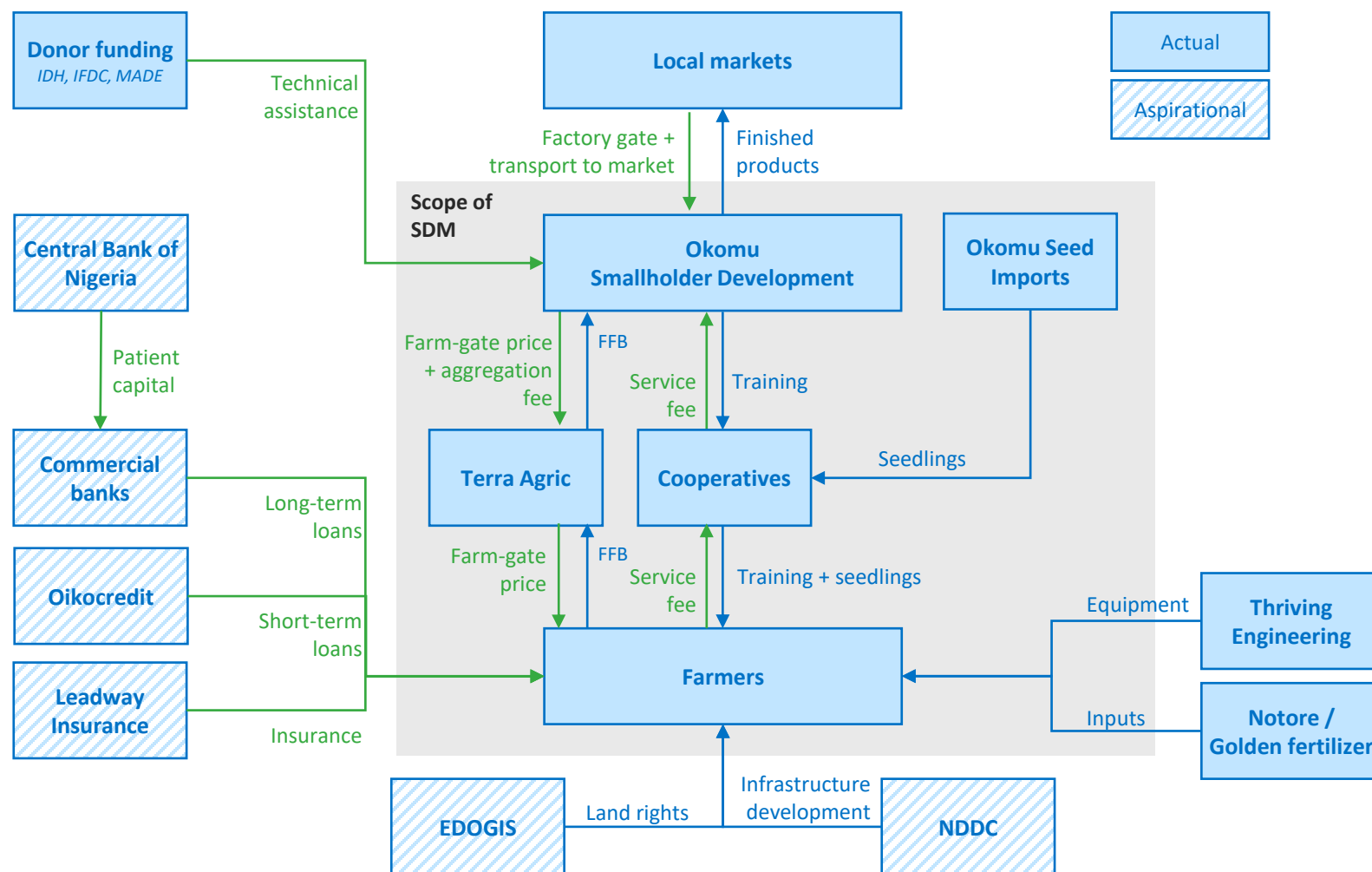
- Assuming an average farm size of 10.5 ha for existing farms and 4 ha for new farms, Okomu can integrate 3,338 farmers into their supply chain by 2030
- Around 25% is estimated to be new to oil palm farming, requiring more financial support than existing farmers

1) Existing and New farms numbers based on EOP Document (2021)

2) Projected numbers based on adjusted farmer characteristics on farm size (from 4.0 ha to 10.5ha) and yield curve for Tenera and Dura.

## Okomu and Terra Agric are jointly implementing the service and sourcing model, with Okomu playing a key facilitating role between farmers and knowledge, inputs and financial service providers

### Overview of services and financial flows between SDM actors



### Roles within the SDM

- This SDM is coordinated by Okomu, and jointly implemented by Okomu and Terra Agric
- Okomu actively seeks knowledge, funding and implementation support of public organizations such as IDH, IFDC and MADE
- The farmer cooperatives are the primary channel for service delivery; individual farmers the point of contact for off-taking by Terra Agric
- Okomu plays a facilitating role between farmers and input providers; and farmers and financial service providers
- Governmental organizations play a supporting role in building a more enabling environment, especially on land-rights and infrastructural development

## Designing the program from scratch provides opportunities to build a sustainable smallholder palm oil model. Expertise, upfront investment and implementation support are essential before scaling up

### External support needs

- Okomu and Terra Agric are well-positioned to service and source from farmers
- To guarantee the sustainability of the model, IDH and IFDC need to bring in:
  - Expertise on income diversification, regenerative agriculture, and gender inclusion
  - Support on target setting, monitoring and evaluation and continuous improvement of the model
  - co-funding of activities that strengthen the farmer business case and sustainability of the landscape

### Envisioned activities required to ensure sustainability of production

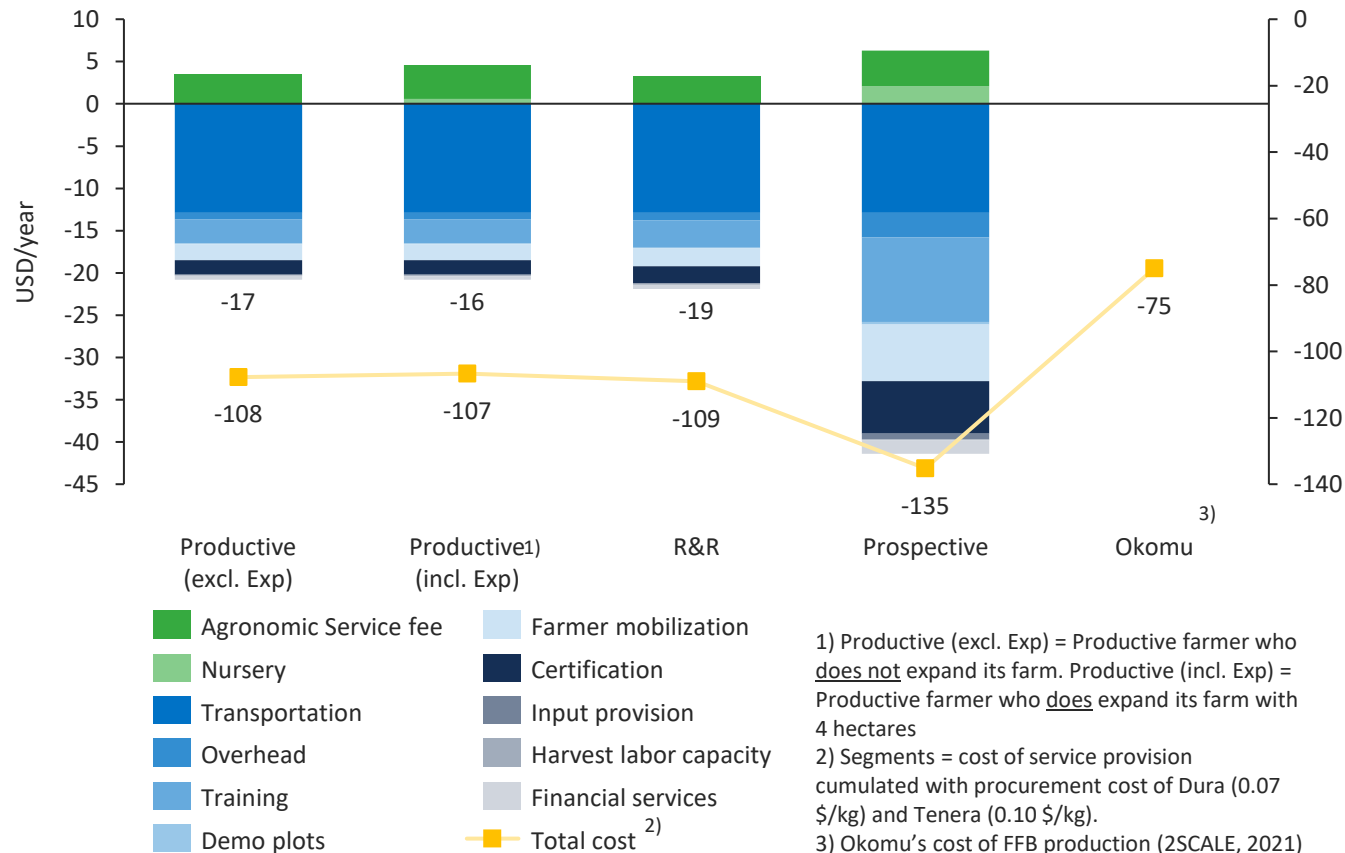
Envisioned activities required to ensure sustainability of production				Okomu & TA	IDH/IFDC	IDH
2021	2022	2023	2024	>2025		
Farmer recruitment, selection and engagement						
Ongoing sourcing, transporting, processing of FFB and selling of CPO						
Ongoing service provision to increase sourcing volumes, farmer incomes and environmental sustainability						
Statutory studies (including HCV/HCS/FPIC) and implementation						
Support access to finance, insurance and inputs						
Promote on-farm income diversification practices						
Promote bio-diversification strategies for sustainable land use						
Support field monitoring visits						
Support project with Multi Stakeholder Platform						
Support SDM Study						
Baseline farm survey						
			End-line SDM and farm survey			
PPI compacts						
Support restoration of degraded forest land in the Okomu Landscape						
Support conservation activities Okomu Landscape						



## Okomu faces significant transport costs for all segments, whereas costs for provision of other services are highest for prospective farmers due to the provision of and access to finance and high-quality seedlings

### Cost of service provision per Mt FFB for smallholders and Okomu

Annual average cost of service provision between 2021-30 in USD per Mt FFB/segment



### Transportation drives SHF sourcing cost

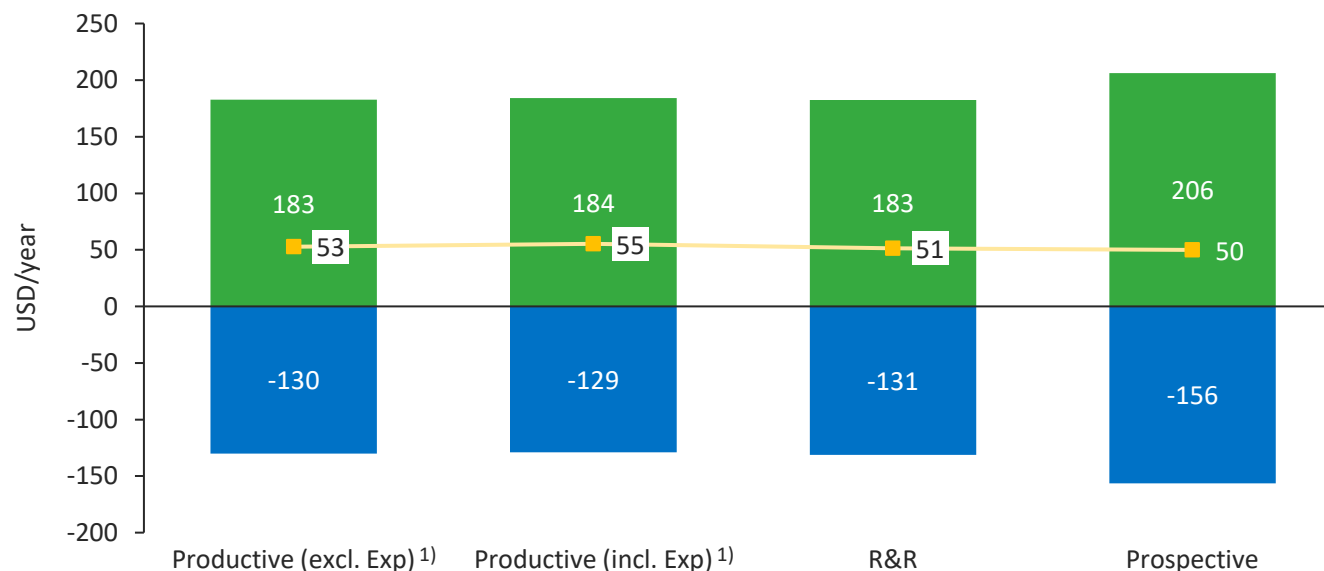
- The cost to provide services per farmer is highest for the productive farmers who expand their farm, which is caused by the highest volume of FFB sourced from this group resulting in higher transport costs
- The prospective farmer has a relatively low service fee income for Okomu and, with a lower sourcing volume in the first 10 years compared to the other segments, the total cost to service this segment is the lowest of the three
- The high cost for the prospective farmer per Mt FFB is due to the maturity period of its oil palm trees in the first 5 years, causing low sourcing volumes to distribute the service costs to

## Service provision will increase the sourcing volume of Tenera, leveraging Okomu's processing effectiveness and outweighing increased procurement cost

### Margin per Mt FFB for smallholders per farmer segment

Annual average margin between 2021-30 in USD per Mt FFB/segment<sup>2)</sup>

Revenue Cost Net-margin



1) Productive (excl. Exp) = Productive farmer who does not expand its farm. Productive (incl. Exp) = Productive farmer who does expand its farm with 4 hectares

2) Segments = cost of service provision cumulated with procurement and processing cost.

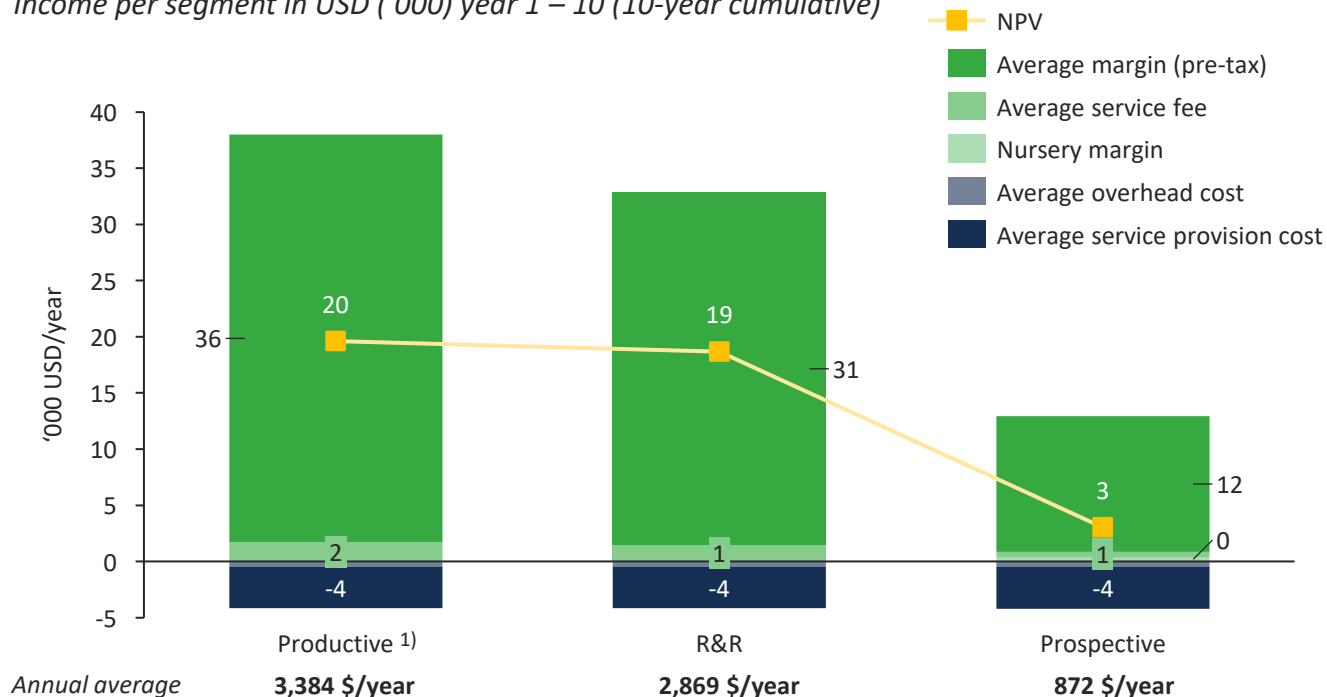
### Margin justifies higher costs

- Cost per Mt FFB is mainly driven by procurement, transport, and processing cost, as these costs count for up to between 87% - 97% of the total cost per Mt/FFB
- Revenue is mainly driven by income from sales of CPO ranging between 96 – 98% of the revenue
- As Prospective farmers only produce Tenera FFB, the average cost per Mt FFB of the first 10-years of doing business with Prospective farmers is more compared to the Productive and R&R farmers. On the other hand, the procurement of only Tenera enables to earn more revenue, as Tenera has a higher FFB to CPO ratio
- Overall, the net-margin (pre-tax) per Mt FFB is comparable between the segments as processing effectivity of Tenera as the positive effect on revenue is in balance with increased procurement cost of the same FFB type

## With limited uptake of services and high potential sourcing volume, Productive farmers present to be farmer cohort with the highest potential business value for Okomu

### Customer Lifetime Value (CLV) analysis per segment

Income per segment in USD ('000) year 1 – 10 (10-year cumulative)



Note that CLV will become more positive for Prospective farmers when taking a 20 year perspective

### All segments are net positive investment

- All farmer segments are a business opportunity for Okomu to work with, as for each segment the additional gross-margin outweighs the cost-of-service provision
- Productive farmers present the highest business value to Okomu per farmer, due to a combination of high sourcing volumes (compared to R&R and Prospective) and limited-service uptake (low cost)
- Although Productive and R&R farmers outperform Prospective farmers, the high-quality maturing trees of the Prospective farmers are pivotal for Okomu to secure its sourcing volumes in the future

\* Customer lifetime value can be defined as the monetary value of a customer relationship, based on the present value of the projected future cash flows from this customer relationship. Customer lifetime value is an important concept in that it encourages firms to shift their focus from quarterly profits to the long-term health of their customer relationships.

