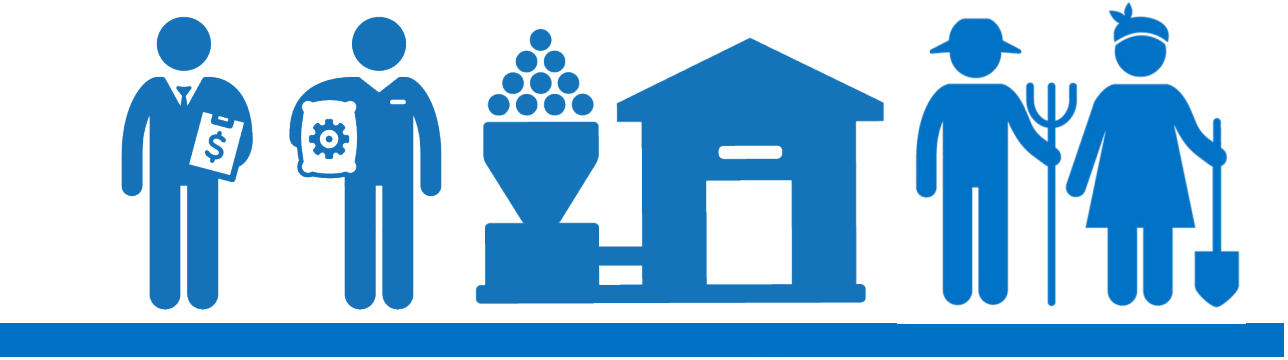
SDM: Case Report Jungle Nuts, Kenya

Service Delivery Model assessment: short version

May, 2019

Location:	Kenya
Commodity:	Macadamia nuts
Services:	Farmer training, extension services, planting materials, financial services, overhead/enabling services, community services



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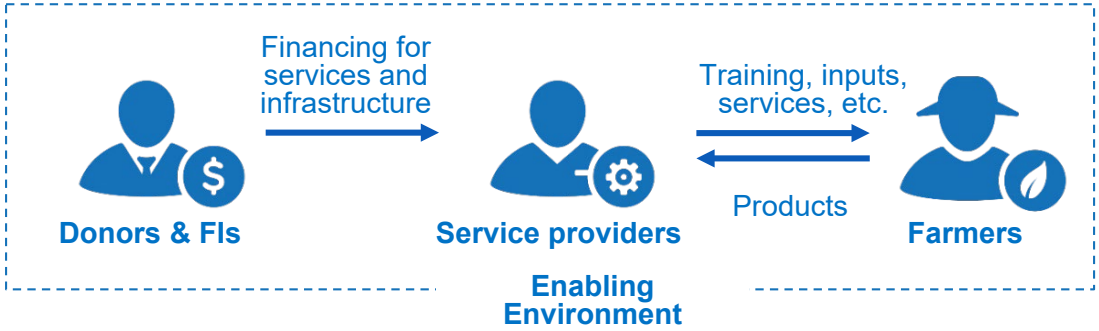
What are SDMs and why are we interested in analyzing them?

Service Delivery Models (SDMs) are supply chain structures, which provide services such as training, access to inputs and finance to farmers, to improve their performance, and ultimately their profitability and livelihoods.



By analyzing SDMs, we aim to support **efficient, cost-effective and economically sustainable SDMs at scale** through:

- Key drivers for success of SDMs benchmarking
- Innovation opportunities to support
- Cross-sector learning, learning community
- Convening at sector and national level

Analyzing SDMs brings a range of benefits

Farmers and farmer organizations

- **Better services** improve productivity, product quality, quality of life and social and environmental outcomes
- **Better outcomes**: improved productivity, income and resilience

SDM operator

- **Understand** your model's business case
- Gain insights to **improve** service delivery
- Develop **cost-effective** SDMs based on insights
- Identify opportunities for **innovation** and **access to finance**
- **Learn** from other public and private SDM operators operating across sectors/geographies
- **Communicate** stories of impact and success at farmer level

Investors/FIs

- **Common language** to make better informed investment decisions
- Insights to achieve optimal **impact, efficiency and sustainability** with investments and partnerships in SDMs

The Jungle Nuts SDM and objectives

General SDM information:

