Building a sustainable smallholder sourcing model for Kenyan tropical fruits

Service Delivery Model Analysis – Public report May, 2023





Introduction

Smallholder livelihoods 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 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 & 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.



IDH Farmfit Africa

The study was commissioned under IDH's Farmfit Africa Program, which consists of 3 pillars;

Farmf	it Business Su	upport
Business	Innovation	Connecting

Farmfit Business Support provides businesses and banks the tools they need to optimize cost-efficiency and maximize the impact of their engagement with smallholder farmers. It helps identify areas ripe for innovation and matches them with the most suitable finance, to bring them to scale.

Farmfit Intelligence Centre			
Access to	Business	Actionable	
data	modelling	insights	

Farmfit Intelligence Centre shares key insights on how to make smallholder value chains more efficient and effective. Its benchmarking database contains insights from 40+ smallholder farmer engagement models, helping partners innovate in technology and gender inclusion. The robust data set helps financiers make better investment decisions.



Farmfit Fund is the world's biggest ever public-private impact fund for smallholder farmers. The Fund's innovative structure de-risks investments in smallholder farming and helps drive sustainable impact by showcasing the commercial opportunity represented by smallholder farming finance.

Abbreviations

DTA	Digital transformation assessment
EBITDA	Earnings before interest, taxes, depreciation and amortization
BRC	British Retail Consortium
FGP	Farm-gate price
FTE	Full-time equivalent
FMS	Farm management system
GAP	Good agricultural practices
HCDA	Horticultural Crops Development Authority
п	Information technology
IPM	Integrated pest management
ISP	Independent service provider

Kenya Plant Health Inspectorate Service
Kenyan shilling (currency)
Living income
Metric ton (1,000 kg)
Post harvest loss
Profit and loss statement
Service delivery model
Smallholder farmer
Technical assistant
United States dollar (currency)

Report outline

To navigate between the different chapters, simply click on the corresponding name in the reading guide on the right of each page, and you will be taken to the first page of that chapter



. Annex

Executive summary

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1. Summary

2. The SE

Business case

. Impact case

Goshen Farm Exporters Ltd (GFEL)

 Established in 2010, GFEL Ltd is a processor and exporter of Kenyan horticultural food products sourced from contracted farmers

- The company has cut a niche for itself by focusing on value addition of tropical fruits into dried healthy fruit snacks
- All the fresh fruits are sourced from over 4,000 small scale producers in Lower Eastern Kenya and the Coast. The company aims to grow this number to 9,000 by 2024
- The company seeks to tap into the growing market of dried (organic) fruits globally and plans to transition to sourcing and processing more (organic) fruit accordingly
- Locally, it already sells its dried fruit to retailers under its own brand *Fruitee*, while also selling to local bulk buyers. For the export market Goshen aims to grow bulk sales while also penetrating retail market
- Through farmer groups, Goshen provides its farmers with extension services, fruit fly traps and harvesting services. It also seeks to develop partnerships with financial service providers to facilitate access to finance for farmers. The company recently started a pilot to turn biowaste into biofertilizer, which it intends to supply to its farmers
- This report focuses on Goshen's sourcing activities for **mangoes** (from Tana River and Makueni) and pineapples (from Kilifi)

Sources: 1) FAO, (2020) 2) HCDA (2020) 3) Soehn & Bien, (2022) 4) Goshen interview (2023)

ted farmers • Mango: Kenya rar

The opportunity | Goshen seeks to tap into the growing global market for dried (organic)

tropical fruits by enhancing production and value addition of these products in the country

- Mango and Pineapple value chains
- Mango: Kenya ranks 15th globally in mango production¹. Annual production volume has averaged 790,000 MT and represents ~17% of the total value of fruits produced and 6% of fruits exports²
- Production has experienced growth in the last 4 years with a slight decline in 2020² due to weather and climate shocks as well as pests (fruit flies) and diseases
- Most of the mangoes produced are consumed locally, largely traded through middlemen (80-95%) with minimal value addition (<10%) undertaken. Post harvest losses (PHL) are between 25–40%³
- Pineapple: Kenya ranks 21st globally in pineapple production. The annual production volume is around 370,000 MT and represents ~14% of value of fruits produced and 12% of fruit exports²
- It is the third most produced fruit in Kenya with presence of large commercial farms such as Delmonte. It's mainly grown in Murang'a (43%), Kiambu (15%) and Kilifi (10%)²
- Despite multiple challenges limiting production, the country's productivity levels are almost double the East African average. Poor transport and storage infrastructure result in PHL of up to 50%⁴