1) Productive farmer is modelled as farmer who does expand its farm with 4 hectares

\* See [CLV Assumptions](#) for the input of this calculation.

**There needs to be a clear and shared understanding of PPI risks and opportunities. Required actions and corresponding roles and responsibilities should be defined for all actors involved**

### Recommendation 3: Act on PPI risks and opportunities in the region

Pillar 3

3.A

Have a clear understanding of relevant PPI risks and opportunities in the region

3.B

Develop potential measures to mitigate against risks or tap into opportunities that impact the business case for Okomu, communities and the landscape

3.C

Define interventions between service coalition partners to ensure effective production, protection and inclusion within the region

## The integration of smallholders into Okomu's value chain brings about both risks and opportunities to the sustainability of production, protection of forests and inclusion of communities

	Sustainable production	Protection & restoration	Inclusion
Benefits / opportunities PPI compact	<ul style="list-style-type: none"> <li><b>Potential to develop and test environmentally friendly palm oil</b> (e.g., reusing waste, intercropping, livestock, farm water management)</li> <li><b>Import substitution</b> of 232,566 Mt locally produced CPO<sup>1)</sup></li> </ul>	<ul style="list-style-type: none"> <li><b>Increased land productivity</b> as yield increases from 7.0 Mt/ha to 8.9 – 12.0 Mt/ha</li> <li><b>Cost-effective</b> protection and restoration of 3,200 ha of HCV area if Okomu manages their entire concession as agreed</li> <li><b>More efficient use of chemicals</b> through timely application</li> </ul>	<ul style="list-style-type: none"> <li><b>Increased farmer incomes</b> with 845 \$/HH on average for 3,000 to 5,000 farmers, due to higher yields and price</li> <li><b>More stable incomes</b> due to better contracts and more resilient farming systems</li> <li><b>Local healthier food production</b> of 300 Mt of Banga oil, serving 30,000 bottom of the pyramid consumers</li> <li><b>Potential to improve gender and youth inclusion</b> from the start of the program (sensitization, training, access to finance, jobs creation)</li> </ul>
Costs / risks to the PPI compact	<ul style="list-style-type: none"> <li><b>Increase in chemicals and effluent</b> as 3,040 of kg NPK/year<sup>2)</sup> fertilizer additional is to be used</li> <li><b>Reduced biodiversity</b> if 8,167 Ha<sup>3)</sup> of land currently used for other crops develops into monoculture palm oil</li> </ul>	<ul style="list-style-type: none"> <li><b>Farmer encroachment on HCV</b> as they expand land existing for palm oil production due to increased palm oil profitability</li> <li><b>Degradation of nearby forests</b> if production of 8,167 Ha<sup>3)</sup> newly planted smallholder plots scales up without effective monitoring and enforcement</li> </ul>	<ul style="list-style-type: none"> <li><b>Land ownership disputes</b> when land transfers are not executed without careful due diligence and FPIC</li> <li><b>Data privacy</b> issues if Okomu does not adequately collect, process and share data</li> <li><b>Higher indebtedness</b> with a debt to income ratio of 70%<sup>4)</sup> (compared to 0% for baseline) from fertilizer loans</li> <li><b>Risk of poor cash management</b> due to increased incomes</li> </ul>

1) Difference between Baseline and SDM farmers in volumes Mt CPO of 2021-2030

2) Usage in kg NPK/ha for hectare with full mature palm oil trees

3) Total of newly planted Ha of palm oil from Prospective and expanding Productive farmers in the SDM

4) This assumes an existing farm with 15 year old oil palms



## Develop potential measures to mitigate against risks or tap into opportunities that impact the business case for Okomu, communities and the landscape

### Priority activities

#### Benefits / opportunities for the landscape

##### 1. Bring in expertise to strengthen the farmer business case, inclusion and sustainability

The current business case is not convincing, nor clearly designed with inclusion and sustainability in mind. Regenerative practices can reduce expenses and promote inclusion, while reducing the environmental footprint

##### 2. Partner with Oikocredit for input financing

Most farmers cannot afford prefinancing of expensive inputs required to restore the soils for improved yields. Conditional on a stronger business case, affordable input loans can help farmers make the investment required to lift them towards higher production and profitability levels

##### 3. Co-design affordable and viable R&R and planting loans

Current long-term loan products are too high-risk and not attractive for farmers. The Anchor Borrowing Scheme exists to provide patient capital at attractive rates. A loan product viable for all stakeholders needs to be co-designed and vetted by CBN and commercial banks

#### Costs / risks to the landscape

##### 4. Leverage NISCOPS to guarantee fair, inclusive and transparent land use planning, allocation and management

The development of new plantations and infrastructure will impact existing land use dynamics. All stakeholders need to be involved in the design and enforcement of communal and concessional land use management plans for the region

##### 5. Implement an inclusive and fair data MIS system that enables identification of and acting on risks and opportunities

There are no track records of farmers yet. Regular reporting and sharing of progress among stakeholder is needed to improve service effectiveness, facilitate access to finance and safeguarding compliance to regulations and agreements

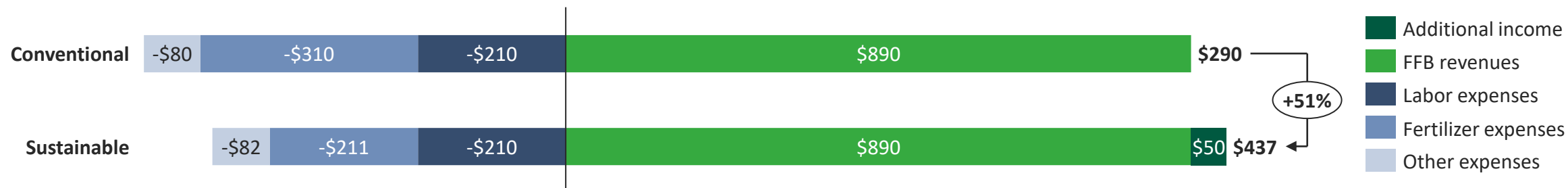
##### 6. Design resilience-enhancing services

A variety risks (market, price, legal, climate) can impact farmer yields and incomes. Higher indebtedness exacerbates these risks. Solutions such as drought-tolerant oil palm seedlings, regenerative practices, and insurance need to be integrated into the service offering to mitigate these risks

## Regenerative palm oil is largely unproven. Rolling out Okomu's SDM provides opportunities to develop, test and innovate a regenerative farming system to improve soils, reduce costs and increase farmer incomes

### Indicative annual net income, revenues and expenses (USD/ha)

For a "Conventional\*" and "Regenerative" oil palm farming system



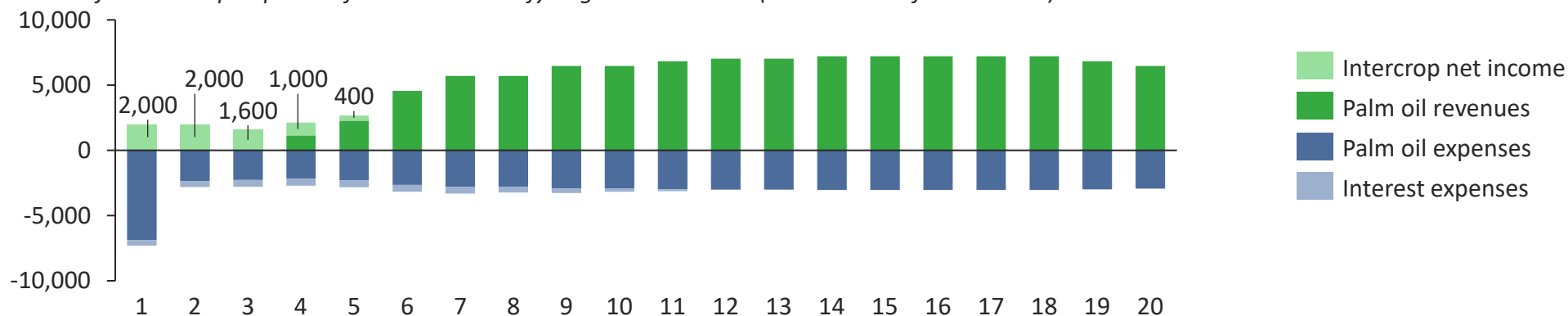
Practices	Desired effect	Business case impact		Feasibility	
<b>Annual plant tissue analysis</b>	Assessing nutritional needs will allow for more accurate fertilizer application	Unproven	<ul style="list-style-type: none"> <li>A 20% decrease in fertilizer costs</li> <li>A cost of \$2/ha</li> </ul>	High	<ul style="list-style-type: none"> <li>Already common practice</li> <li>Low costs</li> </ul>
<b>Soil testing</b>	Soil testing to measure soil conditions and applying inputs more accurately	Unproven	<ul style="list-style-type: none"> <li>A 5% decrease in fertilizer costs</li> </ul>	High	<ul style="list-style-type: none"> <li>Soil tests available</li> <li>Soil tests costs should outweigh savings</li> </ul>
<b>Intercropping</b>	Intercropping shade tolerant legumes in between palm stands can provide nutrients, reducing fertilizer needs. Sale of crops generate additional income	Unproven	<ul style="list-style-type: none"> <li>Generate a \$50 additional net income</li> <li>A 5% decrease in fertilizer costs</li> </ul>	High	<ul style="list-style-type: none"> <li>Shade-tolerant legumes are available and can grow between oil palms</li> <li>Farmers should know how to cultivate them, and a markets needs to exist</li> </ul>
<b>Nutrient recycling</b>	Nutrients of Empty Fruit Bunches and trunks could be recycled, reducing fertilizer needs	Unproven	<ul style="list-style-type: none"> <li>A net decrease in fertilizer costs of 2%</li> </ul>	Low	<ul style="list-style-type: none"> <li>Due to high transport costs, this is only feasible if FFB is processed on the farm</li> </ul>

\* These results are based on 1 hectare of an existing farm with 10 year old oil palms

## Seemingly small intercropping income during initial years of unproductive palm oil could significantly reduce financing needs and improve farmer cash-flows

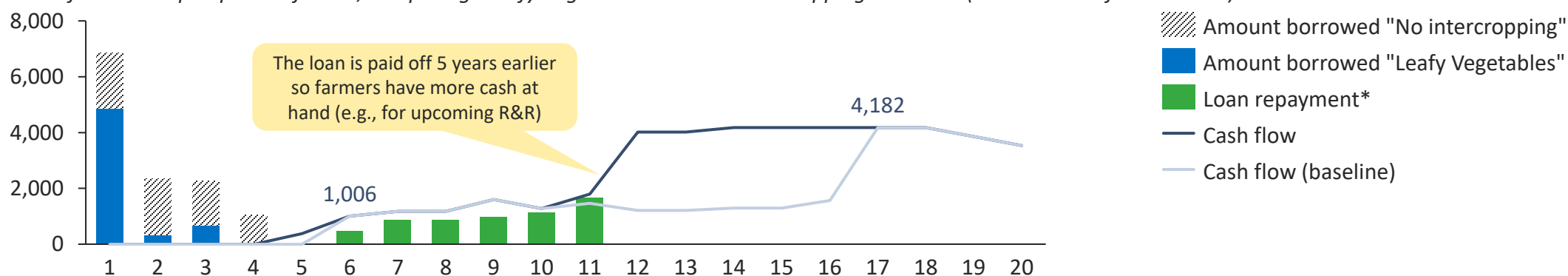
### Profit and loss (\$/year)

of 4-hectare prospective farmer under Leafy Vegetable scenario (see next slide for scenarios)



### Cash-flow (\$/year)

of 4-hectare prospective farmer, comparing "Leafy Vegetable" and "No Intercropping" scenario (see next slide for scenarios)



\* Repayments are based on the share of oil palm revenues, gradually increasing with revenues. See for further loan assumptions [Annex 3.3](#)

**Intercropping could earn a Prospective farmer up to \$7,000, reducing the total oil palm loan amount to \$5,900 (vs. \$12,500), total interest expenses to \$4,700 (vs. 12,400) and years until repayment to 11 (vs. 16)**

## Farmer loan requirements

*Comparing various intercropping scenarios for a 4-hectare prospective farm*

<i>Figures rounded to nearest '00</i>	No intercrop	Plantain	Cassava	Yams	Leafy veg.
<b>*Annual intercrop income (\$/year)</b>	\$ -	\$ 300	\$ 700	\$ 1,200	\$ 2,000
<b>**Total intercrop income (\$/loan)</b>	\$ -	\$ 1,100	\$ 2,500	\$ 4,200	\$ 7,000
<b>Principal (\$/loan)</b>	\$ 12,500	\$ 11,500	\$ 10,100	\$ 8,600	\$ 5,900
<b>***Principal + accrued interest (\$/loan)</b>	\$ 17,500	\$ 16,900	\$ 15,000	\$ 12,700	\$ 9,000
<b>Years to breakeven</b>	13	12	12	12	11
<b>Years to repayment</b>	16	16	14	13	11
<b>Total interest expenses (\$/loan)</b>	\$ 12,400	\$ 11,000	\$ 9,300	\$ 7,400	\$ 4,700
<b>Average annual interest expenses (\$/year)</b>	\$ 800	\$ 700	\$ 700	\$ 600	\$ 400

\*Annual crop income for crops grown in humid forest agro-climatic zones derived from [Profitability of Key Crops in Fadama Regions of Nigeria – IFPRI](#)

\*\* As oil palm canopy increases, intercropping yields are expected to decline over time. Yields for years 1 to 5 of 100%, 100%, 80%, 50% and 20% of the maximum realizable yield are assumed

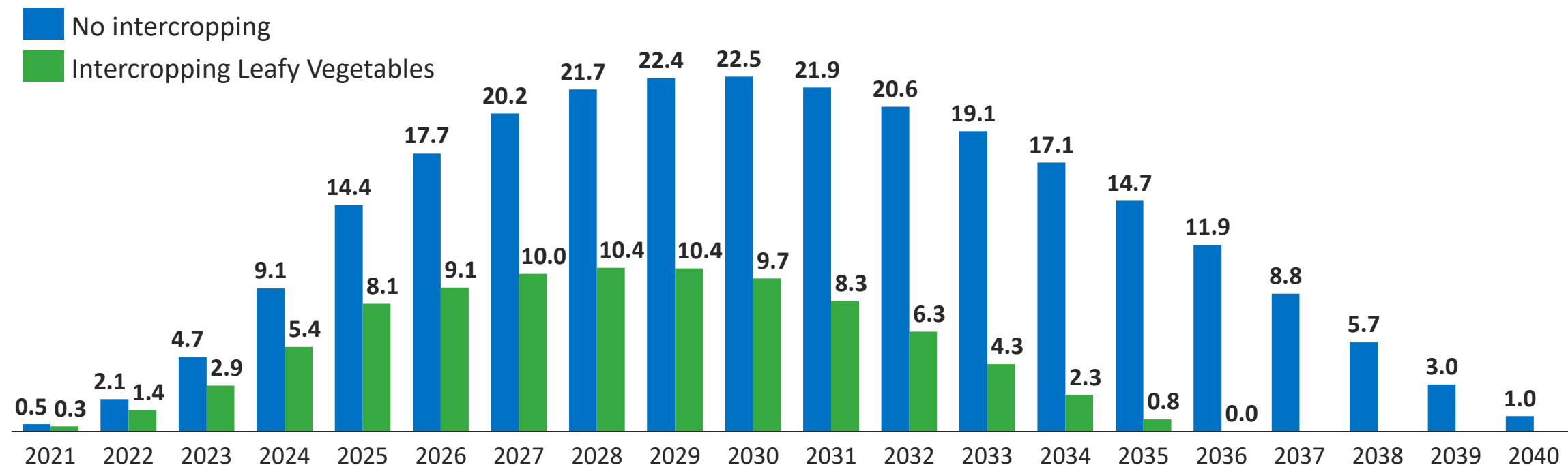
\*\*\* Assumes a grace period of 5 years

See for further loan assumptions [Annex 3.3](#)

**At aggregate level, intercropping income can significantly reduce total finance requirements, reducing the peak loan outstanding to \$10.4 M (vs. \$22.5 M) and shortening year to repayment (by 2035 instead of 2040)**