Location:	Kenya
Timing in analysis scope:	2017-2022
Scale (start of analysis):	1,800 farmers
Scale (end of analysis):	69,167 farmers
Funding:	Jungle Nuts
SDM Archetype*:	Global sourcing

- Founded in 2004, Jungle Nuts Ltd is a Kenyan nut processing company; it is one of 4 affiliates under Jungle Holdings, alongside Jungle Energy, Jungle Housing and Jungle Foundation
- Jungle Nuts procures both organic certified and conventionally farmed nuts. Jungle Nuts sources from 7 different regions in Kenya. These regions are Nyeri county, Kirinyaga County, Embu County, Muranga and Kiambu County, Tharaka Nithi County, Machakos county and Taita Taveta
- Jungle Nuts sources nuts from 33,000 smallholder farmers and produces four nut-based products: macadamia nuts and oil, cashew nuts and butter, and bio-briquettes

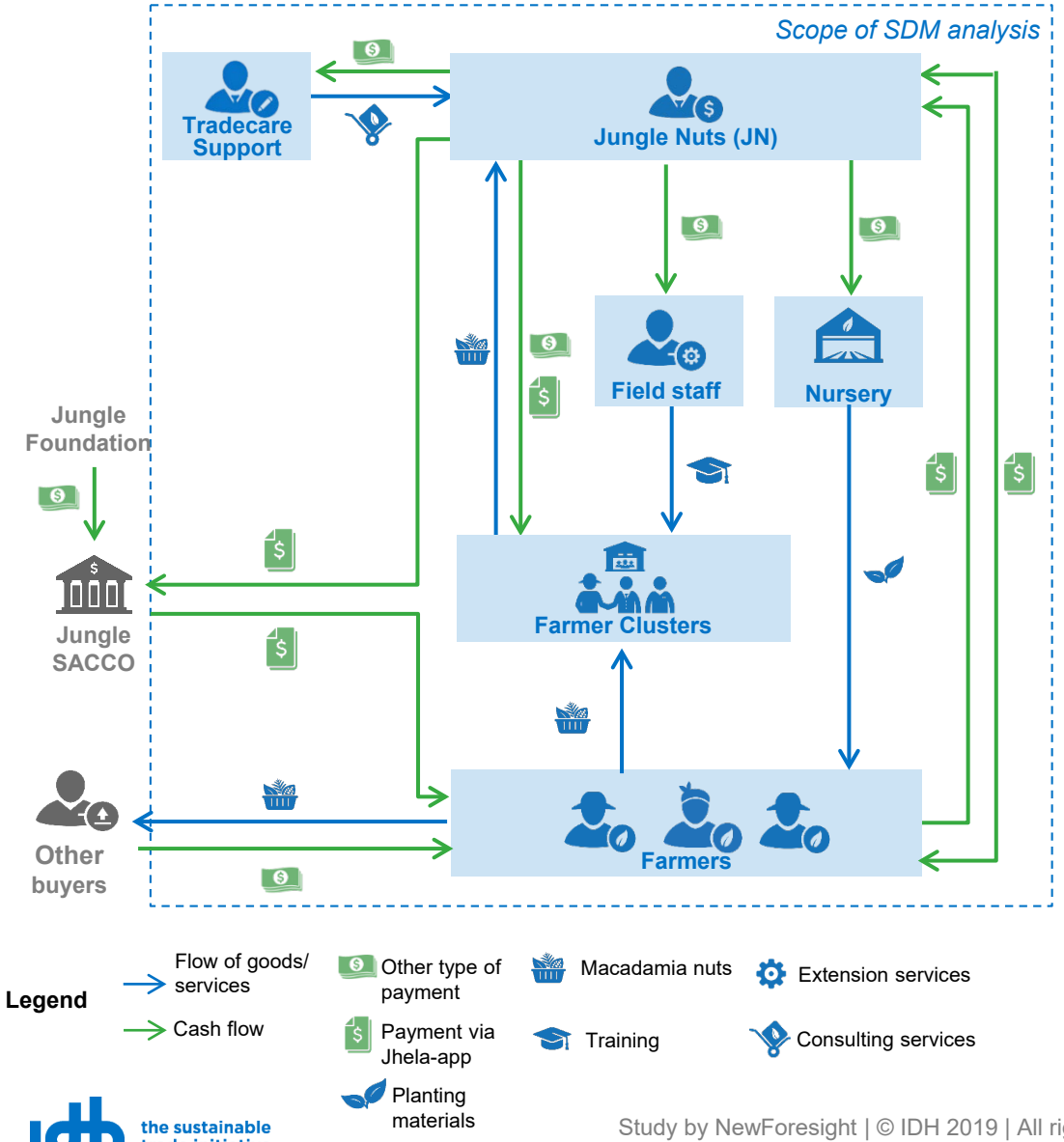
SDM objectives:

