the sustainable trade initiative

Service Delivery Model Analysis

Kenyacof, Kenya

Case report

October 2022

Swiss Confederation
Federal Departement of Economic Affairs, Education and Research EAER
State Secretariat for Economic Affairs SECO

Ministry of Foreign Affairs

DANIDA

IKEA Foundation

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Introduction of IDH and the SDM analysis

Smallholder Livelihoods

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

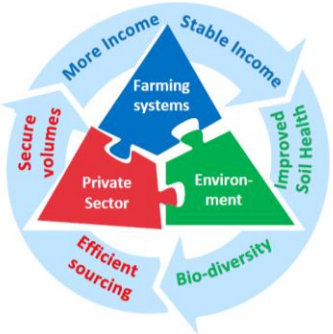
Service Delivery Models

Service Delivery Models (SDMs) are supply chain structures which 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. Using IDH's data-driven SDM methodology, IDH analyzes these models to create a solid understanding of the relation between impact on the farmer and impact on the service provider's business.

Insights and Innovations

Our data and insights enable businesses to formulate new strategies for operating and funding service delivery, making the model more sustainable, less dependent on external funding and more commercially viable. By further prototyping efficiency improvements in service delivery and gathering aggregate insights across sectors and geographies, IDH aims to inform the agricultural sector and catalyze innovations and investment in service delivery that positively impact people, planet, and profit.

Introduction of Coffee Farmer Income Resilience Program



Coffee Farmer Income Resilience Programme (CFIRP)

Period: 2020 -2024
Countries: Uganda, Kenya
Overall objective: Improved livelihood of 20,000 coffee farming families in Kenya and Uganda
Main intervention areas:

A. *Farming systems:* Coffee farmers have diversified farming systems with coffee cultivation integrated with other farming activities. To achieve a higher and more resilient farm income, coffee production and marketing will be embedded in an integrated farming systems approach.
B. *Environment:* Improved soil health and biodiversity are preconditions for regenerative agriculture systems leading to more resilient output levels.
C. *Private sector:* Co-investment by the agri-business sector for the set up, capacity building and testing of blended service delivery for farmers and creating conditions for efficient sourcing and securing supplies of coffee and other farm produce.

Outcomes of the programme

1. Operationally and economically viable business cases for new tailor-made blended service delivery models are developed.
2. 20,000 coffee farming families have access to blended services in line with their needs and potentials.
3. Joint learning and efficient cooperation between different service providers (input supplies, extension, financial services, produce marketing, etc.).

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

1. Executive summary

This section:

- *States the current situation and the purpose of the analysis*
- *Lays out the main findings, recommendations and potential next steps*

The strategy and SDM

STRATEGY

Objectives: Kenaycof is a coffee export dealer in Kenya. Kenyacof's sister concern Sucastainability Kenya Limited (henceforth referred as Sucastainability) operates as a marketing agent in the Kenya coffee value chain for +60,000 smallholder farmers. Due to the high competitiveness of the sector, Sucastainability's main objective is to retain their market share in terms of marketed volumes.

Quality and volumes: Sucastainability aims to secure stable volumes of coffee from their farmers, while simultaneously focus on producing high-quality coffee as to tap into specialty markets and/or fetch higher prices

Milling: Aside from operating as a marketing agent, Sucastainability sister concern Kahawa Bora Millers operates a dry mill and warehouse facility to provide milling services to FCS and farmers in coffee value chain

Sales channels: Sucastainability markets their sourced coffee green beans in direct sales in auction sales. Sucastainability deals in both certified and uncertified produce, of which uncertified green beans represent the largest share

SERVICE DELIVERY MODEL

Farmer Engagement:
Sucastainability collaborates with smallholders through FCS (Famer cooperative Societies) for providing services. Kenyas' coffee regulations requires all smallholder coffee farmers to a member of FCS and access markets through FCS and licensed marketing agents

Service package:
Sucastainability provides a wide range of services to FCS (and thereby to the farmers) of coffee marketing, dry milling, green bean storage, GAP training, certification, inputs, finance and supporting crop diversification

Segmentation:
Sucastainability's engagement and range of services is based on FCS (and farmers) performance in terms of production levels (low, medium and high production FCS) and on FCS loyalty in terms of consecutive years of contract renewal with Sucastainability.

The Business case and Impact case

BUSINESS CASE

60,000	xxxx	$xxxx
# total farmers	VOLUME (MT green bean)	EBT
66,000	64	
# farmers in the SDM	# FCS	USD – market value of total coffee produced

- Sucastainability is projected to maintain its volumes of marketed green beans due to the investment in farmer yields and loyalty, which allows them to secure target annual volume green beans in 2025. Improving the governance and efficiency of FCS by capacity building and service offering, Sucastainability can help improve FCS coffee production volumes and loyalty to Sucastainability.
- Investing in a regenerative agriculture practices for 5,000 farmers to start with allows Sucastainability to award most loyal FCS, generate farm-level impact while simultaneously creating additional profit from commissions for their business in the macadamia, avocado and dairy value chains.

IMPACT CASE

		YEARLY INCOME (Y-1 and Y-5)		INCOME INCREASE
COFFEE	SEGMENT -1	$ 299	$ 492	64%
	SEGMENT -2	$ 396	$ 636	61%
DIVERSE CROPS	SEGMENT -1	$ 104*	$ 585	463%
	SEGMENT -2	$ 133*	$ 627	371%

: Year-1 income excludes investments required for adding cows, planting avocado and macadamia saplings

- All farmer segments can increase their income from coffee by an increase in productivity due to correct input use and input quantities, access to finance and training.
- Supporting farmers to start or scale up diverse crops of macadamia, avocado and dairy farming will start new profitable income streams and improve their resiliency to income shocks from primary crop of coffee(through climate change or price volatility).
- Both segment-1 and segment-2 farmers see their income from diverse crops increase substantially in 3-5 years of taking up crop diversification

Insights and recommendations (1/2)

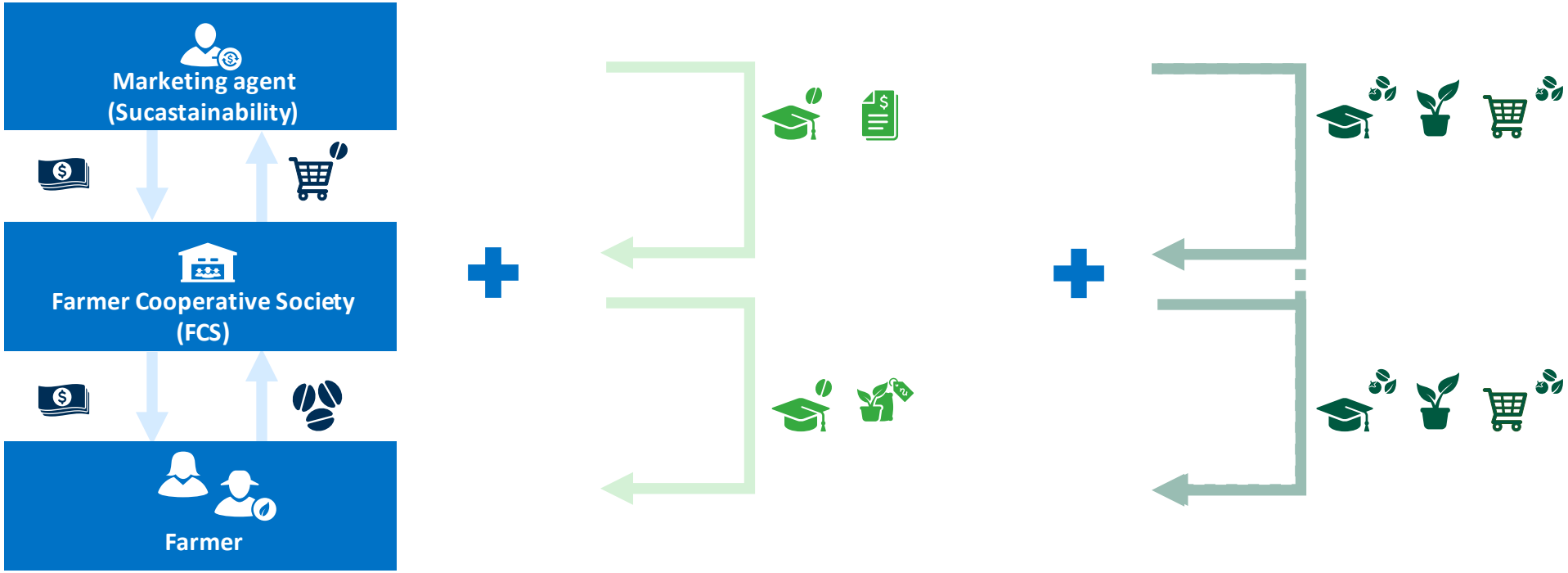
ACTOR	INSIGHTS	RECOMMENDATION
Sucastainability	• Currently, Sucastainability smallholder service delivery model operates at small losses due to a small and fixed coffee marketing commissions coupled with high cost of FCS/farmer services including of supporting demo plots and promoter farmer trainings, prefinancing inputs, milling and marketing operations and fixed overhead expenses. • While there is limited scope for Sucastainability to increase the commission margins or reduce cost of services, Sucastainability can make its smallholder service delivery model more **efficient and financially sustainable by increasing the yield/acre and quality of coffee** grown by the farmers in their SDM	• To address the languishing coffee yield, Sucastainability should develop **a long-term soil health restoration plan** and implement the same across their FCS and farmer network. The implementation of such plans requires offering of new services such as soil testing, tailored input application, suggesting carefully selected diverse crop options, all of which require **forging new partnerships** and bringing in various stakeholders in the service delivery ecosystem • By investing in additional value chains as part of crop diversification plan, Sucastainability could capture additional value which reduce the cost to serve farmers, make FCS/farmers income resilient to coffee yield or price shocks
	• While Sucastainability may not required to incur significant direct service costs in adaptation of regen agri practices by farmers, **Sucastainability will have to work closely with FCS/farmers in developing regen agri roadmap, providing associated services** and support for farmers in adopting soil restoration and crop diversification plans.	• Sucastainability should continue its focussed strategy of **developing market (including speciality coffee) for coffee grown** by their farmers and not take direct market/price exposure to other commodities such as macadamia, avocado or dairy. • At the same time, Sucastainability can facilitate market access to diverse crop with other value chain actors taking lead and Sucastainability getting a small marketing commission on diverse crops without direct involvement or exposure to the same.

Insights and recommendations (2/2)

ACTOR	INSIGHTS	RECOMMENDATION
FARMER	• Access to GAP training, soil testing, inputs, finance and markets has a clear positive impact over time on all farmers in total coffee income. Increase in coffee yield and better quality will greatly out weigh higher input and labor costs incurred by farmers.	• All SDM coffee farmers have large potential to increase their coffee yield by **consistent implementation of GAP practices and adopting regenerative agriculture practices** with due emphasis towards soil health rejuvenation and building upon farms climate change resilience.
	• Implementing regenerative agriculture practices and cultivating macadamia, avocado and dairy farming **increases both coffee and other farm income** significantly and outweigh the additional expenses from year 2.	• Sucastainability should **support farmers to invest in a carefully chosen crop portfolio** that meet the agronomic, economic and market suitability. In the initial 1 or 2 years, Sucastainability could further support farmers by extending loans/advances specifically for regenerative agricultural purposes to enable loyal and high-producing farmers to invest in their own professional diverse farm
FCS	• FCS are susceptible to volatile coffee prices, coffee crop losses that saddle them with bad debt both from under recovery of coffee from farmers and losses arising from fixed FCS operations. Sucastainability invests significant resources to improve the efficiency of FCSs to cover all costs with less than 20% margin on green bean value and further **improve the FCS pass through rate to farmers**	• Sucastainability should continue to **engage FCS management towards improving their governance, efficiency and transparency by tracking FCS performances closely**, capacity building and rewarding top performing FCSs. Providing services for coffee yield/quality improvement, enabling FCS to handle and facilitate market access for diverse crop will lead to better FCS asset utilization and additional pool of income to FCS

Each coffee smallholder farmer needs to be member of an FCS and Marketing agents need to source coffee through FCS. This fixed interdependent relationship between farmer, FCS and marketing agents in the Kenyan coffee value chain defines the possibilities and limitations of service delivery to farmers.

Business-As-Usual	SDM+	Blended services	Holistic service delivery
Basic coffee aggregation, milling and marketing model	Includes additional coffee services as training, coffee prefinancing and inputs (on credit)	Includes additional other crop related services as training, seedlings and market access	



2. About the SDM

Understanding the SDM's strategy, business model and financial performance

This section:

- *Describes the current strategy of* ***Sucastainability***
- *Details proposed improvements as included in the main recommendations*
- *Assessing the SDM's financial performance and opportunities for improvement*

Sucastainability invests in providing blended services to support smallholders in strengthening their income resilience by improving coffee yields and in transition towards regenerative agricultural practices

Overhead (management, HR, legal, utilities, etc.)

Sourcing

Sourcing and Milling

- Farmers bring their cherry to the FCS, who after wet processing, bring the coffee to the dry mill.
- Sucastainability sister concern Kahawa Bora Millers operates dry mills for processing dry parchment to green coffee beans.
- Cup quality checks are performed at the wet mill and dry mill. Checks are made on Robusta content and defects.

Marketing & Storage

- Although farmers retain ownership of their coffee until it is sold at auction or to direct buyers, Sucastainability operates as a marketing agent, who is contracted by the farmers to sell the coffee.
- Sucastainability owns a warehouse which FCS can rent for storage before export of their sold coffee.

Supporting activities

Digitization

- Sucastainability uses an internal platform of parent company (Sucafina) for IT solutions including ERP, collecting of farmer data and other digital solutions

Farm services

Training & organization

- Sucastainability provides training to Promoter Farmers, who in turn train farmers on demoplots. The training is free of charge. Training topics are: GAP, farming as business, water harvesting, certification, climate resistant crops and production of food crops and dairy.
- Sucastainability supports the FCS through training and co-financed purchases of wet milling infrastructure.
- Sucastainability pays for FCS to become certified, covers the annual audit costs and provides training on certification requirements on an annual basis.

Inputs

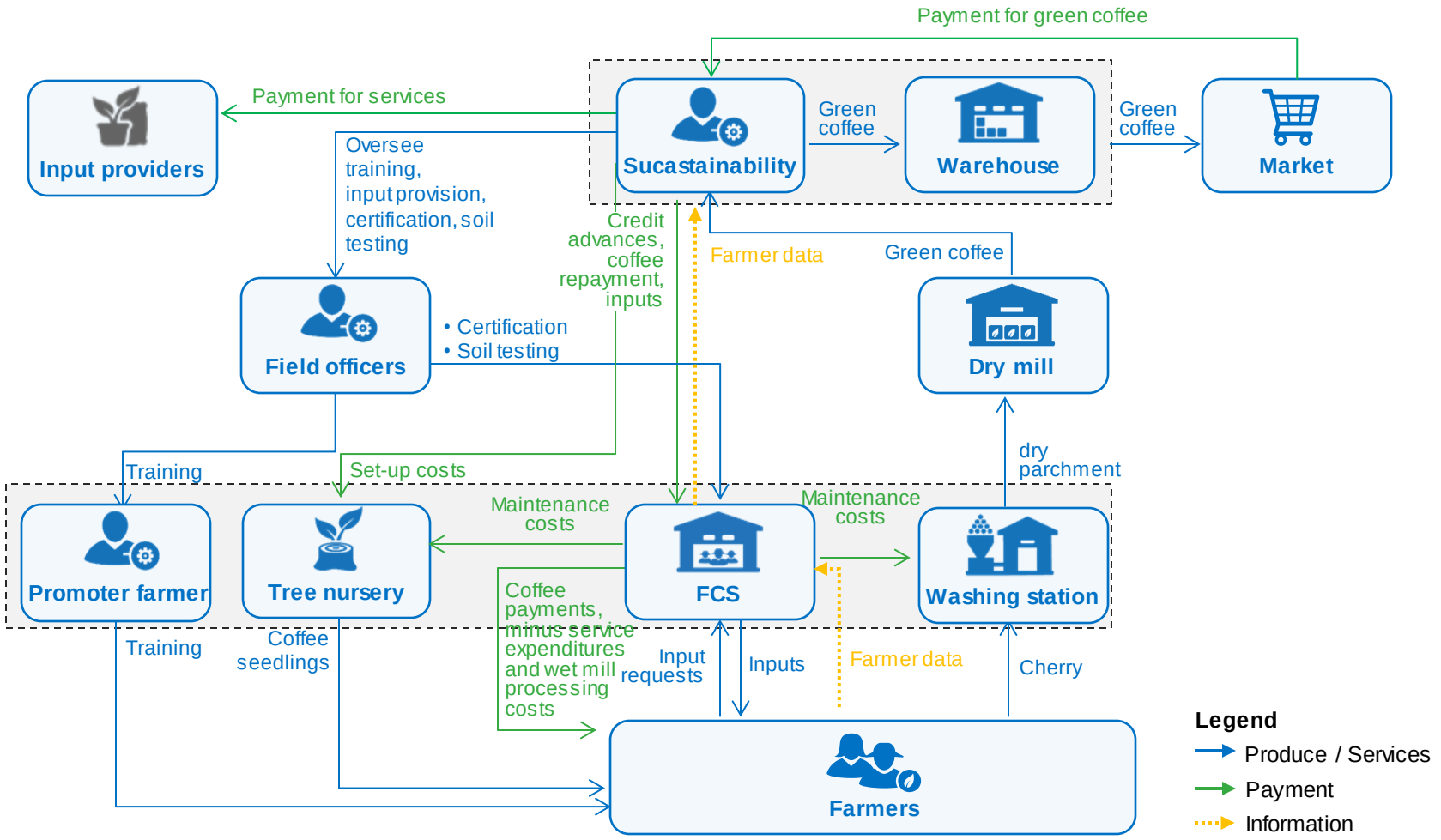
- Sucastainability supports the set-up of coffee tree nurseries and pays for the salary of the nursery manager. This enables farmers to purchase quality coffee seedlings at a subsidized price.
- Sucastainability provides input on credit, such as ground and foliar fertilizer, herbicides, insecticides, fungicides, lime and coffee seedlings.
- Sucastainability performs soil test at farm level to determine which nutrients to add and the quantities required.
- Sucastainability provides select farmers with macadamia and avocado seedlings

Finance

- Sucastainability pre-finances the final coffee purchases to enable farmers to purchase high-quality inputs and other coffee farm equipment.
- Up to 40% of the value of coffee sold in the previous year can be used for prefinancing.