### Cumulative\* loan facility size (USD M)

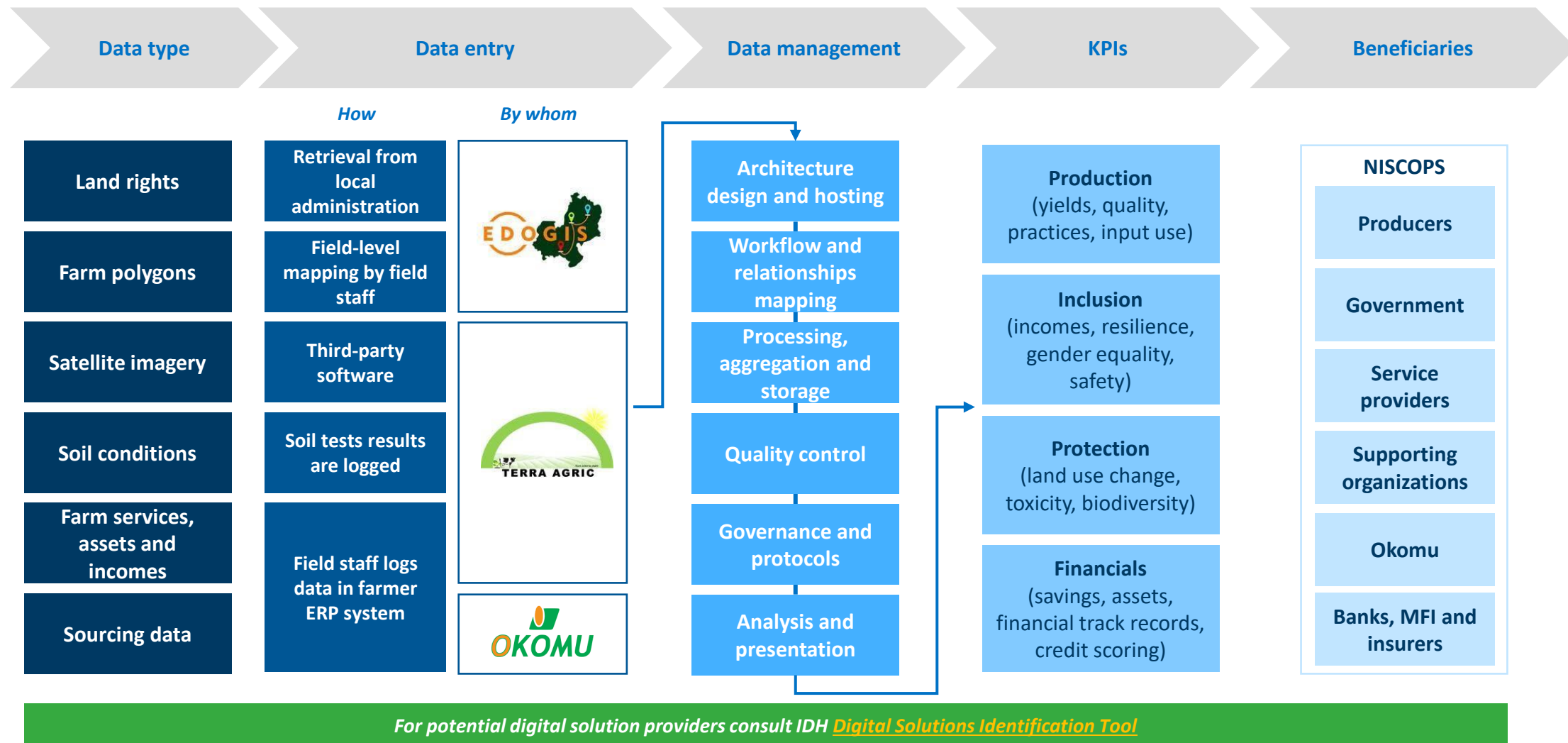
Comparing “No intercropping” and “Leafy vegetable” scenarios



\* Total loan required to finance all prospective farmers joining between 2021 and 2025: 63, 188, 250, 375, 375



## NISCOPS is well positioned to lead the implementation and management of a data infrastructure that captures, processes, and reports progress against production, protection and inclusion targets



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[Click here](#)

# 3. Annex



*This section includes the following subchapters:*

*3.1 About the context*

*3.2 About the SDM*

*3.3 Assumptions and methodology*

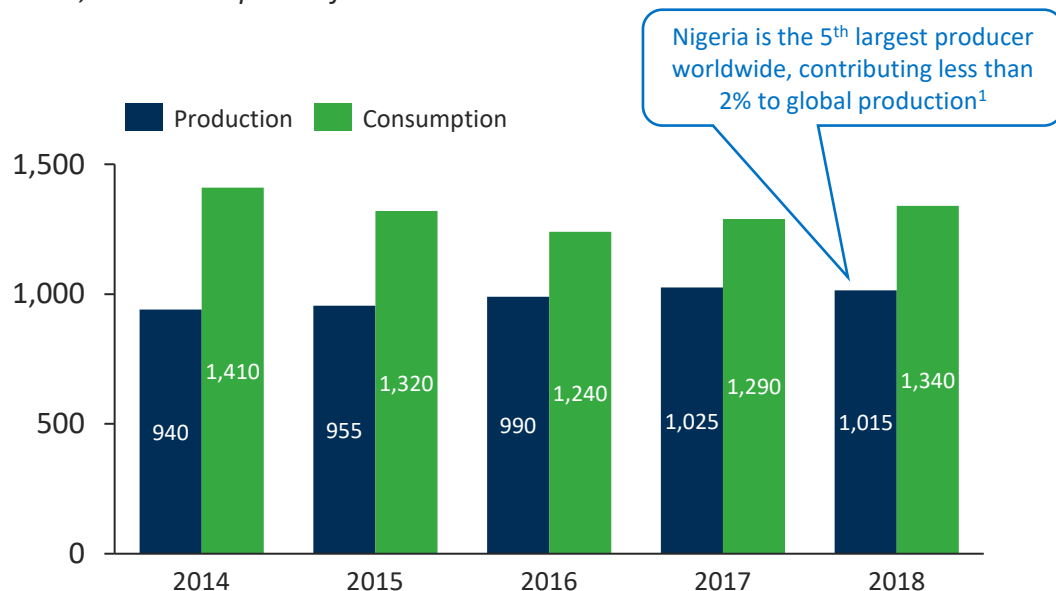
# 3.1 About the context

*Understanding the palm oil sector in Edo state, Nigeria*

## A structural supply deficit results in high dependence on imports from Asia. Nigerian palm oil is uncompetitive internationally, but a 35% import duty provides room for expanding domestic production

### Palm oil production and consumption in Nigeria ('000 Mt)<sup>1</sup>

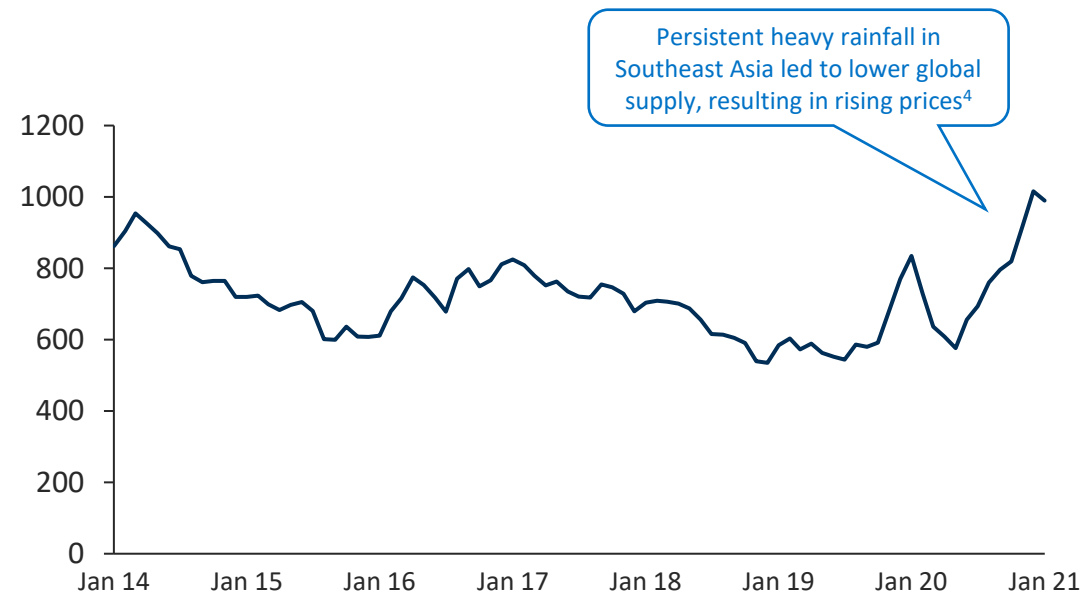
Consumption structurally outstrips production with an average shortfall of 34%, which is imported from Asia



High import duties lead to informal cross-border trade with neighboring countries like Ghana, Togo and Benin. This implies that the actual supply deficit is even larger than the official numbers show<sup>3</sup>

### International crude palm oil prices (USD/Mt)<sup>2</sup>

Crude palm oil prices are highly volatile and unpredictable



Nigerian palm oil is uncompetitive internationally, mainly due to low productivity. Domestic prices are around 45% higher than international prices, so a 35% import duty is levied in an attempt to be able to compete domestically<sup>3</sup>

Sources: 1) PWC – X-raying the Nigerian palm oil sector (2019); 2) IndexMundi; 3) PIND Value Chain Analysis (2011) 4) Biofuels International (2020)



## Unlike other countries, Nigeria palm oil is primarily produced for domestic consumption as Technical Palm Oil

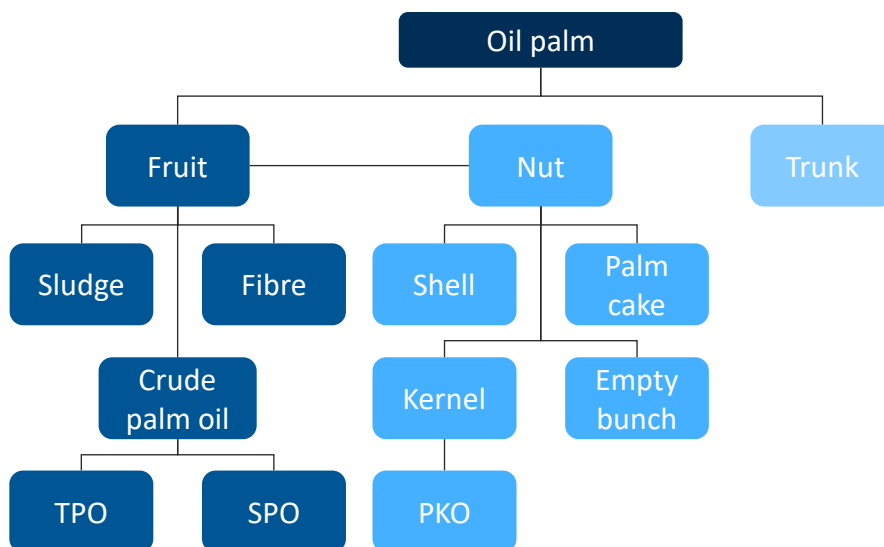
### Oil palm fruit types<sup>1</sup>

	Dura	Pisifera	Tenera
Type	Unimproved	Unimproved	Improved hybrid
Kernel size	Large kernel	Small kernel	Good size kernel
Oil extraction rate	14%	N/A*	20%

### Tree

### Intermediate products

### Final products



### Oil palm products<sup>1</sup>

- While all parts of the oil palm yield many different products, the palm oil and resulting products and by-products are the most important. Therefore the Tenera is the preferred fruit type, due to its high oil content
- Nigeria is a net importer of palm oil for both industrial uses and food, production is targeted at the domestic market
- There is high demand for Technical Palm Oil (TPO)\*\* in the food market, representing 81% of total demand<sup>2</sup>
- Opportunities also exist in the Special Palm Oil (SPO)\*\*\* market, since most millers are not able to meet quality standards, leading to a significant supply shortfall
- Okomu sells the majority of their CPO into the domestic industrial market, but around 2% of their CPO is processed into Banga cooking oil which is sold to consumers
- All of the oil Okomu produces is classified as SPO, although Okomu does not make the distinction between TPO and SPO themselves
- The nutrients contained in the oil palm empty fruit bunches (EFB) and trunks can potentially be reused on the smallholder plots or Okomu's plantation. However, transportation costs at least \$8/Mt of EFB and up to 60 Mt/ha is required to cover the inorganic fertilizer use equivalent

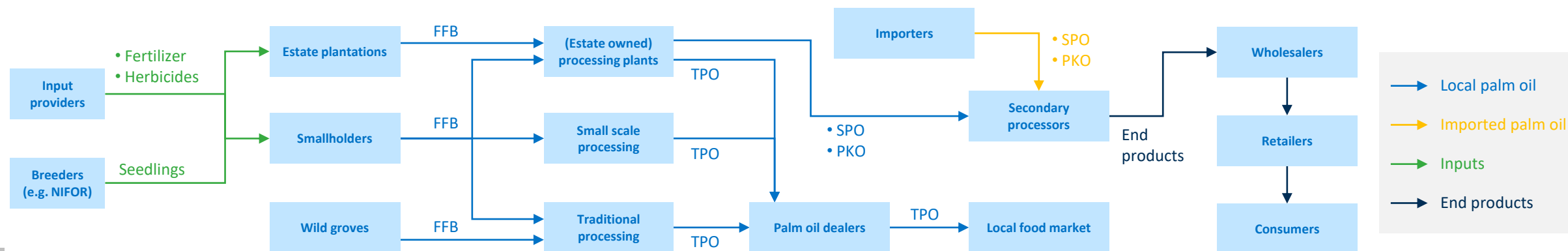
\* The Pisifera oil palm is sterile and does not produce any fruits \*\* Palm oil with Free Fatty Acid (FFA) levels below 5% is classified as SPO. If FFA levels are above 5% it is classified as TPO

\*\* Palm oil with Free Fatty Acid (FFA) levels above 5% is classified as TPO. TPO is sold directly as unprocessed oil, used by households for food preparation.

\*\*\* Palm oil with Free Fatty Acid (FFA) levels below 5% is classified as SPO. SPO is mainly used in the processed food industry, but also for soaps and creams

Sources: 1) [PIND Value Chain Analysis \(2011\)](#); 2) [Sahel Capital \(2015\)](#)

**The value chain is characterized by its many channels. Smallholders suffer from low quality inputs and inefficient production/processing techniques. Estates and importers dominate the industrial market**



#### Inputs      Cultivation      Processing      Marketing

- The market for **seedlings** is characterized by many buyers and few suppliers. The variety is crucial because of yield and oil content differences; therefore, it is a concern that many farmers are not certain what variety they are getting, even when buying from government organization NIFOR
- **Fertilizer** is crucial for productivity, but farmers have difficulty accessing it due to low availability as well as a lack of cash. Middlemen benefit from loopholes in subsidized fertilizer distribution, leading to high market prices
- Demand for **herbicides** is high, but high costs make it unaffordable for most farmers. The quality of herbicides is low, the influx of adulterated products high, and chemicals are applied without protection, after which they are disposed of unsustainably.

- Productivity and palm oil quality of wild groves and smallholders are low, due to lack of investment and input usage
- Market incentives led to investment in smallholder commercial farming in the early 2000s, but a lack of reinvestment results in aging trees today
- Cost of (specialized) labor is high and often unaffordable for farmers
- The timing of harvesting is crucial; too early leads to suboptimal oil contents, too late leads to high FFA levels (and thus lower quality)

- FFB must be processed within 12 to 24 hours after harvesting to ensure optimal levels of FFA
- Traditional processing methods are labor intensive and inefficient, resulting in low extraction rates
- Some farmers have small scale mills on/near their farms. This is an improvement compared to traditional methods in terms of efficiency and quality, but still far from optimal
- Large scale processors can handle large quantities and can achieve high extraction rates and quality
- Local and imported SPO and PKO are processed further into end products like processed food, soap and cosmetics

- Palm oil dealers buy TPO and sell it in the local food market, for home consumption
- SPO and PKO end products reach the end consumers via wholesalers and retailers

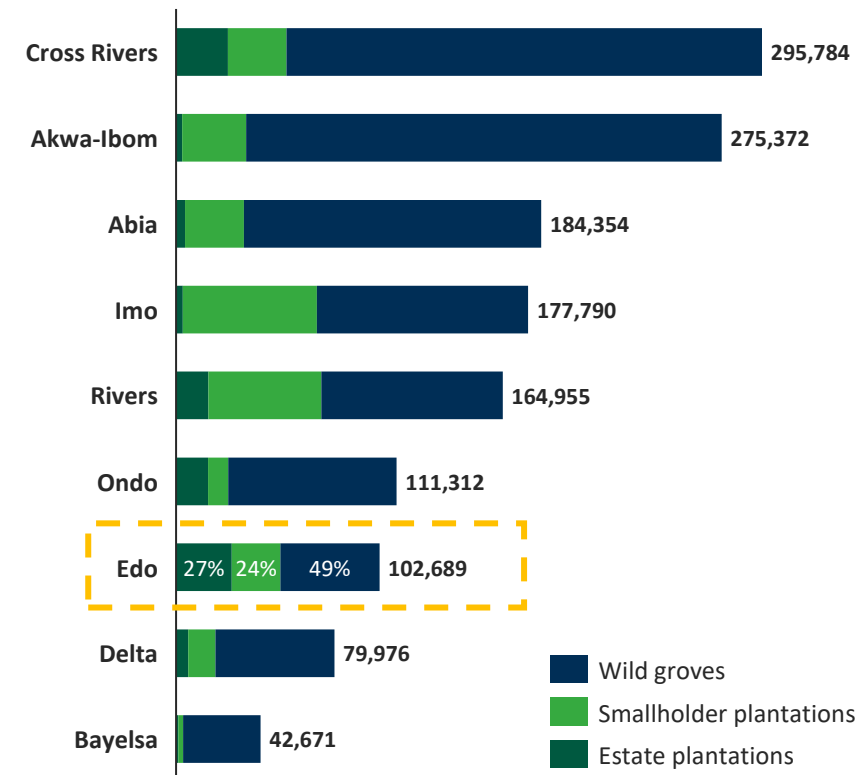
Sources: 1) [PIND Value Chain Analysis \(2011\)](#)

## Edo state has the 7<sup>th</sup> largest palm oil area with the highest share of large plantations. Wild groves and smallholders still cover around 75,000 hectares (73% of total area).