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Summary (1/7) | Yields differ significantly between the different farmer segments that Goshen works with. Goshen should take this into account when reaching out to new farmers

 Yields of organic mango farms in Tana River (147 kg/troportional forms in Makueni (218 kg/trees) Mango <u>yields</u> fluctuate y-o-y due to biannual yield dia 67%. On top of these fluctuations, yields decrease in Mareduced productivity of aging trees (+25 years). In Tana already in the mature phase (+40 years), leading to low Productivity of Makueni farms thus reduce from 218 kg/(peak year) to 47 kg/tree in year 10 (dip year). While the function of the set of the set	
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 farms reduce from 96 kg/tree in year 2 (peak year) to 3 (dip year)* With current average plant age of 2.5 years, pineapple 	 differences of up to Vakueni due to a River, the trees are w but stable yields g/tree in year one hat of Tana River 32 kg/tree in year 9 have higher yields. The farmers Goshen currently works with have grafted trees already, but as part of the farmer outreach and selection strategy, Goshen can target to exclusively include mango farmers growing newer varieties, farmers with grafted trees, or farmers who are willing to start grafting their trees.

*The years indicated refers to the years that the farmer is part of the SDM (as per the financial model) These topics, observations and recommendations were derived from a set of learning questions that were formulated up front. A list of these learning questions can be found <u>in the annex</u>

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Summary (2/7) | Despite higher yields, conventional mango farmers make losses compared to the organic farmers during dip years. Only pineapple farmers earn a living income

	Observations	Recommendations
Farmer incomes	 Pineapple farmers have low costs (avg. \$98) with SDM farmers generating net incomes as high as \$7,000 annually; almost 30% higher than the baseline farmers Due to lower production costs (avg. \$36), organic mango farmers have a positive net income both in peak (\$173) and dip (\$34) years, despite lower yields With a net income of \$501 during peak years, conventional mango farmers make higher profits than organic farmers. However, they make losses of \$28 during dip years. Despite the biannual yield fluctuations, the farmers spend \$250 (85% of total costs) on inputs each year in hope of better yields. This demonstrates the importance of the trainings that Goshen gives to their farmers on this tenio. 	 Promotion of other crops/fruits that farmers grow to smooth income especially during dip years. Goshen can work with other likeminded off-takers to facilitate market for the alternative crops grown by the farmers, like oranges, bananas, French beans and maize Leverage the farmer management system (FMS) to better understand the costs of production at farm level, especially for Makueni farmers given the intercropping practices adopted in the region
	 Mango farmer incomes fall below the poverty line and living income (LI) benchmark with a LI gap of 90% for organic farmers and 92% for conventional farmers. Pineapple farmers on the other hand are above the LI benchmark by 15%. 	

These topics, observations and recommendations were derived from a set of learning questions that were formulated up front. A list of these learning questions can be found in the annex



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Summary (4/7) | The proportion of female farmers that Goshen works with is very low. Specific policies and strategies can be employed to target female farmers

	Observations	Recommendations
Gender at farm level	 The proportion of female farmers that Goshen works with is very low in Kilifi (10%) and Tana River (17%). This is due to cultural barriers in these regions, limiting women ownership of resources and decision making Overall, female farmers have lower yields for both mango (35%) – 1,025 vs 650 fruits per tree and pineapples (21%) – 11,900 vs 9,300 fruits per acre than their male counterparts, which demonstrates the need for tailored support 	 Implement inclusive policies and strategies to increase involvement of women. Particularly advocate for women to serve as leaders in farmer groups and take active roles in recruitment and training of farmers. Goshen can explore setting aside budget/fundraising for implementation of their Gender Action Learning System (GALS) training in Kilifi and Tana River
		 Further recruit more female Technical Assistants (TAs) and build capacity of the TAs on gender inclusion