Margin

The SDM is structured in the following way



Service description

- **Sucastainability provides services to farmers through the FCS.** Their services include marketing, dry milling, warehousing, pre-financing coffee for input purchases, provision of training, certification and soil testing.
- **Sucastainability field officers** provide training to Promoter farmers, follow-up on adoption of certification standards and manage the distribution of inputs to FCS.
- **The FCS coordinate service delivery to farmers** including coffee aggregation, wet milling, marketing, input order and distribution and access to finance.
- **Promoter farmers** train the farmers on a monthly basis on GAP on demoplots.
- **Farmers** sell their coffee through the FCS, who aggregates the cherries, organizes the wet milling process and arranges the transport to the final buyer or the auction (after dry processing and storage).
- Each FCS owns a **tree nursery** for the cultivation and distribution of coffee seedlings.

Sucastainability is among top players in Kenya coffee market with focus on retaining their market share in coffee and unlocking higher value in the coffee value chain through providing blended service packages to FCS and increasing the share of specialty coffee by building market linkages

Goals & Aspirations

Aspirations

- *Quality service offering*– Sucastainability aspires to maintain market share by providing high-quality services to farmers that address the needs of the farmers to increase their coffee yield and quality.
- *Quality coffee* – Sucastainability aims to market coffee that meet specific customer requirements to unlock maximum value for farmers in the value chain.
- *Efficient milling, warehousing and marketing* – Sucastainability aspires to ensure an efficient milling and marketing service leveraging their existing infrastructure of dry mills, warehouses and connections with buyers.

Goals

- Sucastainability aims to eventually work with approximately 80,000 farmers (60,000 currently) while improving their loyalty to Sucastainability

Where to Play

To offer quality services

- Sucastainability maintains year-round relationships with FCS and farmers by providing services that will help them improve their coffee yields, diversify their farm income and to access finance.

To market quality coffee,

- Sucastainability supports certification, provides training on GAP and marketing support to obtain best coffee price to farmers
- Sucastainability supports smallholders to restore soil health and hence sustainability of coffee farms by adopting regenerative agricultural practices

To ensure efficient milling and marketing,

- Sucastainability sister concern Kahawa Bora Millers maintains and operates dry milling

How to Win

Offer quality services

- Tailor service offerings to FCS and farmers based on their loyalty and needs;
- Serve broader needs of farmers and capture business opportunities that go beyond coffee.

Market quality coffee

- Uphold certification practices
- Focus on adoption of GAP
- Promote speciality coffee brands and market them to suitable customer markets
- Market other crops from farmers and get them better prices and provide inputs and other goods tailored to farmer needs.

Efficient milling and marketing

- Create new partnerships with (local) off-takers, and input suppliers and showcase the potential to transform the business.

Capabilities Required

Critical capacities

- **Knowledge and expertise** on smallholder service provision, especially to their market share and farmer productivity;
- **Network and collaboration** with government and value chain players (roasters, buyers) to develop market access;
- **Pilot experience, and vision** on diversification activities and continuous development to establish and tailor diversified service provision;
- **Ability to incentivize farmer behavior** to increase both farmer loyalty and adoption.
- **Ability to model and analyze** the financial and environmental output of (to be) implemented interventions on farm and business level.

	Helpful	Harmful
Internal	**Strength** • Sucastainability has established operations as coffee marketing agent, milling and export activities in Kenya coffee sector, a highly competitive and regulated market • Sucastainability has a team of skilled agronomists and field staff having extensive experience in coffee sector • Over the years Sucastainability has developed and continue to maintain a close relationship with the FCS management and coffee farmers across the country	**Weakness** • Low control on FCS loyalty as contracts with FCS need to be renewed annually • The role of coffee marketing agent (Sucastainability) is highly regulated in Kenya resulting in a narrow profit margins for Sucastainability • Limited potential for increasing the number of farmers Sucastainability can be a marketing agent
External	**Opportunity** • Demand for organic, certified coffee is increasing globally • Potential for moving up the value chain by increasing Sucastainability's market share in specialty coffee markets • Helping farmers to adopt regenerative agriculture practices will lead to a) higher coffee productivity and sustainability b) higher farm income and resilience from crop diversification	**Threat** • High level of competition in the Kenyan coffee market that increases the risk of losing market share • Reducing area of established coffee acreage due to clearing of plantations for meeting the demands of urbanization. The challenge is widely prevalent in central Kenya • Volatile global coffee prices • An increase in adverse weather events due to climate change is increasing crop losses and negatively impacting farmer incomes

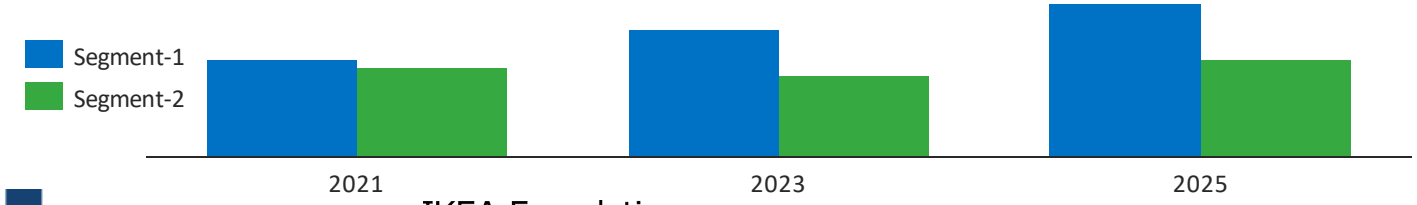
Sucastainability engages with multiple actors both vertically and horizontally in the coffee value chain

Actor	Organizations	Function (within this SDM)	Revenue model (within this SDM)	Incentive to participate (within this SDM)
Operator	• Sucastainability	• Provides services to farmers • Marketing agent who connects farmers with buyers (processors) to sell their Arabica coffee beans.	• Margin on coffee sales	• Increase and secure sustainable coffee supply • Invest in farming communities
Processor	• Exporters • Roasters	• Buys coffee beans from farmers and processes it into consumer products. • Exports final products of coffee.	• Margin on coffee sales	• Increased access to high quality single origin coffee
Dry mill	• Dry mill	• Process wet parchment into dry parchment	• Margin on coffee volumes	• Increased supply
FCS	• Farmer Cooperative Society (FCS)	• Organizes coffee farmers and manages their interests • Provides services to farmers • Aggregates coffee beans	• Membership fee • Margin on coffee volumes	• Increase negotiation power of farmers
Impact Leads	• IDH • IKEA Foundation • Government • Research Institutes	• Co-investor and capacity builder for Regenerative Agriculture projects in Kenya and Uganda;	• None • Consulting Fee	• Increase experience on business with smallholders and cooperatives. • Bring into practice the results of research
Input providers	• Value Chain Players	• Manufacture, sell and source agro-inputs, equipment and produce in order to improve farmer productivity and income.	• Margin on product sales	• Increased sales volumes • Increase experience on business with smallholders.

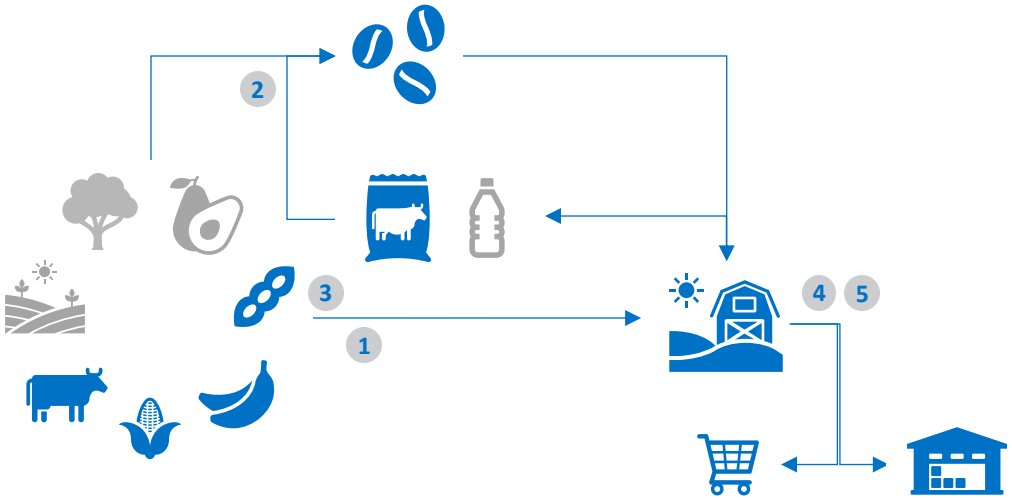
The FCS segmentation corresponds with different farmer segments in the farmer analyses

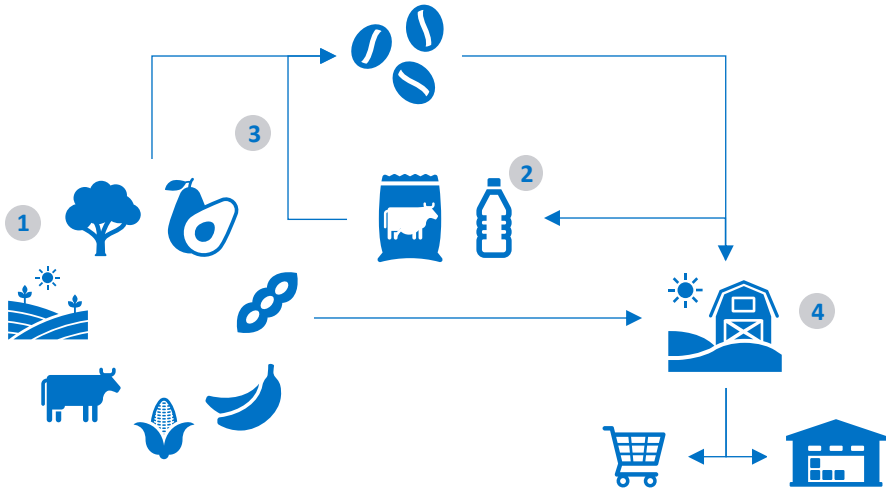
	Baseline	Segment 1	Baseline 2	Segment 2
Description	• Farmer is part of the SDM • Does not apply GAP, organic fertilizer or professional pruners or harvesters	• Farmer is part of the SDM • Belongs to low loyal FCS (FCS has > 2 marketing agents in last 5 years)	• Farmer is part of the SDM • Does not apply GAP, organic fertilizer or professional pruners or harvesters	• Farmer is part of the SDM • Belongs to highly loyal FCS (FCS has <=2 marketing agents in last 5 years)
Farm profile	• Coffee: 0.4 acres • Other crops: 0.6 acres • Coffee tree density: 500-540 trees/acre	• Coffee: 0.4 acres • Other crops: 0.6 acres • Coffee tree density: 500-540 trees/acre	• Coffee: 0.4 acres • Other crops: 0.6 acres • Coffee tree density: 500-540 trees/acre	• Coffee: 0.4 acres • Other crops: 0.6 acres • Coffee tree density: 500-540 trees/acre
Diverse crop portfolio	*Beans + Banana*	*Beans + Banana* *Avocado* *Macadamia + Dairy*	*Beans + Banana*	*Beans + Banana* *Avocado* *Macadamia + Dairy*
Services	• None	• Training (+ Certification) • Organic Fertilizer • Bean seeds • Avocado seedlings • Macadamia seedlings • Coffee pre-financing • Market for coffee	• None	• Training (+ Certification) • Organic Fertilizer • Bean seeds • Avocado seedlings • Macadamia seedlings • Coffee pre-financing • Market for coffee

Number of farmers in SDM



Sucastainability intends to support 5,000 smallholder farmers with blended service provision with the purpose of supporting regenerative agriculture practices at farm-level to restore soil health and support crop diversification of farm households





Legend

- (Un) performed
- Coffee
- Banana
- Beans
- Maize
- Grasses
- Avocado / Macadamia
- Organic pest control
- Fertilizer and Agrochemicals
- Cows (milk)
- Farm
- (Local) market
- Off taker

Current farmer practices (Segment 1-4 farmers)

1. Diversified produce from beans, banana and maize are mainly used for household consumption;
2. Residual of the diversified crops is used as mulch, is mixed with manure to produce organic compost to stimulate coffee trees' production;
3. Crop protection is used. Additionally, Beans are used as cover crops to reduce the growth of weeds;
4. Most of coffee and diversified produce is sold at local markets and to aggregators or used for household consumption;
5. Limited to no return of energy to the soil or to protect, feed, and fertilize farmer activities (coffee and diversified crop).

Regenerative farmer practices (Segment 5 and 6 farmers)

1. Additionally, farmers adopt holistic regenerative agriculture practices with the cultivation of avocado and macadamia trees. Cows are reared for milk and onward-sales;
2. On top of using manure (of cows and bought), plant rests and grasses as mulch, farmers perform less weeding and slashing practices and use more fertilizers and agrochemicals and soil nutrients to activate soil life and improve fertilizer response;
3. Avocado and Macadamia are used as shade trees, cultivated in boundaries between acres or amongst the coffee trees to reduce the spread of diseases.
4. Produce from diversified activities is used for household consumption, to diversify income, to dampen cash flow volatility, and to increase income resilience against e.g. climate extremes.

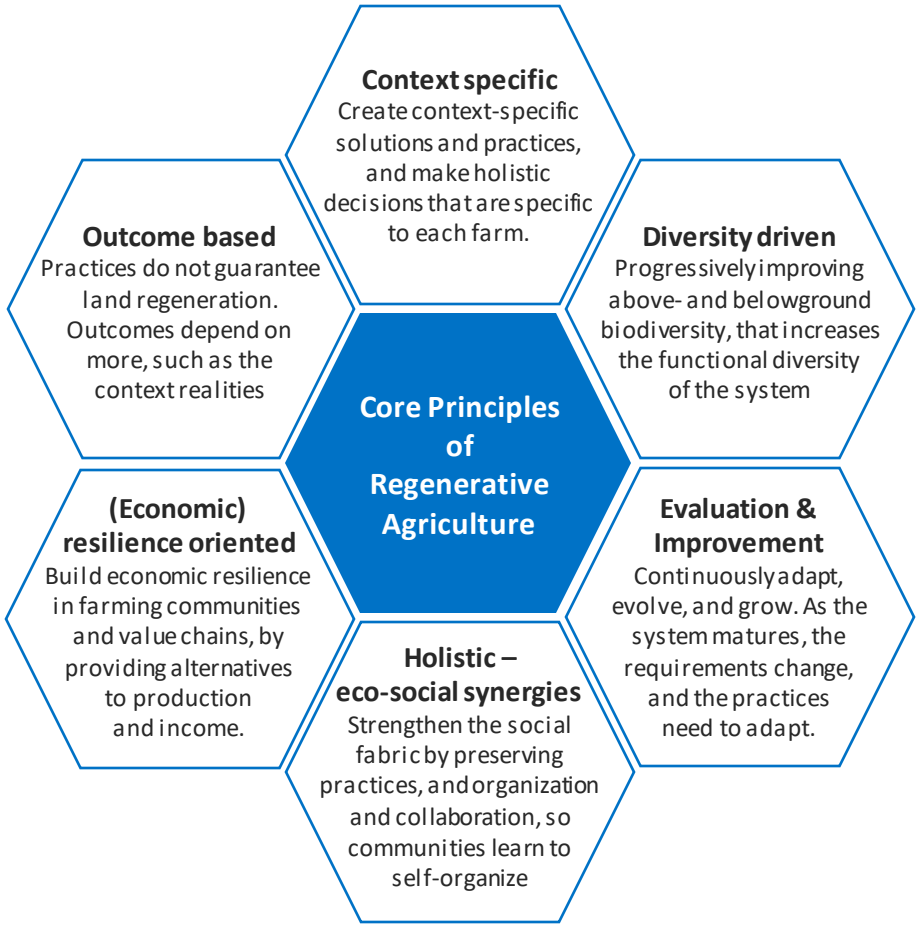
As an holistic agricultural approach that retains or if needed restores ecosystems, RA provides a theoretical and practical implementation pathway towards Climate Smart Coffee

Climate Smart Coffee [1)]

Climate smart coffee (CSC) production sustainably increases productivity, enhances resilience to climate risk, and reduces or removes greenhouse gas emissions (GHGs). Many of the interventions that make up CSC already exist worldwide and are used by farmers to cope with various production risks, and can take place at different technological, organizational, institutional and political levels.

Regenerative Agriculture [2)]

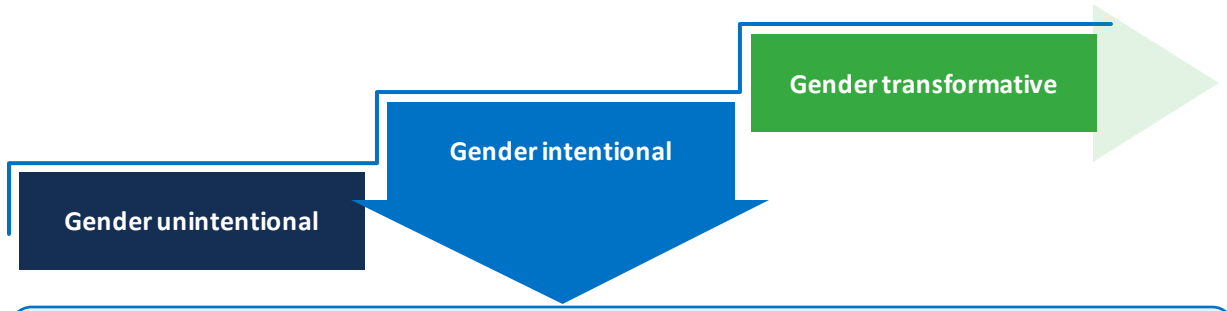
RA is an approach to farming that uses soil conservation as the entry point to regenerate and contribute to multiple provisioning, regulating and supporting ecosystem services, with the objective that this will enhance not only the environment, but also the social and economic dimensions of sustainable food production. A healthy soil is the basis for RA and therefore degraded agricultural soils should be restored to healthy soils.