1. Grow the professional macadamia sector in Kenya to secure supply and improve farmer livelihoods
2. Increase productivity and quality of the macadamia nuts by enabling access to high quality planting material
3. Improve farmers access to interest-free finance, improve farmer and cluster savings and provide a secure and efficient payment
4. Empower farmers and their communities by enabling self organizing clusters

SDM rationale:

* For more info on SDM archetypes, see the IDH Smallholder Engagement Report

SDM and structure and enabling environment



- JN supplies services and electronic payments to farmers that are organized in farmer clusters.
- **Farmer clusters** do not operate as a farmer cooperative, but are also a formal way to organize smallholders within a region, and align a group of farmers, using the community to support and share savings.
- Clusters are used to organize both extension services and sourcing services within the communities.
- JN also directly interacts with farmers when sourcing product, receiving nut-in-shell macadamia nuts, and paying farmers via the J-Hela application.

Enabling environment

1. Pricing & Competitiveness

Prices have been steadily rising for Macadamia. As coffee prices are volatile, macadamia is offering a high valuable alternative income stream.

2. Trading system

The industry trading system is extremely competitive, which can provide sector growth, but the buying system constrains it because the value proposition isn't made clear to farmers.

3. Inputs & Financing

Input usage and access has been growing in rural Kenya. Access to Finance, however, is limited, with only 3% of the total financial portfolio of the country dedicated to agri-food.

Services delivered and farmer segmentation

Farmer training

- Farmers who have joined a cluster are provided basic training (on GAP, buying processes, and other) [1]
- Once farmers have progressed they receive further trainings and other services (such as organic practices, health and safety and others) [1]
- In the future, farmers will also receive trainings to diversify their operations to bee keeping and other options[1]

Extension services

- Jungle Nuts has extension officers on the ground that are part of the cluster system
- Each cluster has a Cluster Head, who is an extension officer from Jungle Nuts. For every 7 cluster heads, there is a Cluster Manager that coordinates operations
- As part of extension services, farmers are trained on organic practices and are provided the audits and services affiliated[1]

Planting materials

- Farmers have access to planting material form improved varieties produced via uproot grafting, which accelerates the productivity peak of the tree
- In addition to the planting material, farmers have access to compost preparation information and organic pesticides, fungicides and fertilizers[1] at cost

Financial services

- Farmers are provided a mobile application to receive electronic payments, savings and loans, with 0 % interest rate and a minimal transaction cost of 6%[2]
- J-Hela also serves as a platform to place requests on loans and planting material, and it is linked to J-Shamba (ICS system)
- Farmers can receive financing and cash advances to support them between harvests[2]

Overheads/enabling services

- Jungle Nuts has set up a customer care center to enable the correct functioning of the SDM
- Monitoring is done by field staff and through the J-Shamba system[1]

Community services

- Jungle Nuts provides support to communities through programs and infrastructure, including:
  - Jungle Nuts Foundation (education)
  - Jungle Nuts street lighting programs
  - Kiandutu water project
  - Jungle Nuts football club

Farmers are segmented in this SDM:

Segments are distinct groups of SDM beneficiaries that differ on farm characteristics and/or services received.

