

SDM: Case Report KPD Plc, United Republic of Tanzania

Service Delivery Model Assessment

September 2019

Public report



IDH introduction

Importance of Service Delivery

Agriculture 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 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 (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.

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

About this study

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

Thanks

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



Reading guide

In this document we present the findings of our study. You can navigate through the document by clicking on the index.

In this document you will:

- ✓ Understand what SDMs are
- ✓ Get a complete overview of the flows of goods, money and services in your SDM
- ✓ Analyze in depth all the implications of the different services
- ✓ Have a clear understanding of the financial performance of the SDM
- ✓ Get insights on the farmer business case

Contents

Overview of SDM stakeholders & objectives

Services, scale and organization of the SDM

Farm-level impact

Service entities

Financial analysis overall SDM

Conclusions

Annex





Overview of SDM stakeholders and objectives

This chapter provides a general introduction to the SDM partner and other relevant actors, as well as the SDM objectives and context.

In this section you will:

- ✓ Key learning questions for this SDM analysis
- ✓ Learn the basics about the SDM operator
- ✓ Understand the value chain in scope
- ✓ Get an overview of the stakeholders involved in the SDM
- ✓ Understand the objectives of this SDM

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Annex

Context – KPD Plc and United Republic of Tanzania



KADERES PEASANTS DEVELOPMENT

KPD COFFEE

- KADERES Peasants Development Plc (KPD) is a Tanzanian-registered public company, consisting of 8,271 shareholder farmers, with over 10 years experience buying beans, and organic and fair trade coffee¹.
- Headquartered in Kayunga, the Kagera region, KPD Plc currently works with 20,000 local bean farmers and 8,000 local coffee farmers in two districts namely Karagwe and Kyerwa.
- KPD is looking to expand to 100,000 bean farmers in the coming years, with the majority of their product destined for export.
- Bean products are exported to the East-African market and the World Food Programme (WFP), with planned expansions to Canada and Asia. Coffee products are exported to European and USA markets.
- Current production is 8,000 MT of natural coffee per year and 20,000 MT of beans per season.
- KPD's coffee products are certified organic and Fairtrade, receiving premiums for the focus on quality and sustainability.
- Kaderes and KPD are expected to become separate entities that play different roles in the service delivery model. Kaderes is a non-profit that provides services, while KPD Plc is an offtaker focused on making profit for its shareholders.

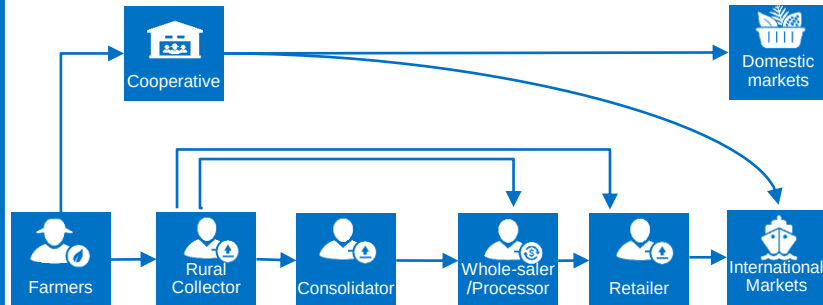


- Kagera is the remote north western region bordering Uganda, Rwanda and Burundi.
- Due to the distance to the main export hubs, most trade goes to the neighbouring countries or through Mwanza³.
- The main crops grown in the Kagera region are pulses (43%), cereals (33%), roots and tubers (18%), oil seeds (3%) and cash crops (2%)².

Sources: 1) <http://www.kpdcoffee.co.tz/index.php/2018-12-05-20-32-46>; 2) URT National sample census of agriculture - Kagera Regional report (2007); 3) FEWS NET (2018) Tanzania market fundamentals summary;

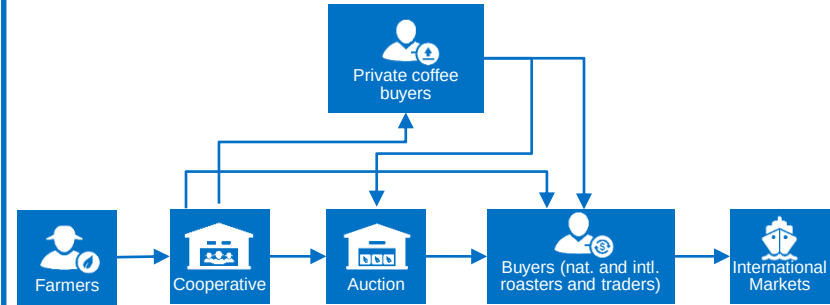
Context – KPD Plc and United Republic of Tanzania

Overview of the Tanzanian bean value chain



- Beans play an important role in the rural Tanzanian diet, being a staple for two-thirds of households,³ with the majority produced by smallholder farmers².
- Common beans are the most widely grown legume in Tanzania accounting to on average for between 60 and 75% of the annual production of pulses².
- The main production regions are the Southern Highland Zone, the Lake Zone and the Northern Zone². The Kagera region has the largest planted beans area⁵.
- The average yield of common beans is 0.6 MT/ha⁵ and the total annual production is around 1 million MT⁶.
- Beans are mostly sold dried, as this allows for longer product lifetime. This step is predominantly undertaken by the farmers themselves⁵.
- Post harvest handling, storage and processing (cleaning, sorting and packing) are fundamental steps of the legume grain value chain and are currently mostly performed by processors⁵. These steps have increasing income generation potential through mechanization and economies of scale⁴.

Overview of the Tanzanian Robusta coffee value chain



- With an annual coffee production of 55,600 MT, grown by half a million farmers on 265,000 ha, coffee represents a significant cash crop in Tanzania⁶.
- Over 90% of the coffee produced is exported to the international market, with Arabica representing the majority of production⁶.
- Robusta coffee volumes have been steadily growing over the past 30 years and currently represent about 45% of all Tanzanian coffee production. The average yield of Robusta coffee is 0.55 MT/ha⁶.
- The main Robusta production region is the Lake Zone², with the Kagera region having the largest planted coffee area⁷.
- 89% of the coffee is processed at the farmer or cooperative level, allowing farmers to capture some of the additional value created⁸.
- Regulations requiring smallholders to be part of a cooperative to process and sell their coffee, and high local taxes on produce encourages sales through informal markets and smuggling⁸.
- Commercial grade coffee is sold at government-supervised auctions, while premium coffee can be exported directly⁶.

Sources: 1) <http://www.kpdcoffee.co.tz/index.php/2018-12-05-20-32-46>; 2) FEWS NET (2018) Tanzania market fundamentals summary; 3) <http://agra.org/sstp/where-we-work/Tanzania>; 4) FAO (2018) Pulse crops for sustainable farms in sub-Saharan Africa; 5) The United Republic of Tanzania (2017) AAAS Crop and Livestock report; 6) BTC (2012) Organic Kidney Beans : potential for certified producers in Tanzania; 7) The United Republic of Tanzania (2017) AAAS Crop and Livestock report; 8) Tanzania Coffee Board (2011) Tanzania Coffee Industry Development Strategy

SDM Stakeholders and Entities Overview

	Legal Status	Function (within this SDM)	Revenue model (within this SDM)	Incentive for participation (within this SDM)
Service Providers				
	Private research group	Provision of quality planting materials	- Sale of seedlings to farmers - Stakeholder funding	Sector investment
	Foundation	Co-development of platform to give farmers access to finance		Creating access to finance for smallholders
Value Chain Partners				
 KADERES PEASANTS DEVELOPMENT KPD COFFEE	Private Limited Company	- Sources beans and coffee from farmers - Provisions of extension services to farmers	- Sales of services - Sales of certified produce (% of premium)	Create a solid production base of high-quality beans and coffee
	International non-governmental organization	Off taker of beans and coffee to support farmer's livelihoods		Support development of a sustainable beans value chain
Finance Providers				
	Not-for-profit organization	Providing finance to build a warehouse to support smallholders and create jobs in the region		- Creation of construction jobs for youth - Helping improve livelihoods of agricultural producers
	Not-for-profit organization	Assistance in developing the capacity building capabilities of KPD		- Improving access to domestically produced food for Tanzania - Fulfilment of mission and vision



SDM Objectives

Outcomes per Stakeholder

	Farmer 	SDM operator 
1 Increase high-quality certified Robusta coffee sourcing volumes and export to European markets	- Increased yields and incomes from coffee - Larger farmer population benefiting from access to markets	- Increased profitability through improved margins - Increased efficiency via economies of scale
2 Diversify into, and scale sourcing of, food crops (beans, maize, cassava, milk, honey)	- Increased incomes from alternative income streams - Increased coffee yields through increased soil nutrients and cross-pollination	- Additional income from alternative supply chains - Reduced exposure to market and climate risk due to diversified portfolio of products
3 Scale operations to serve, and source from, 100,000 farmers in the region	- Increased access to services - Greater bargaining power - Improver market access	- Sufficient product supply for value chain - Increased efficiency and improved utilization of facilities - Decreasing cost of service delivery at scale
4 Improve livelihoods of smallholder farmers through higher prices, yield and income diversification	- Improved household incomes - Increased resilience against market and climate shocks	- Increased loyalty of farmers - Increased opportunities to work with and receive support from public sector



SDM Structure: Services, scale and organization of the SDM

This section provides information about the services delivered to the farmers, the number of farmers in the SDM and the way they are organized.

In this section you will:

- ✓ Get an overview of the services provided
- ✓ Get a breakdown of the dynamics and flows per service, as well as the delivery method, costs and impact
- ✓ Understand how they are sequenced and how they are related
- ✓ Get an overview of the SDM scale in terms of number of farmers
- ✓ Understand the farmer segmentation used for targeting

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Farm-level impact

Service entities

Financial analysis
overall SDM

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Annex



Regional farmer context

Farmer context

Bean

Coffee



Agronomic

- Average yields of beans 0.6 MT/ha compare poorly against an estimated attainable yield of 1.5-3 MT/ha⁵.
- Most farmers use seed retained from previous harvests or combine different varieties on the same plot as there is a lack of affordable higher yielding seeds^{3,7}.
- Most farmers combine different varieties on the same plot leading to dominance of mixed beans on the market and lower prices³.
- 95 % of bean seeds planted by smallholder farmer is bought through informal networks, which increases the risk of using counterfeits⁶.

- Most of the coffee trees have exceeded the age during which they are economically profitable (20-25years). The average age of coffee trees in the North of Tanzania is 40 years⁹.
- Despite the old age of coffee plantations and low yields, most farmers do not replant their coffee trees, or stump them, due to limited access to affordable finance and a lack of extension services on specific coffee agronomy issues⁹.



Economic

- The average farm in the region is 5.3 acres and grows multiple food and cash crops, with banana representing the highest volume
- Fertilizer application levels are very low due to high cost and the existence of few commercial fertilizer brands⁶.
- Beans and coffee are usually intercropped with maize and other food crops, for income security, to improve soil quality and for drought mitigation^{2,3}.

- Poor market price awareness by farmers leads to low bargaining power⁷.
- Market prices fluctuate from year-to-year and are frequently lowest at the end of the harvesting season¹
- With an average interest rate of 17.5% access to credit in Tanzania is very low, especially for smallholders. Only 6% of smallholder farmers have access to credit^{6,8}.
- Farmers mainly produce low-quality uncertified beans and coffee, leading to relatively few farmers receiving premiums^{7,9}.

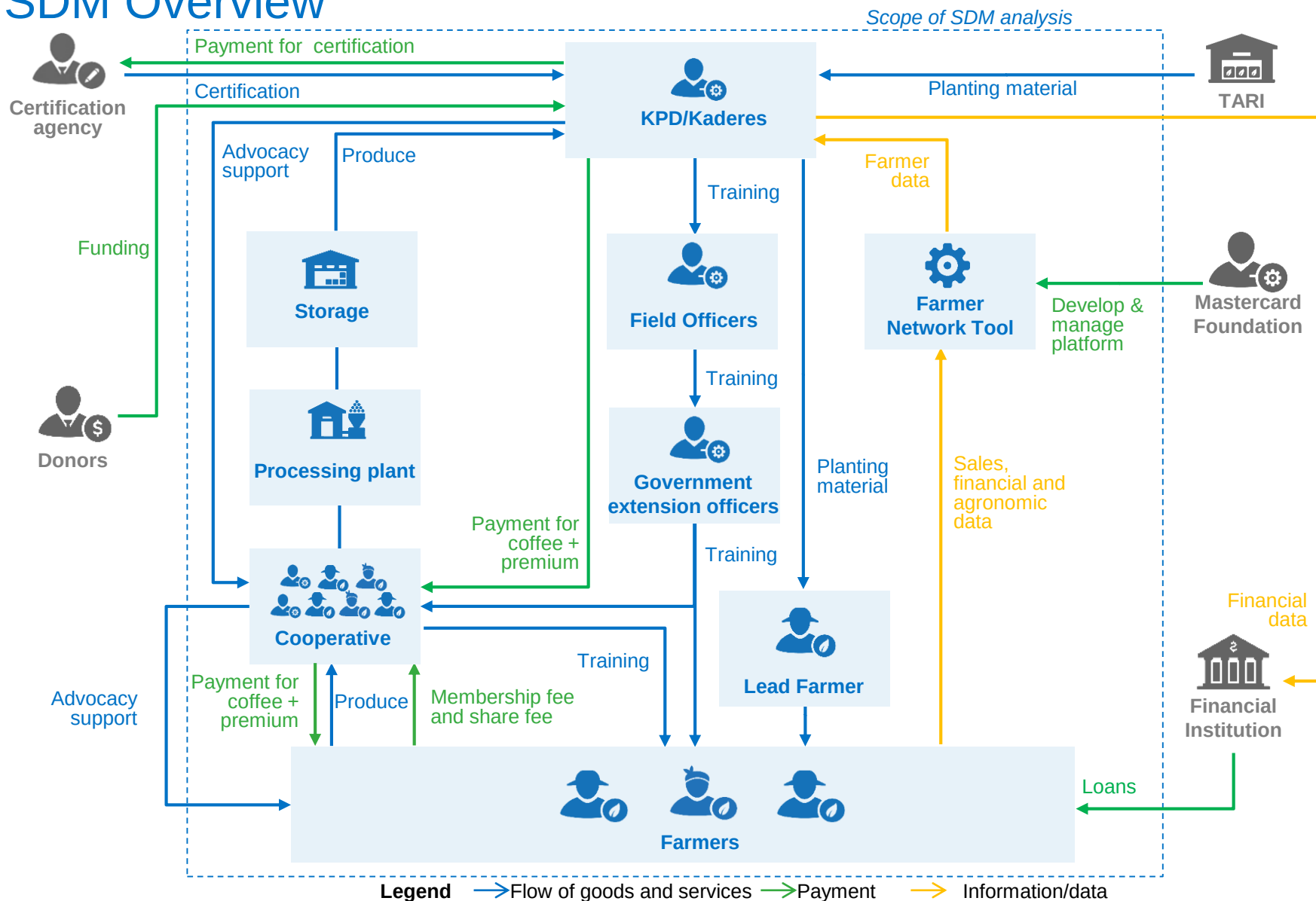


Social & Environmental

- Rainfall in the North produces 2 harvests in Jan/Feb and July/Aug, while unimodal rainfall in the South produces one harvest in June/July³.
- Agriculture in Tanzania is highly rain-dependent with increasing vulnerability to irregular weather conditions⁴.
- Smallholder farmers have limited educational and entrepreneurial skills, limiting their access to and use of price and market requirements^{3,4}.