These topics, observations and recommendations were derived from a set of learning questions that were formulated up front. A list of these learning questions can be found in the annex

Summary (5/7) |

	Observations	Recommendations
Scale ambitions		This information is only available in the private version of the report
Cost to serve		This information is only available in the private version of the report

These topics, observations and recommendations were derived from a set of learning questions that were formulated up front. A list of these learning questions can be found <u>in the annex</u> *The cost to serve indicated doesn't include the cost of fruit fly traps which are recovered from the farmers, ** Loyalty level is the proportion of marketable surplus that farmers sell to Goshen \bigcirc

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Summary (6/7) |

	Observations	Recommendations
Business performance		This information is only available in the private version of the report
Investment in trucks		This information is only available in the private version of the report

These topics, observations and recommendations were derived from a set of learning questions that were formulated up front. A list of these learning questions can be found in the annex

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Summary (7/7) |

	Observations	Recommendations
Organization capacity		This information is only available in the private version of the report
Digital assessment		This information is only available in the private version of the report

These topics, observations and recommendations were derived from a set of learning questions that were formulated up front. A list of these learning questions can be found in the annex

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The Service Delivery Model

1. Summary

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2. The SD

3 Business ca

4. Impact case

Objectives | Goshen seeks to build an inclusive and profitable business model that facilitates and fosters smallholder farmers (SHFs) to commercially participate in the fruits value chain

Envisioned	outcomes	per	stakeholder	
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	Objective	Farmers	Goshen	IDH
Core objective	Become Africa's leading exporter of dried tropical fruit by building an efficient and scalable business model that integrates smallholder farmers.	 Higher and stable incomes and improved long-term business case 	 Access to higher premium export markets Contribute to smallholder impact 	 Scale learnings within the industry in favor of the horticulture industry in Kenya
ves	Improve access to good agricultural practices and affordable inputs	 Higher yields and margins Better quality produce 	 Lower cost to serve Increase supply security to meet capacity 	 Improve long-term market sustainability Contribute to smallholder impact – food and income security
Secondary objectiv	Reduce post-harvest loss by providing a guaranteed market for farmers	 Higher margins and income stability 	 Increase volumes supplied Contribute to smallholder impact 	 Contribute to smallholder impact – food and income security
	Increase current processing capacity and in turn volumes sourced from farmers	Higher incomes	Diversified product portfolioHigher sales	 Contribute to smallholder impact – food and income security
	Diversify into new/export markets - global organic market for dried fruit	 Higher/premium margins Certification Soil restoration 	 Higher sales/margins from dried fruit Sales of biofertilizer 	 Improve long term business sustainability

Sources: Company documents & interviews (2022)

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2. The SD

3. Business c:

Location | Goshen target farmers are located in the Eastern and Coastal regions of the country. The factory is located in Makueni county – the main source of fruit for Goshen

Makueni County Tana River County Mango Mango Makueni produces 37% of Kenya's total Goshen works with ~400 farmers from Tana mango production¹ River. Input use is minimal in this area which ~1,800 farmers from Makueni are part of makes obtaining organic certification easier Goshen's SDM The farm-gate price (FGP) is lower Inputs commonly used are foliar fertilizer, ٠ compared to Makueni, since farmers are fruit fly traps and fungicides located more remotely, limiting market Many farmers smooth out their mango ٠ access and increasing transport cost for off season income with income from takers orange/citrus Overall, trees in this region are on average • Tree age in the region is between 20-30 • 40 years old years **Kilifi County Pineapples** Goshen works with ~200 farmers that are part of the SDM, and an additional 1,000 that are not yet part of the SDM Operating facility · Input use is minimal which makes it

Sources: Company interviews (2022) 1) Bett et al., (2021)

easier to obtain organic certification

SDM overview | Goshen's technical assistants work closely with the independent service providers (ISPs) to source from and provide services to the farmers



Stakeholders | Goshen works directly and indirectly with a broad range of stakeholders to deliver services to their farmers