Conventional small farmer

- Productivity: 608kg
- Land size: 0.4ha
- Services: Planting material, individual finance services

Conventional medium farmer

- Productivity: 1419kg
- Land size: 1.3ha
- Services: Planting material, individual finance services

Organic small farmer

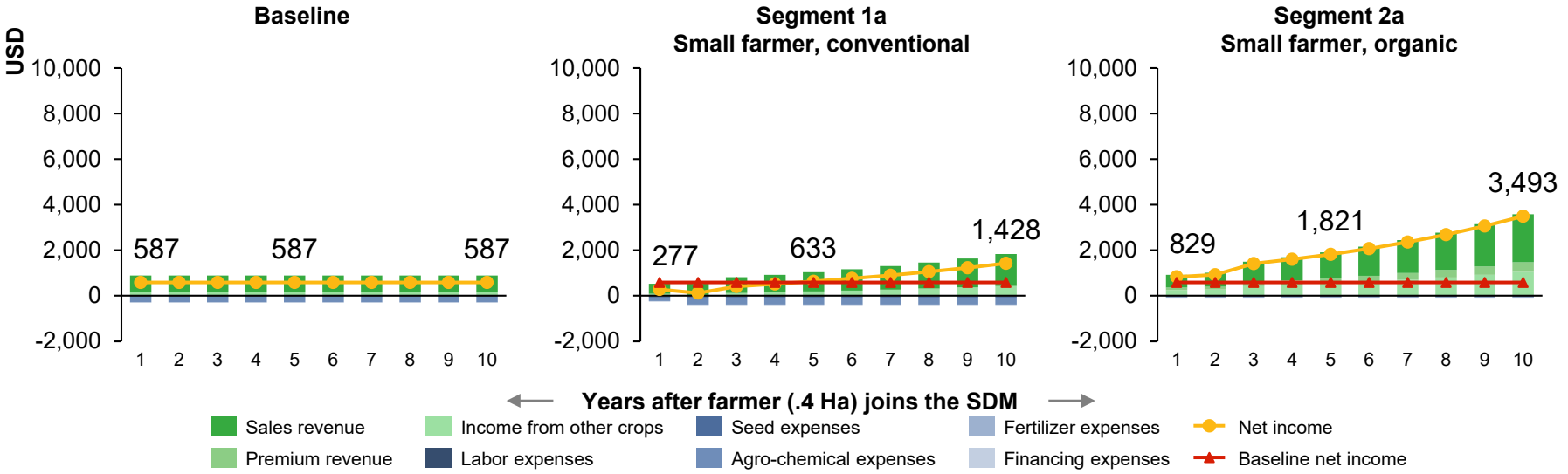
- Productivity: 845kg
- Land size: 0.4ha
- Services: Fertilizer, finance, planting material and labor

Organic medium farmer

- Productivity: 1969kg
- Land size: 1.3ha
- Services: Fertilizer, finance, planting material and labor

Sources:1) Tradecare Africa (N.a.). Macadamia Buying Strategy 2) Jungle Nuts (2019). Client Interview

Farm P&Ls: overall impact on small farmers



Economic sustainability at farm level

The baseline farmers in this situation are well below the median income for the region; however, they start off better than a small conventional farmer due to initial investment in planting materials and crop protection. Over time, the conventional farmers improve their yields and end up nearly matching the countries median income of 1,870 USD, with yields expected to continue to grow.

The organic farmers initially start off above both the baseline and conventional small farmers, yet are well below the median household income. But, after an initial dip in year two, when the farmer invests in seedlings and planting materials, they begin to see a rapid return and by year five, matching the household median income. By investing in seedlings and organic practices early, the farmers seen long-term returns and receive a premium for their product that supplements their income.