Sources: 1) FEWS NET (2018) Tanzania market fundamentals summary; 2) World Bank (2015) – Tanzania Agricultural Sector Risk assessment; 3) BTC (2012) Organic Kidney Beans : potential for certified producers in Tanzania; 4) GAFSP (2016) Agribusiness country diagnostic – Tanzania; 5) The United Republic of Tanzania (2017) AAAS Crop and Livestock report; 6) FAO (2018) Pulse crops for sustainable farms in sub-Saharan Africa; 7) Aid Environment (2017) Tanzania pulses sector diagnostic; 8) WB (2019) Lending interest data; 9) Tanzania Coffee Board (2011) Tanzania Coffee Industry Development strategy

SDM Overview

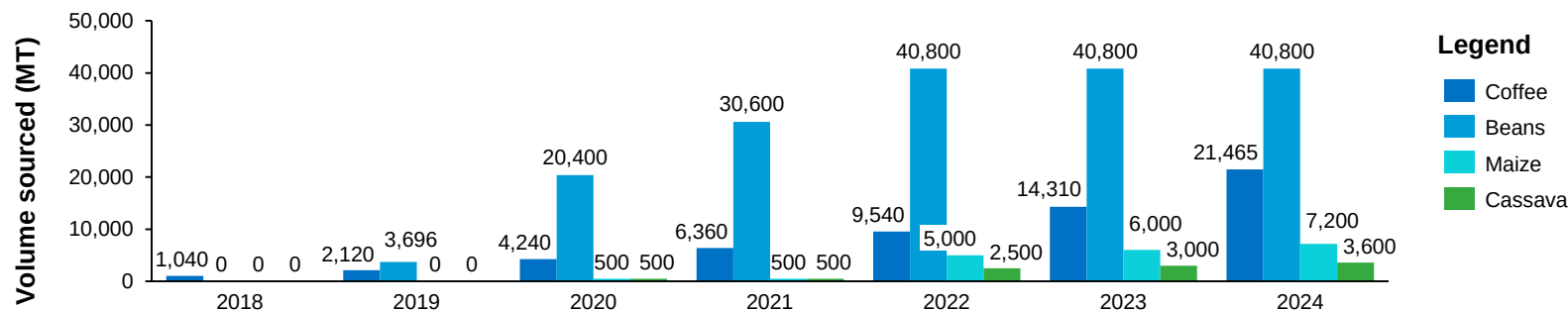


Sources: 1) <http://www.kpdcoffee.co.tz/index.php/2018-12-05-20-32-46>; 2) BTC (2012) Organic Kidney Beans : potential for certified producers in Tanzania; 3) IDH (2019) Expert interview

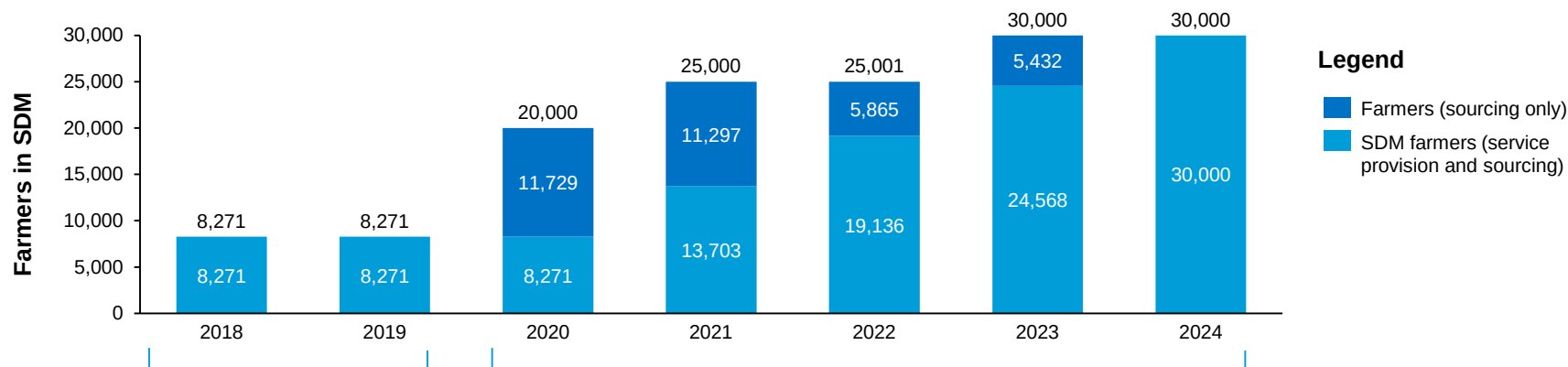


Scale of the SDM and duration in scope of this case study

Volumes of coffee, beans, maize and cassava sourced over time (MT)



Number of farmers over time



2018-2019: Start of analysis

For the last few years the total number of farmers KPD has registered as Fairtrade and/or Organic has been stable at around 8,000.

2020 - 2024: Scale-up phase

KPD needs to rapidly increase the number of registered farmers to 30,000 to meet the expected sourcing* targets set by the AGRA partnership. KPD will source coffee from farmers that are currently only selling beans in the region to fill the gap. In the future all farmers will supply a combination of coffee, beans, maize, cassava. These will be sold locally, to the World Food Program, or exported to Asia, North America, and Europe.

* Sourcing targets: only feasible with sufficient working capital and technical assistance.

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Overview of Services



Farmer Training and Certification

- Farmers are offered training on GAP, crop diversification, climate change and health issues via the cooperatives and government field officers
- KPD provides training and tools to the government trainers
- KPD provides training to the cooperatives' members, who pay for the training through their annual membership fee
- KPD organizes the FairTrade and Organic certification for the coffee farmers, including training on standards, and support on recordkeeping and auditing to the farmers



Finance and Digitalization

- MasterCard provides an integrated management system to capture agronomic and financial data from farmers
- KPD uses this system to validate their purchases
- Farmers use the system to understand their productivity and sales, and in the future can use it to access finance
- The tool will be used to ensure credibility of expected incomes and yields, which will allow farmers to receive loans against expected financials of the coming seasons



Planting material

- During a 1.5-year project, KPD purchased high yielding bean seeds from TACRI and sold these seeds, below purchase price, to lead farmers
- KPD subsidizes this cost to encourage lead farmers to grow the beans and sell the seeds to other farmers in the region
- This ensures KPD has access to a sufficient supply of high-quality beans that meet the market demand, while offering a means for lead farmers to diversify their income



Farmer Organization

- Under the new regulatory environment that has been implemented in 2018, KPD can no longer directly source cash crops from farmers
- Due to this new regulation cooperatives are being created with the assistance of the government and KPD
- KPD will now help unite the 8 newly created cooperatives under a united entity; this entity will be trained and supported by KPD to advocate on behalf of farmers
- KPD advocates to the local, regional, and national governments on farmer matters



Income diversification

- KPD provides a cow to farmers through a loan mechanism in which the farmer repays the loan over the lifespan of the cow with the annual income earned from the cow
- KPD supports farmers in acquiring beehives for honey production

Services are stated as currently provided or planned by KPD. There is room for improvement as not all farmer challenges are addressed. Priority areas are improving access to high-quality coffee seedlings and (organic) agro-inputs. Other services could include crop insurance and/or long-term replanting loans (building on the digital platform).

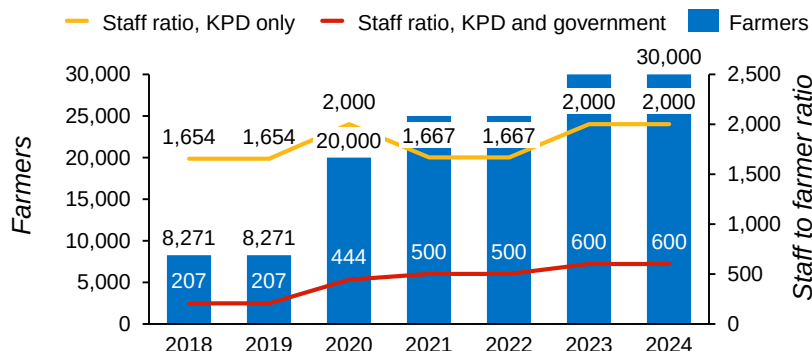


KPD's growing business requires expansion off and investment in human resources operations



Field staff capacity

Number of farmers; ratio of staff to farmers (excl. and incl. government staff)



Sources: 1) SDM database October 2018, sample of 12 cases.

Invest in human resources

- Currently one KPD extension worker services 1,654 farmers, and is increasing to 2,000 farmers. The median of other SDM cases lies around 460 farmers per worker¹. This is on top of a changing work curriculum (see above).
- Including 35 governmental staff, this ratio improves. However, quality of these workers is doubtful, and they cannot be held accountable.
- Where KPD should expand and invest in its own staff, other partners (local authorities, NGOs) should invest in and adequately incentivize governmental staff in the region or better utilize cooperatives and lead farmers
- Given the high number of farmer per field staff member, the impact expected at farm level may be lower than expected (see farm P&L)
- Common goals for KPD and government staff and an accountability framework are recommended.

Role of farmer organizations in this SDM



KPD



Cooperatives



Farmers

*Where primary processing
of coffee can occur

Relationship between KPD and Cooperatives:

Establishment: A new government directive prohibits direct sourcing from farmers; therefore cooperatives are established by the government to organize coffee farmers and help them capture greater value through fairer prices.

Commercial relationship: Cooperatives and farmers undertake primary drying and processing of coffee beans. Beyond this, all other products such as beans, maize and cassava are sold to the cooperative, which supplies them to KPD for further processing or to be sold as is.

Funding: Due to the new government directive in the last year, old cooperatives have been restructured and new cooperatives have been created. This process is being organized and funded by the Tanzanian government and is expected to guide the value chains for food commodities going forward.

Capacity building: KPD currently provides training on certification and GAP to the cooperatives and supports their organization building. As time progresses, KPD will work more with government extension officers, providing them with training on the requirements for certification and GAP. KPD will continue to work with the cooperatives to organize themselves and provide more guidance on how they can advocate or lobby for their needs to regional and national governments. This way, KPD will evolve to a more hands-off role, helping the cooperatives to empower themselves.

Relationship between farmers and Cooperatives:

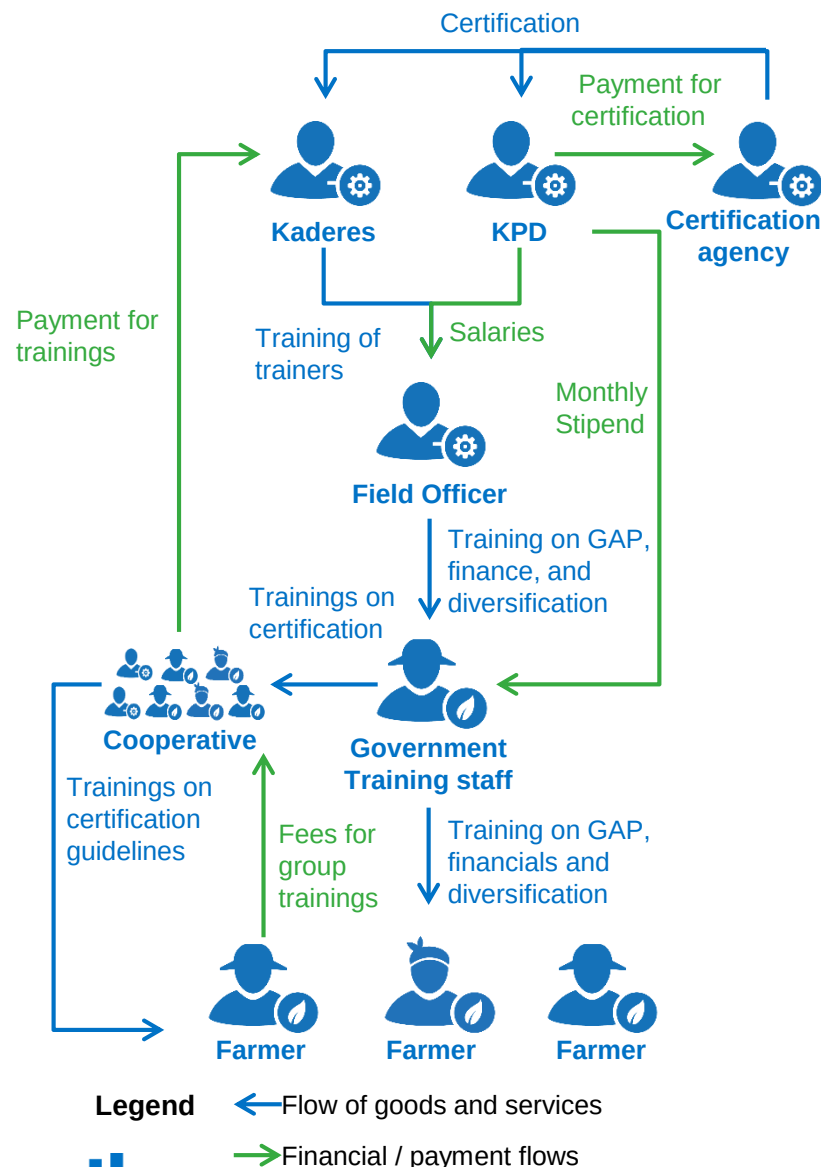
Ownership: The cooperatives are owned by their shareholders and members. Farmers in the region are able to buy shares to join the cooperative, from a minimum of 1 share up to a maximum of 20.