Actor	Type of organization	Function (within this SDM)	Revenue model (within this SDM)	Incentive to participate (Within this SDM)
Smallholder Farmers	Individuals	Receive services, training and inputSupply produce	Sale of produce	 Improve income and thereby livelihoods
Harvesting teams	Individuals	Harvest mature fruit	 Payment for produce harvested 	Generate income
Farmer Groups	Registered groups	 Delivery of trainings Distribute inputs Provide farmers with loans 	 Subscription fee by SHF members 	 Training and inputs facilitation for members Interest from farmer loans
Input providers	Limited company/ individuals	 Provision of fruit fly traps, fertilizer, fungicides etc. 	 Profit from input sales 	Grow customer baseGenerate income
Off takers	Limited company	Produce offtakeDistribution to end consumers	 Profit from sales of produce 	 Improved quality and quantity of produce
FMS provider	Limited company	 Provision of traceability and farmer management system 	Subscription fee	Revenue from offering service
IDH	Non-profit	 Knowledge/technical assistance partner 	• N/A	 Improve farmer productivity and profitability
Truvalu	Limited company	 Providing working capital and CAPEX 	 Return on investments 	 Empowering agri SMEs through equity investment
Partners in Food Solution	Non-profit	 Supporting implementation of BRC certification in year 1 	• N/A	 Increase competitiveness of food companies in Africa

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1. Summary

Farmer groups | Farmer groups are critical for Goshen SDM as they provide the direct link to the farmers; they support in trainings and input distribution and facilitate access to finance



Relationship between Goshen and farmer groups:

- Establishment: TAs support in mobilization of farmers to form farmer groups near central collection points. The groups have an average of 15-30 members and are encouraged/supported to be formally registered
- **Capacity building:** TAs undertake group trainings in various topics. Goshen intends to enhance training through digital extension as well as supporting in set up of demo farms
- Input and credit facilitation: Goshen works with the groups to distribute inputs (fruit fly traps) to the farmers. Goshen is exploring partnerships with financial providers to facilitate financing for well-established groups
- **Commercial relationship:** Goshen assigns contracts to the groups specifying the price early in the season. Goshen pays farmers (through the groups) one week after fruits have been harvested to allow for proper quality checks. Certification of farmers is also done through groups

Relationship between farmers and farmer groups:

- **Membership:** To become part of the farmer group, farmers pay an annual membership fee which varies depending on the region
- Meeting frequency: Farmer groups across the three regions meet on a weekly basis.
- Service provision: Farmer group leaders/chairman serve as the main interface between Goshen and farmers. The groups distribute the fruit fly traps and organize for trainings though the group champions trained by Goshen
- Access to finance: The groups operate a village savings and loans/table banking model. The groups are, however, not able to meet the financing needs of their members



ISPs | The current relationship with Independent Service Providers (ISPs) is transactional; there is potential for their role to evolve in building and maintaining the relationship with farmers



Source: Company interviews (2022)

Description

- Rationale: ISPS are locally based with deeper community reach than the TAs. By working with the ISPs, Goshen will be able to expand their reach to farmers and frequency of the support cost-effectively
- Selecting ISPs: Currently, there is no criteria for selecting ISPs. A well-defined selection framework would ensure Goshen onboards ISPs that are motivated and understand the farming business
- Assessing performance and graduation: By leveraging the <u>TA/ISP module</u> in the FMS, Goshen can be able to assess the performance of the ISPs based on parameters such as volumes sourced, and farmers mobilized. ISPs can graduate to TAs depending on performance and interest

Legend: Dotted line and orange text depict future flow

Goods & services

Data & information

Money

SD

Services (1 of 2) | Trainings, access to fruit fly traps, and fruit harvesting are the main services Goshen directly provides to their farmers

Category	Service	Beneficiaries	Impact	Implementation	Revenue model	Status
Training & information	GAP, Climate Smart Agriculture, Entrepreneurship training	All farmers	Reduced cost to serve, improved operations, higher quantity and quality	GAP trainings are held in groups and individual farm visits by the TAs. Other trainings are delivered by Goshen and other 3 rd parties	Indirect revenue by sourcing more, and higher quality of the crop	
Inputs	Biofertilizer provision	Conventional mango farmers	Higher quantity and quality, organic compliance	The biofertilizer production is in a pilot phase	Sale of biofertilizer	
	Crop protection	Conventional and organic mango farmers	Higher quantity & quality, better food safety compliance	Goshen has been facilitating access to fruit fly traps through a credit model	Indirect revenue through reduced PHL and higher sourcing volumes	