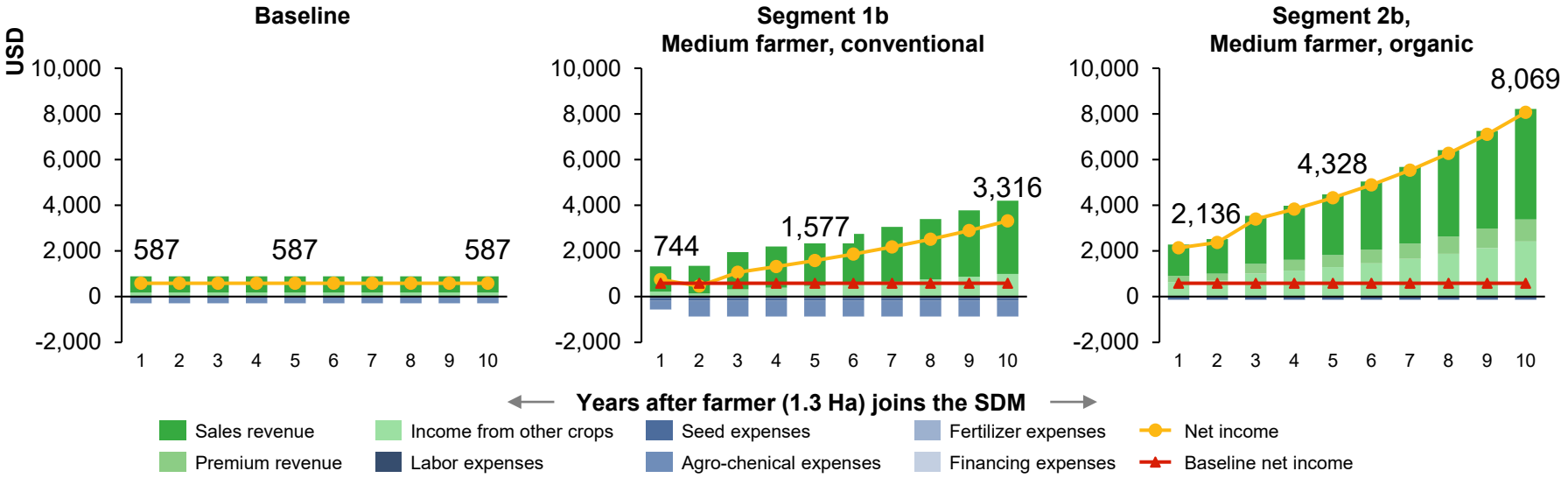
Main cost drivers

- **Labor:** Though most costs are low, labor represents a fairly significant share of a farmers expenditures. The majority of labor is used in the processing and preparation of the farm, with some labor hired to de-husk the nuts. There is a small component of hired labor for harvesting, but this is minimal in the scope of total cost. Even smallholders hire casual labor, to harvest efficiently and avoid theft.
- **Agro-chemicals:** Agro-chemical expenses (pesticides and foliar) represent, by a significant amount, the largest cost for conventional farmers. Organic farmers do not use these components the expenditure does not exist, instead using smoking techniques to get rid of pests and organic components in fertilizer.

Main revenue drivers

- **Production:** Production is the main driver of most farmers, yet given the long period between planting a seedling and seeing returns, it can be hard to convince farmers to invest in additional seedlings. However, when looking at the medium and long term, the growth from initial investment is exponential, with the highest yields beyond the scope of this analysis.
- **Organic Premium:** Farmers that chose to use organic practices receive one-sixth of their income from this segment. Moreover, since one of their largest costs are school fees (which come in January, May and September) there is the added benefit that the organic premium from the previous year is paid in January and they have the advantage that they can use cash advances to help in times of need.

Farm P&Ls: overall impact on medium farmers



Economic sustainability at farm level

The baseline farmers in this situation are well below the median income for the region. Medium conventional farmers start well below the median household income, yet as they invest in planting material and in improved practices, they are able to nearly double the median earnings within ten years. Their productivity and economic situation would continue to improve beyond the ten year period.

The medium scale organic farmers are the best off, starting above the median household income, which they nearly quadruple within ten years. This is because these farmers invest significantly in expanding the size of their macadamia tree count, nearly doubling it. Moreover, by attending training and increasing spending on inputs like fertilizer, they are able to grow their yields. This is compounded by their joining of the Jungle Nuts clusters, where they get free access to a de-husker, which allows for saving on labor.

Main cost drivers

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- **Agro-chemicals:** Agro-chemical expenses (pesticides and foliar) represent, by a significant amount, the largest cost for conventional farmers. However, since organic farmers do not use these components the expenditure does not exist, instead using smoking techniques to get rid of pests and organic components in fertilizer.