Financial relation: Farmers sell their product to the cooperatives, who further distribute it to other value chain actors. The farmers pay a small fee (50 TSH /kg) to the cooperative for management fees, and if the cooperative sells FairTrade or Organic products, for record keeping.

Service provision: The cooperative provides group trainings to the farmers for a fee, can help in the organization of a SACCO, and coordinates the data needed for certifications. The cooperative also takes care of logistics of the product once they have purchased it.

Sources: 1) IDH (2019) Expert interview

Detailed overview of training and certification



Description / Methodology

- KPD's field officers provide training on GAP, crop diversification and climate change to extension officers from the Government, who in turn train the farmers.
- Additionally, KPD's field officers provide training to the cooperatives on Organic and Fairtrade certification standards, recordkeeping and auditing. This training service is given on a yearly basis to all farmers that are part of a cooperative.
- Farmers pay the cooperatives a small fee based on the amount sold to the cooperative (50 TSH /kg). This fee includes a payment for training participation.
- KPD recovers the costs of trainings through a fee charged to the cooperatives. They do not recover the cost for certification.

Service costs (from perspective of SDM Operator)

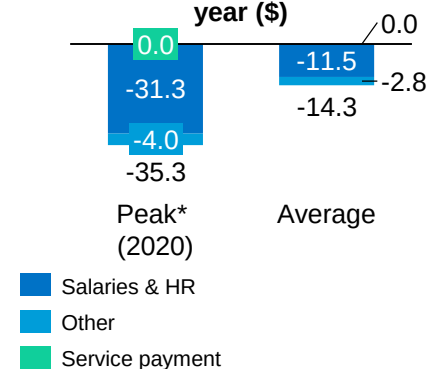
Description

- KPD pays the field officers and government extension officers for the provision of training
- KPD directly pays for the certification and audits
- Cooperatives pay a fee for trainings

Drivers

- Staff salaries make up the largest share of costs, followed by audit costs
- Costs per farmer will decrease over time as cooperatives will take over more training responsibilities

Input expenses per farmer per year (\$)



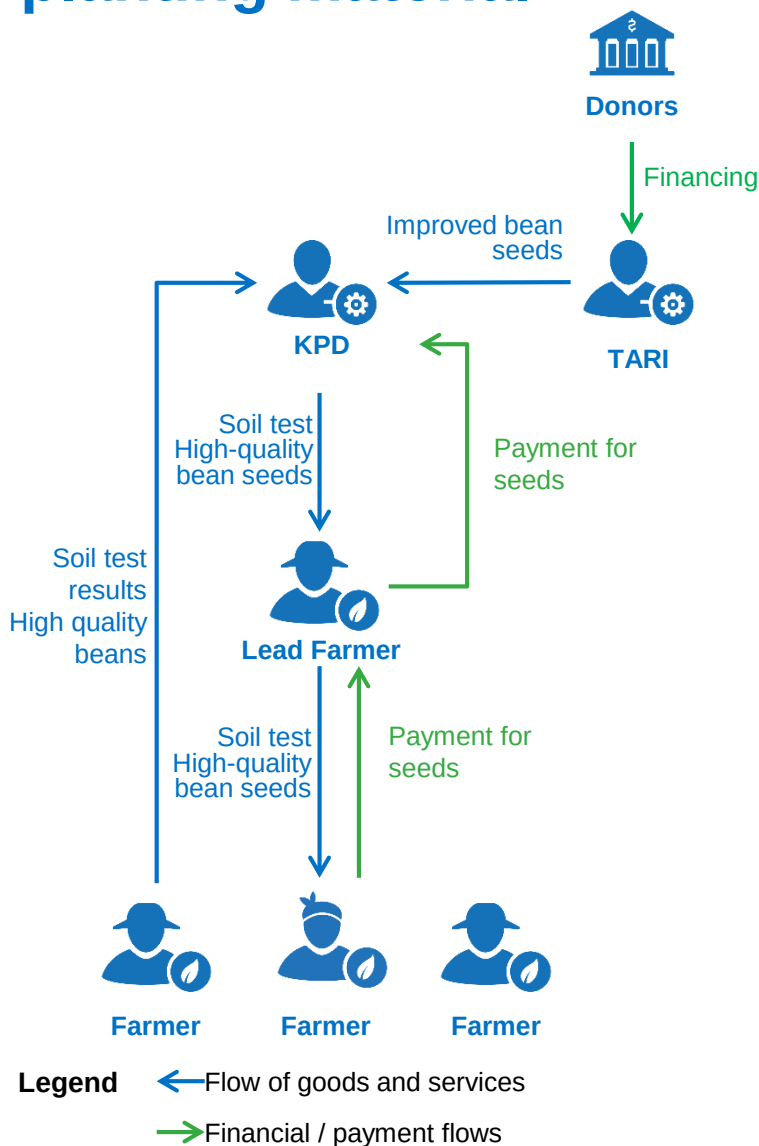
Impact

- Higher income from certification premium
- Improved access to markets through certification
- Increased coffee, bean, maize and cassava yield through training on GAP
- Improved climate resilience through crop diversification

*Takes into account only farmers receiving the service and years it is provided

**Year of highest cost or lowest net income

Detailed overview of planting material



Description / Methodology

- The TARI research center developed high-quality bean seeds and gave them to KPD free of charge. In turn, KPD sells seeds to lead farmers for seed production at a subsidized price.
- The lead farmers distribute the improved planting material to the farmers to produce quality bean grain.
- KPD subsidizes the bean seed costs, expecting to recapture the value when sourcing the final product.
- While KPD and TARI discontinued the project after 1.5 years, KPD maintains the aspiration to start up a new initiative for high-quality seed distribution.
- KPD performs 200 soil analysis on farms per year to inform farmers on the potential for crop diversification and other services needed.

Service costs (from perspective of SDM Operator)

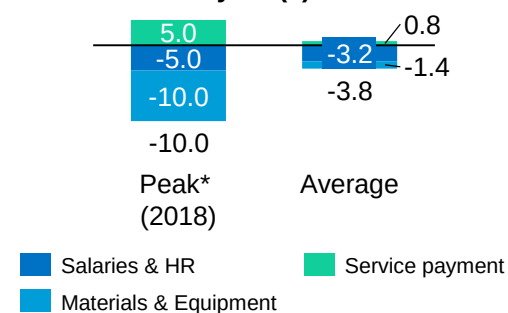
Description

- KPD received the improved planting material free of charge from TARI
- Lead farmers pay for the seed

Drivers

- Purchasing of high-quality bean seeds
- Soil tests for SDM farmers

Input expenses per farmer per year (\$)



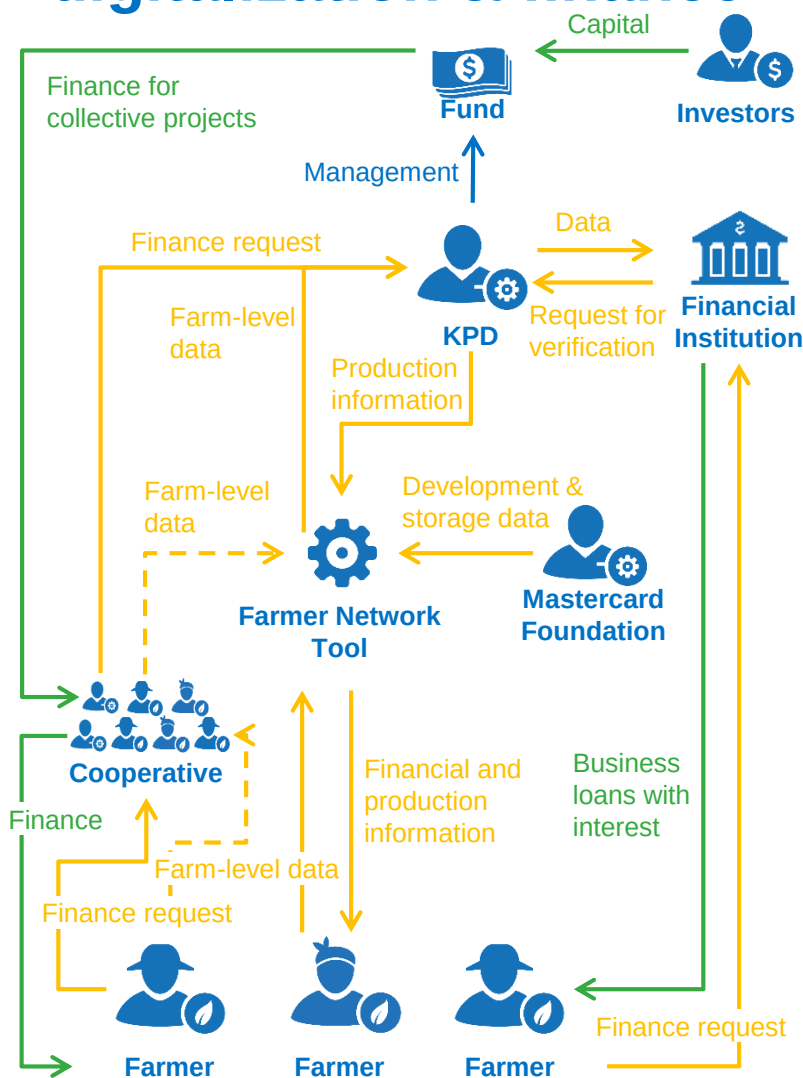
Impact

- Better tailoring of service provision due to understanding of soil needs
- Higher bean yield from the use of improved planting material

*Takes into account only farmers receiving the service and years it is provided

**Year of highest cost or lowest net income

Detailed overview of digitalization & finance



Legend

- ← Flow of goods and services
- Financial / payment flows
- Information/data

Description / Methodology

- The Mastercard Foundation developed the Farmer Network Tool free of charge, which gathers farmer data on certification, production level, sales, income and trainings followed.
- KPD staff with mobile devices register farmer data. Farmers in turn can receive updates on their data and receive price information via SMS.
- Two future ways are proposed for farmers to access finance: 1) individual farmers can request business loans from a local financial institution and use the collected data in the tool as verification for their financial sustainability, 2) cooperatives can request finance for specific collective projects, such as livestock provision. KPD who plans to co-manage the (not yet existing) fund decides based on farmer level data whether the request can be granted, how funds are recouped, and under which terms.

Service costs (from perspective of SDM Operator)

Description

- KPD receives the tool free of charge

Drivers

- The purchasing of phones to distribute to lead farmers

Input expenses per farmer per year (\$)

Peak* (2021)	Average
-2.4	-2.1
-0.8	-0.4
-3.2	-2.5

■ Infrastructure ■ Materials & Equipment

Impact

- Clearer prices through information sharing on production and prices.
- Improved access to finance due to the ability of financiers to assess farmer creditworthiness based on expected productivity and asset holdings and by combining individual farmer finance requests through cooperatives.

*Takes into account only farmers receiving the service and years it is provided

**Year of highest cost or lowest net income

Detailed overview of farmer organization



Legend

- ← Flow of goods and services
- Financial / payment flows

Description / Methodology

- KPD provides organizational support and capacity building to each of the 8 cooperatives to encourage the creation of a strong informal union. A union would allow the cooperatives to advocate on behalf of the farmers with local government.
- Being part of a cooperative and potentially larger union allows for policy information to be easily translated and passed on to farmers.
- Each farmer KPD sources from is a member of a cooperative. They pay a small membership fee based on the produce sold (50 TSH /kg) and must own a minimum of 1 share and a maximum of 20 shares of the cooperative.

Service costs (from perspective of SDM Operator)

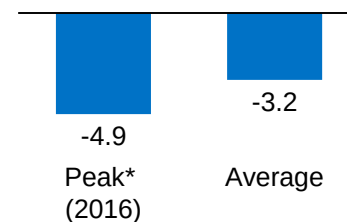
Description

- KPD's staff supports cooperatives with the creation and management of their organization

Drivers

- Staff salaries represent the largest share of the cost for this service
- Costs per farmer are expected to decrease over time as cooperatives will be able to represent themselves once they are properly set up

Input expenses per farmer per year (\$)



Salaries & HR

Impact

- Improved representation of farmers issues at government level
- Improved farmer bargaining power towards traders
- Improved knowledge on governmental directives agricultural matters and changes affecting farmers

*Takes into account only farmers receiving the service and years it is provided

**Year of highest cost or lowest net income



Farm-level impact

This chapter presents the analysis at farmer level.