Source: Company documents (2022)

Under development

Ongoing

Category Service **Beneficiaries** Impact Implementation **Revenue model** Status All conventional High quality produce Harvest teams paid Direct revenue by mango farmers, by Goshen harvest the fruits. harvested, lower sourcing more, and Farmers then transport the Harvesting and 75% of organic logistics costs for higher quality of the fruits to a central collection aggregation mango and farmers, improved crop pineapple operations point Postfarmers harvest Reduced loss – higher Goshen's truck or a Indirect through services reduced PHL quality and quantity leased vehicle picks up Transportation the harvest. Planning to All farmers and cold chain purchase a refrigerated truck to reduce losses Improved Currently looking for service Sale of certified/high operations/logistics providers to provide a farmer value produce leading to lower costs, management system **Traceability ERP** Market All farmers better farmer system access management and certification compliance

Services (2 of 2) | Trainings, access to fruit fly traps, and fruit harvesting are the main services Goshen directly provides to their farmers

Under development

Ongoing

Farmer segments | Goshen's farmers are segmented based on crop and farming practices. Every SDM segment has a baseline counterpart that does not receive any services from Goshen



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2. The S

3. Business

Farmer relationships | Goshen intends to implement a farmer management system to better manage its relationship with their farmers

Outreach

Goshen's TAs reach out to farmer groups who are active in the sourcing areas. Additionally, ISPs assist Goshen in outreach and mobilization of farmers. Goshen competes with other off takers in these areas and its thus critical for them to build loyalty through the services provided.

Selection

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Goshen has not explicitly specified the selection requirements for the farmers except that they need to be in groups. Mango farmers that have already received GAP training or are certified, are however, preferred. Farmers also need to commit to supply produce at least once in a year.

Contracting

Farmer groups are the main interface between Goshen and individual farmers and they manage the annual contracting. Contractual agreements with illiterate/semiliterate farmers, requires the presence of a county official who reads out the contract to the farmer. The contract specifies the price at which Goshen will purchase the fruits.

Segmentation

Goshen farmers can be segmented based on their region, and their agricultural practices (conventional or organic). By segmenting the farmers Goshen will be able to closely monitor performance and tailor services based on needs ultimately reducing cost of service provision.

Graduation

A graduation approach encourages farmers within an SDM to achieve certain performance criteria making them eligible to move from their current segment to a segment with specific, more expensive or risky services.² Goshen does not currently have a farmer graduation program in place.

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Data collection

Goshen captures projections on farmers' potential production quantity and records in excel. In the future, Goshen aims to collect more data from its farmers in a standardized manner. Acquiring an ERP/farmer management system is part of the strategic plan.



Category	Status	Observations
Gender strategy: Is gender equality a strategic goal for Goshen which is communicated in documents?	Yes	In 2021, with the support of a consultant, Goshen developed a Gender Action Learning System (GALS) training manual to promote gender equality. This has however, not been fully implemented. Gender is also documented in HR policies.
Data collection: Does Goshen collect data on staff or customers/farmers disaggregated by gender?	Yes	Data collected is disaggregated by gender. Further improvements can be made in the analysis and tailoring of services. The FMS will play a critical in the analysis and presentation of the data to identify trends.
Inclusive workplace: Does Goshen have policies/ practices to make the workplace inclusive for both women and men?	Yes	Goshen has a human resources and gender policy with internal trainings held to ensure that the gender policy cascades down to staff. There is a code of conduct that all employees must sign and adhere to which addresses issues such as sexual harassment and discrimination.
Inclusive consultation: Does Goshen speak to or consult both male and female customers (farmers) to learn about their different needs and preferences when designing a product	Partly	Consultations are done in group formation. These groups are gender-balanced and are the main form of consultation. However, there are no forums specifically initiated to understand the different needs of men and women.
Inclusive tailoring: Does Goshen tailor services based on how needs may be different for men and women?	Partly	Goshen has already adapted the timing and location of training. They have also ensured that the timing of training is aligned with religious beliefs (i.e., not on Saturdays in Tana River). There is however need to further leverage the disaggregated data to tailor services to enhance productivity.
Independence and control over resources: Do services enable women to improve their independence, control over resources and/or value capture?	Yes	Payments are made to individuals' MPESA accounts, women farmers thus benefit directly from their labour. There have been governance training within groups with consideration for gender balance in leadership Further training using GALS will be provided at business, farmer group and farm-level.