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

Sucastainability is making consistent progress on their gender journey, they can further progress by implementing measurable gender targets to achieve and tracking KPIs

Where is Sucastainability on its gender journey?



Current situation[1]

- Sucastainability is **gender intentional**. The company has a **documented gender policy** in place for their internal processes to ensure both women and men have equal access to all resources and to guide gender in farming operations. However, all departments can choose how to interpret the policy.
- Sucastainability maintains a **gender disaggregated FCS and farmer database.** However, the **use is limited** in seeking to understand the unique needs and preferences of the male and female farmers they work with.
- While **services are provided to all farmers in an equal manner**, limited specific attention is given to adjusting the service delivery to address women's specific needs.
- Sucastainability does not serve women only coffee FCS due to limited number of female farmers. But **Sucastainability does market women only coffee**.

Best practices to implement in becoming transformative

- **Document the gender strategy** for clarity on goals and agenda. Establish KPIs (e.g., targets on the number of male and female farmers you are aiming to reach), develop a roadmap to get there and allocate resources to monitor and measure gender goals.
- Use **sex disaggregated data collected to inform service delivery to farmers** e.g., track sex disaggregated farm level metrics such as yield and income to understand gaps and need for services and skills.
- **Inclusive tailoring of services** by identifying women's needs and preferences in view of training times and location to ensure their participation, while also promoting coffee farming as a business to involve them

Potential KPIs to monitor on the gender journey

- Number of women benefitting from improved working conditions
- Number of women with access to and control over income
- Increase in income for women
- Increase in the number of women accessing services
- Increase in women working as promoter farmers and managing demoplots

Sources: [1]Gender module responses from Sucastainability

Small land size of coffee farmers is a limiting factor for food production. Seasonally farmers are most food insecure between Jan and July as during these dry months food crop production is limited. Improving yield of food crops and income from cash crops is critical for food and nutrition security of farm households

Risks and opportunities

Current situation

Food security

- **Prevalence of undernourished people in the total population** (2019-2021): 26.9% [1]
- **Prevalence of moderate or severe food insecurity in the total population** (2019-2021): 69.5% [1]

Assets

- **Average farm size[2]:** 1 acre
- **Of which food crops[2]:** 50%
- **Land ownership[2]:** Farmers own land

Health & Sanitation

- **The prevalence of stunting among children under five years age[1]:** 19.4%
- **National average dietary energy supply adequacy[1]:** 99%
- **Access to clean water[1]:** Yes. At least 61.6% of Kenyans have access to basic drinking water services.
- **Access to sanitation[1]:** 32.7% of Kenyans have access to basic sanitation services

Food security risks and opportunities

- Average farmland size of 1 acre per household constraining farmers to grow food crops in sufficient quantities
- Low awareness among farm households about importance of nutrition and diet on household health and wellbeing
- Farming being rainfed in Kenya, drought and other vagaries can impact production of cash crops and food crops alike in the same season

Measures taken by Sucastainability

Current measures and policies in place

- Farmers grow beans crop mainly for their own consumption – the bean seeds are supplied by Sucastainability
- Banana is grown for household consumption and any excess produce sold in local market
- On livestock farmers are encouraged to keep dairy cows and poultry
- Farmers receive trainings in growing food crops, maintaining kitchen garden, family nutrition and cooking classes to meet the nutritional requirements of farm household

Challenges and room for improvement

- Average farmland size of 1 acre per household constraining farmers to grow food crops in sufficient quantities Cohesive crop diversification and mixed farming strategies can maximize crop yields
- If coffee yield or coffee price are lower in a particular season, farm households are forced to sell a larger share of their food crops production to meet the income shortfall. Having insurance for coffee crop and encouraging other cash crops such as macadamia and avocado will reduce the need to sell food crops
- Seasonal distribution of cropping calendar of various crops will reduce production risk due to any single weather-related occurrence

Sources: [1]FAO, [2]SDM data collected from Sucastainability

Coffee farmers are affected by increasing temperatures and changed rainfall patterns impacting coffee yield. Sucastainability's support to farmers with regenerative agriculture practices will play a significant role to adapt farms to climate chance and become climate resilient

Climate risks exposure and impact				Measures taken by Sucastainability	
		Risk exposure	Farmer resilience and impact	Adaptation measures and policies in place	Challenges and room for improvement
Temperatures (change in) short- and long-term averages	Medium	• Kenya has experienced increasing temperature over the last 50 years. Future climatic predictions for Kenya indicate possible annual temperature increase of 2.3^{0}C by 2050[1,5]	**Farmer resilience** • Farmers are learning to adopt climate change mitigation practices such as mulching, growing shade trees, planting resilient variety of coffee plants • Farmers have diversified sources of income from dairy, beans and are further diversifying their crops planting macadamia and avocado **Impact** • Coffee farmers are highly susceptible for erratic rainfalls, increase in temperate and higher incidence of pests – the coffee yields may decline without climate change adaptation strategies. Farmers in lower altitude regions are acutely affected	**Strategy, measures and policies** • Sucastainability aims to improve coffee yield and farmer profitability through soil regeneration and enhancement, support to biodiversity and protection of crops through agroforestry and organic inputs **Intelligence** • Collect soil health data • Track temperature and rainfall patterns throughout farms to suggest timely corrective actions to farmers **Farm services** • Regenerative agriculture practices • Agroforestry • GAP including climate resilience • Crop diversification services • Weather information services • Insurance • Supplying drought resistant varieties	• Limited resources for investing in climate adaptation practices • Farmers are risk-averse to invest in diverse crops. Sucastainability understands the risks farmers bear from unsuccessful enterprises and intends to promote well tested solutions • Longer payback period from agroforestry • Developing alternate value chains for diversified crops in parallel to coffee which is attractive
Precipitation (change in) timeliness and availability	High	• Kenya is experiencing changes in the distribution, onset and cessation of rainfall seasons thus making it increasingly difficult to plan agricultural operations[1,3,4].			
Climate extremes (change in) likelihood and severity of hail, floods, locusts, etc.	Medium	• Increased Incidence of Dry Spells/Droughts & Increased Heat Wave Duration [2]			

Sources: [1]Kenya Agriculture Climate Smart Agriculture Implementation Framework (2018 – 2027), [2]https://www.climatelinks.org/countries/kenya, [3]Databasin.org, [4]WRI Water risk Atlas (2019), [5]Geofolio

Embracing technology to monitor climatic changes, in coffee production and processing and integration of agroforestry as an additional source of income have potential to revive the coffee sub-sector

Risk | Neutral | Opportunity

Definition	Situation	Impact on SDM
Technology *Technology availability, research & development, delivery and adoption*	Adoption of technology, particularly at SHF level, is not widespread. Wet processing at cooperative level is dominated by traditional disc pulpers while small estates mainly use hand pulpers that are inefficient and not environment friendly[1].	Conditions under which coffee cherries and mbuni are processed affects not only the financial and environmental costs but also the cup quality which eventually affects the net payout to the coffee producers[2].
Environment *Climate change, possibility of extreme weather, soil type, water supply and quality, pests and diseases. Potential environmental damages such as deforestation*	Coffee grown around Mount Kenya is renowned for quality, but low rainfall and uncertainty in predicting timing of various coffee development cycles[1] can reduce production and quality. Disposal of effluents and off gases coffee processing driven mainly by use of traditional pulpers remains of concern[1].	Reduced coffee production levels limit the amount of quality coffee Sucastainability can source and puts pressure on farmer livelihoods potentially affecting their loyalty to Sucastainability.
Infrastructure *Existence and state of roads, water and electricity networks as well as proximity to main trading / processing hubs (e.g. access to market)*	Generally, coffee growing areas have good roads which has eased the transportation of coffee to the factories and buying centers. However, coffee farmers on Mount Kenya have limited connection to wet-mills and markets due to poor infrastructure.	Poor infrastructure increases sourcing costs for Sucastainability.
Labor *Cultural norms that restrict /promote people of certain ages, genders or social groups from farm labor. Availability and cost of labor*	The coffee sector is one of the major employers in Kenya as it is labor intensive. The dense population in the growing areas provides adequate labour[3] and most farmers manage their coffee farm with household labor.	n/a
Inputs & Financing *Availability of affordable, quality inputs and the necessary marketing and distribution mechanisms. Availability of credit. Enabling regulatory environment*	Farmers have difficulties accessing loans due to their lack of credit history and high risk profiles. There are many counterfeit inputs on the market at high costs, and many distributors try to access farmers to sell their product.	Sucastainability provides qualitative inputs on credit to farmers (based on soil testing) to enable farmer's access to the right amount of quality inputs.

[1] Sauti ya Kahawa Strategic Plan 2018 – 2022, [2] Sauti ya Kahawa – Study on cost of coffee processing in Kenya, [3] Kahawa Safi,

Following promulgation of a new constitution, legal reforms within the agricultural sector have been under implementations. There is need for a coordinated legal approach between the national and county governments in administration of the coffee sub-sector

Risk | Neutral | Opportunity

Definition	Situation	Impact on SDM
Trading System *Organization of the system through which crops are traded from farmer to market, including the number and type of actors involved*	83% of the coffee in Kenya is sold through the auction. The auction structure ensures maximum transparency in the supply chain. The coffee value chain is heavily regulated by the government, whereby farmers retain legal ownership of the coffee until it is sold and paid for., cooperatives aggregate the coffee, and marketing agents market the coffee to direct buyers or at the auction.	kSucastainability as marketing agent can legally only play a limited role in the value chain and is not able to directly work with the farmers. This reduces their direct control on quality and quantity, on the other hand working with the cooperatives assures them of set sourced quantities.
Pricing & Competition *Market dynamics of the main crop of the SDM, including competition between buyers and possible price-setting by the government or other parties*	Locally, competition amongst marketing agents is fierce as they seek to secure their quantities from cooperatives, however this competition does not directly translate into better pricing for farmers. Prices are based on quality, which are in part heavily shaped by factors out of the farmers control such as post-farm processing, and volatile global coffee prices.	Sucastainability offers a fixed above market price in combination with a bundle of services and communicates clearly on their price and quality requirements to secure farmer cooperative loyalty.
Institutional Stability *Stable political environment, peace and security in farming areas*	Regulation in the coffee value chain change regularly, as the importance of the coffee value chain in Kenya makes it naturally connected with governmental interference and sensitive to political changes.	In 2018, the regulations changed and coffee aggregating and processing companies such as Sucastainability had to adjust their legal and operating structures.
Land Tenure *Existence of land ownership rights / regulations and their enforcement. Ease of purchasing/ transferring land*	There are no land tenure issues for the farmers. However due to land inheritance customs, farm size has heavily diminished for smallholders, with the baseline land size at approximately 1.5 acre.	As farm sizes are small Sucastainability needs to engage with enough farmers to secure sufficient volumes, which increases Sucastainability service provision costs.
Social Norms *Availability and quality of schooling and healthcare. Cultural factors. Potential social externalities like child labor, gender disparity*	In Kenya, coffee farming is dominated by ageing farmers with an average of 58 years. Inclusion of women in the value chain is constrained by unequal land rights and exclusion in decision making amongst others[2].	n/a

Sources: [1]International Coffee Organization , [2]Sauti ya Kahawa Strategic Plan 2018 – 2022,

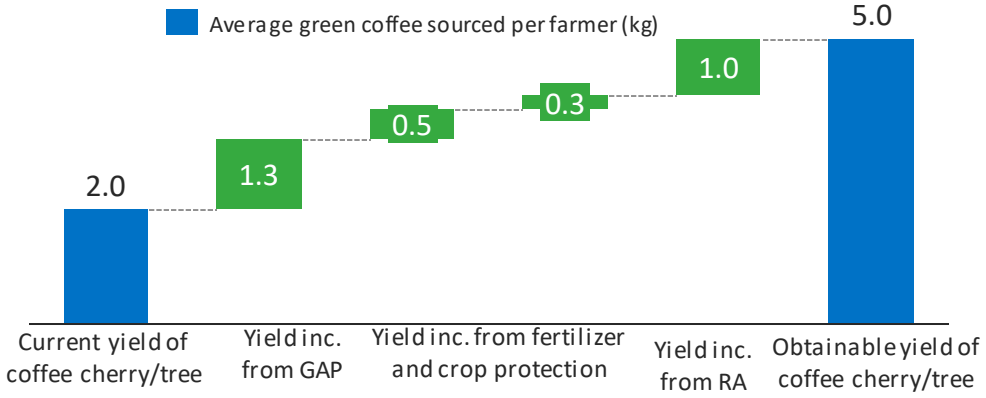
3. The business case

Understanding the context of the SDM

Providing extensive service packages to farmers leads to higher coffee yield and better quality, thereby benefiting Sucastainability to secure high-quality coffee at volumes and reduce cost to source.

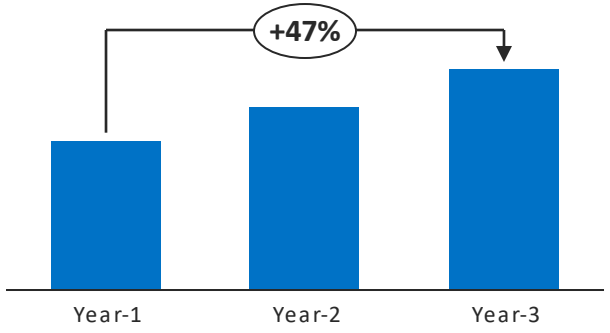
Coffee yield increase resulting from adopting of practices including of crop diversification

Coffee cherry yield in kg/tree of full mature coffee-tree



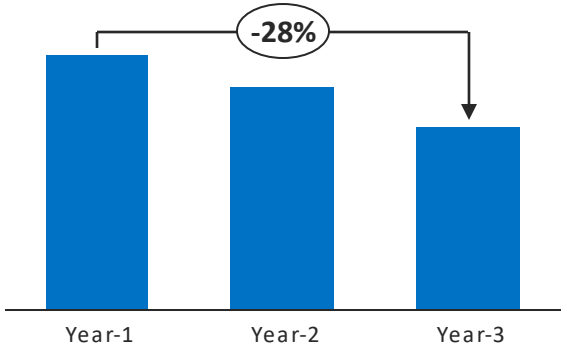
Average volume of green coffee sourced by Sucastainability per farmer

Green bean kg/year/farmer



Cost to source green bean

Cost to source in USD cents/kg of green



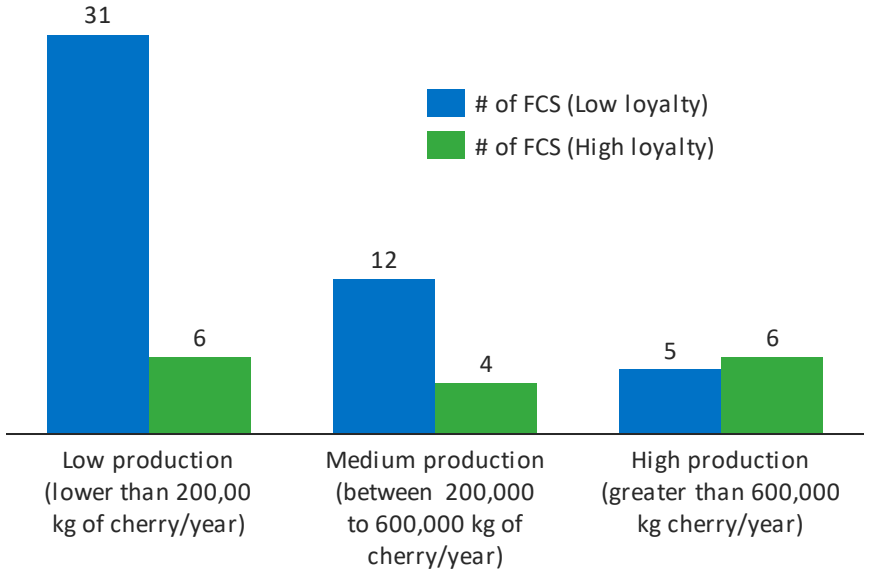
- An average smallholder coffee productivity in Kenya is about 2 kg of coffee cherry per tree, which is well below potential yields of nearly 5 KG/tree in well managed farms – such low yields are commonly **attributed to soil degradation, lack of GAP, lack of use of high quality inputs** over the years and increasingly erratic climate patterns in recent years (temperature increase and unpredictable rainfall pattern). A comprehensive program to restore soil health and rejuvenate coffee farms is critical to stabilize and improve coffee yields.
- Restoring soil health leads to improvement in the coffee yield by making **soils responsive**, which can be achieved by the application of compost, effective microorganism (EM) fertilizers, implementation of GAP and other RA practices such as mixed cropping, planting of shade trees, mulching and maintaining crop cover over the entire farm for the most of the year.