In this section you will:

- ✓ Understand the P&L of the farmers in the SDM according to their segment
- ✓ Understand how relevant factors (e.g. market price, quality, input adoption, yield) impact the farmer business case

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Financial analysis overall SDM

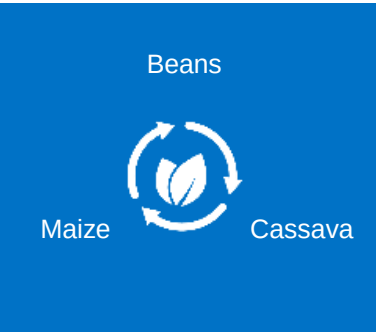
Conclusions

Annex

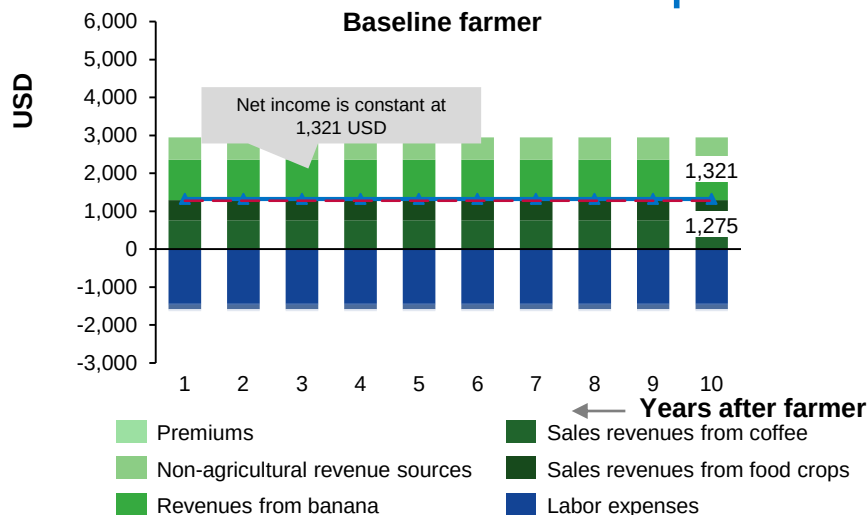
Average farm profile

Farmer characteristics

- **Farming system:** Farmers in the region manage well-diversified farms. Typically the main income comes from 1) banana (45%), 2) coffee (40%), 3) beans (13%) and 4) other (2%). Farmers usually own two plots. One is organically managed and used for intercropping, while the other is managed conventionally (e.g. chemical fertilizers are allowed) and is used for crop rotation.
- **Minimum criteria:** Farmers willing to work with KPD must comply with Organic and FairTrade standards for coffee. A conversion period of three years is mandatory for farmers to qualify their coffee as Organic, while converting to FairTrade coffee takes only one year.
- **Segmentation:** KPD does not segment their farmers and provides services to all.

		Current	Planned
		Banana, coffee, beans, maize and cassava 	
System Farm size Crops Practices (under SDM)		Organic plot Intercropped 3.8 acres Banana, Robusta coffee, beans • Application of manure, organic fertilizers, pesticides and coffee mulch • Stumping of coffee trees	Other plot Crop rotation 1.5 acres Beans, maize, cassava • Application of fertilizers and pesticides
		Potential future revenue streams 	
	Amount	Livestock	Honey
	Lifespan	1 cow	10-20 beehives
	Yield	17 years	10 years
Purchase cost Products/Impacts Costs	Purchase cost	After 8 months	Peak after year 7
	Products/Impacts	665 USD/cow	75 USD/beehive
	Costs	• Manure • Milk • Calves	• Honey • Cross-pollination
		• Cow • Cow feed	• Beehives • Labor

Farm P&Ls: overall impact*



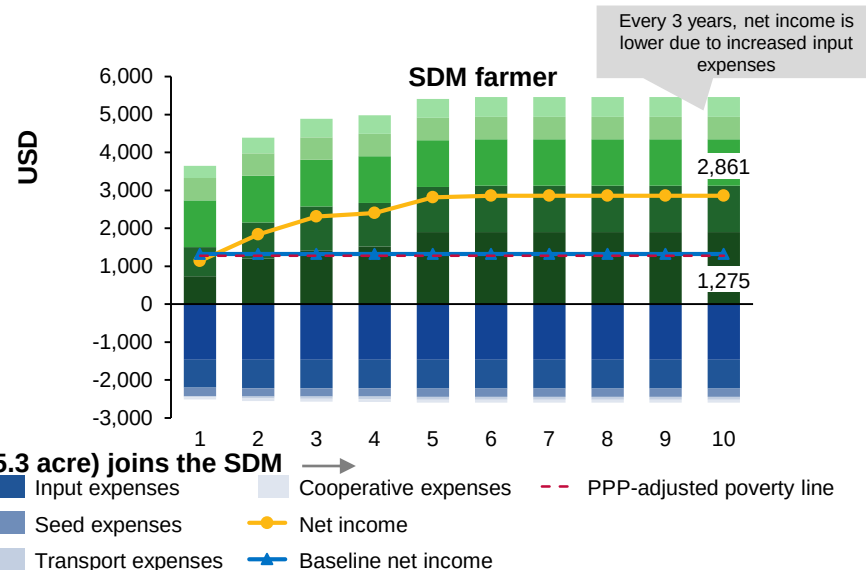
Economic sustainability at farm level

In the first year, the SDM farmer earns less than a baseline farmer due to increased expenses in manure and coffee mulch, slightly higher expenses for high-quality seeds and participation in cooperatives. From year two onwards the SDM farmer is better off, mainly because of increased earnings from applying GAP, using high-yielding seeds and additional income from coffee premiums. Net income of the SDM fluctuates throughout the years, which is due to a recurring large necessary investments in inputs every 3 years.

A baseline farmer earns slightly above the PPP-adjusted poverty line at 1,275 \$/household/year**, while an SDM farmer will earn on average 1.8 times more than the poverty line. While this higher income level can provide a buffer against negative events, farmers' income remains highly sensitive to external factors such as prices, weather conditions and pests.

As coffee trees in Kagera are old and beyond their peak productivity, revenues from coffee will continue to decline over the next years. It is key that farmers either undertake rejuvenation to ensure the long-term viability of their coffee farms (see [replantation](#)) or further increase their efforts in income diversification (see [investments in livestock and honey](#)).

* This P&L is an optimal scenario where field staff, services, and adoption by farmers are all optimized and expanded upon. Realistically, achieving these outcomes may be difficult under current plans and operations. **The World Bank's poverty line of 1.9 USD/person/day, corrected for purchasing power, requires a net income in Tanzania of 255 USD/person/year (584,621 Tzs/person/year). For a household consisting of 5 members this equates to 1,275 USD/ household/year



Main cost drivers

- **Labor:** The major cost driver for the baseline farmer is labor (88%), especially the activities related to land preparation and harrowing. Labor cost only slightly increases (from 1,442 to 1,463 \$/farm) for SDM farmers due to the extra hired labor needed for applying the manure.
- **Inputs:** The use of fertilizer is very low for a baseline farmer (1%). The application of organic fertilizer such as manure and of coffee mulch is the major cost driver for the SDM farmer, equal to 29% of total costs. Mulch and manure are only applied once every three years. Costs in this analysis are averaged out over the years.

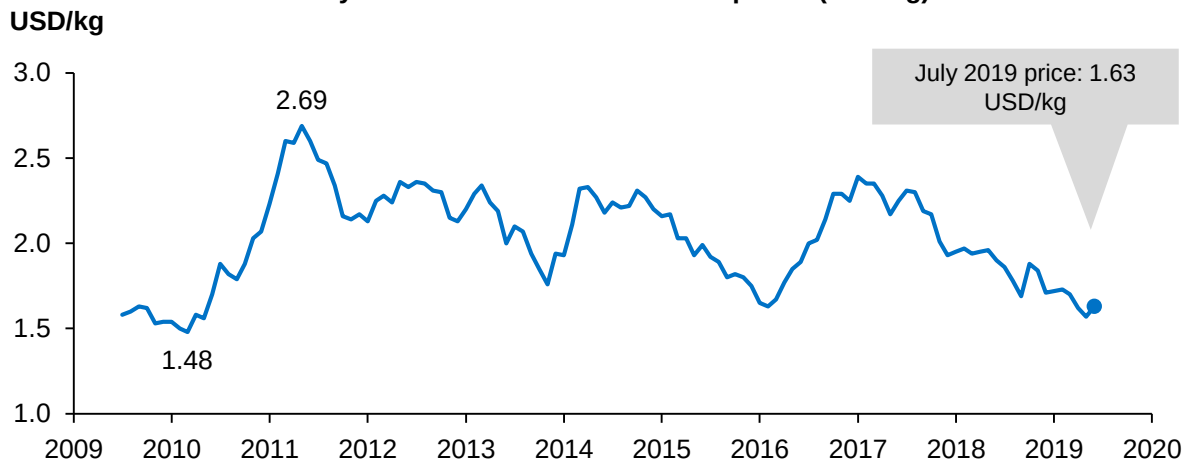
Main revenue drivers

- **Production:** Farmers applying GAP may improve their yields by 37% on average for coffee, beans, maize and cassava. Using improved seeds for food crops further increase yields, up to 300% for maize. Production improvements lead to a 121% increase in sales revenues and a 4% increase in net income compared to the Baseline farmer.
- **Coffee quality:** SDM farmers receive a premium for Organic and FairTrade coffee of 0.30 and 0.09 USD/kg respectively (compared to a farm-gate price of 0.47 USD/kg for the baseline) due to higher quality cherries, leading to an average 35% increase in income.



Coffee price evolution and sensitivity analysis

Monthly world market Robusta coffee prices (USD/kg) ¹⁾



Volatility of coffee prices

The graph on the left shows the monthly world market prices for Robusta coffee. These prices can vary up to 40% annually, current prices are close to historical low.

These low and volatile prices pose a risk for the smallholder farmers and the SDM, as their income depends for more than 50% on the farm-gate price ²⁾.

Sensitivity of farmer income

The below table shows a sensitivity test of net income at varying price and production levels for a baseline (red box) and SDM farmer (blue box) in year 10.

Changes in price have relatively less impact on SDM farmers; if an SDM farmer would receive the same price as the baseline farmer (0.47 USD/kg coffee), then his net income would decrease from 3,972 to 2,954 USD, still 1,998 USD more than the baseline. This is due to the additional income from premiums and the higher yields from beans, maize and cassava, which increase the farmer's resilience against price and productivity changes in coffee.

The PPP-adjusted poverty rate in Tanzania is 1,275 USD/person/year. Both baseline and SDM farmer remain above it. However, for the baseline farmer a small decrease in production (e.g. due to droughts), or price (see lowest global price) will push him into poverty.

It is important to note that farm-gate prices are only 30% of the world prices, which is substantially below average. This impacts farmers incomes (potential underestimation), and influences the SDM's profitability significantly (potential overestimation).

Coffee world market price (USD/kg)		Farm-gate price* (USD/kg)	Farmer annual net income (USD) for varying coffee prices and production (avg of 7 years)				
			Coffee yield (kg)				
			41%	61%	100%	129%	159%
			175	259	426	594	677
2.69	170%	0.80	1,634	2,151	3,185	4,219	4,736
2.54	160%	0.75	1,543	2,033	3,012	3,991	4,481
2.24	140%	0.66	1,360	1,795	2,666	3,537	3,972
1.94	120%	0.56	1,177	1,558	2,320	3,082	3,463
1.63	100%	0.47	994	1,320	1,974	2,627	2,954
1.48	90%	0.42	902	1,202	1,801	2,400	2,699

SDM farmer projection

Current projection

Below poverty line

Price includes premium

Sources: 1) ICO indicator price, average Bremen/Hamburg markets price, indexmundi.com; 2) Global coffee Platform (2016) AFRICAN COFFEE SECTOR – Tanzania case study

While livestock and honey provision can have large farm-level impact, KPD could better prioritize it's growing core business

Comparing farmer repayment schemes of livestock investment ¹⁾

Principal repayment (% of annual revenues)

Annual interest fee

Repayment

Outstanding debt at end of lifespan (17 years)

Total net income

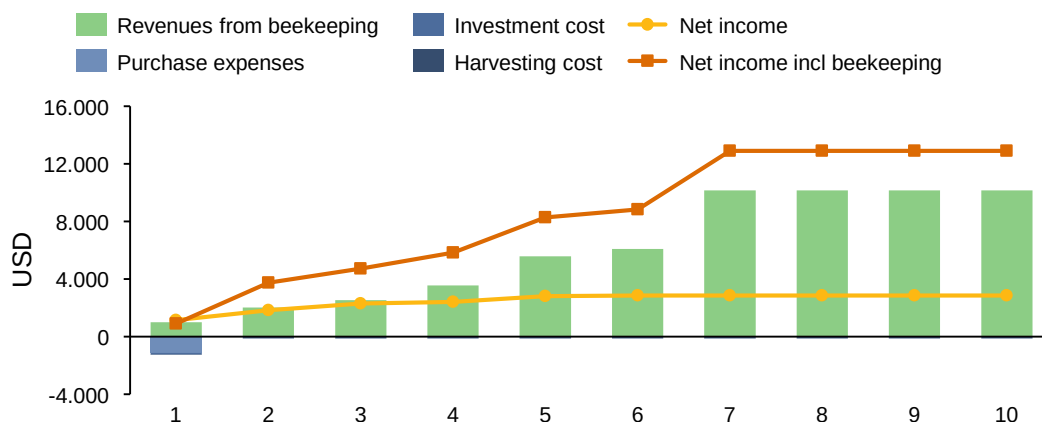
Annual farmer net income

Proposal KPD	Alternative I	Alternative II
20%	50%	100%
6% of outstanding debt	6% of outstanding debt	6% of outstanding debt
After cow's lifespan	Repaid in year 10	Repaid in year 5
216 USD	0 USD	0 USD
1,458 USD	1,506 USD	1,569 USD
86 USD	89 USD	92 USD

Profitability of livestock investment

- The table on the left indicates that an investment in a cow by the farmer is most profitable when he repays the total investment during the first five years with the annual net income earned from the cow (a 100% repayment rate).
- Since the average age of a cow is 17 years, a farmer who applies a repayment rate of 20% of annual revenue related to livestock will not succeed in repaying the total investment and will remain with an outstanding debt of \$216 at the end of the investment.
- By purchasing a cow, the farmer can decrease its expenses for organic fertilizer for coffee and beans (i.e. manure) by 6% annually.