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Gender best practices | Goshen and its farmers could benefit from implementing inclusive policies and services while lifting key barriers to women economic empowerment

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Summary

JOURNEY ON GENDER INTENTION LADDER		BEST PRACTICES TO IMPLEMENT			
Gender Gender transformative	Establish Key Performance Indicators (KPIs) e.g., targets on the number of male and female	Use sex disaggregated data collected to inform service delivery to farmers e.g., track sex disaggregated farm level <u>metrics such</u> <u>as yield and income</u> to understand gaps and need for services and skills.	Incorporate both men and women farmers in the design process of key services to ensure the different needs are considered.		
Gender Intentional unintentional GOSHEN FARM	to reach, develop a roadmap to get there and allocate resources to monitor and measure gender goals.	Intentionally advocate for women to serve admap to get there d allocate resources monitor and measure nder goals.			
 Goshen has a gender/HR strategy that is 					
 developed a training manual that seeks to promote gender equality. One the 7 current TAs only one is female despite efforts to recruit more women TAs especially in areas where women are still 	Adapting training to women's capacities, literacy rates, time schedules and location	Recruitment of women's groups is more likely to foster higher loyalty levels ² and increased bankability of the farmers/ groups.	Using existing women leaders and female TAs to attract more women is an effective farmer recruitment strategy.		
 While Goshen collects data disaggregated by gender, this data is not analysed to identify trends and tailor services. 	leads to improved yields and quality of produce ¹ , leading to higher supply.	Women's financial resilience is beneficial in household and community resilience and fosters stable market and constant supply chains. ³	Goshen gains reputation as a gender inclusive company increasing chances of attracting funding and other support.		

FMS best practices (1/2) | There are key critical considerations that Goshen needs to consider to ensure successful design and implementation of the FMS

1	Understand business needs	Understanding the business needs that Goshen envisions to tackle at the onset helps in customizing the system to capture the crucial data points that need to be collected. For example, if Goshen would like to track the farms then geolocation data needs to be collected.
2	Create ownership at Goshen and farmer level	There needs to be full support from the company's management team. The management should work closed with the IT officer/manager who will be overseeing implementation. Further ensure key employees are aware of the implementation to ensure alignment. Also identify lead farmers/early adopters as champions to drive behavior change and enhance acceptability.
3	Design clear workflow/roadmap	Clearly articulate all the activities that need to be undertaken and assign responsibilities between FMS provider and Goshen's staff involved in implementation.
4	Capacity building	Success will largely depend on the TAs and ISPs ability to collect and verify data as well as to maintain relationship with farmers and influence adoption. As such, the TAs and ISPs need to be well trained and equipped to implement the FMS including facilitation to access smartphones and data bundles.
5	Gender integration	To incorporate gender into FMS implementation, Goshen can a) collect gender disaggregated data and profile early adopters, b) encourage women participation in initial trainings and demos, and c) have women TAs to cater to the needs of women farmers.
6	Data security and consent	Involve an external expert if needed when it comes to data security (e.g., when mobile money payments are integrated) and integrate farmers consent when sharing data with 3rd parties.
7	Clarity on costs	Aside from the initial hardware and software costs, Goshen should get clarity on other continuous costs such as maintenance; costs of data collection, costs for bulk SMS, training of users and additional application programming interface (API) after initial set-up to ensure these are considered in the annual budget.