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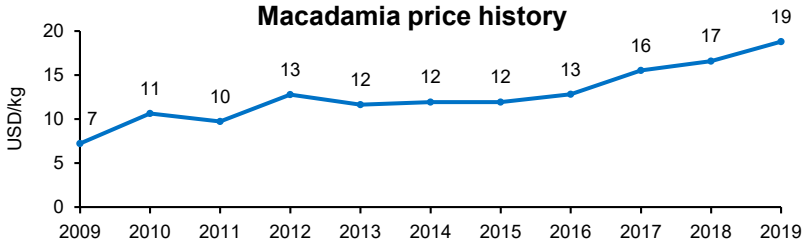
Productivity, number of trees and farmgate price



Sensitivity assuming productivity 38 kg/tree

Number of trees \ Farmgate price	1.2	1.4	1.6	1.8	2	2.2
10	454	529	605	681	756	832
15	682	795	909	1,023	1,136	1,250
20	910	1,061	1,213	1,365	1,516	1,668
25	1,138	1,327	1,517	1,707	1,896	2,086
30	1,366	1,593	1,821	2,049	2,276	2,504
35	1,594	1,859	2,125	2,391	2,656	2,922
40	1,822	2,125	2,429	2,733	3,036	3,340
45	2,050	2,391	2,733	3,075	3,416	3,758
50	2,278	2,657	3,037	3,417	3,796	4,176
55	2,506	2,923	3,341	3,759	4,176	4,594
60	2,734	3,189	3,645	4,101	4,556	5,012

Sensitivity assuming 15 trees per farmer

Productivity (kg/tree) \ Farmgate price	1.2	1.4	1.6	1.8	2	2.2
15	241	286	331	376	421	466
20	331	391	451	511	571	631
25	421	496	571	646	721	796
30	511	601	691	781	871	961
35	601	706	811	916	1,021	1,126
40	691	811	931	1,051	1,171	1,291
45	781	916	1,051	1,186	1,321	1,456
50	871	1,021	1,171	1,321	1,471	1,621
55	961	1,126	1,291	1,456	1,621	1,786
60	1,051	1,231	1,411	1,591	1,771	1,951
65	1,141	1,336	1,531	1,726	1,921	2,116

Current projection

Volatility of macadamia prices

Global macadamia prices have been steadily rising, with demand constantly outstripping supply. This has pushed macadamia prices up and led to a focus by Australia, South Africa and Kenya on expanding their macadamia operations and improving yields. Current average yields of nut-in-shell in the 3 major producing regions, Australia (50.3 Kg/tree), South Africa (35 kg/tree) and Kenya (25-28 Kg/tree), are all being prioritized as price remains high.[2,3,4]

The United States and Europe have been the main markets, but a recent growth in demand from Asia, specifically China, has put further upward pressure on prices. There is an inherent risk that high prices will eventually drive an oversupply of production as yields improve and land use for macadamia increases, but that is not currently an issue.

Sensitivity of farmer income

Farmer income relies heavily on two main factors, price and the number of trees.

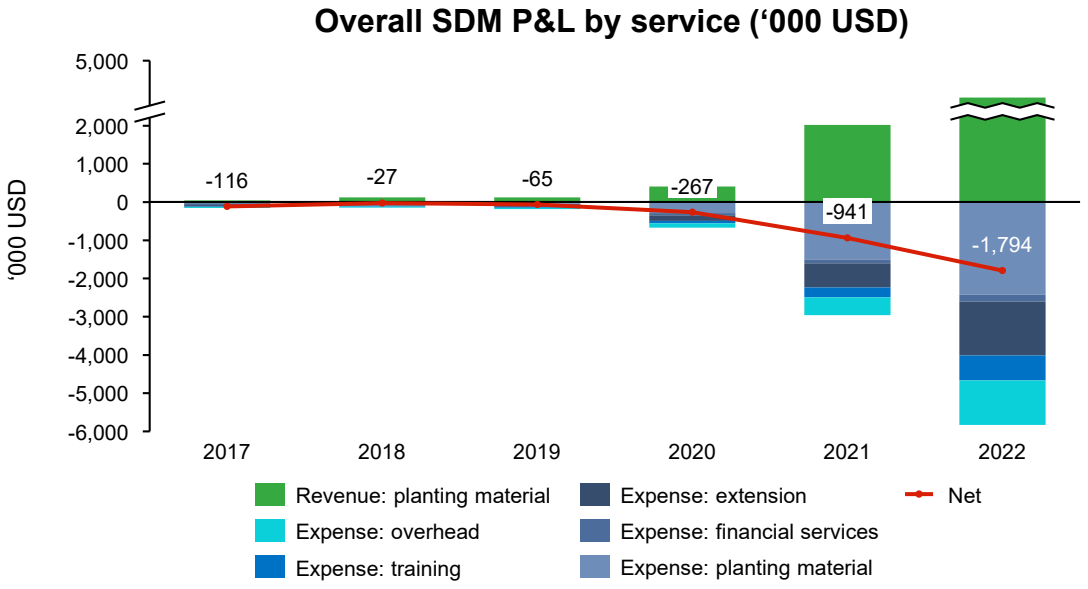
- Holding productivity as a constant with 38 kg/tree and with the current farmgate price of 180 KSH/kg or 1.8 USD/kg, farmers with 15 trees are set to make 1,023 USD/year however, for farmers to earn above 3,000 USD/year from macadamia they need own at least 45 trees, which might not always be possible due to the farm size.
- Similarly, if we hold the number of trees as a constant of 15 trees per farmer, it can be seen that even if farmers reach maximum productivity and get above 2 USD/kg, they are not able to get more than 2,000 USD from the macadamia income.