Annual farm expenses and revenues from beekeeping ²⁾ (\$)



Sources: 1) Dairy farm and livestock provision business plan; 2) KPD interviews – data confidence is very low. Results presented serve as a stepping stone for further discussions and are directional only. A feasibility study would be required before designing a business honey production

Profitability of beekeeping

- Not only does crosspollination benefit the yields of the other crops (increase of 70%), the revenue of beekeeping is five times higher ²⁾ than the combined revenue of the other crops.
- Only in the farmer's first year of operation does he incur a net cost. From year 2 on, net income from honey is positive and growing.

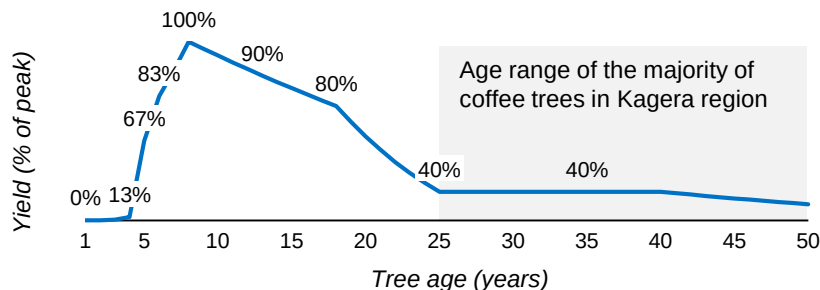
Feasibility

- While both products are interesting from a farmer perspective to invest in, KPD does not have in-house expertise, capital to invest, nor do farmers have access to finance yet.
- Expertise on livestock, investment and technology (MasterCard Network Tool) are necessary to make these services work

To increase coffee yield and incomes, and ensure long-term supply, local partners need to jointly invest in rejuvenation infrastructure

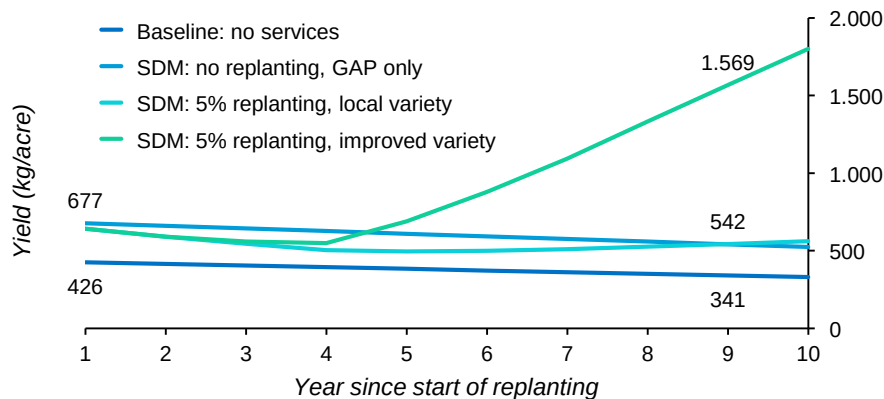
Robusta coffee yield curve ¹⁾

% of peak yield by tree age



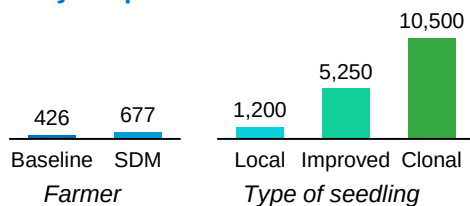
Replanting potential ²⁾

Yield (kg/acre) over time for different replanting scenarios



Current yield ²⁾ and yield potential ³⁾

Kg/acre



Rejuvenation is necessary but a challenge

- Robusta coffee yields are low (on average at 40% of peak potential) and declining. Most trees are local varieties planted between 25 and 60 years ago.
- Today, some farmers are stumping or replanting trees, at rates of around 1.5% of total trees per year. These low rates are the result of a lack of awareness, motivation and/or capital of farmers to replant effectively. The main costs are replanting labor, seedlings, and lost revenues from removed trees.
- In the region there is limited availability of improved and clonal seedlings, and no effective delivery mechanism in place.

Under the right conditions, long-term coffee yields and supply can increase significantly

- Farmers need tailored advice on optimal replanting rates and density, and access to quality seedlings and finance.
- TACRI, with additional resources and support of local partners, needs to increase the supply of high-quality seedlings to meet local demand.
- NGOs and traders like KPD need to work together with TACRI to arrange efficient delivery of seedlings. This means using their networks (cooperatives, lead farmers and extension workers) when coordinating the placement and aggregation of orders, and subsequent distribution of seedlings to farmers.
- The envisioned rollout of the Farmer Network Tool will allow for more efficient placements of orders and distribution, and in future, provide access to loans to cover the cost of replanting.

Sources: 1) other Robusta coffee SDM analyses; 2) KPD Farmer Field Books, assumes coffee tree density of 150 trees/acre. 3) KPD field staff interviews, note that clonals are not widely available nor have these yields been observed on farmers' fields

Financial analysis overall SDM

This chapter presents the findings of the financial analysis of the whole SDM.

In this section you will:

- ✓ Understand the financial performance of the SDM
- ✓ Get an insight of the different sources and founders of the SDM
- ✓ Find an overview of the financing KPIs

Overview of SDM stakeholders & objectives

Services, scale and organization of the SDM

Farm-level impact

Service entities

Financial analysis overall SDM

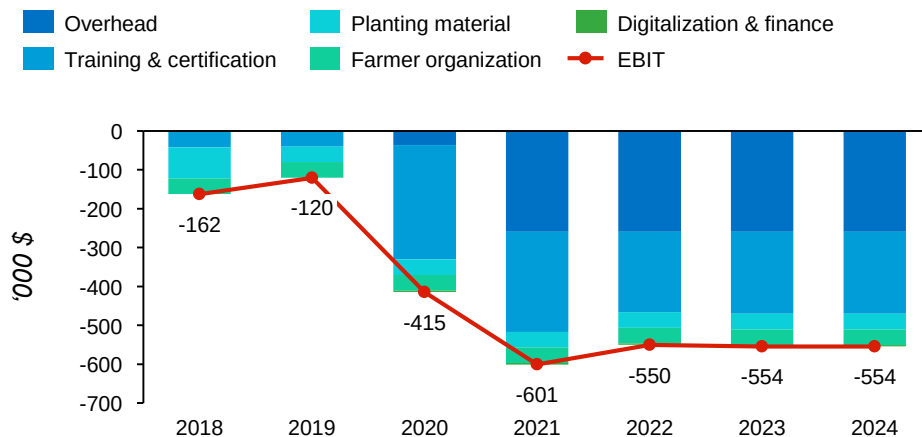
Conclusions

Annex

Service provision is not seen as standalone business; costs are recouped through commercial activities

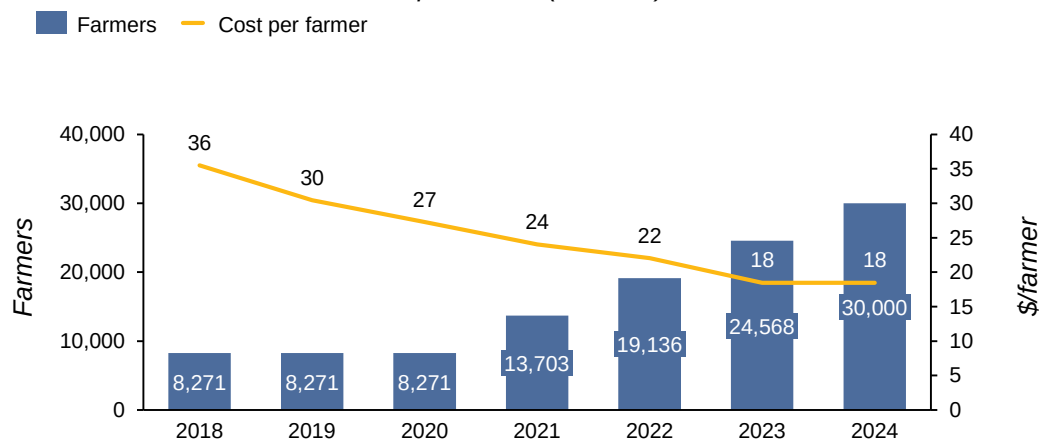
SDM P&L, excluding overhead and commercial activities

Service revenues and expenses, '000 \$



SDM scale and efficiency

Number of farmers and SDM cost per farmer (\$/farmer)



SDM sustainability

- Considering only KPD's service revenues and expenses, an annual loss, stable from 2020 onward, of around \$540,000 is projected.
- This is in line with KPD's strategy, where most service costs are expected to be recouped through increased sales and improved margins (see slide 29). The remainder of the costs is covered by donor funding.
- Service costs are typically not recouped via direct payments, the only exceptions are mentioned below.

Service revenues

- One-off sales of 40,000 kg improved bean seeds at \$1 per kg.
- Training fees charged to cooperatives for 3 trainings per year at \$125 per training.

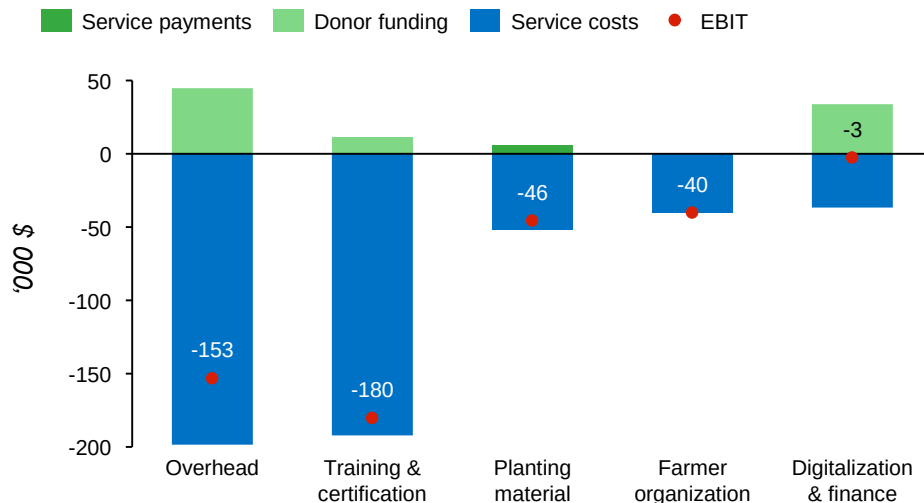
Service expenses

- Annual overhead staff salaries stabilize at \$330,000 by 2021, covering 2 agronomists, 15 KPD field staff (on pay-roll) and 35 governmental extension workers (paid out in-kind).
- Fairtrade and Organic certification audit costs are fixed at \$56,000 each year.
- Bean seeds were bought at \$2 per kg, twice the amount KPD sold the seeds for.
- Smartphones to enter and upload data into the Farmer Network Tool (FNT) are paid for by KPD by 50%.
- FNT membership fees per farmer are covered by CIAD, with no clear exit strategy in place.

Overview of service profitability

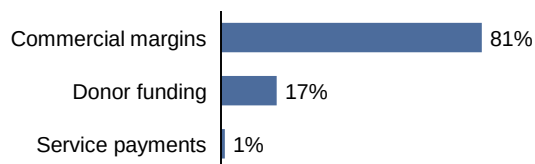
Service profitability

Annual revenues and expenses, '000 \$, average over 2018-2024



Share of expenses covered by source ¹⁾

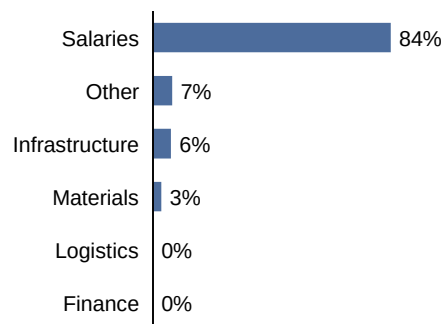
% of service costs, total of 2018-2024



1) Revenue sources as defined in the SDM methodology; in this case, assuming the SDM is profitable (see next slide), the commercial margins cover all service costs not covered by donor funding and service payments

Share of expenses by type of cost

% of service costs, total of 2018-2024



Service sustainability

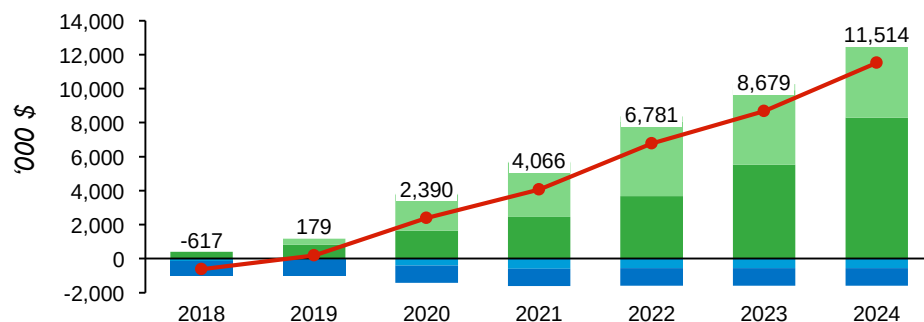
- Not taking into account commercial revenues, all services operate at a loss.
- If KPD seeks to become more self-sufficient as a service provider, it needs to design payment schemes for its products and services.
 - **Training & certification** should be recovered through increased sourcing per farmer (due to GAP) and larger margins (selling organic coffee at a premium). Profitability is not assessed here.
 - **Planting materials:** building on the earlier subsidized bean seeds pilot (2018) and now with the FNT in place, KPD should supply cooperatives with bean seeds based on actual aggregate demand while charging the full price (cost of seeds and transportation).
 - **Farmer organization:** professionalization of farmer organizations could, if done well, be charged to the cooperatives. Further research is required to understand which party (KPD, government officials, other NGO, IDH) is best positioned to offer this service.
 - **Digitization & finance:** currently CIAD covers all the membership fees for farmers and KPD pays for half of the mobile devices used for data entry. Over time, if added value is proven, costs should be borne and shared between KPD and the cooperatives. As the FNT provides KPD with commercial data, part of the costs should be recovered through its margins.
 - **Overhead:** currently AGRA covers the extension work activities between 2018-2020. To become fully sustainable thereafter, KPD would need to add overhead fees (ideally charged to cooperatives) to all of its services (trainings, planting materials, access to the FNT) to cover for payments of the field staff and agronomists.