Comparing palm oil production systems<sup>1</sup>

Characteristics	Wild groves	Smallholder plantations	Estate plantations
<b>Production system</b>	<ul style="list-style-type: none"> <li>These comprise mainly of the low yielding Dura variety</li> </ul>	<ul style="list-style-type: none"> <li>Mainly consists of the Tenera variety, often intercropped with food crops and sometimes other cash crops</li> </ul>	<ul style="list-style-type: none"> <li>These plantations consist of the Tenera variety only, which are mono-cropped</li> </ul>
<b>Management</b>	<ul style="list-style-type: none"> <li>Landowners lease out the trees to individuals to harvest the fruits</li> <li>Owners make little to no investments in maintenance and upgrading</li> </ul>	<ul style="list-style-type: none"> <li>The use of manual labor and proper spacing of plants are common practice with this group</li> <li>Poorly maintained in terms of weeding, slashing, pruning, and fertilizer and crop protection application</li> </ul>	<ul style="list-style-type: none"> <li>Estate plantations are owned by corporations, most of which operate their own mills</li> <li>A significant level of mechanization is used in these systems</li> </ul>
<b>Yields</b>	<ul style="list-style-type: none"> <li>Average yields are 1.5 Mt of FFB per hectare per year</li> </ul>	<ul style="list-style-type: none"> <li>Average yields range from 3 to 10 Mt of FFB per hectare per year</li> </ul>	<ul style="list-style-type: none"> <li>Average yields range from 15 to 20 Mt of FFB per hectare per year</li> </ul>

Palm oil production area by state and production system<sup>1</sup>



Sources: 1) [PIND Value Chain Analysis \(2011\)](#)

## Although average household income is above the national poverty line, there remains a living income gap of 37%. Considering all income drivers, yield seems the most efficient to increase farmer income

### Household profile

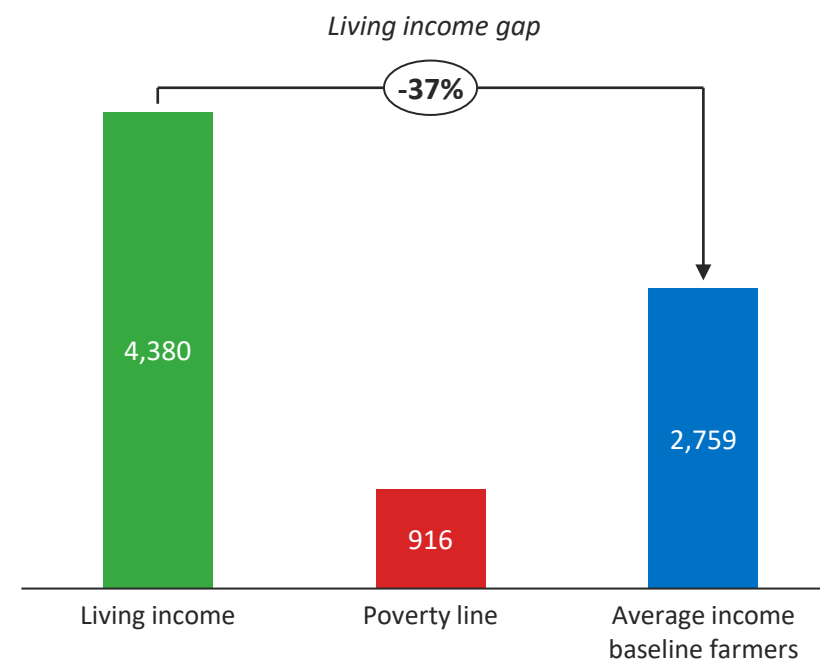
- In rural Nigeria, the average household consists of 5 people<sup>1</sup>
- The annual average household income of baseline farmers is USD 2,759, which is above the poverty line\* of USD 916 per year<sup>2</sup>, but significantly below the living income\*\* benchmark of USD 4,380 per year<sup>3</sup>
- Palm oil farmers in Edo state have an observed annual HH-income between 768 and 3790 USD

### (Living) income drivers<sup>4</sup>

	Average value	Range (high-low)	Comment
Farm size (hectares)	10.5	0.4 – 50	Since farm expansion is costly and may lead to deforestation, the focus should be on increasing yields
Yield (Mt FFB/ha/year)	6.3	3 – 10	Current yields are low, so there is substantial room for improvement
Price (USD/Mt of FFB)	90	70 – 100	The price depends on the type of tree and corresponding oil content, as well as global market prices
Cost of production (USD/ha/year)	436	394 – 454	Cost of production is mainly driven by fertilizer (47%) and hired labor (43%)
Other income (USD/year)	USD 522	USD 86 – 2,464	The majority comes from other crops, but a smaller part also from husbandry

### Household income comparison

Shows the average baseline farmer income compared to the living income benchmark and the poverty line (in USD/year)



\* The poverty line for a typical family was obtained using the OECD-modified scale. Further explanation can be found [in the annex](#)

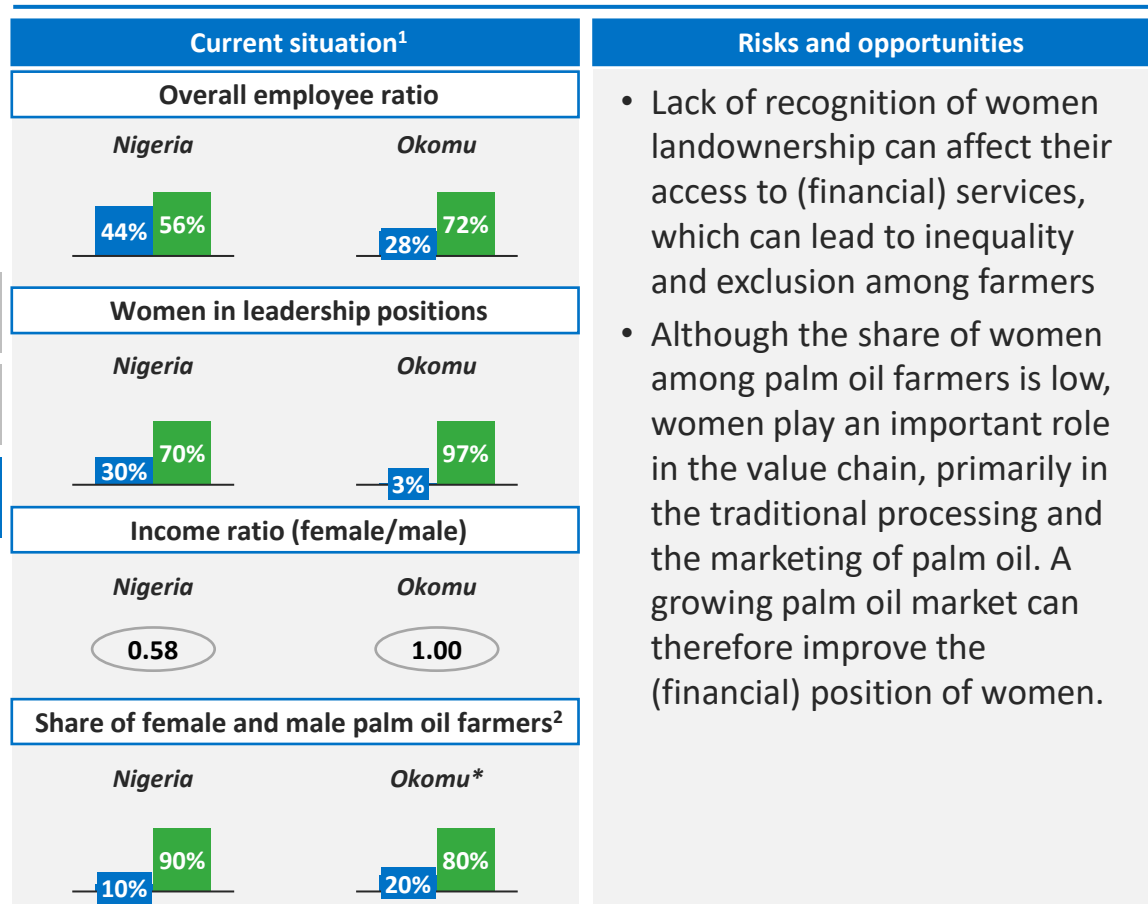
\*\* Living income (LI) is the net annual income required for a household in a particular place to afford a decent standard of living for all members of that household. It goes beyond poverty alleviation, which focuses on basic subsistence and survival. LI takes into account food, housing, education, health care, transportation and other essential needs (including provision for unexpected events). The difference between an LI benchmark and actual income is referred to as the living income gap.

Sources: 1) [DHS \(2018\)](#); 2) [World Bank \(2019\)](#); 3) [Global Living Wage \(2020\)](#); 4) [2SCALE Value Chain Study \(2021\)](#)

## Okomu recognizes the importance of equal opportunity in general, and for men and women in particular. This is underlined by the fact that they have an equal opportunity and a gender policy in place

Female Male

### Gender risks, opportunities and impact



### Measures taken by Okomu

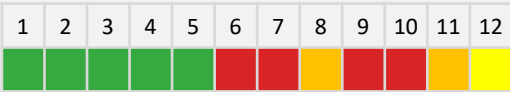
Current measures and policies in place	Challenges and room for improvement
<ul style="list-style-type: none"> <li>Okomu has a general equal opportunity policy in place as well as a specific gender policy (which is reviewed annually)</li> <li>Okomu has a Gender Committee who are responsible for compliance with the policy, for example through the organization of workshops and training programs to enable a gender sensitive work culture</li> <li>They also handle complaints about harassment and inappropriate behavior</li> <li>Okomu collects sex disaggregated data for staff and farmers</li> </ul>	<ul style="list-style-type: none"> <li>Access to financial services is crucial to improve the performance of SHF. The lack of recognition of women landownership therefore poses a serious risk for women inclusion, and this should be taken into account when designing and offering financial products and services to farmers</li> <li>Of all Okomu's employees only 28% is female, and of the 30 leadership positions within Okomu, only 1 is filled by a female. These shares should increase significantly in order to create an equal, diverse and inclusive working environment</li> </ul>

\* Since this SDM is yet to be initiated, these shares are aspirational

Sources: 1) WEF, Global Gender Gap Report (2021); 2) 2SCALE Value Chain Study (2021); 3) Impact Quick Scan assessment filled in by Okomu (Billy Ghansah, April 2021)

## Palm oil provides an opportunity for smallholder farmers to increase their income, but access to suitable finance is required. Growing other (food) crops will make farmers less vulnerable to volatile palm oil prices

### Food security risks, opportunities and impact

Current situation	Risks and opportunities
<b>Monthly cash flow</b> <ul style="list-style-type: none"> <li>Farmers face cash constraints at the beginning of the season, and less so at the end when the main crops revenues come in.</li> </ul> 	<ul style="list-style-type: none"> <li>The increasing demand for palm oil provides a solid opportunity for SHF to increase their income by increasing their production through higher yields. However, due to the volatility of palm oil prices throughout the year farmers should diversify their income</li> <li>In the first 3-4 years after (re)planting oil palms, significant investments are needed and costs are high, while the trees do not produce any fruits.</li> <li>60% of farmers state that financial assistance would help them overcome the constraints they face as a farmer<sup>3</sup></li> </ul>
<b>Income</b> <ul style="list-style-type: none"> <li>Palm oil prices are volatile. In 2020 the highest price in that year was 76.28% higher than the lowest price<sup>1</sup></li> <li>Most palm oil farmers also grow other (food) crops<sup>2</sup>. This makes them less dependent on palm oil, although palm oil still constitutes 84% of their net income.</li> </ul>	

### Measures taken by Okomu




Current measures and policies in place <sup>3</sup>	Challenges and room for improvement
<ul style="list-style-type: none"> <li>Okomu acknowledges the vulnerability of farmers after (re)planting and sees and opportunity to address this issue through the SDM design, TA or investment, although they do not consider it as a strategic goal for their company</li> <li>Okomu does not collect data to assess the level of food security of its farmers</li> <li>Okomu is building a production line for 200ml and 750ml sachets of its high quality (low FFA levels) cooking oil Banga. This is targeted at bottom of the pyramid consumers, of which they aim to reach 30,000 with their products.</li> </ul>	<ul style="list-style-type: none"> <li>(Re)planting oil palms requires high upfront investments before the trees start to produce, but also for an operational palm oil plantation most costs must be incurred before revenues come in</li> <li>However, there is a lack of availability of affordable financial products. This lack of credit forms a constraint, and farmers score the severity of this constraint with a 4.85 out of 5, underlining the crucial importance<sup>3</sup></li> <li>Affordable financial products and services should be designed that recognize the different financing needs farmers have and the long-term nature of palm oil farming</li> </ul>

Sources: 1) [IndexMundi](#); 2) [PIND Value Chain Analysis \(2011\)](#); 3) 2SCALE Value Chain Study (2021); 4) Impact Quick Scan assessment filled in by Okomu (Billy Ghansah, April 2021)



## Okomu is well-positioned to enhance smallholder resilience by providing climate smart services (e.g., information services, planting materials, insurance) and coinvesting in infrastructural improvements

### Climate risk, opportunities and impact

Risk exposure and potential impact		Farmer vulnerability
 <b>Temperatures</b> (change in) short- and long-term averages	<b>Medium risk</b> <ul style="list-style-type: none"> <li>• In terms of temperatures and sunlight, Edo state is well suited for oil palm cultivation<sup>1</sup></li> <li>• Temperatures have risen slightly and become less predictable<sup>2</sup></li> </ul>	<b>Farmer adaptive capacity</b> <ul style="list-style-type: none"> <li>• Farmers earn above the poverty line, and between 66%-94% of the LIB. They have limited savings and are not insured.</li> </ul>
 <b>Precipitation</b> (change in) timeliness and availability	<b>High risk</b> <ul style="list-style-type: none"> <li>• In terms of rainfall and humidity Edo state is well suited for oil palm cultivation<sup>1</sup></li> <li>• Rainfall has increased and become more volatile<sup>2</sup> The dry season has been longer and is expected to extend further<sup>2</sup></li> </ul>	<b>Impact</b> <ul style="list-style-type: none"> <li>• Extending droughts and increasing temperature and rainfall volatility impacts plant growth and gives rise to more pests and diseases</li> </ul>
 <b>Climate extremes</b> (change in) likelihood and severity of hail, floods, locusts, etc.	<b>High risk</b> <ul style="list-style-type: none"> <li>• In Edo state there is a high risk of river floods, extreme heat and wildfires<sup>3</sup></li> </ul>	<ul style="list-style-type: none"> <li>• This can significantly reduce yields and push up costs of cultivation if no measures are taken by farmers</li> </ul>

### Measures taken by Okomu

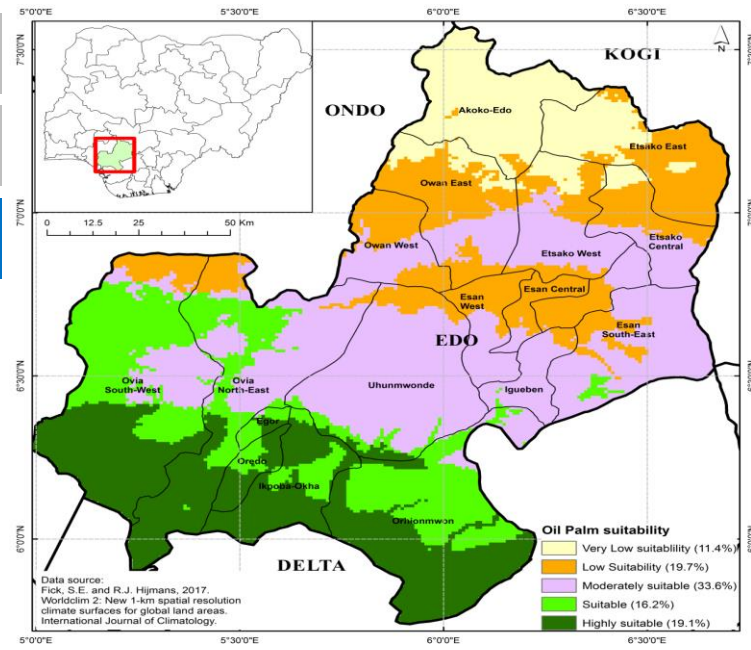
Current adaptation measures	Recommendations
<b>Strategy, measures and policies</b> <ul style="list-style-type: none"> <li>• Okomu takes climate seriously, seeing it as a business risk affecting their triple bottom line</li> <li>• Okomu's own plantations are insured against climate disasters</li> </ul>	<ul style="list-style-type: none"> <li>• Okomu and partners should explore the use of climate smart inputs and technologies</li> <li>• Okomu and partners should aim to provide drought tolerant planting materials and other technologies</li> </ul>
<b>Intelligence</b> <ul style="list-style-type: none"> <li>• Okomu collects data on rainfall days, sunshine hours, temperatures, wind speed and direction and humidity on their own plantations</li> </ul>	<ul style="list-style-type: none"> <li>• Climate resilience should be incorporated in farmer trainings</li> </ul>
<b>Farm services</b> <ul style="list-style-type: none"> <li>• As of April 2021, Okomu is not yet providing services to nor sourcing from farmers directly.</li> </ul>	<ul style="list-style-type: none"> <li>• Other actors should provide farmers with services related to crop/livestock diversification. This can contribute to both biodiversity and income diversification, thereby increasing farmers' adaptive capacity</li> </ul>

See annex for details on 1) climate suitability and 2) perceived climate change; 3) [Thinkhazard Nigeria, Edo state](#)

# Looking at rainfall, humidity, sunshine and temperature, Edo state is moderately to highly suitable for cultivating oil palm (1/2)

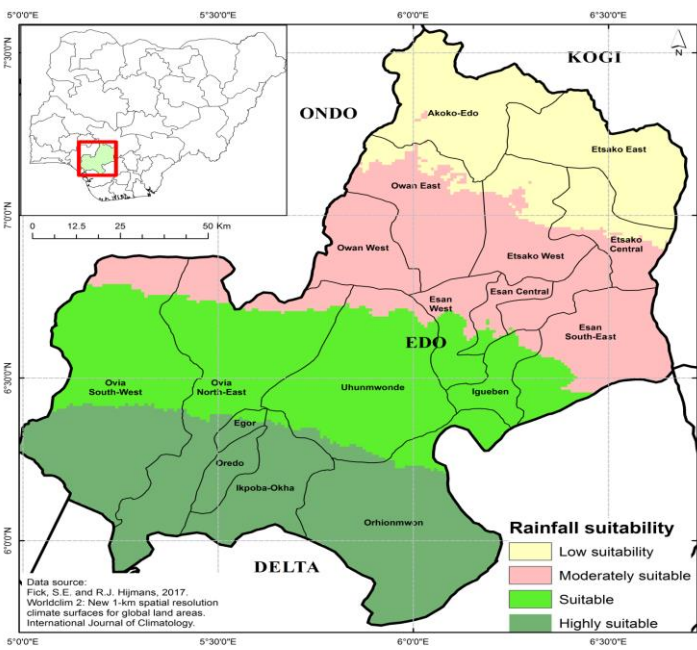
## Oil Palm Production Suitability

Given all the agro-climatic requirements of oil palm and the different climatic characteristics of the Local Government Areas (LGA) in Edo State in this and next slide, an oil palm suitability analysis of the LGAs was carried out. The outcome of the analysis is in the figure below. Five LGAs accounting for 35.3% of the state land mass are either highly suitable or suitable for cultivating oil palm. These are Oredo, Orhionmwon, Ikpoba-Okha, Egor and Ovia South West. About 33.6% of the state is moderately suitable while the areas with low suitability constitute about 19.7% of the state.