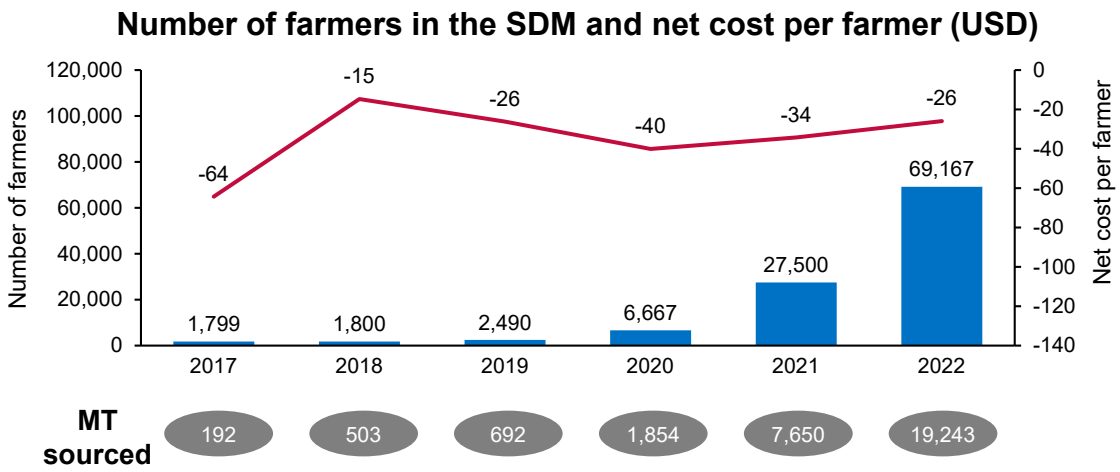
Given that the price for macadamia has been increasing lately, and that it is uncertain how long this will last, it is recommended that farmers not only work towards increasing their productivity, but also acquiring more trees to at least own 30 trees.

Assumptions:

Sources: 1) USDA (2019). Macadamia Nuts Unit Value 2) Queensland Government (2018). Macadamia industry benchmark report 3) SAMAC. (2019). FAQ 4) Muthoka et al. (2008). Macadamia Nut Production and Research in Kenya

SDM P&L, scale and sustainability





*This calculation excludes sourcing costs (cluster management and committee fees), currently assumed at 13 KSH/kg

Economic sustainability of the program

The model operates at a loss, but once the sourcing revenues are included, that is no longer the case.

Extension services account for a large part of the expenses, which include the costs for monitoring and coordination on the ground. Part of the extension services – such as the farmer outreach - is done by cluster personnel, however that is quantified as a sourcing cost and is paid as a fee-per-kilo-sourced, however, this is not including in this overview. The other major cost is the planting material, however that is proportional to the sales.

Revenue drivers

- Planting material is the only service that is provided commercially to farmers, and therefore the only revenue streams. Given that the current market price allows for a healthy profit, this income covers part of the services that do not recover their costs.

Cost drivers

- Planting material is also the major cost driver, however this is due to the fact that the cost of establishment of nurseries is high and current projections include the set-up of a nursery that will produce one million seedlings per year.
- Extension services is the other high cost driver, as this is tied to the number of farmers reached; as the number of farmers grows, as does the cost.
- Overhead and training represent significant costs.