- The highly competitiveness of Kenya coffee sector having dominant coffee marketing players with entrenched market share while the area under coffee acreage is receding, to secure stable coffee volumes at a reasonable growth makes it imperative for increasing the yield per acre of coffee farms.
- By providing a basket of services including of regen agri, Sucastainability can increase the average volume of coffee sourced per farmer by 47% in 3 years and reducing the cost to source an unit(kg) of green bean by 28%

By having long-term loyalty with FCS and farmers, Sucastainability can increase the share of certified and speciality coffee (that leads to higher premiums/margins)

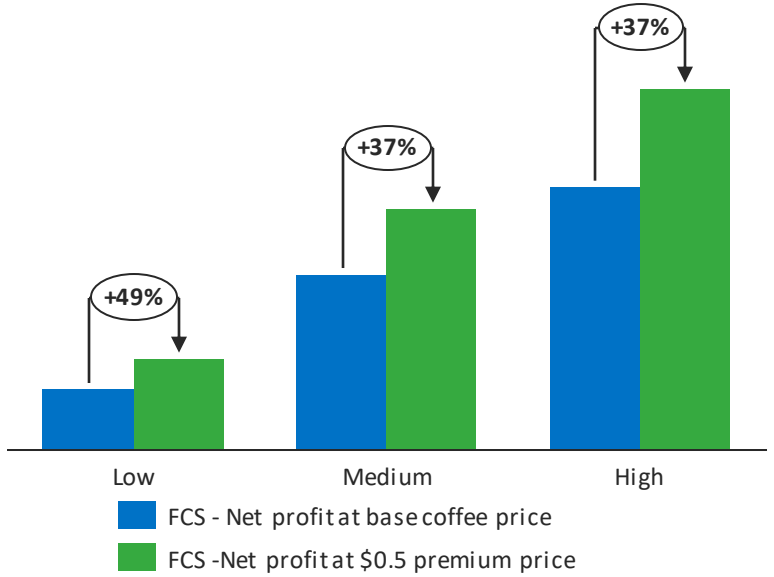
Graduating higher number of FCS from low production and loyalty to higher production and high loyalty category will benefit both farmers and Sucastainability

# of FCS in different categories on production and loyalty



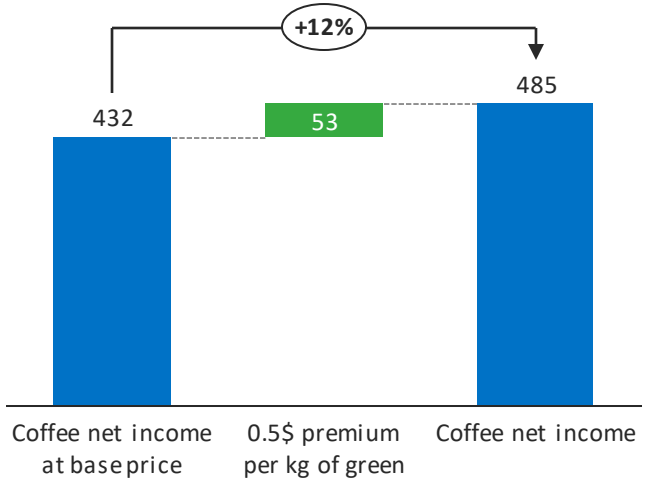
Increase in realized green coffee prices due to better quality and marketing will lead to significant increase in FCS profitability (at constant FCS expense ratio)

FCS Net profit – USD/year



Farmer coffee income increases in proportion to Increase in green coffee price

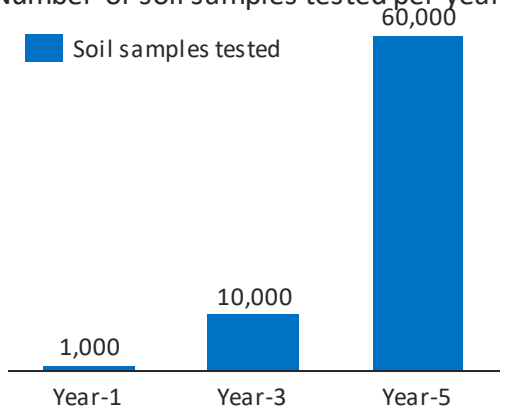
Segment-1 SDM farmer coffee income – USD/year



By restoring soil health and helping farmers increase farm income by crop diversification, Sucastainability can sustainably secure coffee production volumes in the long-term

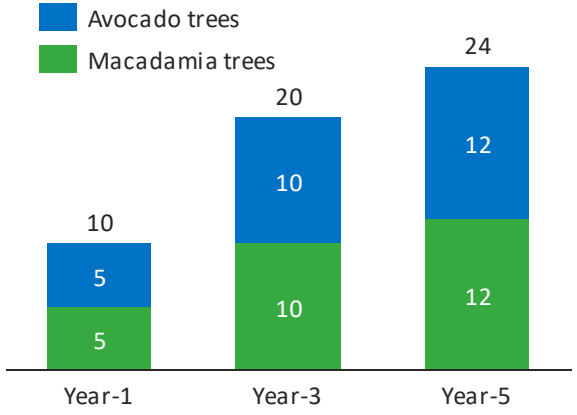
Sucastainability will continue to increase the number of soil samples tested per year

Number of soil samples tested per year



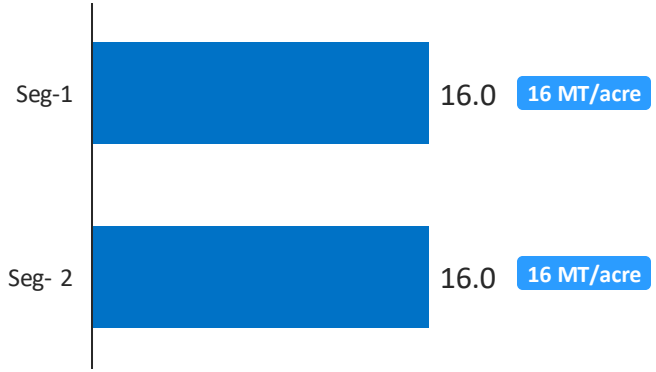
Coffee farms will have on an average 24 shade trees per acre

Trees per acre



Cow manure produced per farm for different farm segments

Produced and applied organic manure in Mt/year (from 2 cows for each farm)



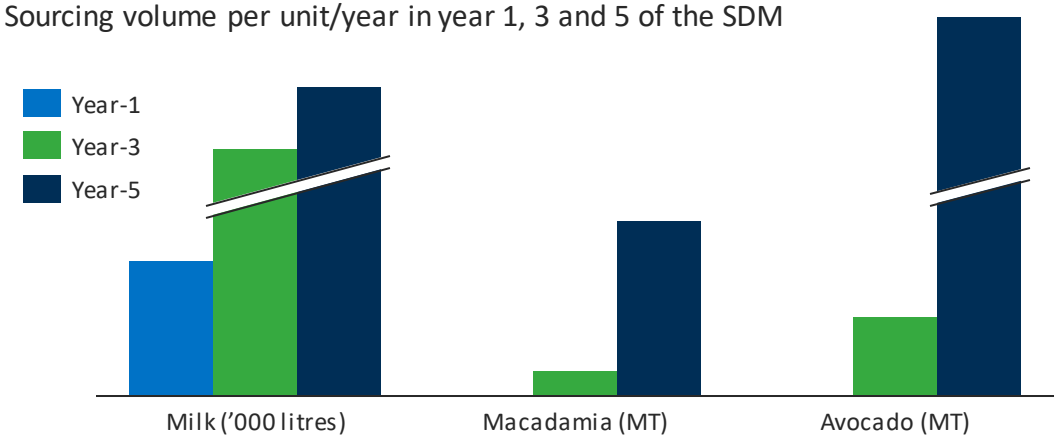
- Restoring soil health is a key outcome of regenerative agricultural practices. Sucastainability plans to implement a comprehensive set of services towards restoring soil health starting from soil testing, encouraging agroforestry for increasing shade in coffee farms and training farmers to apply organic manure in the farms
- Sucastainability will start with testing 1000 soil samples and gradually ramping up the capacity to test every farm each year. Sucastainability will buy soil scanners in sufficient number to meet the demand while the cost of soil testing will be paid by farmers
- Macadamia and avocado trees will be planted in the coffee farms for increasing the shade and also as farm income diversification plan. Farmers will have 12 each of avocado and macadamia trees ie approximately one tree for 45'*45' area

- Soil in coffee farms have been exploited for long without adequate effort for replenishing them. Applying of organic manure is recommend as a critical steps towards replenishing soil health due to number of benefits it confers such as increasing the organic matter in soil, higher concentration of living organisms, and improved water retention in the soil while balancing the soil PH, soil responsiveness and reducing soil erosion.
- Cow dung from each cow in the farm and other organic matter available on farm (such as bean crop, residue, tree crop droppings etc) can produce 8MT of organic farmyard manure. With 2 cows on each farm, farmers can produce and apply 16MT/acre of organic farmyard manure.

Sucastainability can further reduce cost to serve farmers by facilitating market access to diversified crops

A diversified crop portfolio of a regen-agri practicing farmer enables Sucastainability, FCS and other value chain partners to collaborate on value addition and market access of diverse crops

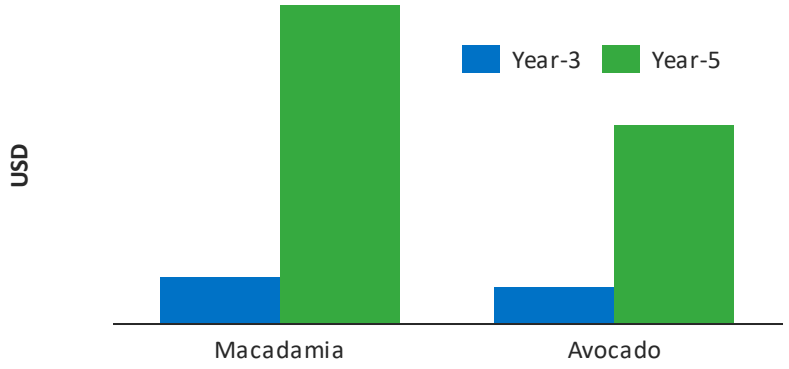
Sourcing volume per unit/year in year 1, 3 and 5 of the SDM



- **Dairy**: A typical farmer keep two dairy cows each producing an average of 3 litres of milk for 10 months a year. Farm households consume 2 litres of milk and sell 3 litres per day to local dairies at 30KES/litre. In villages where farmers don't have a dairy nearby, Sucastainability can encourage and support FCS to setup a milk collection centre and a small-scale chilling centre to strengthen the milk value chain.
- **Avocado**: Since avocado is bulkier and more perishable than macadamia, availability of timely logistical infrastructure is crucial to limit post-harvest losses. This requires a relatively higher level of logistical support by FCS for storage and transport. Sucastainability can facilitate local or export market offtake linkages for avocado at a small commission.

Macadamia value chain can accrue significant market access commission to Sucastainability followed by avocado

Market facilitating commission[1] to Sucastainability (USD/year)



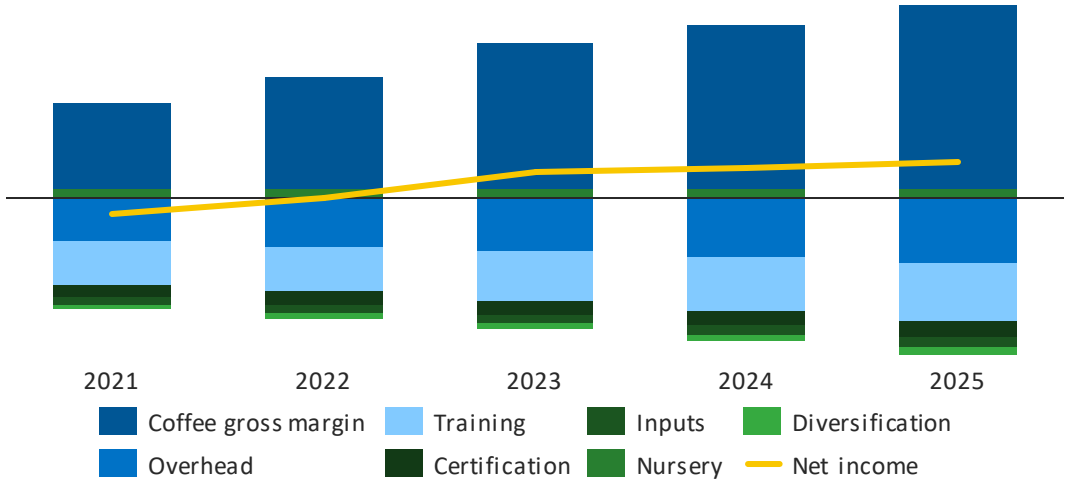
- **Macadamia**: Macadamia being the most high value cash crop pound for pound and less perishable among all the crops grown by farmers, facilitating market access will be lucrative for both FCS and Sucastainability. Since Sucastainabilitys' strategy is not to get directly involved in marketing of crops other than coffee, we recommend Sucastainability only to facilitate market access at a small commission without active involvement. Even at 2.5% commission over farm-gate price, by year-5 Macadamia can accrue Sucastainability a substantial additional income

1) At a net income margin of 2.5% of farm-gate price. Margins can vary and depends on number of factors

The SDM will be profitable from 2022 due to higher coffee volumes absorbing fixed SDM and overheads costs. Volume of coffee sourced per farmer in the SDM is a key profitability driver

The SDM is profitable (doesn't include commission from diverse crops)

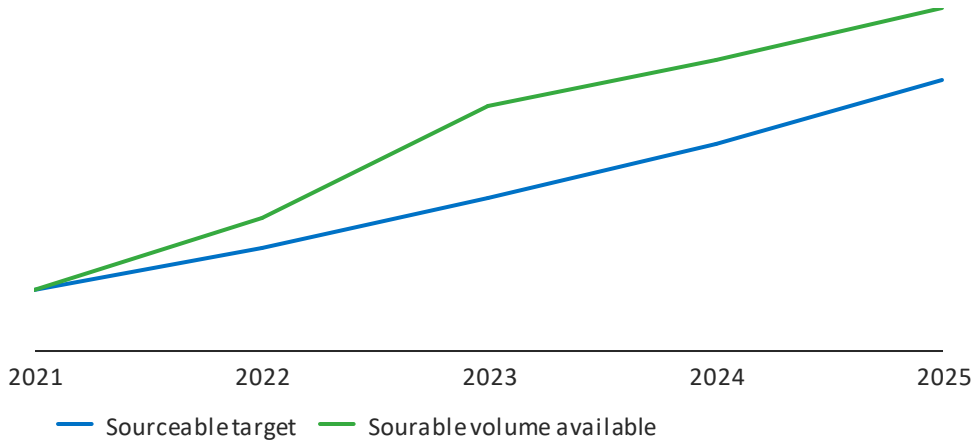
5-year projection of net-income in USD ('000)/year



- The SDM will be profitable from 2022 due to increase in total coffee volumes. SDM doesn't charge farmers for on farm services such as training, certification and many other services are such as inputs, seedlings, soil testing, transportation etc are charged at cost. The objective of Sucastainability is for securing required volume of coffee while continuing to invest in improving the coffee quality and not directly maximizing the profitability of SDM
- For further increasing the profitability of the SDM, Sucastainability can source higher volume of coffee per farmer or increase the share of speciality/premium coffee in the total sales mix.

Sourceable volume available with from SDM farmers will be higher than the sourcing target of Sucastainability, only if coffee cherry yield per tree is increased

5-year projection of sourcing coffee volume MT/year of green bean



- Sucastainability targets to increase coffee sourcing volume. About 50% of volume growth contribution is from increased number of farmers and remaining 50% of volume growth by the coffee cherry yield increase per tree

Sucastainability SDM profit projections are highly sensitive to volume of coffee sourced. Profits growth are a result of higher volume of coffee sourced, which is driven by improving farm coffee yields

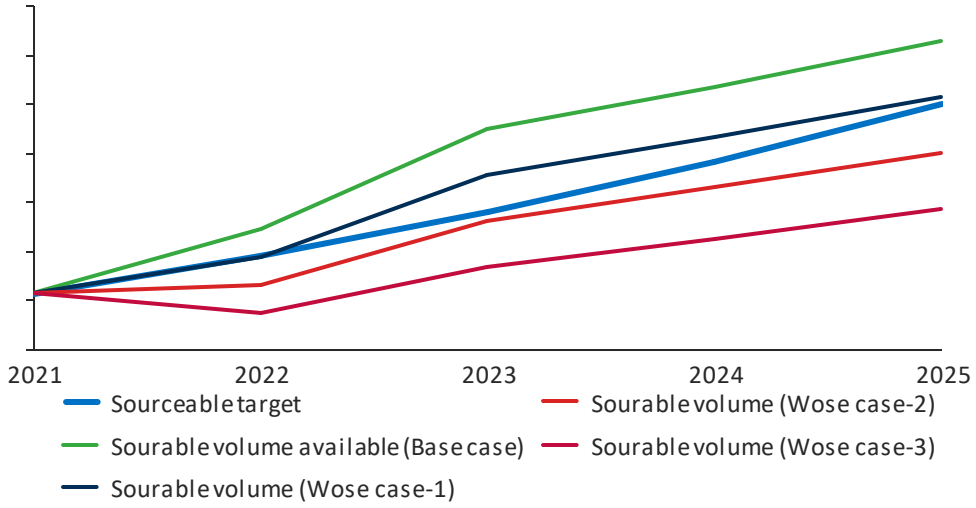
The SDM profitability is highly dependent on coffee yield/tree

Year-5 projection of net-income in USD ('000)/year

- The SDM profitability will be affected if the cherry yield are less than projected. SDM will remain profitable up to 1kg decline in average cherry yield/tree vis-à-vis assumed base case cherry yield.
- SDM profit decline is due to fixed nature of service costs/farmer such as training, certification, inputs and other overheads.