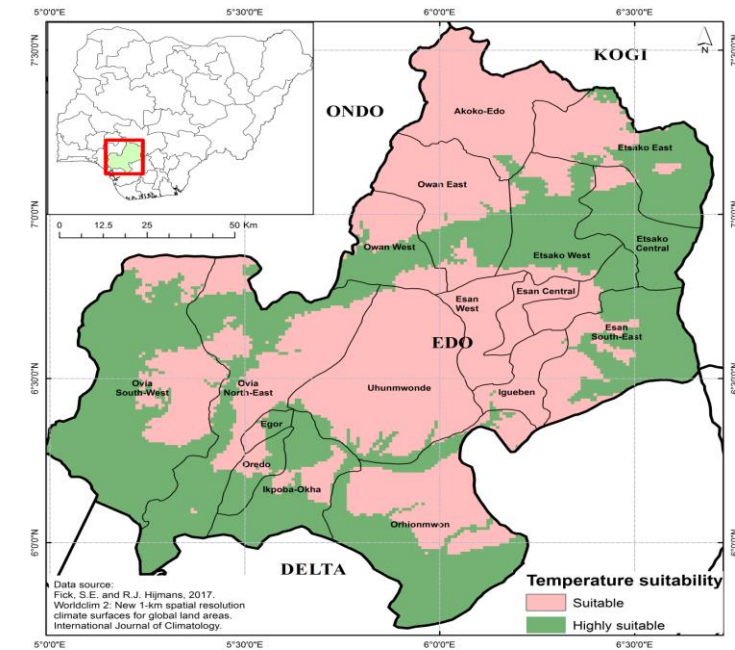
## Rainfall Suitability of LGAs

A rainfall suitability analysis of the LGAs was carried out by comparing rainfall distribution by LGAs with rainfall requirements of oil palm. The outcome is presented in the figure below. The highly suitable and suitable LGAs are Ikpoba-Okha, Oredo, Orhionmwon, Egor, Ovia South West, Ovia North East, Uhumwonde and Igueben. Eight of the 17 LGAs in Edo State meet the rainfall suitability criteria. Seven other LGAs are moderately suitable for oil palm production.



## Relative Humidity

The relative humidity requirement for oil palm is 75 – 80%; this is required for optimal growth and flower and fruit development. The figure below presents the relative humidity across the LGAs in Edo State. It shows that all the LGAs have enough relative humidity to nurture oil palm.

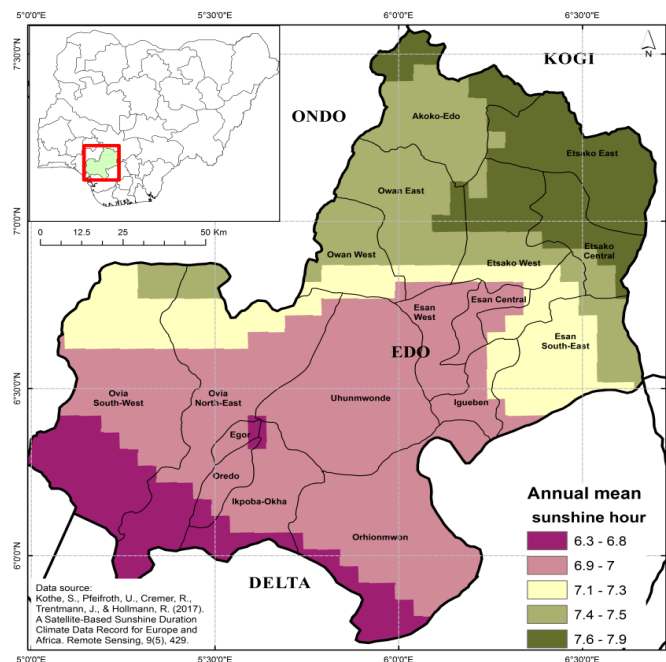


Oil palm scoping study in Edo state (IDH, January 2020)

## Looking at rainfall, humidity, sunshine and temperature, Edo state is moderately to highly suitable for cultivating oil palm (2/2)

### Sunshine Hours

The distribution of sunshine hours in Edo State is shown in the figure below. The annual mean sunshine hours in the state vary from 6.3 to 7.9 hours. Oil palm requires five to six sunshine hours per day. Every LGA in Edo State therefore has enough sunshine hours to support oil palm production. However, LGAs which have relatively higher number of sunshine hours are Etsako East, Etsako Central, Akoko Edo, Owan West and Owan East LGAs.



### Minimum and Maximum Temperatures; and Temperature Suitability of LGAs

Temperature requirements for oil palm range from 22°C to 24°C (minimum) and 29°C to 33°C (maximum). The figures below are maps of annual minimum and annual maximum temperatures in Edo State. The two maps clearly show that, across the LGAs, the minimum temperatures ranges from 18.9o C to 22.7o C while the maximum temperature ranges from 28.4o C to 32.3o C. Thus, temperature is not a constraint to oil palm production in Edo state. Figure 10 is the temperature suitability map for the state which combines the information in Figure 8 and 9 with oil palm's temperature requirements.

Figure 8: Annual Minimum Temperature, Edo State (2017)

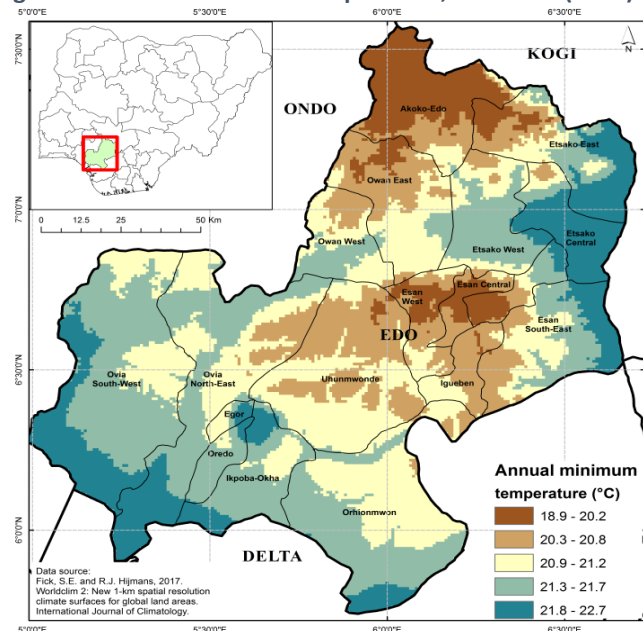
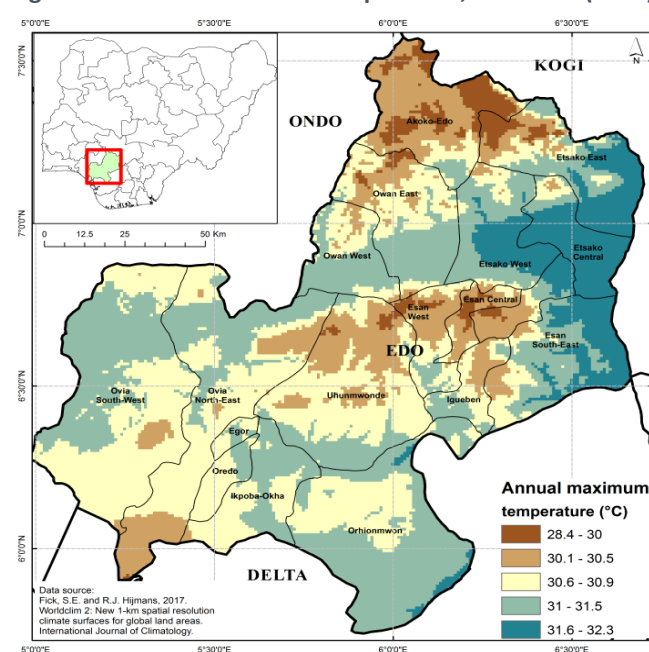


Figure 9: Annual Maximum Temperature, Edo State (2017)

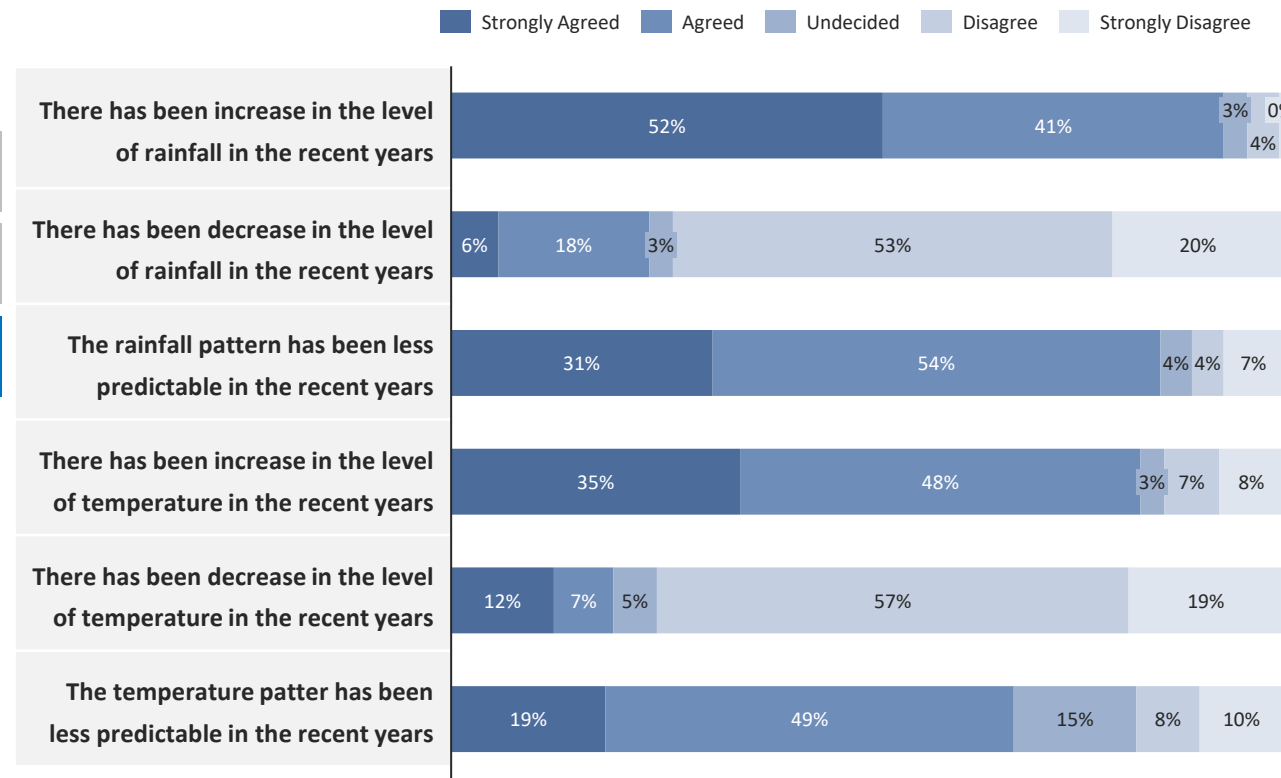


Oil palm scoping study in Edo state (IDH, January 2020)

# Rainfall and temperatures are perceived to increase and become more volatile by farmers and Okomu

## Farmer perception of climate change <sup>1)</sup>

Farmers seem to agree that there has been increase in the level of rainfall and temperature in the recent years. They also agreed that the rainfall and the temperature patterns have been less predictable. Their consciousness of changes in the weather may increase their willingness to take action to mitigate the effects of climate change.



## Okomu perception of climate change <sup>2)</sup>

Question	Answer	
Do you perceive climate change to be a major risk to your organization and the farms?	Yes	The 4-month dry season has significant impact on OP yields in Nigeria and Okomu. If it gets prolonged the yield drop and rise of pests and disease associated with it will be difficult to surmount. if it's too wet it might affect mostly the beneficial organisms and might give rise to more new diseases
If no, do you see an opportunity for climate change related SDM design, TA, and/or investment support?	Yes/No	Opportunity to look at options to use drought tolerant planting materials, use of technologies
Are climate adaptation and mitigation strategic goals to your organization?	Yes	We view climate change seriously and are looking out for planting material that are more adapted for the conditions in here as well technologies to mitigate the adverse impact of climate change

1) Oil palm scoping study in Edo state (IDH, January 2020); 2) Impact Assessment Okomu (Billy Ghansah, March 2021)



## Low yielding trees, low quality inputs and deforestation are the main risk factors affecting Okomu's SDM. The development of high quality, resilient trees can partly support in mitigating these risks

Definition	Situation	Impact on SDM
<b>Technology</b>	<ul style="list-style-type: none"> <li>Research institutes are focusing on the development of high yielding, disease and drought tolerant planting materials</li> </ul>	<ul style="list-style-type: none"> <li>Higher yielding trees will increase farmer incomes</li> <li>More robust planting materials make farmers more resilient</li> </ul>
<b>Environment</b>	<ul style="list-style-type: none"> <li>Irregular rainfall patterns arising from climate change negatively affect oil palm yields and production, and makes forecasting and planning difficult</li> <li>Deforestation is a risk that can exacerbate climate change impact</li> </ul>	<ul style="list-style-type: none"> <li>Lower yields and farm productivity in the short run as well as in the long run</li> </ul>
<b>Infrastructure</b>	<ul style="list-style-type: none"> <li>Due to the weight of FFBs and required timely processing (within 12 to 24 hours after harvesting) a good road network is crucial. However, road quality and access is low, especially during rainy season, hampering the sourcing of FFBs and the delivery of inputs</li> </ul>	<ul style="list-style-type: none"> <li>High transportation costs and higher loss of FFBs due to high transport time</li> <li>The sourcing of palm oil as well as the delivery of services poses a significant logistical challenge</li> </ul>
<b>Labor</b>	<ul style="list-style-type: none"> <li>Skillful labor is required for harvesting. This in combination with tribalism and poor remuneration negatively impacts availability of labor</li> </ul>	<ul style="list-style-type: none"> <li>Low availability of (sufficiently skilled) labor leads to high costs for farmers</li> </ul>
<b>Inputs &amp; Financing</b>	<ul style="list-style-type: none"> <li>Many farmers (unknowingly) grow the Dura fruit type which has lower oil content</li> <li>There is no quality assurance system in place for inputs like fertilizer, and adulteration is common</li> <li>Agro-chemical inputs and planting materials are of low quality, and many products are adulterated</li> <li>Availability of agricultural credit is limited, and the long-term nature of palm oil complicates this further</li> </ul>	<ul style="list-style-type: none"> <li>Inferior oil palm varieties lead to lower yields and productivity</li> <li>Low quality inputs lead to suboptimal yields</li> <li>Low quality inputs can be harmful to farmers' health</li> <li>Adulteration of inputs leads to unfair pricing and lower productivity</li> </ul>

Source: Enabling Environment survey filled in by Okomu (Billy Ghansah, April 2021) and local IDH staff (Chris Okafor, March April 2021)

## Farmers' limited access to finance is exacerbated by lack of (formal) land ownership, especially for women. Good farmers relations and training are needed to tackle efficiency issues in the value chain