To grow into a sustainable business KPD requires a clear financial strategy shifting away from grants, towards loans

SDM P&L*, including overhead and commercial activities

Overhead and service costs; sourcing profits, 000'\$

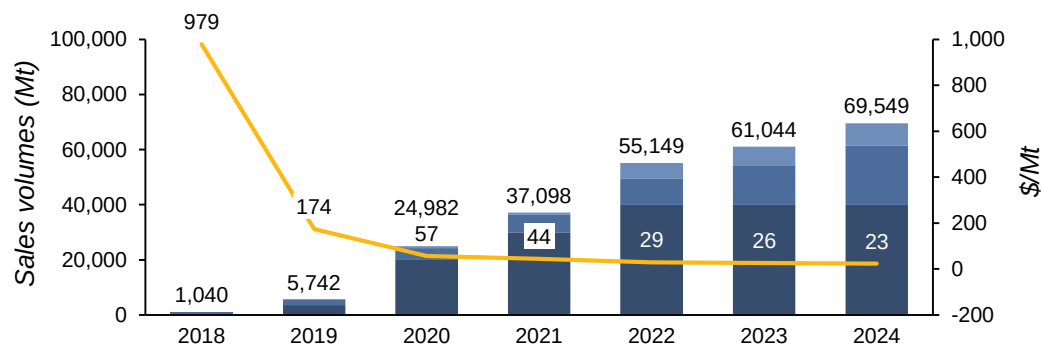
■ Gross profit coffee ■ Gross profit flour ■ Net services
■ Gross profit beans ■ Overhead —●— EBIT



SDM scale and efficiency

Sales volumes and cost per Mt produce sold

■ Beans ■ Flour
■ Coffee — Cost per Mt



SDM sustainability

- Assuming KPD can meet its sourcing targets, it will turn into a highly profitable business.
- However, to meet those targets KPD needs to overcome a range of issues:
 - KPD sources small volumes and struggles to gather enough working capital to bridge the period between procurement and being paid by clients.
 - Investors for additional processing equipment (bean sorting, bean cooking and canning, flour processing) have not been found yet.
 - There is limited evidence of a growing demand for coffee and beans. Efforts of a recently hired sales manager for the European coffee market are too recent to assess. So far, the only expected large-scale bean order (15,000 kg; WFP) has not been placed. There have been no mentions of other recurring buyers.
 - While there are plans to expand the field team, in the past few years it has contracted from 20 to 5, due to financial limitations.
 - This smaller team faces the challenge of not only servicing a growing farmer base but having to do so indirectly through coops and government extension officers.

Sales revenues

- The SDM's profitability is mainly driven by large Robusta coffee gross margins combined with strong volume growth (from 1,000 to 21,000 Mt).
- Beans are sold at much larger volumes (40,800 Mt by year 2024) yet lower margins

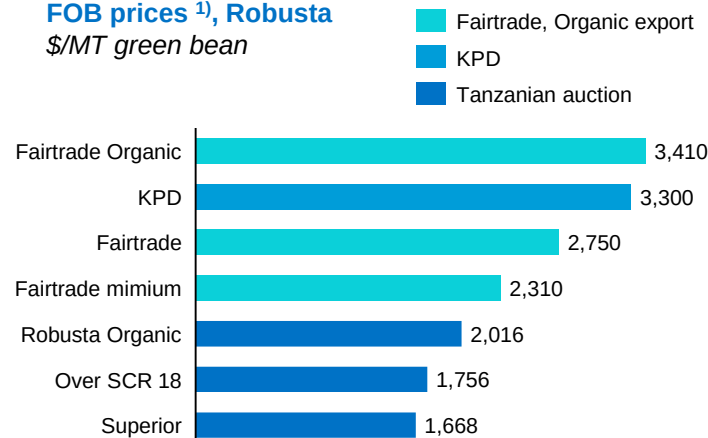
*Profitability figures have been altered for this public version of the report

The sustainability of KPDs SDM is highly sensitive to changes in Robusta coffee prices and Costs of Goods Sold (CoGS)

Coffee revenue projections

- Given KPDs assumptions, profitability is highly dependent on high-quality coffee revenues
- To assess the resilience of the SDM coffee prices and CoGS are compared against market data and literature studies (see right).
 - FOB price:** worst case, if KPD cannot find European buyers for FT Organic Robusta, prices will drop to between 2,016 (auction) and 2,310 (FT minimum).
 - CoGS:** KPD's service and sourcing costs seem to be underestimated, resulting in a 74% versus 14% margin
- Below table calculates the average annual SDM EBIT for varying coffee prices and CoGS. Taking worst case prices (around \$2,000) and CoGS (1,750 \$/MT), profitability of the SDM drops significantly from around \$17.7 million to between 0.6 and 4 million.
- KPD should invest heavily in quality control, and marketing and sales of coffee. It is also advised to improve the understanding of the coffee cost and profit margins and be able to reduce costs where possible.

FOB prices ¹⁾, Robusta \$/MT green bean



SDM EBIT (million \$, annual average over 2018-2024)

For combinations of coffee FOB prices and CoGS

	FOB price (\$/MT)				
CoGS (\$/MT)	1,300	1,800	2,300	2,800	3,300
1,000	4.2	7.6	11.0	14.4	17.7
1,250	1.9	5.3	8.7	12.0	15.4
1,500	(0.4)	2.9	6.3	9.7	13.1
1,750	(2.8)	0.6	4.0	7.4	10.7
2,000	(5.1)	(1.7)	1.6	5.0	8.4

Cost distribution along the Robusta value chain

% of FOB price, comparing KPD assumptions and literature

Item	Literature ²⁾	KPD
Farm-gate price	67.5%	24.1%
Service cost	0.0%	0.3%
Trader cost	4.6%	1.5%
Trader margin	5.2%	0.0%
Export processing cost	8.2%	2.1%
Total CoGS		
Exporter margin	14.4%	74.1%
Export price	100.0%	100.0%

Sources: 1) KPD interviews; Tanzanian Coffee Board 2018; Fairtrade minimum price and premium table 2018; 2) Uganda coffee supply value chain analysis; while dated and based on Uganda, this analysis gives a comprehensive benchmark for how costs are distributed along the value chain

Conclusions

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Annex

This chapter presents the findings and conclusions of the overall analysis, reflecting on the objectives described at the beginning of the analysis.

In this section you will:

- ✓ Get insights of the overall SDM performance in relation to the initial objectives
- ✓ Find the key drivers for success identified and the lessons learned



Conclusions: key drivers of success and key risks



Key drivers of success

Significant potential for expansion

The processing and warehouse capacity for both beans and coffee is significantly greater than the current utilization and could be further expanded if needed. Moreover, there are large plots of land surrounding both facilities that could further be utilized as needed, if capacity became a constraint.

Relatively low input and procurement costs

The region of Tanzania that KPD operates has relatively low costs for produce and inputs. This allows KPD to serve their farmers at a low rate and to purchase products at below market values. This leaving room for KPD to outcompete neighboring areas while still having a comfortable bottom line. If either of these factors change, or the quality diminishes to a point they cannot secure the premium prices they require, this may be a challenge.

Maintain certification and contracts with offtakers

The key differentiator for KPD is their certifications which allows them to export to premium markets. Maintaining these is pivotal to the success of this SDM and their operations.



Key risks

No clear strategy and business model

There is no strategy outlined on recouping costs, other than attracting grant funding. This leads to high dependency on sporadic success of attracting donor funds while distorting the KPDs actual profitability and cost charged to farmers.

Coffee dependency

KPD relies heavily on coffee revenues. 1) Not finding enough offtakers for direct export; 2) selling consistently at lower prices, and/or 3) if production costs are higher than expected (which is probable due to reliance on donor funding and low data reliability, see below) will significantly impact the profitability of KPD.

Lack of data and misalignment with comparable data

There is no clarity on estimated sales volumes, farmers sourced from, logistics costs and potential scalability. This proved to be a key challenge in assessing the sustainability of this SDM, and will present a challenge improving business operations and when bidding for contracts and on presenting working plans to receive working capital or loans. Moreover, comparable data from nearby regions or actors was significantly different than the presented KPD data.

Government regulations limiting interaction with farmers

Recent changes to regulation limit KPD's ability to source products and supply services directly to farmers. This threatens to remove their differentiating advantages and makes service delivery more challenging.

Investments required to scale

To reach the growth figures that KPD seeks will require investment in multiple parts of their business, from processing and staff, to technology and logistics. As working capital is already a constraining factor, gathering further capital for investment may be a challenge



Lessons learned during the study exercise



Opportunities for improvement

Sourcing working capital to purchase volumes

Current storage and processing capacities can handle significantly greater throughput, allowing KPD to purchase greater volumes. However, getting access to working capital to fulfill these purchases has constrained KPD in sourcing further volumes.

Finding a long-term offtakers that commit to volumes

To help gain access to additional finance or ensure steady working capital, KPD must have steady throughput of both beans and coffee. Stagnant inventory bottlenecks their production and ties capital up. Decreasing the days of product in inventory will allow them to utilize their facilities more effectively

Ensuring quality of production to sell to premium clients

KPD's key differentiator is quality and access to overseas markets, yet this requires quality product. To do this, they must ensure their producers have access to high quality planting material and use processes that do not damage the product.

Services can better address key issues for producers

Farmers struggle in accessing high yielding planting material, paying high interest rates, and clarity in market pricing. The current services do not address these areas. By working with external groups (for planting material), banks, and downstream actors, KPD could remedy these issues. Moreover, farmers could use a steady and cheaper supply of fertilizer, as this represents a significant cost.



Key factors in replication

Building strong relationships with investors and institutions

A large portion of KPDs success can be attributed to the outfitting of their facilities with state-of-the-art equipment. They have capacity to spare and the capability to deal with multiple crops. This comes from strong relationships with funders and foundations, as well as the ability to put forward valuable proposals.

Creating strong relationships and trust with farmers

The farmers in the region trust that KPD has their wellbeing as the priority of their organization. This kind of trust has spawned a strong buyer-seller relationship and helps ensure that KPD gets the most, and high quality, product.

Diversify crops

Reliance on one crop or stream of income, especially one such as coffee with high price variability, may not keep an SDM operating for long. While coffee is by far the most profitable crop and development thereof should be prioritized, KPD should diversify into beans and other crops to strengthen its own business and contribute the development of region.





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This chapter presents additional information that were used to carry out the analysis.

In this section you will:

- ✓ Get a general introduction to Service Delivery Models
- ✓ Get insights on other analysis (e.g. environmental lens, gender lens)
- ✓ List of KPIs used
- ✓ Glossary

Annex



Annex I: SDM General Introduction & context

This section of the annex is standard for all cases and provides an introduction to the topic and the approach of this study.

In this section you will:

- ✓ Understand what SDM means
- ✓ Get a snapshot of the stakeholders and forces that shape an SDM
- ✓ Get an overview of our approach



Service Delivery Models (SDMs)

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

Service providers offer the services; they can be a trader, processor, farmer organization, NGO, public extension scheme, etc.

Investors tend to be (final) buyers of the product, looking to secure their supply and / or for reputational reasons are interested to invest in the farmer.



Processors, traders and other value chain players in agri-commodities are beginning to see service delivery as part of their business, rather than something the buyer requested or only as a way to create farmer loyalty.

This results in value chain players establishing a relationship with the farmer as a client, being interested to gain a better understanding of the structure of their existing SDMs, what services are being delivered, to which farmers, and the impact on their business.

Companies are also gaining a clearer understanding of how to fund such services and are exploring ways to make their model less dependent on external funding, i.e. commercially viable.

Service delivery models and the stakeholders that shape them are evolving



Processors, traders and other value chain partners - see service delivery as part of their core business



Financial institutions, development banks and social investors – show an increased risk-taking appetite



Donors - focus on how to create the largest leverage and return on investment



Innovative businesses emerge that develop solutions for optimizing service supply

Levels of SDM Analysis



SDM Structure

The analysis looks at the SDM from a holistic perspective, identifying the way the model is structured



Within this structure (financial) resources are invested

Those resources allow for a set of services to be delivered

These services are targeted at a (type of) farmer

The aim of these services is an impact at farm level

This impact translates into financial benefits so the structure (over time) becomes financially sustainable

This analysis in this case study is organized in the following way:

1. What is the **structure** of the SDM
2. What are the **services** provided
3. What is the impact of those services at **farm** level
4. What is the business case for the individual **entities** delivering the services
5. What is the **financial** impact of the SDM as a whole
6. What **conclusions** can we draw from our analysis

Purpose of the SDM Analysis

An outcome of SDM analyses to date was the identification of those issues which the SDM operators found of critical importance, and where they encountered limited knowledge to be available. Examples are:

Focus learning questions

- How to improve adoption and loyalty rates
- How to use farmer profiles to tailor make service packages
- How to drive down costs (for farmers and service operators)
- How to finance a SDM (types of finance, types of farmers) and timelines
- How to create a positive enabling environment for a service delivery model

IDH will stimulate dialogue with key partners on these topics, by targeting these questions in a broader range of SDMs and by facilitating webinars and knowledge sharing events.