Sourceable volume available with from SDM farmers will fall short of the sourcing target of Sucastainability if the cherry yield/tree decline by more than 0.5kg than base case

5-year projection of sourcing coffee volume MT/year of green bean

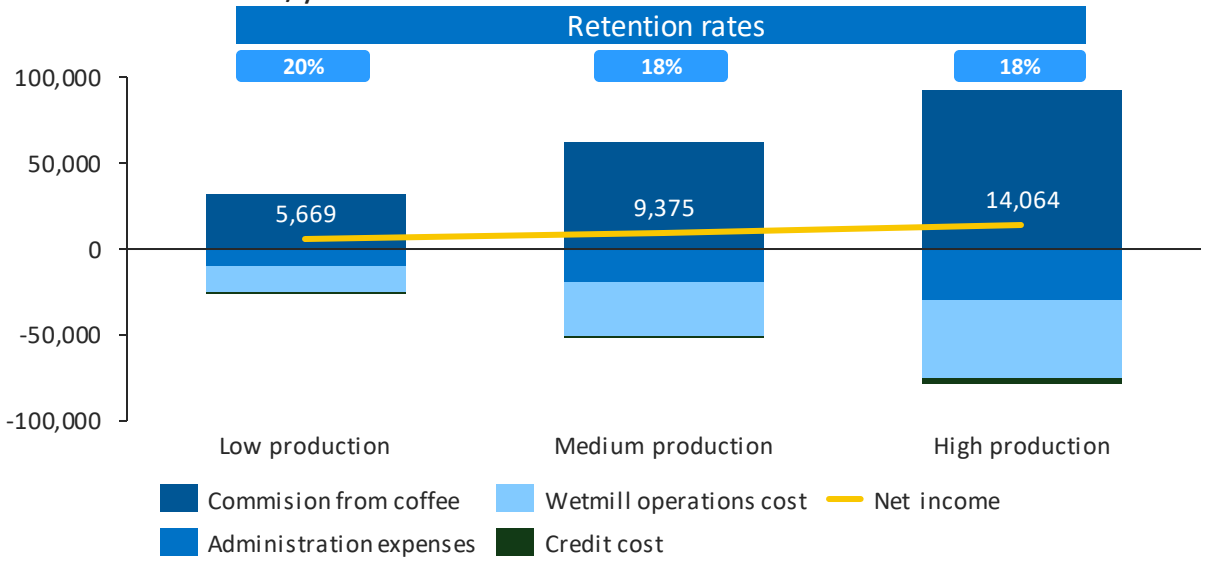


- Sucastainability can meets its target sourcing of coffee volumes even if the cherry yield per tree declines by 0.5kg/tree (Worse case-1). However, if the average cherry yield/tree declines by 1kg (worse case-2) then the source able volumes decline by 11% vs target sourcing volume

Improving the governance and efficiency of FCS will result in increase of the coffee price pass-through rate to farmers

High production* FCS can spread their fixed expenses over a larger volume of coffee and hence can have a higher pass-through rate to farmers than low production FCS

FCS net income USD /year



At higher coffee green prices, FCS expense ratio reduces

FCS expense ratio as % of coffee revenue

Coffee green price (USD/kg)	FCS expense ratio
4.5	17%
5.0	16%
5.5	15%
6.0	14%
6.5	13%
7.0	12%
7.5	11%

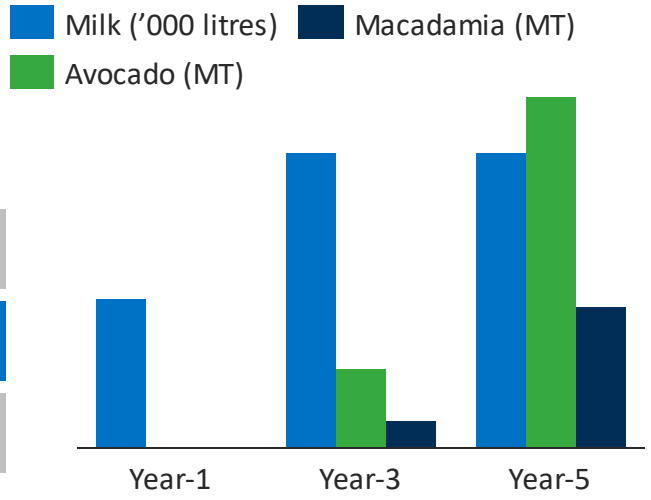
- FCS byelaws aim for retaining a maximum of 20% of realized green bean price towards administration of FCS and wetmill operations costs resulting in a pass-through rate of 80% or more to farmers. The efficiency of FCS operations is a key link impacting the income of farmers particularly during times the market price of coffee is low.
- Sucastainabilitys' liaison and field officers work closely with FCS management throughout the year to rationalize their cost and improve the governance mechanism to ensure the operations are efficient, transparent and sustainable for the ultimate benefit of small holder farmers

- Coffee green price directly affects the farmer pass-through rate of FCS. For a typical FCS the breakeven retention rate is 15% at USD 5.5/kg green coffee prices. Every 50 cents change in green prices impact the retention rate by 1% (ie lower retention at higher price and a higher retention at lower price)
- There are FCS that have greater than 90% pass-through rate and majority of FCS Sucastainability works with maintains a passthrough rate of 85%

Note:* Low production (<200K kg of coffee cherry/year), Medium production (200k – 400K kg of coffee cherry/ year and High production FCS (>600K kg cherry/year)

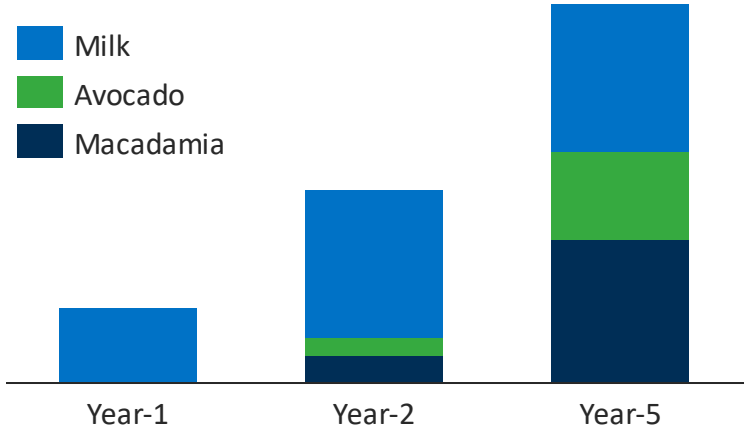
FCS participation in diverse crop value chains will increase the staff and asset utilization of FCS, in long-term it will support enhancing FCS capacity and financial sustainability to serve farmers

Volume of diverse crop produce at FCS level (1000 farmer members)



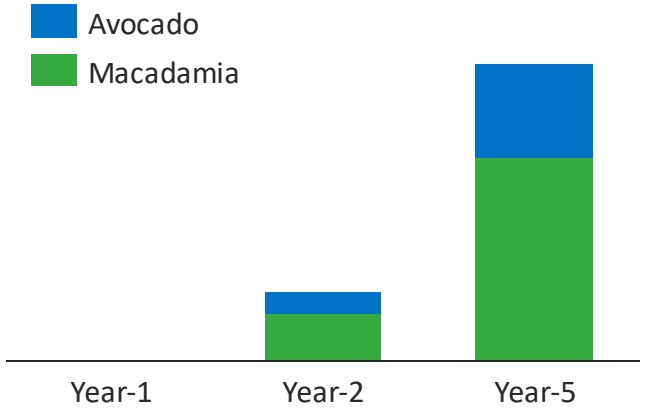
FCS can earn substantial revenues from diverse value chains

USD/year for 1000 farmers



Additional FCS income* with facilitating only Macadamia and Avocado market access

USD/year for 1000 farmers



* Assuming an FCS commission of 2.5% of farm-gate price

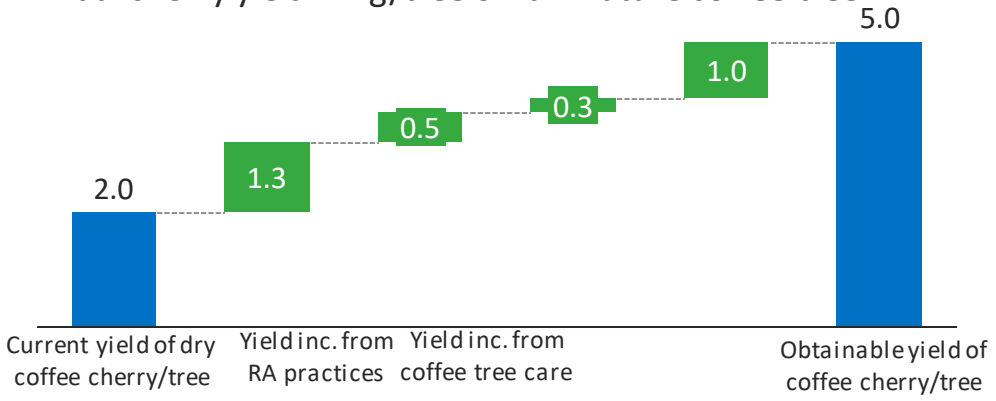
4. The impact case | Farm-level

Assessing farmer impact and opportunities for improvement

Accessing blended services of Sucastainability, farmers increase their coffee yield and hence higher income from coffee

Coffee yield increase resulting from adopting of GAP practices and applying the right quantities of high-quality inputs

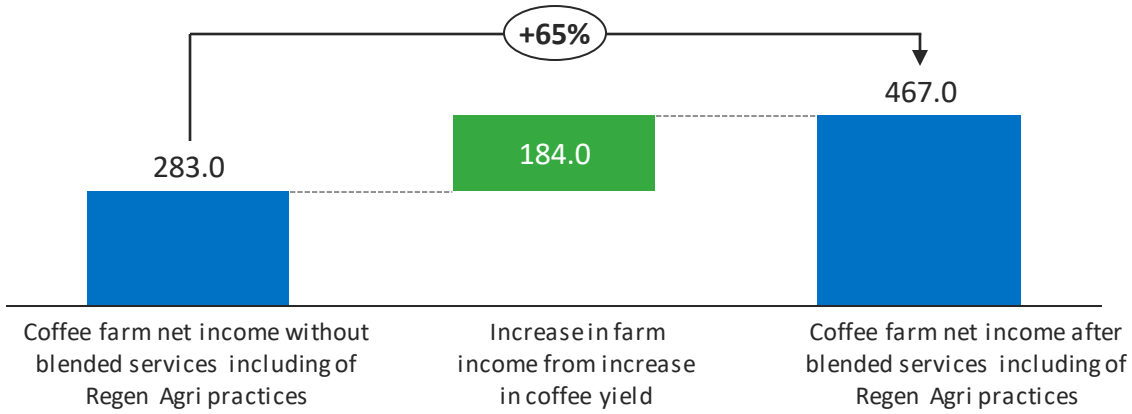
Annual cherry yield in kg/tree of full mature coffee-tree



- Current coffee yields in for the Segment 1 and Segment 2 farmers are an average of 2 to 2.5kg of cherry per tree, which is below potential yields of 5 kg of cherry per tree in best managed farms – such low yield is commonly attributed to lack of GAP and lack of use of high quality inputs over the years.
- Access to the SDM service package entail that farmers are informed of the right amounts of agri-inputs needed due to soil testing, are able to apply quality agri-inputs due to pre-financing and are trained on the application of GAP on pruning, weeding and harvesting.

Segment-1 farmer coffee net income increase due to increased productivity of coffee from adoption to GAP and regen agriculture

Price in KES/kg cherry for different farmer segments

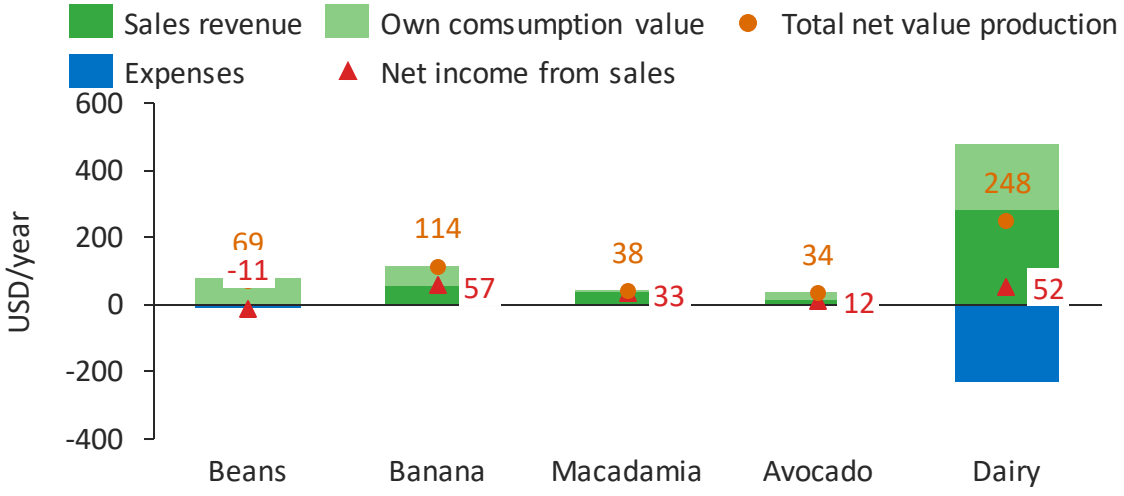


- Segment-1 farmers' coffee income increases by 65% mainly from increase in coffee cherry yield/tree. Increase in average price of coffee can provide another leg up for income growth.

By providing services to farmers for other crops, which are profitable and for which market opportunities exist, Sucastainability can further support increases in farmer livelihoods and farmer income resiliency

Comparing additional net income from diversification activities

Year net income from sales, own consumption value and total net value production in USD/year



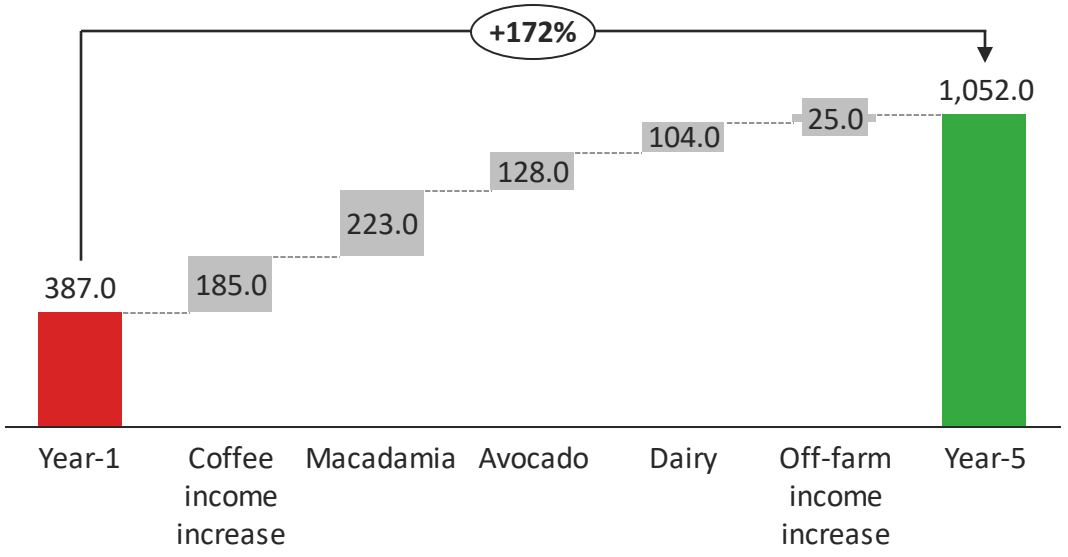
Unit of analysis	0.1 acre	0.1 acre	1 tree	1 tree	1 Cow

- The income per unit indicates the potential income and expenses from each unit of a diversified enterprise. Underlying units for each crop and livestock are different and can be compared with each other only after taking all other parameters such as investment required, land area, labour requirement into consideration
- The total units of each crop, tree or livestock are limited by the size of farm land to support all the planned activities

Note: * Doesn't include cost of cow purchase in year-1

Diversification of farming activities outweighs initial other crop income

Income increase of segment-1 farmer by year-5 vs year-1* (USD/year)



- Providing blended services to farmers and supporting diversification strategy helps farmer increase their income and income resilience by increasing income from coffee and providing additional income from avocado, macadamia and dairy enterprises
- The proposed diversification approach **doesn't require additional land or significantly high investments** or labor, increasing the feasibility of more farmers adopting to the same

A clear phase-wise implementation road map for farmers, which is linked to expected outcomes from previous phases helps mitigate risk for farmers

Gradual and outcome-based investments to mitigate risk and smoothen transition to RA

Step 1
Assessment and plan: Soil testing and profiling, plan tree crops layout (coffee, macadamia and avocado
), and livestock

Move to step-2 based on:
- Farmer motivation to adopt
- Farmer (FCS) loyalty to Sucastainability

Step 2
Phase-1 of RA implementation: plant 5 each of macadamia and avocado trees, beans in farmer plots.

Move to step-3 based on:
- Net positive cashflow from Dairy and banana
- Adoption of soil regeneration practices such as applying organic manure

Step 3
Soil restoration: Mulching, applying compost, apply organic manure, water retention.