Definition	Situation	Impact on SDM
<b>Trading System</b>	<ul style="list-style-type: none"> <li>Farmers use no or inefficient weighing scales</li> <li>Quality assessment is difficult to carry out</li> </ul>	<ul style="list-style-type: none"> <li>Farmer education and training is paramount to ensure the mitigation of existing risks</li> <li>Clear contractual agreements are needed, based on the farmers' understanding of their products' price and quality parameters</li> </ul>
<b>Pricing &amp; Competition</b>	<ul style="list-style-type: none"> <li>Market information systems are not easily accessible for smallholders and in most case unreliable</li> <li>Farmers do not/can not plan their operations based on external factors (e.g. changing import duties)</li> </ul>	<ul style="list-style-type: none"> <li>A fair and transparent pricing mechanism is needed, in combination with timely payment</li> <li>Good farmer relations are necessary to increase loyalty and avoid side-selling</li> </ul>
<b>Institutional Stability</b>	<ul style="list-style-type: none"> <li>There are limited supporting institutions in terms of legislation and market control</li> <li>Policies that apply to palm oil production are instable and prone to change</li> <li>The rise of non-state actors providing security is a threat as they do not have to adhere to a code of conduct</li> </ul>	<ul style="list-style-type: none"> <li>Capricious policy making poses a risk to long-term planning and commitment</li> </ul>
<b>Land Tenure</b>	<ul style="list-style-type: none"> <li>Land ownership for most farmers in Edo state is arranged through traditional systems of ownership without legal backing</li> </ul>	<ul style="list-style-type: none"> <li>Lack of formal land ownership can lead to disputes and impedes farmers' access to short- and long-term finance, which negatively affects yields and production</li> </ul>
<b>Social Norms</b>	<ul style="list-style-type: none"> <li>There is a lack of recognition of women landownership, due to limited inheritance rights of women</li> </ul>	<ul style="list-style-type: none"> <li>Women's access to (financial) services will be affected, and gender related differences in access to services lead to exclusion and inequality among farmers</li> </ul>

Source: Enabling Environment survey filled in by Okomu (Billy Ghansah, April 2021) and local IDH staff (Chris Okafor, March April 2021)



## 3.2 About the SDM

*Understanding Okomu's strategy and business model*

**In general, Okomu seems to be well positioned to roll-out a SHF outgrower model from scratch. Key priorities are strengthening their field staff and support functions, while mitigating a range of risks**

#### Helpful

#### Harmful

#### Internal

- **Size & track record:** Okomu is one of four largest processors in Nigeria, dominating most of Edo State, enabling them to expand fast into smallholder sourcing
- **Sustainability:** Okomu is dedicated to sustainable palm oil production, allowing them to expand as they are aligned to common public interest
- **Partnerships:** Okomu can leverage the joint knowledge and skills of 2SCALE, IDH and Terra Agric to design a sustainable, inclusive and viable smallholder engagement from scratch
- **Own capital:** with their own established capital-intensive operations, Okomu should be able to cover initial working capital needs from their own balance sheet, while gradually increasing smallholder sourcing

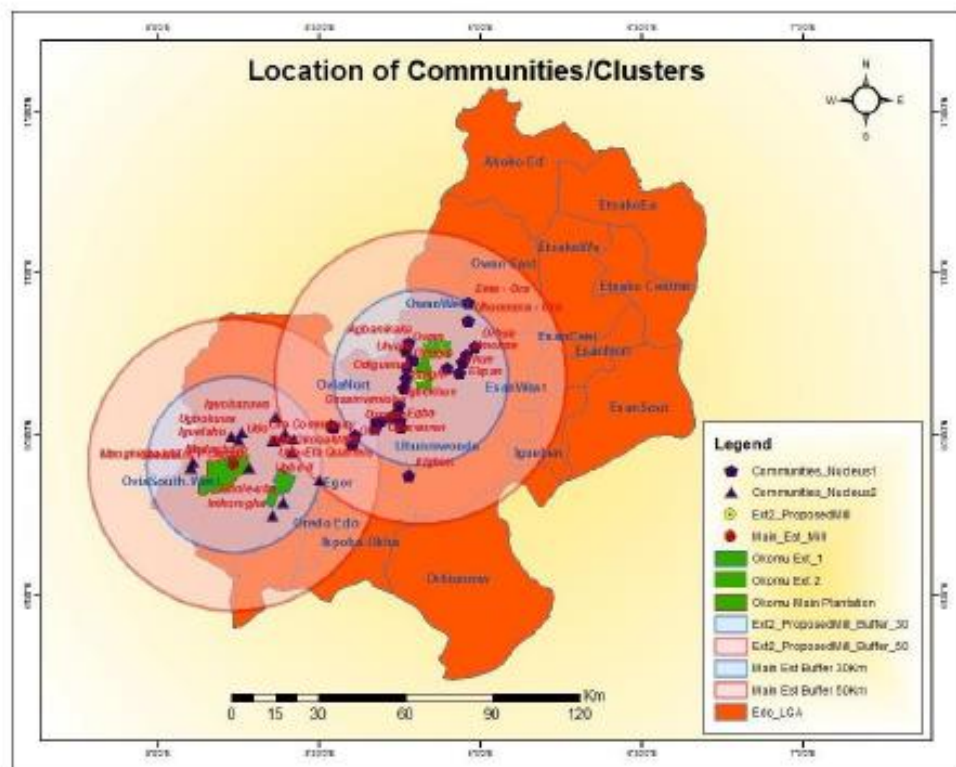
#### External

- **Anchor Borrowing Scheme:** the Nigerian Central Bank provides affordable finance to smallholders through eligible Anchors (companies working with SHFs)
- **Impact case:** with current smallholder productivity at very low levels, there is relatively much social and environmental impact to be made
- **Conducive environment:** currently Edo State climate (rainfall, humidity, sunshine and temperature) is moderately to highly suitable to palm oil cultivation
- **Public funding:** as long as sustainability criteria can be met, Okomu should be able to access public funds relatively easily
- **New plantings:** there is a considerable number of farmers with land available willing to enter oil palm cultivation
- **Import tariffs:** the Nigerian governments aims to protect the local palm oil market from cheap Asian imports by levying import tariffs, improving relative competitiveness of locally produced palm oil

- **No SHF program nor experienced field staff in place:** currently Okomu has no established relationships with smallholders, nor a fully functioning field staff
- **Working capital intensive and risk prone:** palm oil sourcing is a capital-intensive business. Okomu has limited experience in adequately managing smallholder sourcing working capital flows, mediated by potential smallholder risks
- **Farmer financing:** there is no proof of concept of input, rehabilitation and planting loans, loan products that are essential to making this SHF engagement work. Farmers are not insured (yet)
- **M&E:** Okomu has no monitoring and evaluation infrastructure in place for smallholders, refraining them from continuous learning and improvement
- **Chemicals:** yield increases rely on increased fertilizer usage, potentially damaging the environment as well as farmers' health, since most farmers don't use PPE
- **Climate change:** extending droughts, increasing temperatures and increasingly volatile rains may reduce FFB yields and increase costs of cultivation and sourcing
- **Forex:** as the global economy recovers from Covid-19 there is an increased volatility of exchange rates, impacting Okomu's profitability
- **Poor access to knowledge, inputs and roads:** smallholders require high upfront investments to ensure decent levels of quality and quantity of FFB produced
- **High fertilizer prices:** fertilizers, the biggest expense of smallholder FFB production, are relatively expensive in Nigeria
- **Poor quality seeds:** Nigeria has limited good quality Tenera seeds available
- **Price fluctuations:** palm oil prices are indexed to global markets. Extreme events in distant markets can have strong impacts on local production and profitability
- **Side-selling:** farmers are price sensitive. If Okomu does not offer the right price, it risks losing produce and any upfront investments in the farmer

## To efficiently expand their operations, Okomu seeks to source from existing and prospective oil palm farmers within a 50km radius of their palm oil mills in Edo state

### Location of Okomu operations and farming communities



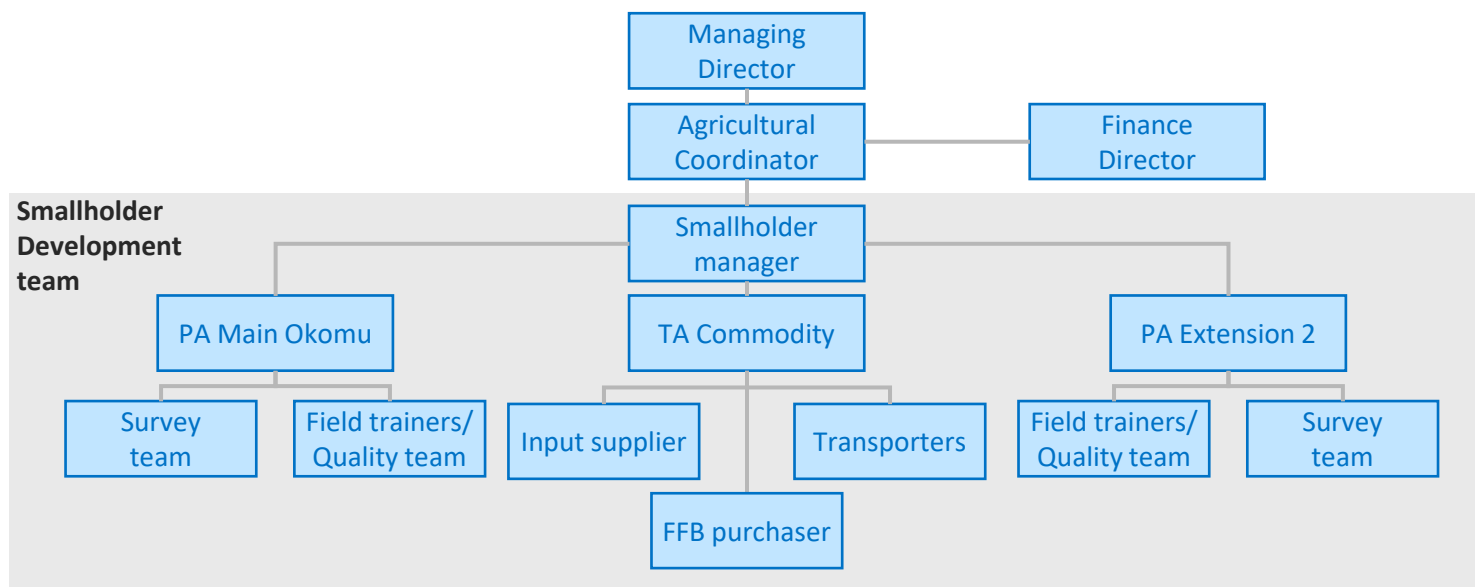
### Rationale for engaging SHF

- Okomu owns two mills in West and Central Edo state with a total installed processing capacity of 400,000 Mt FFB per year
- Their own plantations cover 19,060 hectares (18,879 ha mature oil palm and 181 ha immature) supplying 250,000 Mt FFB per year, growing to 330,000 in the next 5 years
- Limited available land hinders Okomu from expanding their own plantations
- The size and weight of FFB, poor road conditions and frequent heavy rainfall can significantly drive up logistical costs
- Hence, Okomu aims to source from farmers located ideally within 30km and not beyond a 50km radius
- There are 42 communities located within Okomu's reach with an expected 5,000 farmers, of which 3,500 farmers growing oil palm
- Of 511 farmers surveyed in the region 50% were existing oil palm farmers and 50% were prospective oil palm farmers
- 76% of farmers were not part of a cooperative

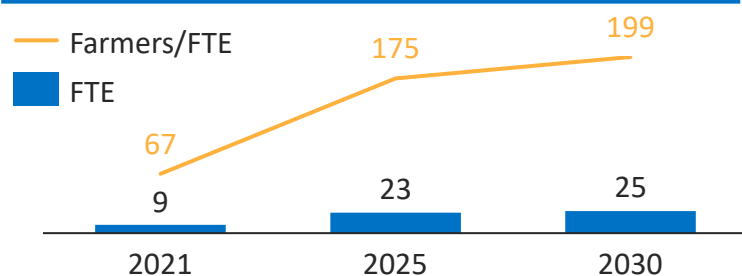
Sources: 1) Mapping of smallholder oil palm clusters within 30-50km of the estates of Okomu oil palm company plc, final report (2020)

**Okomu is building a team dedicated to Smallholder Engagement including service and sourcing functions, strongly anchored into their wider organization. There are opportunities to become more inclusive**

### Okomu Smallholder Development team organogram

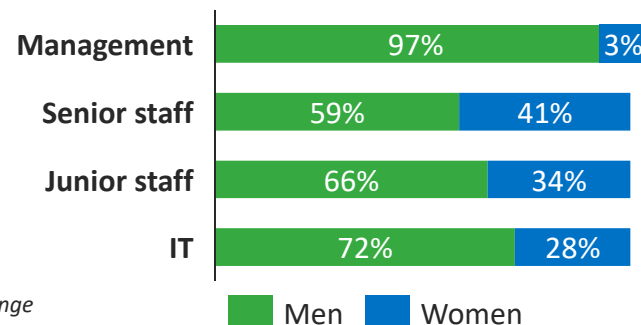


### Team growth and efficiency



\* This SDM is not yet operational, therefore this organogram is a draft and is subject to change

### Gender distribution per staff level



### Smallholder Development team

- Okomu has a dedicated smallholder development team including both service and sourcing teams, supervised by the Agricultural Coordinator
- Currently there is no dedicated sustainability function, only support from the Okomu sustainability team
- The team currently consist of 9 FTE, growing to 25 FTE by 2026 (compared to 1388 FTE working at the entire organization, which mainly consists of manual laborers on the plantation)
- Okomu is striving for equal opportunities as evidenced by e.g., policies on Equal Opportunity and Gender
- Women are still underrepresented in the company, especially at senior management level

## SDM stakeholders, their roles, revenue model and incentive to participate (1/2)

Actor	Company type	Function	Revenue model	Incentive to participate
<b>IDH</b> The Sustainable Trade Initiative	Foundation (NLD)	<ul style="list-style-type: none"> <li>Provide support in designing the SHF model</li> <li>Conduct a baseline survey to measure and monitor the performance of the wider sector</li> <li>Support the development and scaling of the outgrower model through TA</li> </ul>	<ul style="list-style-type: none"> <li>None (grant funded)</li> </ul>	<ul style="list-style-type: none"> <li>Environment protection and restoration</li> <li>Smallholder inclusion</li> </ul>
<b>IFDC / 2SCALE</b> International Fertilizer Development Center	NGO (USA)	<ul style="list-style-type: none"> <li>Mapping potential outgrowers</li> <li>Developing agribusiness clusters</li> <li>Development of a marketing channel for Banga cooking oil</li> <li>Fund initial farmer technical training</li> </ul>	<ul style="list-style-type: none"> <li>None (grant funded)</li> </ul>	<ul style="list-style-type: none"> <li>Smallholder inclusion</li> <li>Promote sustainable agricultural solutions</li> </ul>
<b>Terra Agric</b>	Private company (NLD)	<ul style="list-style-type: none"> <li>Aggregation of FFBs</li> <li>Training of farmers</li> </ul>	<ul style="list-style-type: none"> <li>Commission</li> </ul>	<ul style="list-style-type: none"> <li>Increase sales</li> <li>Expand customer base</li> </ul>
<b>Okomu Seeds Imports</b>	Input suppliers (NGA)	<ul style="list-style-type: none"> <li>Develop and supply high yielding, slow growing drought-tolerant and disease-resistant hybrid Tenera seeds</li> </ul>	<ul style="list-style-type: none"> <li>Margin on sales</li> </ul>	<ul style="list-style-type: none"> <li>Increase sales</li> <li>Increase quality and stability of SHF production</li> </ul>
<b>Notore</b>	Private limited company (NGA)	<ul style="list-style-type: none"> <li>Provision of crop specific fertilizer and herbicides to smallholder farmers</li> </ul>	<ul style="list-style-type: none"> <li>Margin on sales</li> </ul>	<ul style="list-style-type: none"> <li>Increase sales</li> <li>Expand customer base</li> </ul>
<b>Thriving Engineering</b>	Private limited company (NGA)	<ul style="list-style-type: none"> <li>Provision of PPE and farm tools (sickles, poles, chisels)</li> </ul>	<ul style="list-style-type: none"> <li>Margin on sales</li> </ul>	<ul style="list-style-type: none"> <li>Increase sales</li> <li>Expand customer base</li> </ul>
<b>Troika Investments Ltd</b>	Private limited company (NGA)	<ul style="list-style-type: none"> <li>Transportation of FFBs</li> </ul>	<ul style="list-style-type: none"> <li>Margin on sales</li> </ul>	<ul style="list-style-type: none"> <li>Increase sales</li> <li>Expand customer base</li> </ul>

## SDM stakeholders, their roles, revenue model and incentive to participate (2/2)

Actor	Company type	Function	Revenue model	Incentive to participate
<b>Central Bank of Nigeria</b>	Nigerian federal government entity (NGA)	<ul style="list-style-type: none"> <li>• Enable access to finance for oil palm farmers through their anchor borrowers' program</li> <li>• Enable access to finance for Okomu</li> </ul>	<ul style="list-style-type: none"> <li>• Interest on loans</li> <li>• Subscription fees</li> </ul>	<ul style="list-style-type: none"> <li>• Increase revenue</li> </ul>
<b>Oikocredit</b>	Limited liability cooperative (NLD)	<ul style="list-style-type: none"> <li>• Provision of short term input loans to farmers</li> <li>• Provision of long term (re)planting loans to farmers</li> </ul>	<ul style="list-style-type: none"> <li>• Interest on loans</li> </ul>	<ul style="list-style-type: none"> <li>• Increase revenue</li> <li>• Smallholder inclusion</li> </ul>
<b>Leadway Assurance</b>	Private limited company (NGA)	<ul style="list-style-type: none"> <li>• Provision of health care insurance to farmers</li> <li>• Provision of hazard (e.g. fire) insurance to farmers</li> <li>• Provision of loan default insurance to farmers</li> </ul>	<ul style="list-style-type: none"> <li>• Premiums (deducted from FFB sales)</li> </ul>	<ul style="list-style-type: none"> <li>• Increase revenue</li> </ul>
<b>FCMB</b> First City Monument Bank	Private limited company (NGA)	<ul style="list-style-type: none"> <li>• Provide finance for setting up the outgrower model</li> </ul>	<ul style="list-style-type: none"> <li>• Interest on loans</li> </ul>	<ul style="list-style-type: none"> <li>• Increase revenue</li> </ul>
<b>NDDC</b> Niger Delta Development Commission	Nigerian federal government entity (NGA)	<ul style="list-style-type: none"> <li>• Development and improvement of roads through infrastructural investments</li> <li>• Facilitating access to land titles</li> </ul>	<ul style="list-style-type: none"> <li>• None</li> </ul>	<ul style="list-style-type: none"> <li>• Development of the Niger delta area</li> </ul>
<b>NIFOR</b> Nigerian Institute for Oil-Palm Research	Nigerian federal government entity (NGA)	<ul style="list-style-type: none"> <li>• Developing a seedling production system of high quality Tenera oil palm seedlings</li> </ul>	<ul style="list-style-type: none"> <li>• None</li> </ul>	<ul style="list-style-type: none"> <li>• Development of the oil palm sector</li> </ul>
<b>EDOGIS</b> Edo State Geographic Information Services	Nigerian federal government entity (NGA)	<ul style="list-style-type: none"> <li>• Ensuring proper land titles and land rights for farmers</li> </ul>	<ul style="list-style-type: none"> <li>• None</li> </ul>	<ul style="list-style-type: none"> <li>• Proper land administration and management</li> </ul>