IDH aims to create:

Action driven analysis

- Analyzing a broader range of SDMs with partners that are keen to improve their SDM
- Establishment of an Innovation Program & Fund to co-design and co-fund innovative solutions within SDMs
- Develop insights packaged for financial institutions, which facilitate partnerships with service providers

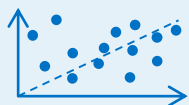
A learning community

- Deeper analyses on key levers for optimizing performance of SDMs; e.g. farmer segmentation and adoption
- Convening key partners on pre-competitive topics in SDMs through learning events, webinars and knowledge sharing
- Forming strategic partnerships with knowledge partners that share the interest in driving performance of SDMs



With the SDM analysis, IDH envisions to identify and create actionable improvement opportunities

Individual SDM analysis:



Analyze SDM



Identify key success drivers



Identify enabling environment challenges



Identify opportunities for innovation



Evaluate funding needs

To facilitate further learning and improvement, IDH aims to establish:

Global knowledge hub

- Deeper analyses on key levers for optimizing performance of SDMs; farmer segmentation and adoption
- Benchmarking data and best practice for designing and implementing smallholder business models
- Organize learning community

Enabling environment

- Convening key partners (at sector and national level) on pre-competitive topics in SDMs
- Forming strategic partnerships with knowledge partners that share the interest in driving performance of SDMs

Blended finance

- Establishment of an Innovation Program & Fund to co-design and co-fund innovative solutions within SDMs
- Develop insights packaged for financial institutions, which facilitate partnerships with service providers

Technical assistance

- Innovating and improving smallholder business models of private sector players
- Using private sector lessons to inspire public sector players and vice versa



Annex II: Context

This section of the annex is standard provides a description of the context of the SDM

In this section you will:

- ✓ Get a comprehensive overview of the SDM structure
- ✓ Get insights on the development of the commodity sector and characteristics of the farmers in the region under study
- ✓ Get insights on the role of farmer organizations
- ✓ Understand the enabling environment in the region
- ✓ Get insights on the status of gender equity
- ✓ Get insights on the status of environmental resilience of farmers



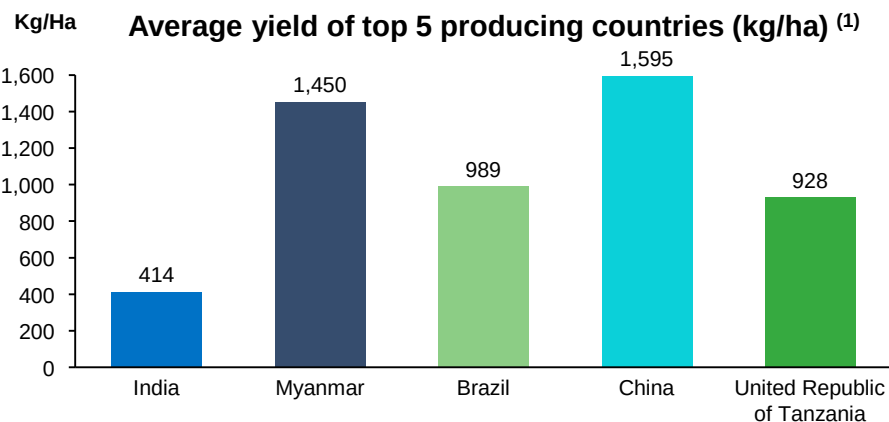
Learning questions

In this SDM study, a set of tailored learning questions were analyzed:

 SDM Structure	1) What are the most impactful services? 2) How can the SDM efficiently be scaled up?	1) Currently, training is the most impactful service, specifically on GAP areas around mulching, weeding, and pruning. The Farmer Network Tool (FNT) is expected to help farmers accessing finance and inputs, and provide KPD with an understanding of performance trends to tailor service provision 2) To scale this SDM effectively KPD must ensure market demand and working capital to source product, allowing them to meet their ambitious targets and pay the prices they expect.
 Financing	1) Are the services offered in a cost-effective manner?	1) All services operate at a net loss, yet training and certification, and planting materials are expected to generate some revenues. Training will become more cost effective in the future with government officials train government officials training farmers directly. Similar cost savings are seen in farmer organization, where previously KPD would undertake lobbying and advocacy. KPD is now helping organize the cooperatives to undertake this themselves.
 Services	1) Are there any other services that can be added?	1) KPD plans to initiate a program allowing for loans to acquire dairy cows, with the milk being sold to KPD, and a portion of farmer revenue being kept to repay the outstanding loan. This will improve farmer access to manure and diversify their income. There is also a program helping farmers diversify to maize and cassava that is meant to start in 2020; however, scaling of the program is set to yield poor results and causes KPD to operate at a loss.
 Farmers	1) What are the greatest needs of the smallholders in the SDM? 2) How effectively does the SDM address the needs of smallholders?	1) The farmers struggle most in record keeping. Currently only records on coffee are kept by buyers, all other crops are done informally. This leads to farmers being unable to prove they are bankable, making finance difficult to achieve and limiting investment. 2) The SDM is quite effective at fulfilling the needs of farmers; however, scaling will be challenging and the expected outcomes may be challenging to achieve.
 Application & Impact	1) How do the added services impact the SDM's efficiency, cost-effectiveness and value creation?	1) The new services are being offered as a means to decrease the burden of SDM in direct provision of services. By utilizing the government extension officers to deliver training, KPD can dedicate less staff to the program. By organizing the cooperatives, KPD can focus their advocacy efforts on training the cooperatives to advocate for themselves. Through the digital platform, farmers can better access finance, which improves their overall access to inputs and assets. Overall these services decrease the human capital burden on KPD while allowing for scale in a cost effective manner.



Context – developments in the Bean sector



Tanzania's role in the global bean sector

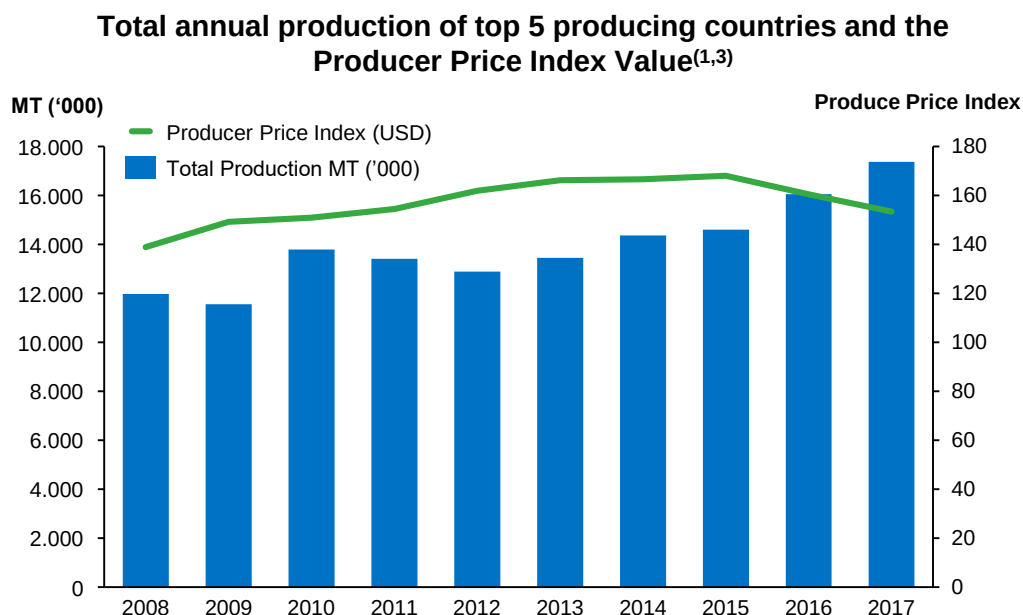
Tanzania is the fifth largest dry bean producing country in the world, with over 1.1 million MT produced annually accounting for 3.6% of global production¹.

The average yield (MT/ha) is relatively low compared to the other main bean producing countries. This is due to the small farm size, their lack of access to affordable credit, to quality inputs, to mechanization and good infrastructure. This limits the ability of farms to professionalize and improve their yield.

Tanzania's relatively low-cost and low-quality beans makes them competitive compared to other bean exporters, especially compared to neighboring countries. Additionally, Tanzania's strategic harvesting timing makes them key bean suppliers of India during a certain period of the year and secures their offtake².

However, India's import quotas on beans in 2016 and 2017 negatively affected the other large producers' markets, thereby highlighting the potential risk for Tanzania's dependency on the Indian market².

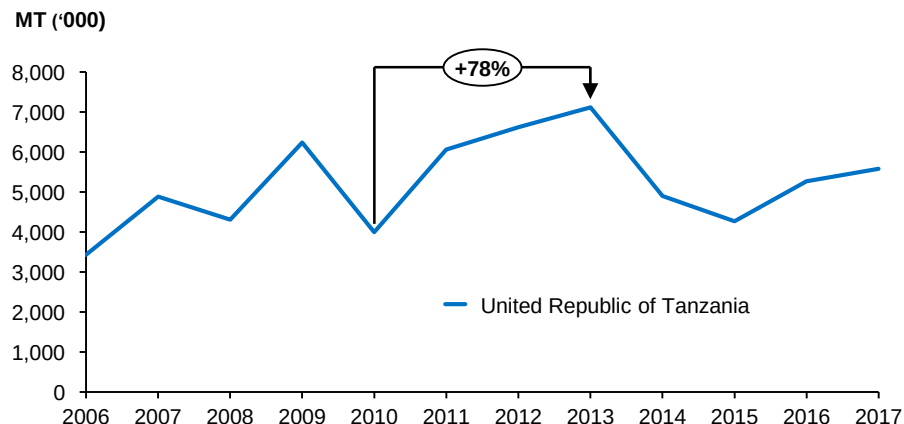
As shown in the bottom graph, there is a global rise in bean production. This is mainly driven by the increasing trend of plant-based diets in Europe and USA, and as key food crop for a growing population in developing countries².



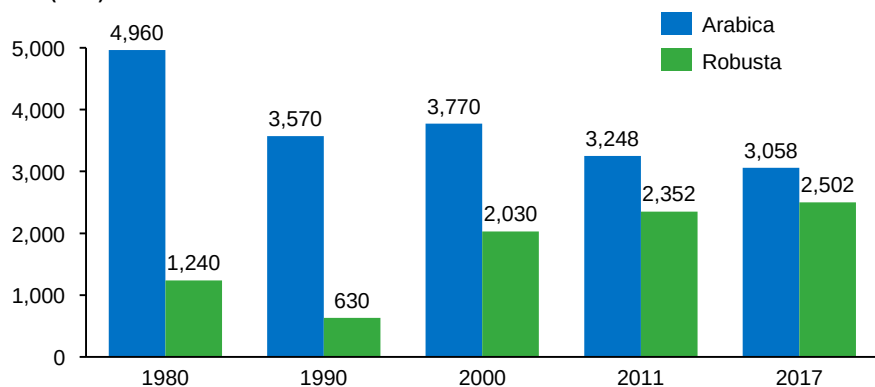
Sources: 1) FAOSTAT (2019). Crop data 2) Aid Environment (2017) Tanzania pulses sector diagnostic 3) FRED. (2019) Producer Price Index: Dry beans

Context – developments in the Coffee sector

Annual average of total coffee produced in Tanzania (MT) ⁽¹⁾



Production volumes of Arabica and Robusta in Tanzania (MT) ⁽²⁾



Tanzania's role in the global coffee sector

Tanzania produces 0.6 % of the world's coffee, with Japan, the USA and Italy, Germany, being the leading export destinations for Tanzanian coffee².

Both graphs show that coffee production in Tanzania has been stagnating as a result of declining yields caused by the old age of the coffee. This is exacerbated by poor farm maintenance practices including insufficient pruning and stumping of trees and poor management of pests and diseases (especially the Coffee Wilt Disease). This indicates a high potential for yield and quality improvement in the coffee sector in Tanzania, if proper training is provided, coffee farms are replanted with resistant varieties, and enabling governmental regulations are developed^{2,3}.

Robusta coffee developments

As can be seen in the graph on the left, the share of Robusta in overall coffee production has doubled over the last 30 years².

A key issue in the Robusta coffee sector is the very high tax charged by local governments on coffee produce (cess). This leads to the prevalence of large informal market where more than 20% of production in the main Robusta producing region is illicitly brought to Uganda and sold there, to avoid the high taxes^{2,3}.

Sources: 1) FAOSTAT (2019). Crop data; 2) Tanzania Coffee Board (2011) Tanzania Coffee Industry Development strategy; 3) Global coffee Platform (2016) AFRICAN COFFEE SECTOR – Tanzania case study

Context – farmers in the SDM region



The Farm

- 80% of all Tanzanian farms are smallholder farms¹. the average farm size is between 0.9-3ha and produces on a subsistence basis². In the Kagera region the farm size is on average between 0.2 to 4ha, with many farms below the national average³.
- Fertilizer application rates for smallholder farmers are particularly low, around 25kg/ha, especially compared to 80kg/ha in neighboring Kenya¹. The lower level of fertilizer application is linked to high costs and poor access to inputs.
- 60% of the labour on smallholder farms is hired. As farm work intensity is low, half of the household works off-farm for extra income¹.
- Only 3% of smallholder farms have access to irrigation, making the highly rain-dependent crops vulnerable to droughts².
- In Tanzania, family labour on smallholder farms is divided equally between females and males¹.
- Smallholders have less access to extension services (14% vs. 17%) and improved seed varieties (21% vs. 24%) than larger farmers, especially compared to Ethiopia and Kenya where rates are more equal¹.