In general and as more farmers are reached, the price per farmer drop as a major part of costs in these initial years is due to the set up costs of the nursery.

SDM outcomes and main learning questions

These are not an official assessment of SDM success or failure by IDH or NewForesight, but an indication based only on the analysis done in this forward-looking study, and on assumptions provided by the case owner(s). Actual assessment of success of the SDM should be conducted during and after the SDM is conducted using measured results

SDM objectives	Projected outcomes
1 **Grow the professional macadamia sector in Kenya to secure supply and improve farmer livelihoods**	• Greater adoption of GAP among farmers, who will enjoy greater financial security, improved livelihoods and a stronger role in the value chain. • Jungle Nuts will secure future supply while raising their volume and quality, while also increasing their market for seedling sales.
2 **Increase productivity and quality of the macadamia nuts by enabling access to high quality planting material**	• Higher farmer income through improved production and quality premiums, as well as additional cluster savings. • Greater supply and higher quality for Jungle Nuts, as well as financial security via diversified revenue and access to new farmers and markets.
3 **Improve farmers access to interest-free finance, improve farmer and cluster savings and provide a secure and efficient payment**	• Farmers improve income security, savings, and crop planning, making them more loyal to Jungle Nuts and enabling them to invest in their own farms. • The payment scheme will be more efficient, secure, and give more clear insights into performance and quality of farmers.
4 **Empower farmers and their communities by enabling self organizing clusters**	• Clusters enable group saving to purchase communal goods, as well as improve knowledge distribution and community cooperation towards interventions. • Lower logistics costs and higher loyalty.

Learning question	SDM insights
What is the best strategy to provide access to planting material to all farmers (centralized vs decentralized)?	The centralized system allows producing seedlings efficiently, ensures that propagation methods are done properly and guarantees correct operations. However, distribution can impact the survival of the seedlings.
Are the extension services offered to farmers done in the most efficient way?	The extension services of Jungle Nuts also includes its sourcing functions. These can be more efficient if a cluster (unit of aggregation) is larger (above 100 farmers) or if Jungle Nuts focuses on increasing the productivity of farmers with more potential.
Are organic farmers better off than conventional farmers, in the short and long term?	The impact of organic farmers is more significant than the impact on conventional, even if yields are similar. As organic farmers do not need as many inputs as conventional, they have a lower costs.

Key insights

Key drivers of success

- The clusters allow farmers to become professional by organizing themselves and it allows Jungle Nuts to work directly with farmers efficiently.
- Innovative solutions such as J-Shamba and J-Hela are key to the SDM. Farmers are able to have up-to-date information and can capture greater value with the removal of a middleman.
- The incentive system that reward farmers for organic production and loyalty, and maximizes the producers' income.
- Investing in "enabling services" contribute to building trust.

Key factors in replication

- The cluster model has the advantage of functioning as a legal entity and avoids all the complications that cooperatives could present over time.
- The J-Hela and the call center make the actual model strong and successful in reaching out to farmers.
- The emphasis on savings at both levels, individual and collective, and the work in educating farmers to leverage on the savings to improve their resilience is a cornerstone of farmer empowerment.
- Integration of functionalities in mobile applications allow maximal transparency a traceability of the products.

Key risks

- Price volatility is one of the major risks. This is exacerbated by the low risk aversion of the farmers. Jungle Nuts is investing in processing capacity to create value-add options, making farmers more resilient to price fluctuations.
- Climate change and water scarcity might cause a drop of 60% in production.
- Increased competition of buyers. If the ban to export raw nuts is lifted, Chinese buyers might out-compete local traders.

Opportunities for improvement

- Farmer loyalty is one of the things that has proven difficult to change. Focusing on increasing loyalty may reduce the costs of the overall SDM.
- Extension services can be optimized as the model is scaled up. Focusing on *quality* and *productivity* will reduce the cost of extension services per farmer.
- The current set up for the financial services is not fully prepared for the exposure as it scales up. As the model reaches scale, a facility fund will be needed to avoid the exposure to risks.
- It is possible to increase impact by providing other products that increase loyalty and make an impact on the farmer livelihoods e.g. crop insurance, funeral insurance, smartphones.

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For more information and insights on SDM's, see the IDH Smallholder Engagement Report