## Overview of services, their envisioned impact and business case (1/3)

Legend

Okomu	FSP	Other
Yes	No	


















Service	Activities	Envisioned impact	Implementers	Delivery mode	Cost recovery	Cost borne by	Modelled in Farmer P&L
 <b>Training</b>	Technical and organizational training	Increase yield, quality and profitability	<ul style="list-style-type: none"> <li>Okomu</li> <li>Terra Agric</li> <li>Product suppliers</li> </ul>	<ul style="list-style-type: none"> <li>Trainer</li> <li>Demonstrations</li> </ul>	<ul style="list-style-type: none"> <li>3% Service fee on net-income from FFB sold to Okomu</li> <li>Sourcing volume increase</li> </ul>		
	Training on RSPO certification	Increases yield, quality and sustainability	<ul style="list-style-type: none"> <li>Okomu</li> <li>3rd Party service provider</li> <li>RSPO</li> </ul>	<ul style="list-style-type: none"> <li>Trainers, demonstrations, videos</li> <li>Internal and external auditors</li> </ul>			 1)
	Farmer organization	Increase sourcing efficiency	<ul style="list-style-type: none"> <li>Okomu</li> <li>2SCALE</li> <li>3rd Party service provider</li> </ul>	<ul style="list-style-type: none"> <li>Agri Business Clusters (ABC)</li> </ul>			
	Farming as a business	Better integration into modern financial architecture	<ul style="list-style-type: none"> <li>Okomu</li> <li>3rd Party service provider like Solidaridad and 2scale</li> </ul>	<ul style="list-style-type: none"> <li>Cooperatives; individual farmers</li> </ul>			
	Safety and health at work place	Less injuries and health issues and reduced costs	<ul style="list-style-type: none"> <li>Okomu</li> <li>3rd Party service provider</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrations, lectures, videos</li> </ul>			
 <b>Inputs</b>	Fertilizers and herbicides facilitation	Increase yield	<ul style="list-style-type: none"> <li>Golden fertiliser / OCP</li> <li>Notore / agrochemicals suppliers</li> </ul>	<ul style="list-style-type: none"> <li>Field staff, demo plots</li> </ul>	<ul style="list-style-type: none"> <li>3% Service fee on net-income from FFB sold to Okomu</li> <li>Sourcing volume increase</li> </ul>		
	Fertilizer quality checks	Increase yield	<ul style="list-style-type: none"> <li>Okomu</li> </ul>	<ul style="list-style-type: none"> <li>Okomu personnel</li> </ul>			
	Improved seedlings	Increase long-term yield	<ul style="list-style-type: none"> <li>Okomu</li> <li>NIFOR</li> </ul>	<ul style="list-style-type: none"> <li>Production and marketing of high quality seedlings</li> </ul>	<ul style="list-style-type: none"> <li>Margin in seedling sales price</li> </ul>		

1) As certification is assumed not to have a significant impact on yield, revenue, or cost in the first 10-years of the farmers' P&L.

## Overview of services, their envisioned impact and business case (2/3)

Legend

Okomu	FSP	Other
Yes	No	

Service	Activities	Envisioned impact	Implementers	Delivery mode	Cost recovery	Cost borne by	Modelled in Farmer P&L
 <b>Equipment &amp; Labor</b>	PPE	Less injuries and reduced costs	<ul style="list-style-type: none"> <li>Safety Nigeria</li> <li>Thriving engineering</li> </ul>	<ul style="list-style-type: none"> <li>Marketing/sales of Personal protective equipment</li> </ul>	• N/a		
	Farm tools (sickles, poles, chisels)	Increase productivity and reduce costs	<ul style="list-style-type: none"> <li>Thriving engineering</li> <li>Crocodile matchets Nigeria Ltd</li> </ul>	<ul style="list-style-type: none"> <li>Marketing/sales of quality farm tools</li> </ul>			
	Mechanization	Increase production efficiency	<ul style="list-style-type: none"> <li>Okomu</li> <li>Terra Agric</li> </ul>	<ul style="list-style-type: none"> <li>Direct contracts through cooperatives or individual farmer</li> </ul>			 <sup>1)</sup>
	Skilled labor gangs	Increase production and productivity	<ul style="list-style-type: none"> <li>Okomu</li> <li>Technical Assistance</li> <li>Labor contractors</li> </ul>	<ul style="list-style-type: none"> <li>Training of skilled labor gangs to be directly contracted through cooperatives or individual farmer</li> </ul>	<ul style="list-style-type: none"> <li>3% Service fee on net-income from FFB sold to Okomu</li> <li>Sourcing volume increase</li> </ul>	 	
 <b>Financial services</b>	Short terms loans	Enable adequate investments in inputs and tools	<ul style="list-style-type: none"> <li>Terra Agric</li> <li>Oikocredit</li> </ul>	<ul style="list-style-type: none"> <li>Contracts</li> <li>Bank accounts</li> </ul>	<ul style="list-style-type: none"> <li>Interest payments (9%/year)</li> </ul>		
	Long-term loans	Enable adequate long-term farm investment	<ul style="list-style-type: none"> <li>Okomu</li> <li>CBN</li> <li>Commercial banks</li> </ul>	<ul style="list-style-type: none"> <li>Contracts</li> <li>Bank accounts</li> </ul>	<ul style="list-style-type: none"> <li>Interest payments (9%/year)</li> </ul>		
	Insurance	Insure farms against damage	<ul style="list-style-type: none"> <li>Leadway Insurance</li> </ul>	<ul style="list-style-type: none"> <li>Contracts</li> <li>Bank accounts</li> </ul>	<ul style="list-style-type: none"> <li>Insurance premium (%/year)</li> </ul>		 <sup>2)</sup>

1) There is no mechanization at farm-level other than farm tools and equipment.

2) Farmer P&L models off-take of financial products excl. insurance premium



# 3.3 Assumptions and methodology

## *Key assumptions and background information*

*This section:*

- *Shows all assumptions used for the SDM operator calculations*
- *Shows the yield curves for different tree types under different conditions*
- *Shows all differing assumptions for all farmer segments*
- *Shows all assumptions used for the different farmer loans*
- *Explains the OECD-modified scale methodology*
- *Contains a list with all abbreviations used in the report*

## SDM P&amp;L Assumptions (1/3)

Variable	Baseline_0	Productive	Segment_2	R&R	Segment_3	Prospective
Exchange	411 NGN = 1 USD	411 NGN = 1 USD	411 NGN = 1 USD	411 NGN = 1 USD	411 NGN = 1 USD	411 NGN = 1 USD
# farmers	N/a	2021: 187 2030: 1,248	N/a	2021: 187 2030: 1,248	N/a	2021: 187 2030: 843
Total	2021: 416 2030: 3,338					
Attrition rate (annually)	N/a	5%	N/a	5%	N/a	5%
Graduation to expansion	N/a	10% (annually)	N/a	N/a	N/a	N/a
Service uptake	N/a		N/a		N/a	
Training		Y1: 100% Y5: 100%		Y1: 100% Y5: 100%		Y1: 100% Y5: 100%
Inputs		Y1: 20% Y5: 50%		Y1: 20% Y5: 50%		Y1: 50% Y5: 100%
Financial services		Y1: short + long for replanting Y5: short		Y1: short + long for replanting Y5: short		Y1: short + long for replanting Y5: short
Equipment & Labor		Y1: 20% Y5: 50%		Y1: 50% Y5: 50%		Y1: 100% Y5: 50%
Post-harvest services		Y1: 100% Y5: 100%		Y1: 100% Y5: 100%		Y1: 100% Y5: 100%
Market access		Y1: 40% Y5: 100%		Y1: 40% Y5: 100%		Y1: 40% Y5: 100%

## SDM P&amp;L Assumptions (2/3)

Variable	Value		Variable	Value	
# Cooperatives	2021: 5	2030: 20	Revenue		
# Farmers/cooperative	250		Agronomic Service fee	3% on net-income farmer	
			Sales price	1,000 Mt/CPO	
<b>Staffing</b>			<b>Transport cost</b>	13 \$/Mt	
Manager	FTE/ 10,000 ha	2021: 0.2 / 2030: 2.0	<b>Processing</b>	<b>Tenera</b>	<b>Dura</b>
Field Ops Manager	FTE / 2,500 ha	2021: 1 / 2030: 8	Conversion ratio	20% (FFB>CPO)	12.5% (FFB>CPO)
Finance Manager	N/a	2021: 1 / 2030: 1	Milling cost (\$/Mt FFB)	\$16	\$19
Accountant	N/a	2021: 1 / 2030: 2	<b>Training</b>		
Accountant Ass.	N/a	2021: 2 / 2030: 4	Training capacity	Specialist: 2,500/year ToT: 1,500/year Trainer: 3,000/year	
Field Officers	1 > 2 FTE / district	2021: 4 / 2030: 8	Training facilitation	Attendees: \$5/training Facility: \$73/training # farmers/training: 25 # farmers/trainer: 250	
<b>Vehicles</b>			SDM Staff	25,000 \$/year	
Four Wheel Drive	# 1 / Manager	Lifespan: 4 year Purchase cost: \$40,000 Annual cost: \$7,800/year	Socio-Economic Support	50,000 \$/year (1/2 year)	
Motorcycles	# 1 / Field Officer	Lifespan: 3 year Purchase cost: \$2,500 Annual cost: \$900/year		Training Y1: 100% Training Y4: 50% Training Y8: 50%	
<b>Other overhead</b>	60,000 \$/year				



## SDM P&L Assumptions (3/3)

Variable	Value	Variable	Value
<b>Demo plots</b>	Ha/cooperatives: 2	<b>Farmer Mobilization</b>	\$6/new farmer
<b>RSPO Certification</b>	All cooperatives	<b>Inputs</b>	Fertilizer (NPK)      Herbicides / Pest control
Audit cost	\$12,500/year	Sales margin	0%      0%
Studies	\$320,000 (one-off)	Quality test	\$49 per 420 Mt
RSPO Campaign	\$10,000/year	<b>Leaf testing</b>	\$1 Ha
RSPO Studies	\$25,000/Y3, Y4, Y5	<b>Nurseries</b>	
<b>Working Capital</b>		Seedlings/ha/year	20,000
Purchase/Transport	24 days to sales	Losses	35%
Processing/Stock	22 days to sales	Seeds	\$1.40
Cost of debt	13%/year	Maintenance	1,947 \$/ha
<b>Harvest labor</b>		Depreciation/other	5,200 \$/ha
Capacity building	Training: 12 \$/harvester Capacity: 2.3 ha/harvester	Sales-price	\$3.07



## CLV Assumptions (1/2)

#### Calculation of annual net-margin per farmer

Variables used to calculate annual net-margin per Farmer Segment for the CLV

1	Customer count	
2	Mt FFB per customer by FFB-type	
3	Gross margin per Mt FFB by FFB-type	+
4	Agronomic Service fee	+
5	Overhead cost	-/-
6	Services provision cost	-/-
7	Net-margin	=

1. To calculate the projected annual net income, the customer count is calculated as the function of one farmer in a particular segment, decreasing in participation in the SDM based on the set churn rate
2. Per farmer segment, taking into account the volume a farmer sells to Okomu (loyalty) and to other off-takers, the sourcing volume of Okomu is calculated per farmer per year
3. Based on Okomu's sales prices (\$/Mt CPO), and difference in procurement cost (\$/Mt FFB), processing cost (\$/Mt FFB), and processing ratio between Tenera and Dura, the gross-margin is calculated per Mt FFB of Tenera and Dura sourced and multiplied with the sourcing volume (Step 2), (see [Calculation](#)).
4. Per farmer segment, taking only into account the net income the farmer earns from FFB sold to Okomu, an Agronomic Service fee is calculated which farmers pay to Okomu for participating in the SDM.
5. Overhead costs (e.g., IT, vehicles, and personnel) are distributed per farmer participating in the SDM.
6. Cost for the provision of service per farmer is calculated based on the segment-specific service uptake over time in combination with the segment's performance in Mt/FFB (see [Calculation](#)).
7. Net-margin is calculated as the sum of revenue from sold Mt CPO, earned Service fee, and overhead cost, and service-specific cost to operate the SDM.

## CLV Assumptions (2/2)

### Revenue

#### Gross margin

- Sales price Mt CPO = \$1,000 per Mt  
 = Equivalent sourcing volume FFB per Mt CPO
- Tenera = 5,000 Mt
  - Dura = 8,000 Mt

Mt FFB	x	\$/value of purchase, processing, and transport	
+		\$/value of purchase and transport	x \$ Working capital
+		\$/value of processing	x \$ Working capital

- = Gross margin Mt FFB/Tenera = 351 \$/Mt FFB  
 = Gross margin Mt FFB/Dura = 219 \$/Mt FFB

#### Nursery (per seedling)

Sales price (\$/seedling)	-/- (	Purchase price (\$/seed)	-/-
Losses (seed > seedling)	x	Purchase price (\$/seed)	-/-
\$ operations, depreciation, and other/seed )			

- = Sales = 3.1 \$/Seedling multiplied with segment specific service uptake.

#### Agronomic Service fee

Per farmer segment a %-fee taking only into account the net income the farmer earns from FFB sold to Okomu.

### Cost

#### Overhead

Annual cost distributed to number of farmer of each particular year, leading an annual \$/farmer.

#### Training cost

- Calculated based on the annual cost for training capacity distributed to number of farmer of each particular year, and individual training uptake per segment, leading an annual \$/farmer segment.

#### Demo plots, Farmer mobilization, Certification, and Financial services cost

- Calculated based on the annual cost for training capacity distributed to number of farmer of each particular year

#### Nursery (per seedling)

= Cost = 2.5 \$/Seedling multiplied with segment specific service uptake.

#### Harvest labor

Calculated based on service uptake per segment, in combination with hectares to be harvested and equivalent of harvest labor capacity to be trained.