Move to step-4 based on:
- Net positive cashflow from diversification crops taken together

Step 4
Shade management, reduce usage of chemical fertilizers and pesticides, spraying foliar micronutrients

Sequence of investments

Key investments
- None

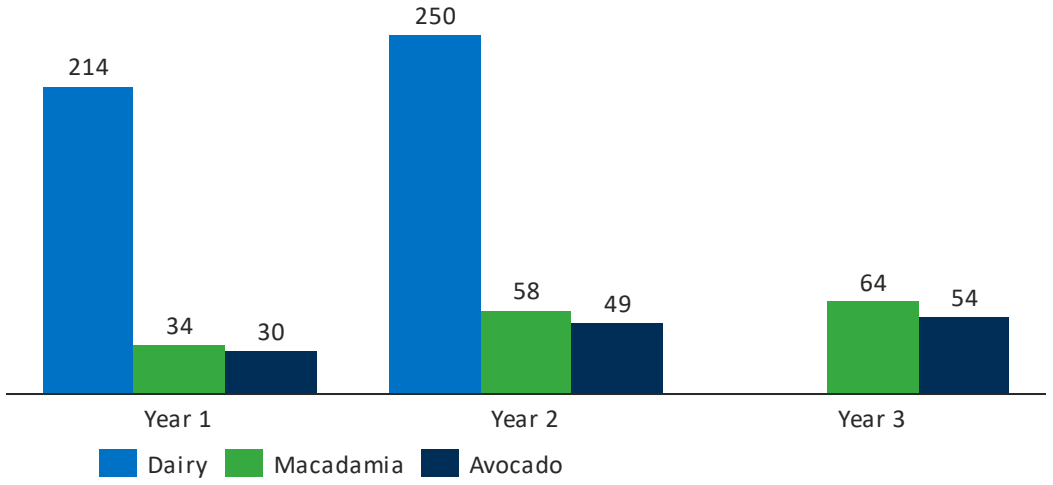
Key investments
- Planting of 5 more trees per acre of Macadamia or Avocado trees till reaching optimal plant density

Key investments
- Planting of 5 trees per acre either of Macadamia or Avocado

Investments required for crop diversification are not high (except for cow), therefore farmers with Sucastainability help can invest in crop diversification by accessing loans

Investment required by farmers towards diversification

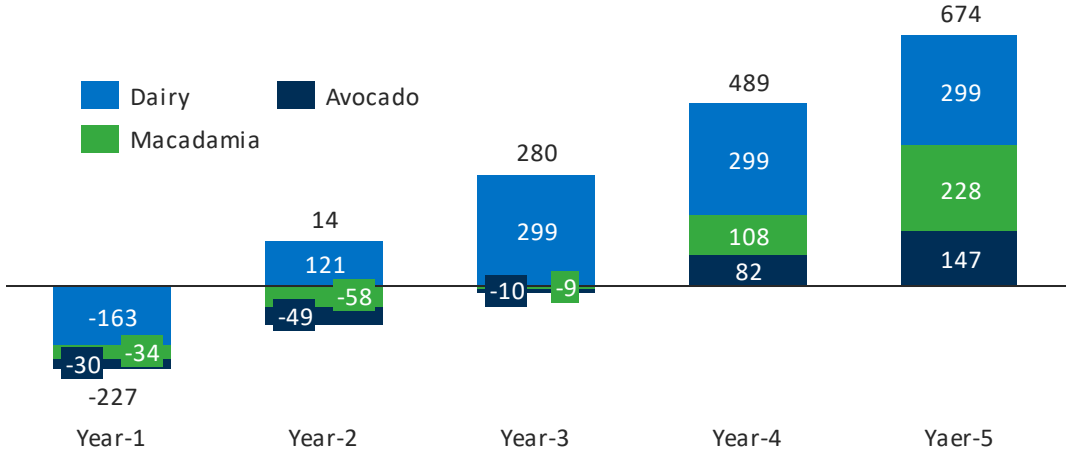
USD/year



- The crop diversification options explored are not capital intensive except for cow, the initial purchase price of which is expensive followed by making arrangements for cows shelter resulting in **over $200/year of investments** for 2 years for 2 cows.
- However since the cow yields milk after a few months from purchase, the farmer will have positive cash flow dairy from year-2 onwards. Therefore, the dairy enterprise **require financial support for farmers mostly in year-1**.
- Macadamia and avocado together needs about $100 investment per year for first 2 years whereas the trees start producing the fruits from year-3 onwards.

Segment-1 farmer income* from diverse crops

Farmers will be net cashflow positive from year-2 (USD)



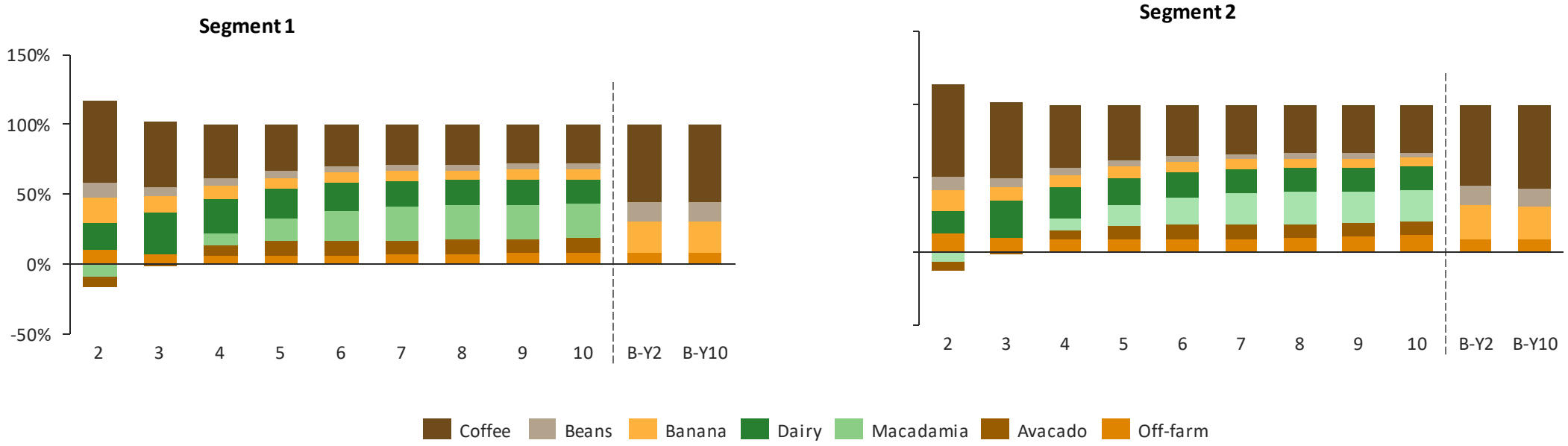
* Including value of own consumption

- For farmers undertaking crop diversification activities in dairy cows, avocado and macadamia, in year-1 they will have negative cash flow mainly due to dairy investments
- Nonetheless the cows are expected to produce milk after a few months of purchase leading to a **positive cash flow for farmer from year-2** onwards on entire diverse crop portfolio
- Tree crops of Avocado and Macadamia will turn net cash-flow positive from year 4 onwards and reach **peak production** level by year-6 or 7.
- In the long run, to sustain and increase the farm income from diversified crops, it is critical for tree crops to yield according to expectation with reliable market access for the produce

By adopting regen agri practices including of crop diversification, farmers will become more financial resilient to shocks, because of a well diversified income portfolio.

Income distribution from farming activities

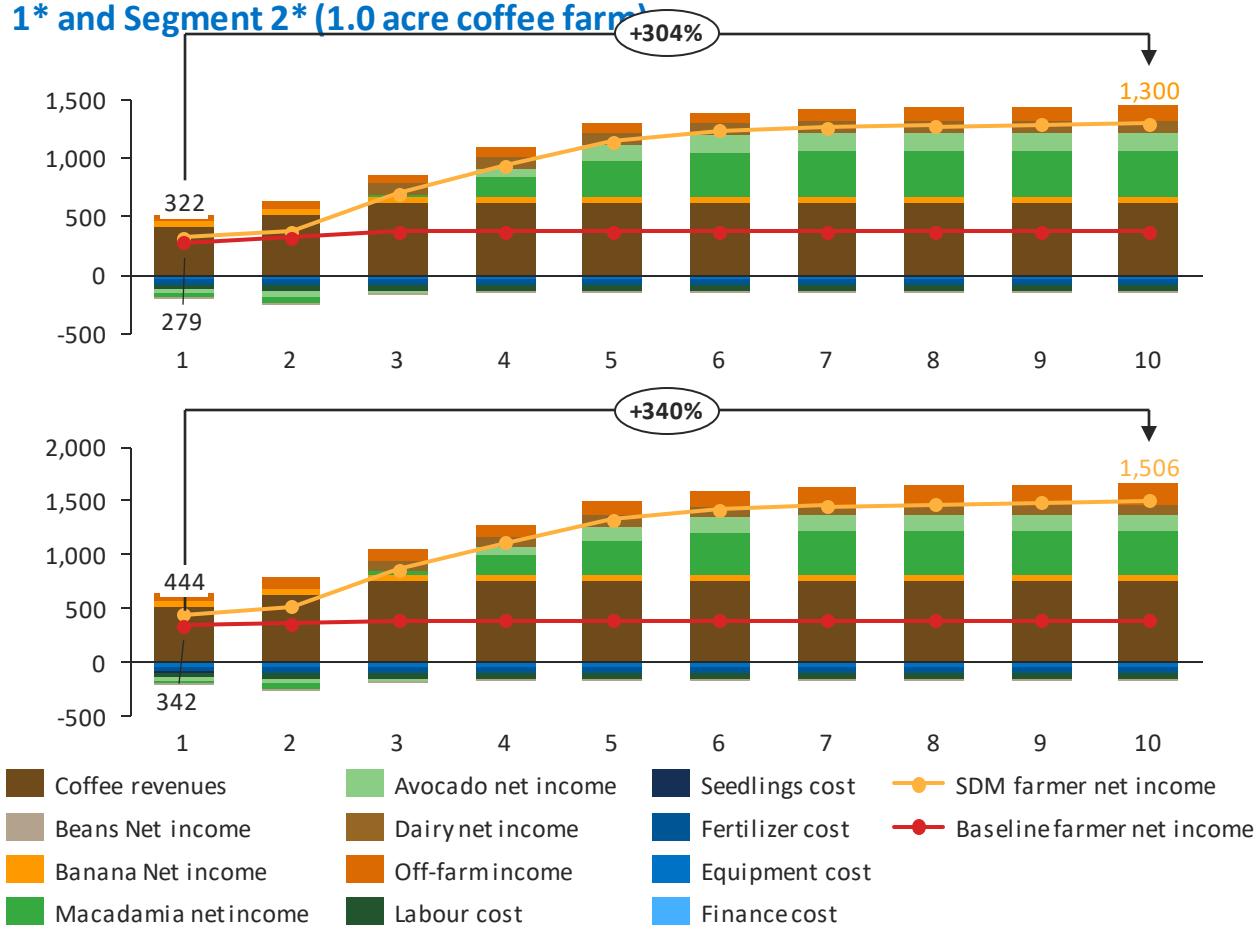
Distribution of net income in %/year compared to Baseline year 2 and 10



- Compared to the Baseline, who are currently already growing beans and banana, all SDM segments are able to diversify their income even more with other activities.
- SDM farmers decreased reliance on a single crop as a source of income, makes them more resilient to climate change and climate shock that cause unforeseen yield variation and crop losses.
- Dairy contributes largest share of diverse income in the initial years up to 4th year and from then onwards the ramp up in production from tree crops of avocado and macadamia will start gaining in their share of contribution and diversification of the income basket.

Segment 1 & segment-2 farmers can increase their total farm income by 3x and 3.5x by 6th year due to coffee yield/quality improvement from their access to blended services and investing in diversified crops of avocado, macadamia and dairy

Comparing total farm net incomes of baseline and SDM farmers of Segment 1* and Segment 2* (1.0 acre coffee farm)



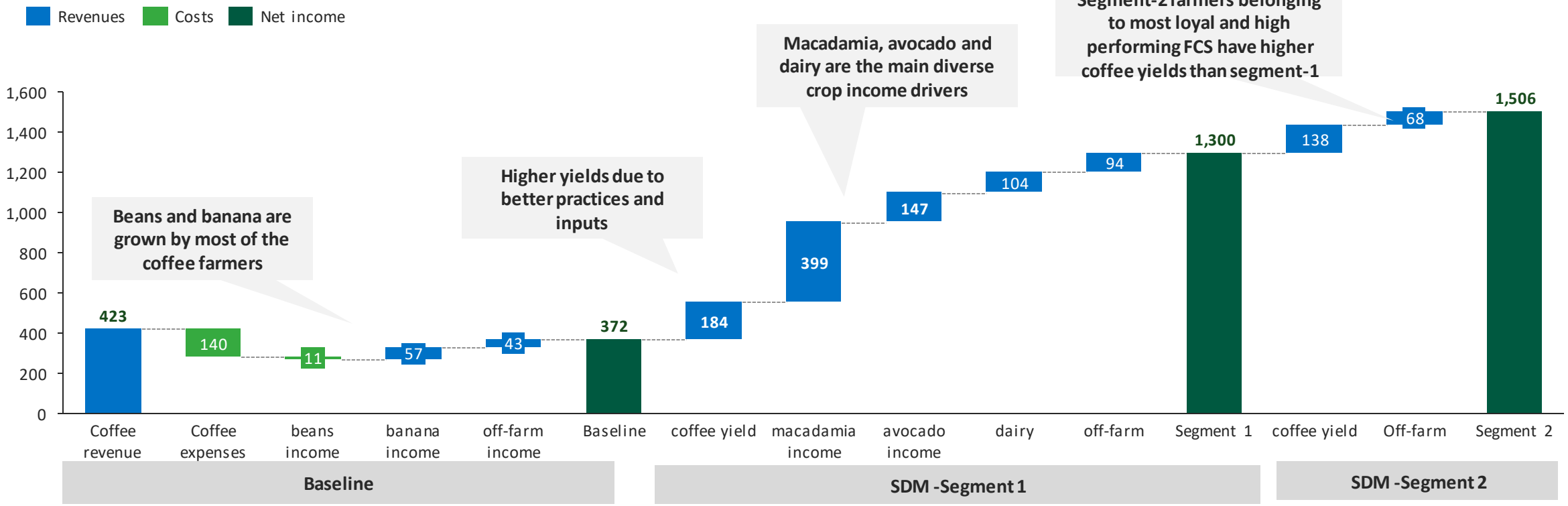
- SDM farmers of Segment 1 could increase their annual **net income with 304% over 10 years time** from USD 322 to USD 1,300.
- SDM farmers belonging to Segment 2 could increase their annual net **income with 340% over 10 years time** from $ 444 to $1506.
- The income improvement can be attributed to the support from Sucastainability in providing services such as GAP training, quality inputs, pre-financing coffee production expenses, FCS organization and capacity building which increases farmers' coffee yields, and quality..
- Sucastainability will continue to broaden their support to the farmers by training them in **applying regenerative agriculture practices that improves soil health including soil testing, income diversification** which gives farmers to diversify their income.
- Although both Segment 1 and 2 farmers have the same coffee farm size, segment-2 farmers earn 15% higher income mainly due to slightly higher coffee productivity than segment-1.

*Note: * net income calculation doesn't consider cost of cow purchase in year-1 and excludes own consumption value in all the years*

Segment-1 SDM farmer earns nearly 3 times the income of baseline farmer, half of the higher income is contributed by higher coffee yield/quality and remaining half by diverse crops. Segment-2 farmer earns 15% higher than segment-1 mostly from slightly higher coffee productivity

Comparing net incomes* of baseline and SDM farmers (Year-10)

Split by revenue and expenses drivers, in USD/year



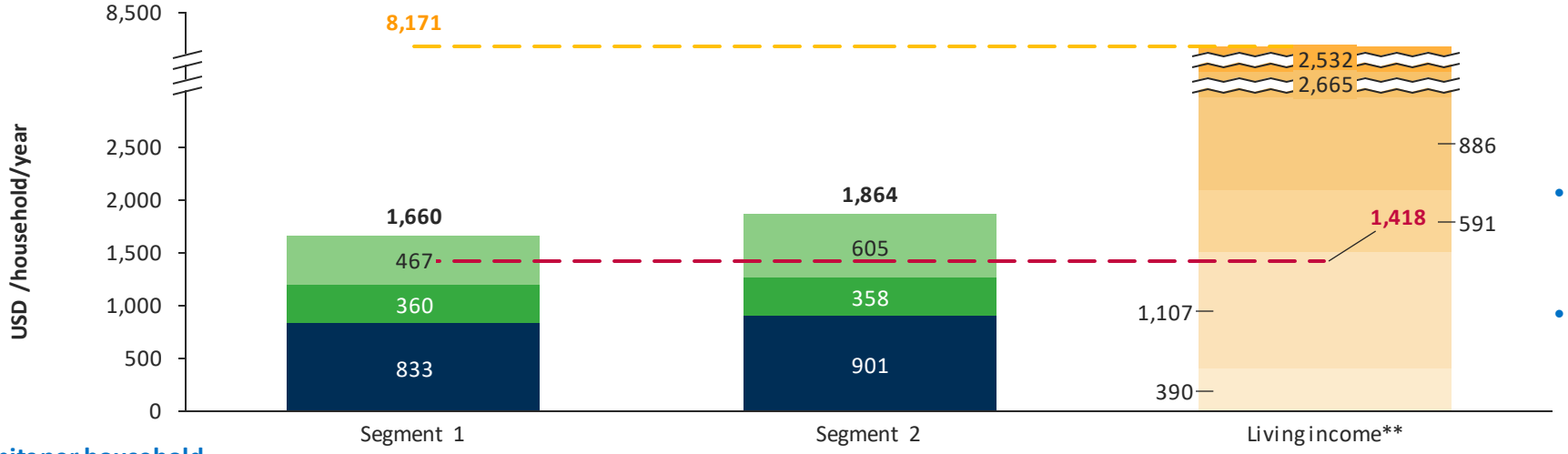
- Refer to slide-17 for details on FCS/Farmer segmentation

*Note: * net income calculation doesn't consider own consumption value*

All farmers who enter the SDM can earn more than the poverty line, although Segment 1 farmers remain reliant on diversified income. Farmers with larger farms can close the gap to a living income.

Comparing household income, living income benchmark and poverty line

Shown for each farmer segment, in USD/household/year from for year-10



Units per household

Coffee	0.4 acre	0.4 acre
Coffee tree density	540 trees/acre	540 trees/acre
Beans (intercropped)	0.2 acre	0.2 acre
Banana (intercropped)	0.1 acre	0.1 acre
Macadamia (shade tree)	12 trees	12 trees
Avocado (shade tree	12 trees	12 trees
Cows	2 cows	2 cows

- Coffee income
- Own consumption value
- Other income
- Poverty line*
- Living Income**
- Food
- Housing
- Transport
- Healthcare
- Education
- Other

Impact on farmer incomes

- All SDM farmer segments in Sucastainability SDM will be able to earn (including own consumption value) more than the poverty line of $1,418 by year-10.
- However, none of the SDM farmers can earns the living income benchmark* of $8170.
- The current living income benchmark is not differentiated for urban or rural living. Presuming the rural living income to half of the benchmark, the farmers will still fall short of the benchmark
- Despite improvement in coffee productivity and crop diversification options, land size of 1-acre is a critical limitation for farmers to reach living income.