Household

- In Tanzania, an average smallholder family consists of five persons⁵.
- Human capital in smallholder farm households is below the national average¹. More formal or informal knowledge sharing on GAP would positively influence the agricultural productivity of the farm.
- Only 2% of Tanzanian smallholder households have running water and only 4.1% uses electricity for lighting in their houses¹. This lack of safe water and sanitation facilities plays a fundamental role on household's nutritional state. The lack of electricity limits performing activities after dark.
- Over half of the smallholder household's members work off-farm, undertaking ploughing, planting, weeding, harvesting, and transporting produce for other farmers, to diversify their income and assist with food security¹.



Income

- In Tanzania an average smallholder family lives on \$1.9 USD/day, per household member¹
- Revenues from crop and livestock production accounts, on average, for 70% of Tanzanian farmers' total income, making them sensitive to price changes and vulnerable to irregular weather events¹. Smallholder farmers rely less on crop and livestock production for their total income as compared with other farmers, 66% and 73% respectively¹.
- Revenues stemming from off-farm agricultural labour accounts for 21% for smallholder farmers and 14% for larger farms¹.
- A large part of smallholders' income is allocated to food (81%). Leaving little room of the remaining budget for health (4%) and Utilities, Education and Transport (3% each)¹.
- 40% of the population in the rural Kagera region lives below the poverty line⁴

Sources: 1) FAO (2015) The economic lives of smallholder farmers; 2) GAFSP (2016) Agribusiness country diagnostic – Tanzania; 3) IDH (2019) Expert interview; 4) http://www.tzdpd.or.tz/fileadmin/documents/external/national_development_frameworks/Poverty_Mapping- PED_June_2016_.pdf; 5) FAO (2014) Gender Inequalities in Rural Employment in Tanzania Mainland



Opportunities and challenges in the enabling environment

Impact of environment on SDM

L (Limiting) = The environment hinders the implementation of the SDM

N (Neutral) = The environment does not influence the implementation of the SDM

E (Enabling) = The environment facilitates the implementation of the SDM

	Definition	Opportunities and challenges	Impact	Measures taken by SDM operator
Governance	LAND OWNERSHIP Existence of land ownership rights / regulations and their enforcement. Ease of purchasing/ transferring land	- In Tanzania land is owned by the State and citizens have the right to use this land. However, there is limited availability and access to land, due to disputes between farmers and pastoralists, lack of awareness on ownership, legal status, and policies². - Most of the farms are small-scale¹.	L	
	INFRASTRUCTURE Existence and state of roads, water and electricity networks as well as proximity to main trading / processing hubs (e.g. access to market)	- Water and electricity facilities are poor in Tanzania¹ increasing farmers' lack of irrigation and mechanization of farming activities. - Most roads in rural areas are unhardened which increases transport costs and limits market access.	L	- KPD undertakes logistics for the product after it arrives at their facility, and will assist with local logistics, if needed. - For trainings KPD can help organize transport to those who could otherwise not attend
Farm Inputs	LABOR Cultural norms that restrict /promote people of certain ages, genders or social groups from farm labor. Availability and cost of labor	On average, 60% of the labor on smallholder farms is hired¹. However, cheap labor due to the high rural unemployment levels, keep total labor costs down.	N	
	INPUTS & FINANCING Availability of affordable, quality inputs and the necessary marketing and distribution mechanisms. Availability of credit. Enabling regulatory environment	- Farmers' use of inputs is low due to low credit access, weak seed production systems, input infrastructure and the high presence of counterfeits^{2,3}. - In Tanzania access to affordable credit is very low due to their high credit risk and their financial needs extending beyond agricultural purposes³. - Additionally Tanzania has an unpredictable tax regime with ad-hoc export bans for crops (including beans) and inconsistent VAT policies leading to higher costs for farmers².	L	- KPD has distributed seeds to lead farmers, with the plan to allow the farmers to sell these seeds to the SDM farmers in the region, improving the quality of planting material - Using the Farmer Network tool, KPD hopes to make finance available to farmers via the ability to show their sales and production records, as well as ensuring repayment through the program

Sources: 1) FAO (2015) The economic lives of smallholder farmers 2) GAFSP (2016) Agribusiness country diagnostic – Tanzania; 3) FAO (2018) Pulse crops for sustainable farms in sub-Saharan Africa; 3) The Mastercard Foundation (2017) Responsible Agriculture Finance for Smallholder Farmers in Tanzania and Uganda

Opportunities and challenges in the enabling environment

Impact of environment on SDM

L (Limiting) = The environment hinders the implementation of the SDM

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E (Enabling) = The environment facilitates the implementation of the SDM

	Definition	Opportunities and challenges	Impact	Measures taken by SDM operator
Crop	TRADING SYSTEM Organization of the system through which crops are traded from farmer to market, including the number and type of actors involved	- The supply chain structure can vary highly and relationships can be flexible or stable⁵, which can lead to offtake insecurity and unfair price setting. - Unfair trading practices exist throughout the supply chain due to a lack of transparency in the price setting and the prevalence of counterfeit seeds⁵.	L	- KPD provides a share of the premium received for organic or FairTrade certification to farmers, increasing their income - KPD ensures the availability of high quality seedlings via lead farmers
	PRICING & COMPETITIVENESS Market dynamics of the main crop of the SDM, including competition between buyers and possible price-setting by the government or other parties	- Bean farmgate prices are low compared to neighboring countries due to low input application which gives Tanzanian farmers a competitive advantage¹. - The market price for beans and coffee is volatile leading to income insecurity for the farmers³.	L	KPD works to ensure the price received by farmers is constant, based on the contract the price received from their buyer
Sustainability	ENVIRONMENTAL RISKS Climate change, possibility of extreme weather, soil type, water supply and quality, pests and diseases. Potential environmental damages such as deforestation	- Agriculture in Tanzania is highly rain-dependent with increasing vulnerability to irregular weather conditions². - Beans are susceptible to pests and diseases which leads to lower yields or total crop loss².	L	- KPD offers trainings to cooperatives on climate resilience and GAP regarding water usage - Farmers are supplied planting materials that are less susceptible to disease and pests
	SOCIAL CONTEXT Availability and quality of schooling / healthcare. Cultural factors. Potential social externalities like child labor, gender disparity	- Finding work outside of on-farm activities can be challenging for smallholders, since they have lower educational skills⁴. - Trainings are usually only attended by the head of the household	L	Women are encouraged to attend trainings alongside the male head of the household

Sources: 1) BTC (2012) Organic Kidney Beans : potential for certified producers in Tanzania 2) GAFSP (2016) Agribusiness country diagnostic – Tanzania; 3) FEWS NET (2018) Tanzania market fundamentals summary; 4) FAO (2015) The economic lives of smallholder farmers; 5) Aid Environment (2017) Tanzania pulses sector diagnostic

Environmental resilience of farmers in the SDM

	Indicator	Discussion	SDM Risks & opportunities
	 37.0 Climate resilience ¹	Tanzania is assessed to be low in climate resilience. While they have high vulnerability to climate change (55.1%), there is low ability to leverage investments and convert them to adaptation actions (29.1%)	- Farmers are offered training on how to work with climate change factors - Farmers are encouraged to use organic materials and GAP to reduce environmental impact
 Soil	Light water deterioration ²	The province of Kagera has light water degraded soils (related to loss of nutrients, salinization, acidification and/or pollution)	- Farmers are encouraged, supported, and trained on the benefits of organic fertilizer - In the future, KPD plans to create a program where farmers can purchase a cow and using the manure to fertilize their crops
 Water	Medium to high risk ³	Tanzania has a medium to high overall water risk. While baseline water stress is low, seasonal variability is high and there is a high percentage of the population without access to improved drinking water supplies	- Farmers use rain water to irrigate their crops - With changing rainfall patterns, farmers require new seedling varieties, or increased access to irrigation systems
 Agro-ecosystem	 7.04 Human footprint ⁴	Tanzania has a medium environmental footprint, with Kagera around the national average. Since 1993, several areas in Kagera have seen an light decrease in environmental impact	- Farms plots are either well diversified or follow a crop rotation scheme to maintain soil fertility - Farmers follow organic practices to minimize environmental impact

1: ND-GAIN Country Index; summarizes a country's vulnerability and readiness to adapt to the negative impact of climate change

2: GLASOD; shows the severity of soil degradation in 4 categories: water, wind, physical and chemical deterioration

3: Aqueduct Water Risk; identifies areas with water-related risks, based on 12 subcategories such as drought severity, seasonal variability and ground water stress

4: WCS Human Footprint; measures the cumulative impact of direct pressures on nature from human activities. Scores 0-50, but national averages rarely exceed 25



Annex III: KPIs and data

This section of the annex provides a description of KPIs used and data sources

In this section you will:

- ✓ Get an overview of the service-specific KPIs used in the analysis for both farmer and SDM operator
- ✓ Get an overview of data sources used to carry out the analysis
- ✓ Get an overview of key assumptions for farmer analytics
- ✓ Get insights on how data is managed (optional)



Service KPIs

Training



Days of training per farmer annually	2
Farmers per training	n/a
Method of payment for training (free of charge, upfront by farmer, on credit)	Free of charge
Training to be certified (yes/no)	Yes
Training topics	Agronomics, business, gender, environment

Finance



Average annual amount of credit farmers receive	n/a
Average time in months until a loan is repaid	n/a
Percentage of total loans (sum of in cash and on credit loans) that are not being repaid	n/a
Method to reduce financial risk	
Annual interest rate charged to SDM farmers	n/a
Cost of SDM operator of providing financing services	n/a

Diversification



Number of crops	5
Crop sourced	5 (coffee, beans, maize, cassava, milk)

Inputs



Margin made on planting material by SDM operator	-1\$ (-50%)
Price charged to farmer for planting material (per kg)	1\$
Method of payment for inputs by farmers (free of charge, upfront by farmer, on credit)	Upfront by farmer



SDM KPIs

Efficiency

Annual SDM expenses per farmer (annual average)	109
SDM net income (loss) per farmer; adopting farmer	1,831 ; 1,866
Change in income (loss) per farmer	+47%
SDM net income per farmer (as % of value of total production; of total sourcing)	55.4%; 56.9%
Baseline sourcing value per farmer	\$1,295
Change in sourcing value per farmer (CAGR over SDM duration)	+238%
Annual SDM net income per MT sourced	\$321
Change in sourcing efficiency (net income per MT sourced, CAGR over SDM duration)	+34%
Loyalty rate (share of total farm production sold to SDM operator)	100%
Loyalty growth rate	0%
Adoption rate (share of farmers that implement services provided)	35%
Adoption growth rate	65%



Data sources

	Data categories	Data collection method	Primary data source(s)	Historic (frequency)	Forward-looking	Key issues
Agronomic assumptions	Productivity	FAOSTAT and Interviews	Interviews with KPD staff	Monthly	2019-2024	Issues in quality; lack of validation; Interviews limited
	Quality	Reports on quality in the region and interviews with KPD staff	Reports on coffee and Tanzanian aid; interviews with KPD staff	Annual	2019-2024	Lack of sources; lack of validation; quality discrepancies
	Price	FAO, Farmer interviews, KPD interviews	http://www.fao.org/faostat/en/	Annual	2019-2024	Issues in quality; lack of regional level; interview quality; single source
	Labor costs	KPD interviews, Farmer interviews, Reports	Interviews	Monthly	2019-2024	Issues in quality; lack of validation; Interviews limited and costs unclear
	Input costs	KPD interviews, Farmer interviews, Reports	Interviews	Per measure	2019-2024	Issues in quality; lack of validation; Interviews limited to few actors
	Other costs	KPD interviews	Interviews	Unclear	2019-2024	Issues in quality; lack of validation; Interviews limited; single source
SDM assumptions	Scale	KPD interviews; Program Proposals	Interviews	Annual	2019-2024	Depends on product and scale of sourcing; lack of clear plan in practice
	Overhead costs	KPD interviews	Interviews, financial statements	Annual	2019-2024	Long-term scoped plans change often; unsure how economies of scale impacts this
	Service specific costs	KPD interviews; Annual Report	Interviews	Annual	2019-2024	Largely estimates; unclear of start-up or operating costs; not sure how it would change with scale
	Service specific revenues	KPD interviews	Interviews, financial statements	Annual	2019-2024	Largely estimates; not sure how it would change with scale
	Commercial margins	KPD interviews	Interviews, financial statements	Annual	2019-2024	Determined based on other numbers, rather than on financial statements; margins differ greatly between products and may not be completely accurate



Key assumptions for farmer analytics

Key drivers	Unit	0	1	2	3	4	5	6
Farm size (organic, intercropping)	Acre	3.8						
Farm size (conventional, crop rotation)	Acre	1.5						
Coffee tree age	Years	35						
Yield								
Coffee	Kg/acre	426	534	642	642	660	677	677
Beans (intercropped)	Kg/acre	200	252	299	319	400	400	400
Beans (crop rotation)	Kg/acre	250	535	634	678	850	850	850
Maize	Kg/acre	400	1,573	1,866	1,994	2,500	2,500	2,500
Cassava	Kg/acre	2,501	6,932	8,223	8,788	11,016	11,016	11,016
Milk	Liter/cow	5,110	5,110	5,110	5,110	5,110	5,110	5,110
Honey	Kg/bee hive	9	18	23	32	50	54	90
Farm-gate price		Coffee	Beans	Maize	Cassava	Milk	Honey	
Price	Usd/Mt	470	258	108	22	430	5,375	
Price (high)	Usd/Mt		387	258			10,750	

Sources: xxx



Annex IV: Glossary

This section of the annex includes an overview of the standard glossary terms used in the SDM analysis