### Customer lifetime value

#### CLV

- With revenue and cost calculated the model computes the net margin per farmer segment
- The net margin is discounted at the assumed cost of equity with the values added across years to obtain the net present values of retained net margin and the accompanied customer lifetime in years

See detailed [Calculations per Segment](#)

## CLV Detailed outcomes (1/3)

Productive farmer	1	2	3	4	5	6	7	8	9	10
<b>Count of farmer</b>										
Existing	1.00	0.95	0.90	0.86	0.81	0.77	0.74	0.70	0.66	0.63
Expanding	0	0.10	0.10	0.09	0.09	0.08	0.08	0.07	0.07	0.07
<b>Mt FFB/year</b>										
Tenera	25.56	34.91	50.46	47.94	51.40	51.49	49.57	48.92	46.40	44.60
Dura	9.76	13.33	19.27	18.30	19.56	19.46	18.49	17.96	16.80	15.96
<b>Revenue/year</b>										
Average margin	2,060	2,814	4,067	3,864	4,141	4,145	3,984	3,923	3,715	3,566
Average service fee	96	131	189	180	192	192	185	182	172	165
Nursery revenue	0	52	49	46	44	0	0	0	0	0
<b>Cost/year</b>										
Overhead	-169	-84	-52	-33	-24	-18	-17	-17	-16	-15
Services	-1,208	-550	-437	-301	-281	-228	-250	-202	-185	-232
<b>Average net-margin</b>										
Average net-margin	780	2,362	3,816	3,757	4,073	4,091	3,901	3,887	3,686	3,484
<b>DISCOUNTED net-margin</b>										
DISCOUNTED net-margin	780	2,099	3,015	2,638	2,543	2,270	1,924	1,704	1,437	1,207
<b>Customer Lifetime Value</b>										
Customer Lifetime Value	19,618									

## CLV Detailed outcomes (2/3)

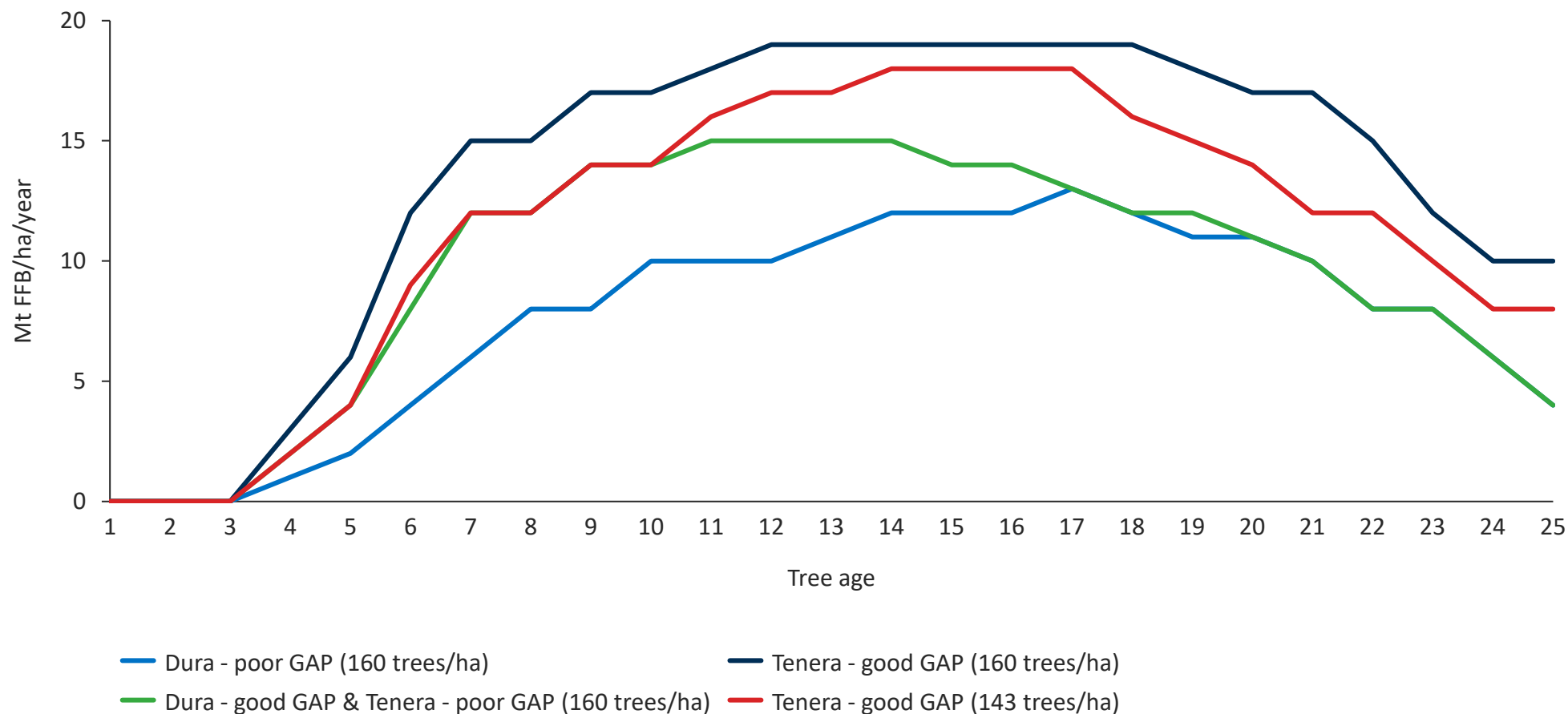
R&R farmer	1	2	3	4	5	6	7	8	9	10
<b>Count of farmer</b>										
Existing	1.00	0.95	0.90	0.86	0.81	0.77	0.74	0.70	0.66	0.63
Expanding	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Mt FFB/year</b>										
Tenera	35.38	48.32	58.95	51.30	46.31	40.91	33.74	30.63	25.15	18.86
Dura	13.51	18.45	22.51	19.59	17.68	15.62	12.88	11.70	9.60	7.20
<b>Revenue/year</b>										
Average margin	2,852	3,894	4,752	4,135	3,733	3,297	2,719	2,469	2,027	1,520
Average service fee	132	181	221	192	173	153	126	115	94	71
Nursery revenue	0	0	0	0	0	0	0	0	0	0
<b>Cost/year</b>										
Overhead	-169	-84	-52	-33	-24	-18	-17	-17	-16	-15
Services	-1,225	-505	-394	-262	-244	-227	-248	-200	-184	-231
<b>Average net-margin</b>	<b>1,591</b>	<b>3,486</b>	<b>4,526</b>	<b>4,033</b>	<b>3,639</b>	<b>3,205</b>	<b>2,580</b>	<b>2,367</b>	<b>1,922</b>	<b>1,345</b>
<b>DISCOUNTED net-margin</b>	<b>1,591</b>	<b>3,099</b>	<b>3,576</b>	<b>2,833</b>	<b>2,272</b>	<b>1,778</b>	<b>1,273</b>	<b>1,038</b>	<b>749</b>	<b>466</b>
<b>Customer Lifetime Value</b>	<b>18,674</b>									

## CLV Detailed outcomes (2/3)

Prospective farmer	1	2	3	4	5	6	7	8	9	10
<b>Count of farmer</b>										
Existing	1.00	0.95	0.90	0.86	0.81	0.77	0.74	0.70	0.66	0.63
Expanding	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Mt FFB/year</b>										
Tenera	0.00	0.00	0.00	7.33	13.93	26.46	31.43	29.85	32.14	30.54
Dura	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Revenue/year</b>										
Average margin	0	0	0	514	978	1,857	2,206	2,095	2,256	2,143
Average service fee	0	0	0	22	42	79	94	90	96	92
Nursery revenue	2,061	0	0	0	0	0	0	0	0	0
<b>Cost/year</b>										
Overhead	-169	-84	-52	-33	-24	-18	-17	-17	-16	-15
Services	-2,924	-506	-399	-267	-249	-234	-253	-205	-188	-235
<b>Average net-margin</b>	<b>-1,032</b>	<b>-590</b>	<b>-451</b>	<b>237</b>	<b>746</b>	<b>1,684</b>	<b>2,029</b>	<b>1,964</b>	<b>2,149</b>	<b>1,985</b>
<b>DISCOUNTED net-margin</b>	<b>-1,032</b>	<b>-524</b>	<b>-357</b>	<b>166</b>	<b>466</b>	<b>935</b>	<b>1,001</b>	<b>861</b>	<b>837</b>	<b>688</b>
<b>Customer Lifetime Value</b>	<b>3,041</b>									



## Yield curves for different tree types, practices and tree densities



## Differing assumptions per farmer segment

	Baseline 1		Segment 1	Baseline 2		Segment 2	Segment 3
Average farm size	10.5 ha						4 ha
Average tree age in year 1	7 years			15 years			0 years
Fertilizer use as share of optimal quantity	66.7%		100%		66.7%	100%	100%
Farm composition	Dura trees: 21% Tenera trees: 55% Other: 24%						Tenera trees: 100%
Planting density year 1	143 trees/ha						160 trees/ha
Average tree age when replanting	N/A					25 years	N/A
Replanting rate	N/A					25% of farm per year	N/A
PHL	12%		5%		12%	5%	5%
Share sold to Okomu	40%		75%		40%	75%	75%
Farm-gate price (\$/kg)	Dura: 0.065    ;    Mixed: 0.08    ;    Tenera: 0.10						
Fertilizer loan	No		Yes		No	Yes	No
Rehabilitation loan	No		Yes		No	Yes	No
(Re)planting loan	No					Yes	Yes
Agronomic service fee	N/A		3% of net income		N/A	3% of net income	3% of net income

## Assumptions for different farmer loans

	Fertilizer loan	Rehabilitation loan	(Re)planting loan
Loan purpose	Cover all fertilizer expenses	Cover additional maintenance expenses	Cover all (re)planting expense to prevent negative cash flow
Interest rate	9% per annum		
Default rate	5% per year		
Type of loan	Annually recurring	One-off	In years with negative cash flow
Grace period	5 months	7 months	5 years
Interest accrued during grace period	Yes		
Compounding interest	No		
Loan received	50% in June and 50% in July	100% in May	100% at time of (re)planting
Loan paid back	20% in January, February, March, April and May	25% in January, February, March and April	During years of positive cash flow
Repayment method	Fixed amount		Variable amount based on production level*
Share of principal per payment	94%	92%	50%
Share of interest per payment	6%	8%	50%

\*Percentage of revenues that is used for loan repayment, per year

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
0%	0%	0%	0%	0%	20%	30%	30%	30%	35%	35%	40%	40%	40%	40%	45%	45%	45%	45%	45%

## The OECD-modified scale methodology for poverty line adjustments

### Poverty line

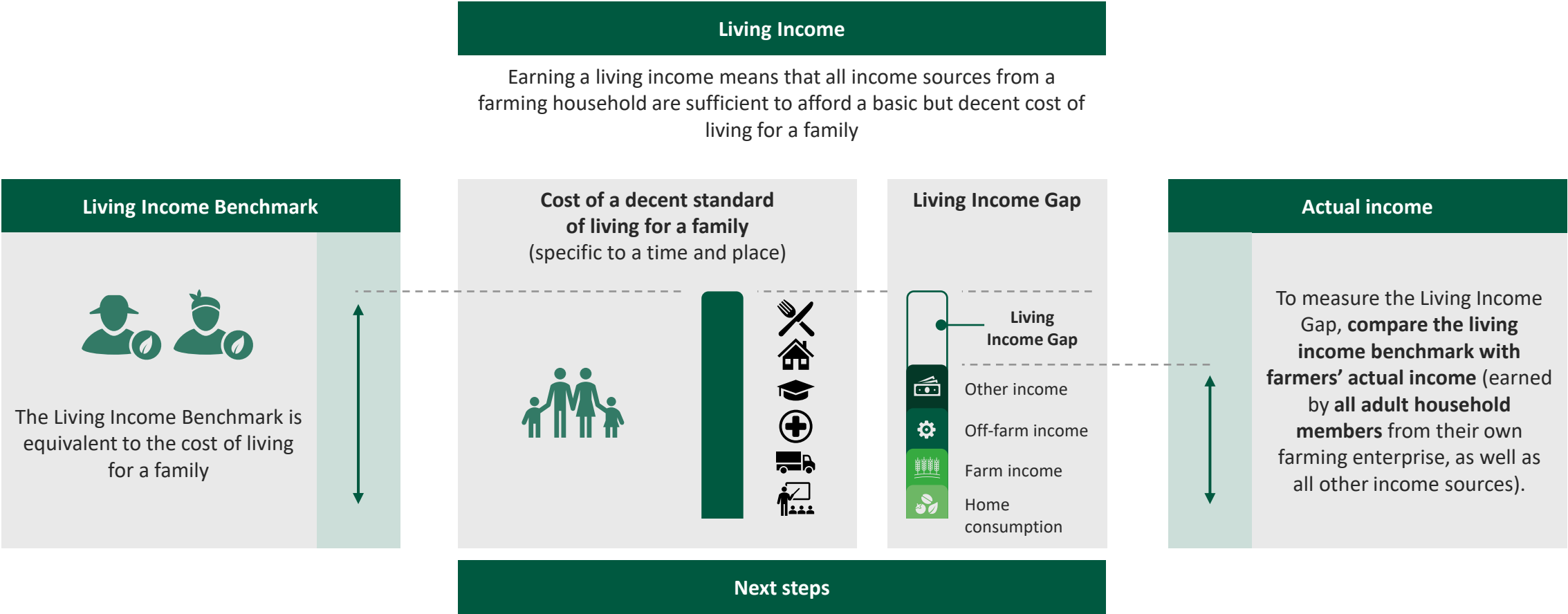
- The general poverty line is 1.90 USD/day for one adult, which is equal to 693.50 USD/year
- The PPP adjusted poverty line for Nigeria is 381.75 USD/year<sup>1</sup> for one adult
- A typical Nigerian smallholder household consists of 5 people<sup>2</sup>, including 1 male adult, 1 female adult and 3 children

### Poverty line adjustment

- Simply multiplying the poverty line with 5 would not take into account the composition of the household and would not take into account economies of scale
- For a proper representation, the poverty line was adjusted with the OECD-modified scale to better reflect reality
- This scale differentiates between the household head, other adults and other children. The scale assigns a value of 1 to the household head, 0.5 to each additional adult member and 0.3 to each child
- Using this scale, a typical Nigerian smallholder household consists of  $1 + 0.5 + 3 \times 0.3 = 2.4$  adult equivalents
- Therefore, the adjusted poverty line for a household would be  $381.75 \times 2.4 = 916.20$  USD/year

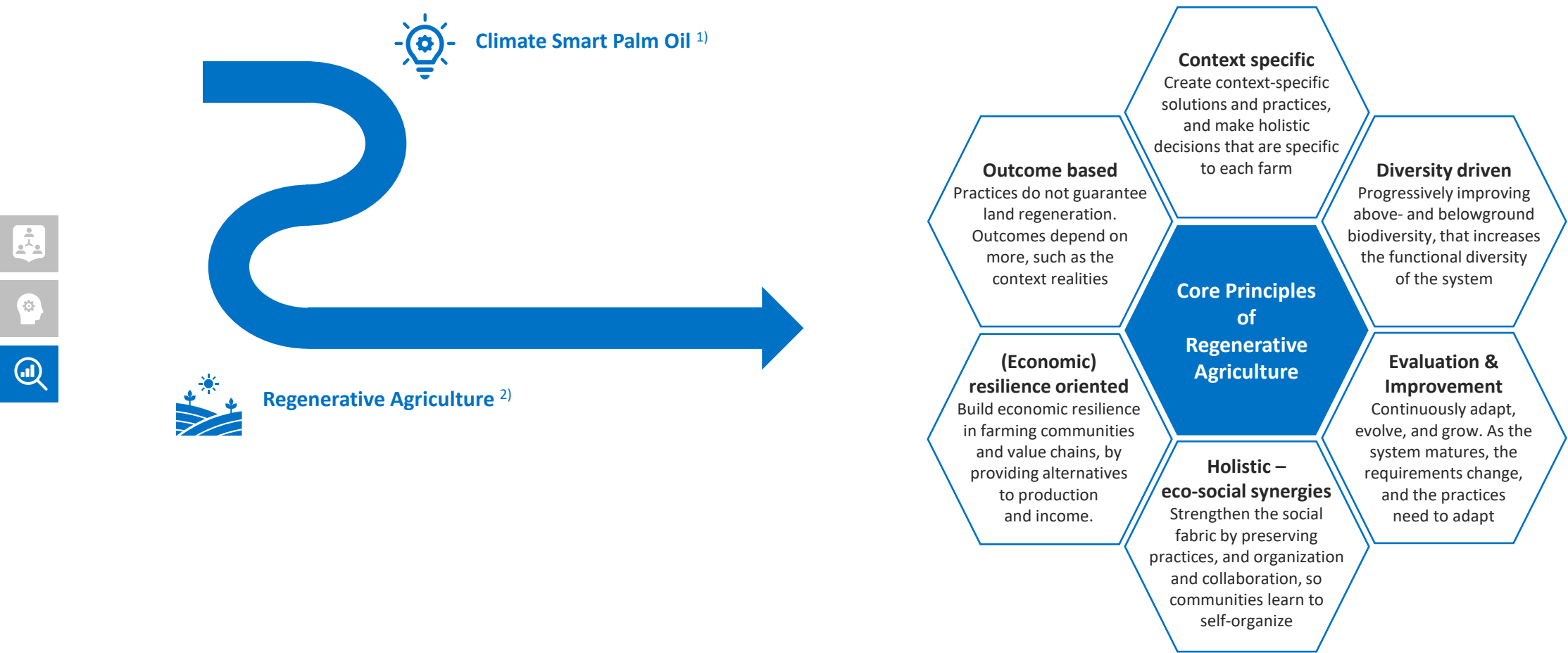
Sources: 1) [World Bank \(2019\)](#); 2) [DHS \(2018\)](#)

# Living income benchmark methodology



Once gaps are identified, you can take action through a smart-mix of solutions that include: delivering bundled services to farmers, adopting better procurement practices, collaborating with and beyond your trade partners, innovating through brand and consumer engagement, and embracing transparency

As a holistic agricultural approach that retains or if needed restores ecosystems, Regenerative Agriculture provides a theoretical and practical implementation pathway towards Climate Smart Palm Oil



Sources: 1) [CGIAR \(2019\)](#); 2) [Schreefel et al. \(2020\)](#); IDH (2020) – Deep dive: Regenerative Systems in Kenya and Uganda



## List of abbreviations

Abbreviation	Meaning
<b>CPO</b>	Crude Palm Oil
<b>DMA</b>	Digital Maturity Assessment
<b>DTA</b>	Digital Transformation Assessment
<b>EBIT</b>	Earnings Before Interest and Taxes
<b>EBITDA</b>	Earnings Before Interest, Taxes, Depreciation and Amortization
<b>EFB</b>	Empty Fruit Bunches
<b>FFA</b>	Free Fatty Acid
<b>FFB</b>	Fresh Fruit Bunches
<b>FPIC</b>	Free, Prior and Informed Consent
<b>FTE</b>	Full-time equivalent
<b>GAP</b>	Good Agricultural Practices
<b>GDP</b>	Gross Domestic Product
<b>GPS</b>	Global Positioning System
<b>Ha</b>	Hectare
<b>HCV</b>	High Conservation Value
<b>HCS</b>	High Carbon Stock
<b>IT</b>	Information Technology

Abbreviation	Meaning
<b>Km</b>	Kilometer
<b>Mt</b>	Metric ton (1,000 kg)
<b>N/a</b>	Not applicable
<b>NGO</b>	Non-governmental organization
<b>P&amp;L</b>	Profit and Loss statement
<b>PKO</b>	Palm Kernel Oil
<b>PPE</b>	Personal Protective Equipment
<b>PPI</b>	Production, Protection and Inclusion
<b>SDM</b>	Service Delivery Model
<b>SHF</b>	Smallholder farmer
<b>SPO</b>	Special Palm Oil
<b>SWOT</b>	Strengths, Weaknesses, Opportunities & Threats
<b>TA</b>	Technical Assistance
<b>Tbd</b>	To be determined
<b>ToT</b>	Training of trainers
<b>TPO</b>	Technical Palm Oil
<b>USD</b>	United States Dollar (currency)