**The Worldbank poverty line was adjusted to a household of 5 members and a PPP conversion factor of 46.41 KES per $.*
***The living income benchmark is based on the family composition of 2 adults and 3 children with 1.7 FTE. The data was based on the living wage for a standard family from Wage indicator (2019) and corrected for inflation.*

The gap to a living income for the Segment 2 farmers could be closed further if farmers would increase their land to coffee cultivation and simultaneously achieve the max yield of 6kg of cherry per tree

The **net income of a SDM farmer (Segment-2) including own consumption value** amounts to **$1,866** in the **tenth year of the SDM**. The table below shows the feasible improvements for each of the income drivers* to increase this income towards the level of the living income benchmark. This benchmark is **$8,170**, so **an income gap of 77% remains.**

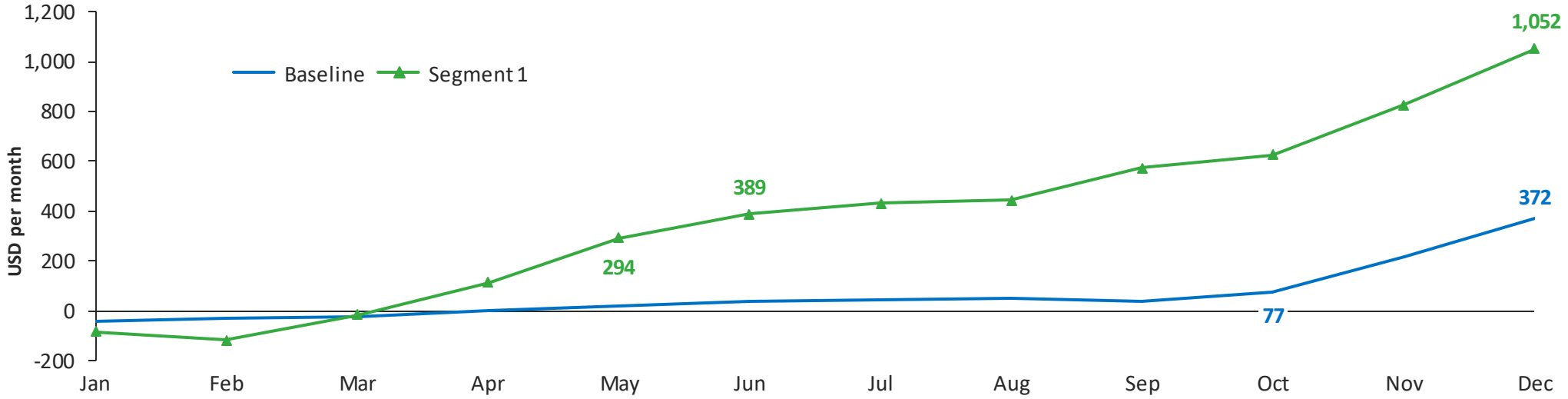
	Baseline assumption	Max obtainable assumption	Corresponding income	Remaining LI gap	Effectiveness	Feasibility	Comment / explanation
Farm size (Acre)	0.4	**1.0** (*+150%*)	$ 2811 (*51%*)	66%	High	Low	SDM farmers own on average 1.0 acre of farmland, so they could convert this into coffee cultivation. However, this means they would have less additional income from diverse crops and while the topline income might increase, their income will be less resilient.
Yield (kg cherry/tree)	5	**1** (*+20%*)	$ 2004 (*+7%*)	75%	Medium	Medium	Segment-2 farmers are already presumed to double their productivity. While theoretically it may be possible for further increase in coffee yield, the probability of further yield increase might be lower
Price (KES/kg cherry)	KES 80	KES 100 (*25%*)	$ 2037 (*9%*)	75%	Low	Low	Improvement in coffee quality and specialty branding will contribute to higher prices. However, coffee price in global markets are not in control of farmers or Sucastainability.
Income from diversification ($/year)	649	649 (-)	$ 1866(-)	77%	Low	Low	SDM farmers are already assumed to implement a wide range of crop diversification activities, further expansion of the activities might not be possible in the medium term

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

SDM farmers cashflow situation sees much improvement due to diverse crop options compared to baseline farmers for whom most cash inflow occurs during main coffee season

Comparing cash flows of Baseline and SDM farmers in Year-5

Cumulative in USD/month



Coffee

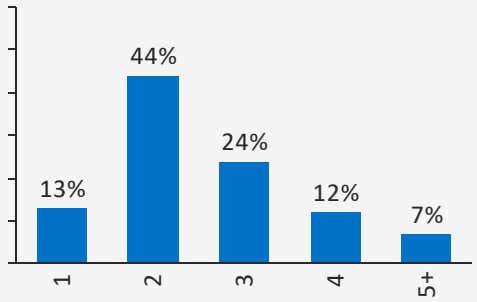
- *Pruning & Mulching*
- *Fertilizer*
- *Lime*
- *Manure*
- *Planting*
- *Weeding & Slashing*
- *Harvesting & Pay-out*
- *Harvesting & Pay-out*
- *Pruning & Mulching*
- *Fertilizer*
- *Lime*
- *Manure*
- *Weeding & Slashing*
- *Harvesting & Pay-out*
- *Herbicide*

Other

- *Beans & Maize*
- *Beans & Maize*
- *Macadamia*
- *Banana & Avocado & Dairy*

Sucastainability coffee farmers are mainly subsistence farmers focused on growing few additional crops, but are keen to expanding their farming activities under right guidance

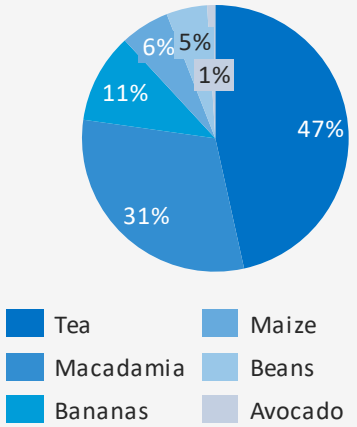
Number of crops cultivated



Crop diversification is fairly limited among the farmers

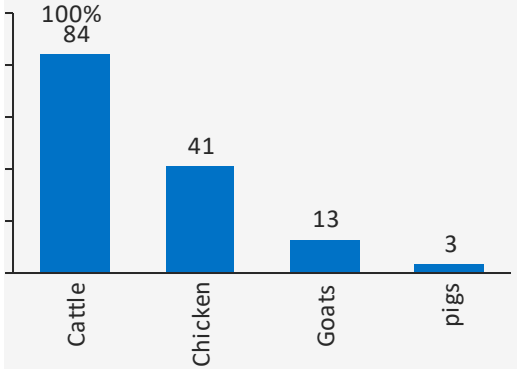
On a total of 356 farmers

Main crops cultivated (+coffee)



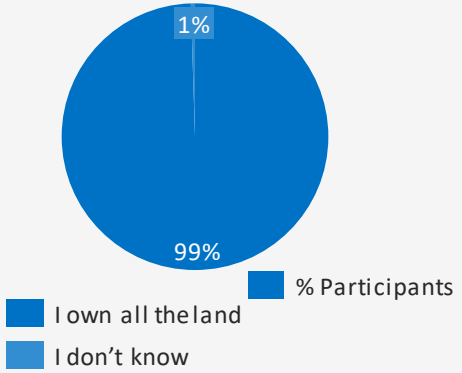
On a total of 302 farmers

Main livestock reared



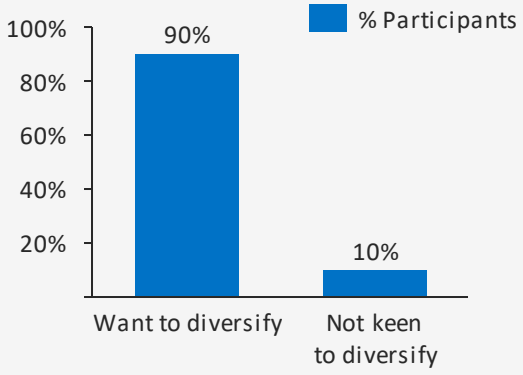
On a total of 199 farmers

Land ownership



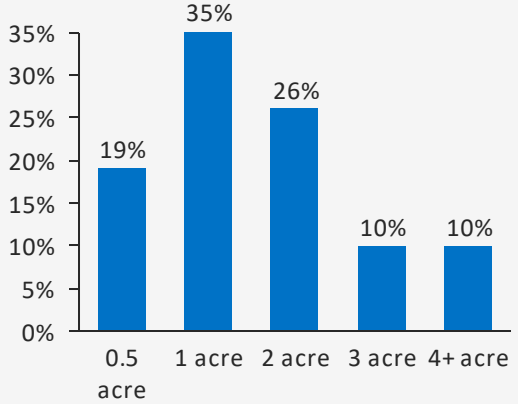
On a total of 359 farmers

Farmers willingness for crop diversification



On a total of 356 farmers

Total farm land size



On a total of 351 farmers

Source: PDC

5. Annex

This section includes the following subchapters:

About coffee in Kenya

Assumptions and methodology

About the context

Understanding the context of the SDM

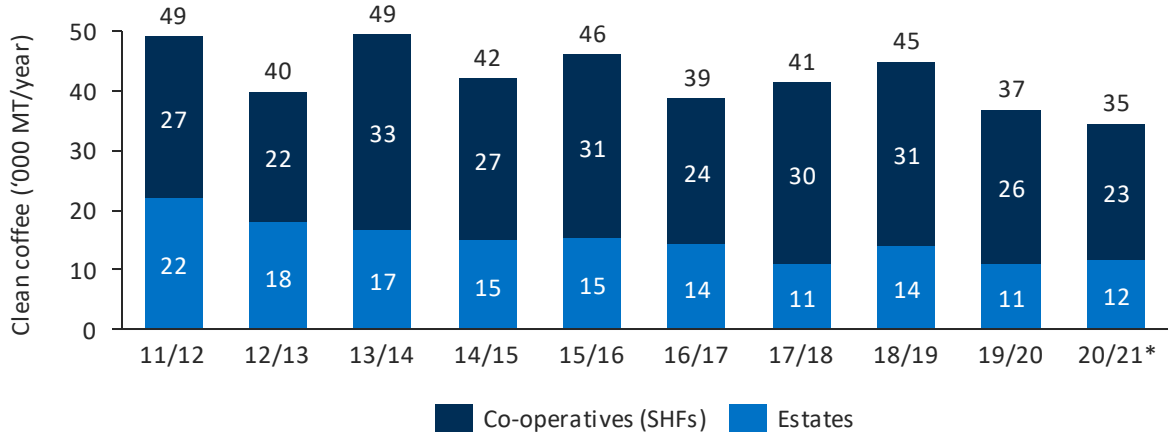
This section:

- *Describes the coffee market and value chain in Kenya*
- *Analyses the enabling environment and key sustainability risks*

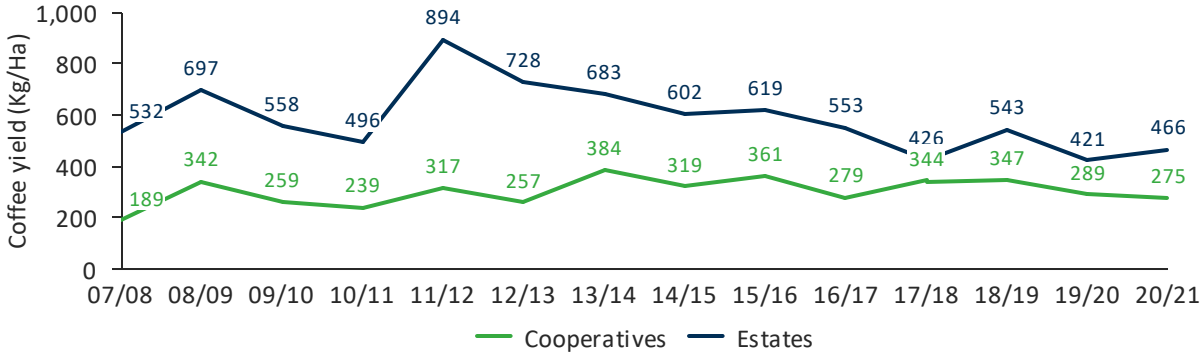
Kenya has historically produced some of the highest quality arabica coffees in the world, remarked for their acidity, intensity, and complexity of flavour

Kenya's coffee production (2011 – 2020)[4]

Co-operatives (land size <2 Ha) and estates production volumes



Coffee yield (2007 – 2020)[4]



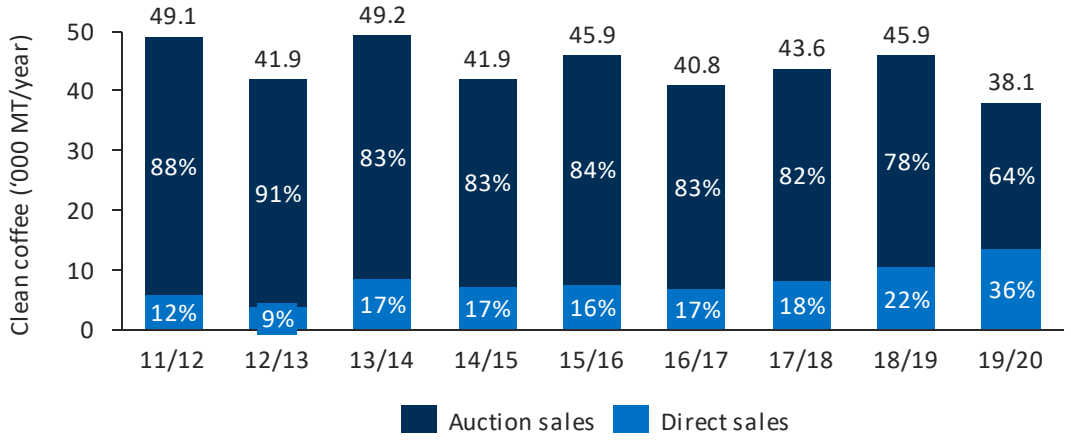
- Globally, coffee is produced in over 60 countries. The **top five producing countries:** Brazil, Vietnam, Colombia, Indonesia and Ethiopia **account for 75% of the global production**[1].
- Although **Kenya** is famed for her **specialty coffee**, the country's **production is estimated at 0.5% of the total global output**[1].
- Kenya predominantly produces **Arabica coffee** (c.99% of total output) which is **highly demanded** globally due to its exceptional taste.
- **Kenya coffee is produced under two systems**: smallholder farmers (SHFs) who predominantly operate farms with coffee tress occupying below two Ha and are affiliated to **co-operative societies** (FCS) and **coffee estates**, which are individually managed coffee plantations of two Ha and above. 70% of the country's production is from SHF[2].
- Kenyan coffee is **mainly grown under rain-fed conditions** although some large estates rely on irrigation. Use of **shade tress to mitigate effects of climate change is becoming increasingly popular** in coffee production[1].
- Kenya's peak production was at an all time high of 129,000 MT during the 1987/88 season[3]. However, **production and productivity has been declining** mainly due to adverse weather, urbanisation, inadequate use and application of inputs and increase in competition from other horticultural crops[2].
- **Widespread pests and crop diseases** have pushed farmers away from older coffee tree varieties towards **disease resistant varieties** including Batian and Ruiru 11[2].

Sources: [1]International Coffee Organization, [2]Coffee Directorate Yearbook 2019 – 2020, [3]Sauti ya Kahawa Strategic Plan 2018 – 2022 ,[4]KNBS – Economic Survey

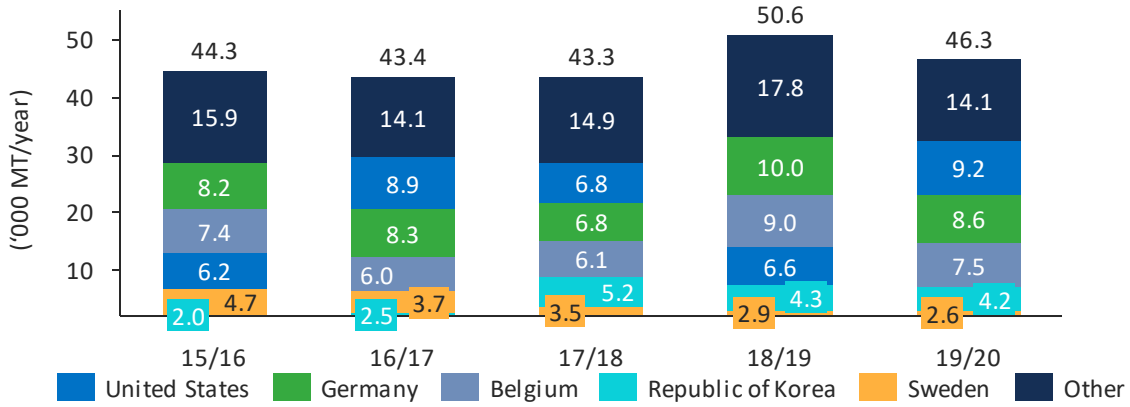
**20/21 figures are provisional. The coffee year runs from October to September*

There's minimal value addition on coffee locally. Over 90% of exports are in green bean form and value addition occurs in exporting destinations.

Kenya's coffee marketing (2011 – 2020)[4]



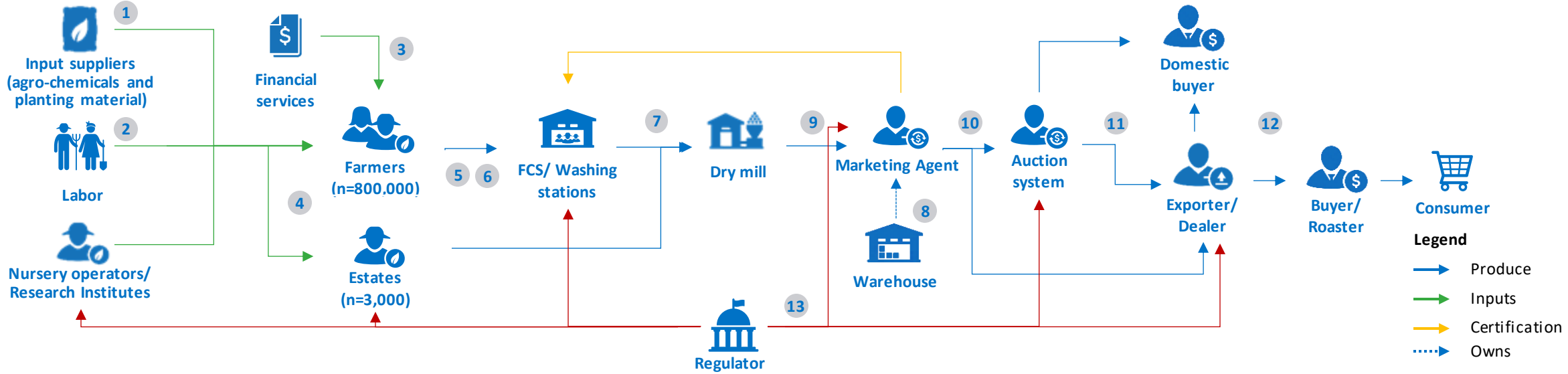
Kenya's coffee exports* by destination (2015 – 2020)[4]



- **90% of Kenyan coffee is wet processed** at washing stations owned by FCS and estate farmers, with the balance dried into buni[1].
- During dry milling, wet processed coffee is milled, polished, graded and classified. **Kenya has an estimated installed dry milling capacity of 400,000MT which translates to a 10% capacity utilization** at current production[2].
- Kenya has two coffee **marketing systems: Central auction system**, which was established for price discovery and is managed by the Nairobi Coffee Exchange Management Committee **and direct sale**[1].
- **Green coffee is offered for sale by a licensed marketing agent** on behalf of the estate and SHF. Ownership of **coffee remains in the hands of the producer until it is sold**[1].
- Marketing **agent fees are regulated** by the government and **must not exceed 3% of the gross coffee sale proceeds**. Marketing agents are **required to pay the coffee producers within seven days** of receipt of the coffee sale proceeds[3].
- **FCS are required to pay at least 80% of sale proceeds to farmers[1].**
- In 2019/2020, **98% of coffee exports were in green bean form. c.66% of exports went to the top 5 destinations**[3].

Sources: [1]International Coffee Organization, [2]Sauti ya Kahawa – Study of Coffee Processing in Kenya, [3]Kenya Coffee Act, [4]Coffee Directorate Yearbook 2019 – 2020
**volumes inclusive of green bean and roasted/ground coffee*

While the highly regulated setting of the Kenyan coffee value chain allows for transparency and farmers remain owner of their produce until point of sale, market control remains in the hands of a few key players



Inputs	Cultivation	Aggregation & processing	Manufacturing / Retail

1. Coffee production is operated on small plots, with limited use of inputs.
2. Women provide over 60% of the workforce in farms and wet mills, but they are often excluded from farmer group membership, training, access to inputs and marketing decisions – as men have the ownership.
3. Due to a lack of collateral, smallholders are not able to access formal finance independently, therefore FCS access loans through SACCOs.
4. Kenya's 800,000 smallholder coffee producers produce the majority of Kenya's coffee (65%). The remaining 35% are produced by Kenya's 3,000 large-scale farm estates.
5. Smallholders are legally obliged to be member of Farmers' Cooperative Societies (FCSs).
6. FCSs are the vehicle through which smallholders access key services such as credit, farm inputs, and secondary processing services. Members combine resources for the common goal of growing, processing and marketing their coffee and all costs are shared before the final payment to farmers is made.
7. Dry mills remove the husks from the parchment, and grade and bag the green coffee.
8. Warehouses store the coffee and provide a title or warrant. This warrant is needed to retrieve the coffee from the warehouses once it is sold.
9. Marketing agents manage the entire sale process (including money and physical coffee ownership transfer).
10. Nairobi Coffee Exchange holds auctions and verifies the auction process is correctly executed.
11. Roasters/traders/exporters purchase green coffee at auction for roasting or to trade and export the coffee outside Kenya.
12. 95 % of the coffee is exported and 32% of that coffee that is certified.
13. Policies and regulations cut across the entire coffee value chain in Kenya.

Sources: Kenya Coffee Platform Economic viability study (2021), IDH IKF EA coffee Programme 2021, IDH Coffee income diversification Study Kenya 2020

Swiss Confederation Federal Departement of Economic Affairs, Education and Research EAER State Secretariat for Economic Affairs SECO
Ministry of Foreign Affairs
DANIDA
IKEA Foundation

Assumptions and methodology

Key assumptions and background information

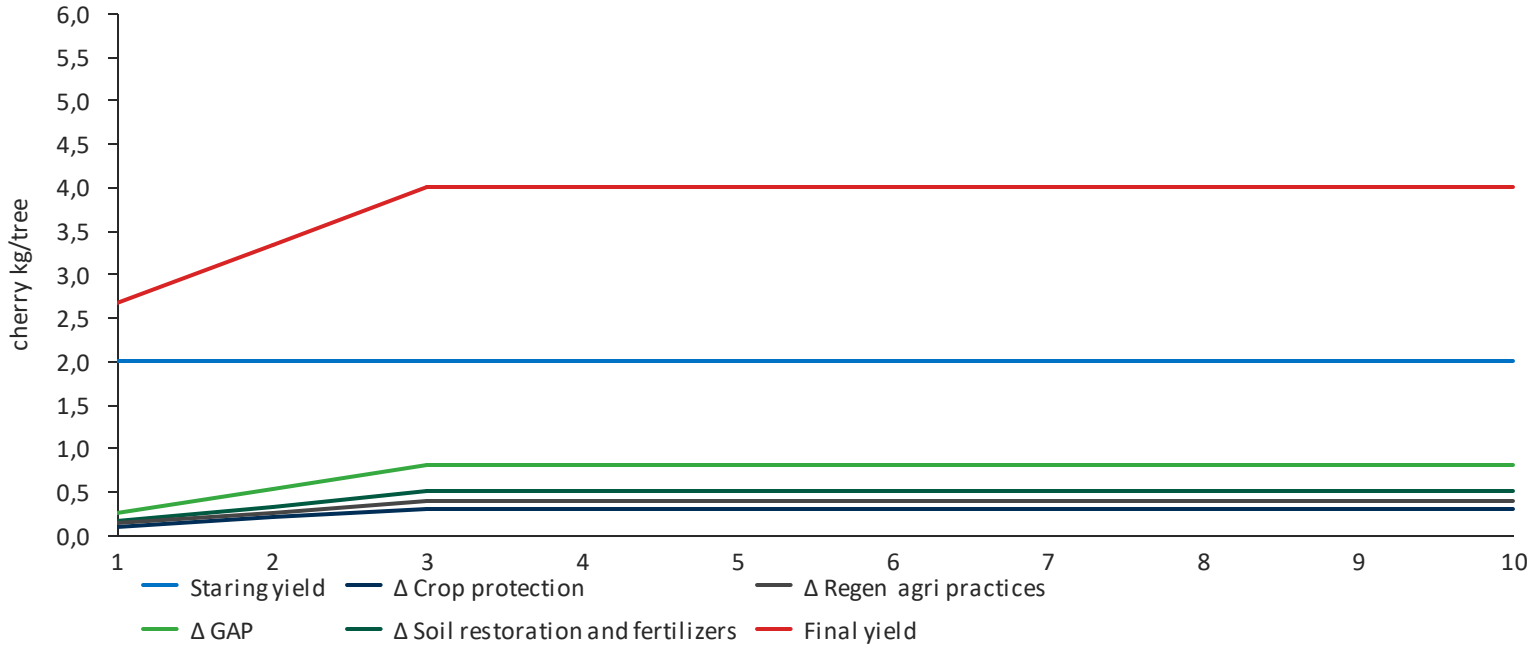
This section:

- *Shows all assumptions used for the SDM operator*
- *Shows all assumptions used for the different farmer segments*
- *Contains a list with all abbreviations used in the report*

Coffee cherry yield-curve from GAP, crop protection, fertilizers and regenerative agriculture practices

Segment 1 farmer yield curve of coffee dry kg/tree

10-year projection of cherry kg/tree due to GAP, pruning and harvesting teams, compost and diversification



Δ GAP	20%	40%	60%	80%	100%	100%	100%	100%	100%	100%
Δ Pruning and harvesting	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Δ Compost	20%	40%	60%	80%	100%	100%	100%	100%	100%	100%
Δ Diversification	20%	40%	60%	80%	100%	100%	100%	100%	100%	100%

- SDM farmers receive training on GAP and have access to high quality inputs which allow the farmers to increase their yield by from 2kg cherry/tree to 4kg cherry/tree.
- Additionally, the regenerative agriculture practices which Sucastainability supports its farmers to implement would allow them to increase their coffee yield due to applying compost, manure, and micronutrients and due to the planting of shade trees and intercropping with beans.

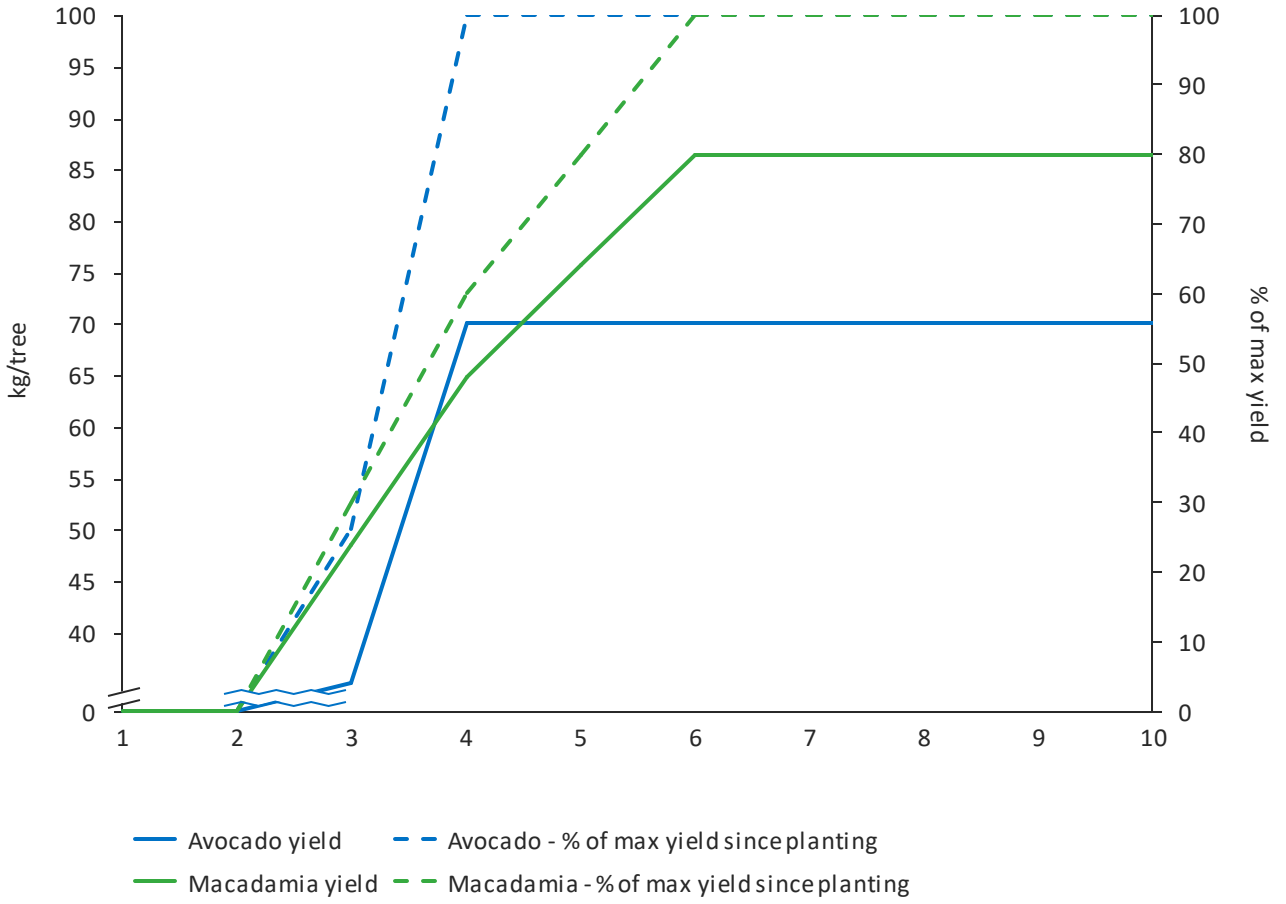
Farmer P&L Assumptions

Variable	Segment_1	Segment_2
Coffee Farm size (acre)	0.40	0.40
Total farm size (acre)	1.0	1.0
Farm size for other crops (acre)	0.6	0.6
Coffee yield (cherry) – current (kg dry/tree)	2 – 2.5	2 – 2.5
Coffee yield (cherry) – optimal (kg dry/tree)	4.0 – 5.0	
Farm-gate price (KES/kg cherry)	90 - 100	
Tree-density (trees/acre)	540	540
Coffee tree intensification	No	
Sales channel (%)		
Direct sales	20%	
Auction sales	80%	
Maximum amount pre-financed by Sucastainability	40%	
Off-farm income	15% of total income	
Household size	5	

Farmer P&L Assumptions

Yield curve of avocado and macadamia

10-year projection of yield per tree in kg/tree and in % of max yield since year of planting



Variable	Value
Beans	**2022 →**
Farm-gate price	50 KES/kg
Own consumption	100%
Banana	**2022 →**
Farm-gate price	200 KES/bunch
Own consumption	50%
Macadamia	**2022 →**
Farm-gate price	60 KES/kg
Own consumption	10kg/year
Avocado	**2022 →**
Farm-gate price	15 KES/kg
Own consumption	10%
Dairy	**2022 →**
Farm-gate price	30 KES/litre
Own consumption	730 litres/year

Farmer P&L Assumptions

RA implementation	1	2	3	4	5	6	7	8	9	10
Coffee	40%	70%	100%	100%	100%	100%	100%	100%	100%	100%
Beans	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Banana	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Macadamia	42%	84%	100%	100%	100%	100%	100%	100%	100%	100%
Avocado	42%	84%	100%	100%	100%	100%	100%	100%	100%	100%
Dairy	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%

RA financing strategy	1	2	3	4	5	6	7	8	9	10
Coffee	Farmer	Farmer	Farmer	Farmer	Farmer	Farmer	Farmer	Farmer	Farmer	Farmer
Beans	Farmer	Farmer	Farmer	Farmer	Farmer	Farmer	Farmer	Farmer	Farmer	Farmer
Banana	Farmer	Farmer	Farmer	Farmer	Farmer	Farmer	Farmer	Farmer	Farmer	Farmer
Macadamia	Sucastainability	Farmer	Farmer	Farmer	Farmer	Farmer	Farmer	Farmer	Farmer	Farmer
Avocado	Farmer	Sucastainability	farmer	Farmer	Farmer	Farmer	Farmer	Farmer	Farmer	Farmer
Dairy	Farmer	Farmer	Farmer	Farmer	Farmer	Farmer	Farmer	Farmer	Farmer	Farmer

SDM P&L Assumptions

Variable	2022	2025
Total farmer numbers	50,030	66,590
Segment 1	30,560	40,675
Segment 2	19,470	25,915
Total sourcing volumes (kg green bean)		
Direct sales price (USD/kg green bean)		
Auction price (USD/kg green bean)		
Number of demo plots	1000	1300
Staff numbers		
Exchange rate	112 KES/USD	

List of abbreviations

Abbreviation	Meaning
DMA	Digital Maturity Assessment
DTA	Digital Transformation Assessment
EBIT	Earnings Before Interest and Taxes
FTE	Full-time equivalent
GAP	Good Agricultural Practices
GDP	Gross Domestic Product
IT	Information Technology
MT	Metric Ton (1,000 kg)
NGO	Non-governmental organization
P&L	Profit and Loss statement
SDM	Service Delivery Model
SHF	Smallholder farmer
SWOT	Strengths, Weaknesses, Opportunities & Threats
USD	United States Dollar (currency)

IDH has adopted the following definitions to define the extent to which a gender lens has been integrated by partners. IDH aims for all its projects to be intentional and for some to be transformative.

Gender unintentional

No steps taken to understand the different needs and preferences of men and women, or target gender gaps/barriers.

Gender intentional

Considers the different needs and constraints of women and men and takes some steps to create gender equality. Such projects adapt to the needs of women and men without seeking to change gender norms or barriers.

Gender transformative

Understands the different needs and constraints of women and men and address the root causes of gender inequality. A gender transformative approach needs to foster changes in **individual capacities (agency)**, **gendered norms and expectations (relations)**, and **institutional rules and practices (structures)**.

Why we believe investing in women can work for business

- By tailoring goods and services to the needs of women, companies can reach a large and often underserved market, potentially increasing revenues from service provision or enhancing their supply security.
- If women had similar access to and control of productive resources as men, yields of female farmers could increase by up to 30 percent. Higher farm yields and incomes create greater business opportunities for companies working with those farmers.
- Companies that are committed to gender equality outperform their peers. Improving gender diversity in the workplace can improve a company's financial performance by up to 25 percent.
- When companies are seen to invest in gender equality, this has the potential to lead to higher levels of farmer and/or worker loyalty. Conversely, unequal opportunities for women can negatively affect companies' reputations which can lose businesses customers as well as workers.

Living income benchmark methodology

Living Income

Earning a living income means that all income sources from a farming household are sufficient to afford a basic but decent cost of living for a family

Living Income Benchmark

The Living Income Benchmark is equivalent to the cost of decent living for a family

Cost of a decent standard of living for a family

(specific to a time and place)

Living Income Gap

Living Income Gap

Other income

Off-farm income

Farm income

Home consumption

Actual income

To measure the Living Income Gap, **compare the living income benchmark with farmers' actual income** (earned by **all adult household members** from their own farming enterprise, as well as all other income sources).

Next steps

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

Effects from regen agri on farm performance

Shade/temperature

Macadamia trees are planted between the coffee rows whereas avocado trees are planted at the boundaries of coffee farm. The shade from macadamia trees will reduce and mitigate temperature increase, leading to a potential yield increase. Further, diversification with trees enriches the soil due to roots penetration of the soil, and water collection to keep the moisture levels sufficient.

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Chemical -> Organic

Keeping of cows, and collecting of cow dung of them and other crop residues, farmers are able to make organic compost on their farm. The organic compost, in combination of applying other organic crop protection, will reduce usage of chemical fertilizer and chemical crop protection

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Beans

Beans are cultivated in midst of coffee plants. Beans function as a nitrogen fixator, enriching the soil to become more fertile and responsive to other inputs such as organic fertilizer.

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