FMS best practices (2/2) | It is crucial for Goshen to understand its data and decision needs across the various supply chain nodes to ensure the FMS is customized to meet those needs

	Farmer level		TA/ISP level	÷P	Goshen level
Business needs	 Timely communicate with farmers (weather information, training tips, event days etc.,) Track production cycles/calendar and follow up on farm activity Measure performance/ productivity of farmers Track and improve farmer loyalty Leverage data to segment farmers and tailor services 	 Gain visibility inform transp Easily foreca based on pre Track perfor the seasons Understand delivery) 	y on volumes aggregated to port/ route planning ast volumes collected per center evious performance mance of the TAs/ISPs through /years and determine rewards training capacity (needs/	B Ti A th to tc	etter budget projections based on volumes. race produce delivered from the farmers bility to link annual procurement needs to ne budgets everage the FMS data to facilitate access o credit for farmers lonitor capacity building activities and erformance of the TAs/ISPs
Data points	 Farmer personal data Production data Farmer account (mobile, bank) details Contract details (crops, volumes etc.) Service data (Type of services received) Farmer group details 	 TAs/ISPs pe Volumes fac Farmers ma Extension se 	rsonal data ilitated by TA/ISP naged per TA/ISP ervices content/plan	 C re T/ ai M 	redit details (amount of loans, type of loan, epayment period etc.) As/ISPs' extension services content/plan nd status. larket information data e.g., prices
Potential risks	 Reluctance of the farmers to share their data Accuracy of the data provided/collected Low levels of digital literacy and mobile phone/mobile money account ownership 	 Digital and fi Access to di mobile phon Lack of own 	nancial literacy of the TAs/ISPs gital/finance solutions (e.g., es, mobile money accounts) ership /reluctance	• A • La • In • Li aą • D	bility to hire staff with the right digital skills ack of ownership by Goshen staff nadequate capacity building support to staff imited budgets dedicated to the digitization genda vata security

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Business Case

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Impact Case

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IDH Annual Report 2021

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Thanks

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

Partners



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Annex

5.1

Farmer Survey Insights

Gender at farm level | The proportion of women farmers is very low in Kilifi and Tana River. Overall, women farmers have lower yields which demonstrate a higher need for more support



Role division

	Female head of HH	Male head of HH
FOF*	50.57%	49.43%
MOF**	11.35%	88.65%



Female input into decision making in household activities



Input into all decisions
Input into most decisions
Input into some decisions
Input into very few decisions

Summary

SDM

Business

Case

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Annex

Source: Household survey carried out by Akvo (2022)

*FOF: Female operated farm **MOF: Male operated farm. Only 22% of the households are headed by women

Mango farmer characteristics | Most mango farmers are male with average land size of 6.5 acres. Most farmers do not access formal credit



Phone and functionalities



Main market





HH size and Age





Makueni Tana River

Loans in the past 12 months



Source: Household survey carried out by Akvo (2022). More information on the methodology can be found in the annex

Importance of focus crop Mango is the main crop for both conventional and organic farmers with organic farmers also engaged in more off farm activities



Source: Household survey carried out by Akvo (2022). More information on the methodology can be found in the annex

Mango farmer satisfaction | Farmers are most satisfied with the quality of services delivered by Goshen. The range of services delivered is however, limited

Why would you recommend using the

services of Goshen?

59%

High quality services

32%

Others

N = 110

Recommendation from farmers

Reason for positive feedback

100%

80%

60%

40%

20% 9%

Wide service range

How likely is it that you would recommend Goshen to a friend/peer?



N = 181

In general, farmers are likely to recommend Goshen to a peer

High quality services are key in influencing the positive feedback provided by farmers in the SDM



Out of the 246 mango farmers interviewed, a guarter indicated that the services range is currently too limited. Half of the negative feedback relies on other reasons

Reason for negative feedback

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Source: Household survey carried out by Akvo (2022). More information on the methodology can be found in the annex

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Farmer gender and Farm Size % hired labour Crop age Land ownership N = 51 N = 70 N = 71 N = 71 90% 100% 26% 50% 41% 10% 59% Male Female 74% 5,29 6 92% 4,56 4 2,67 0 to 2 years 2,00 Caretaker 2 Hired labour 2 to 6 years Entirely Owned 0 Family labour more than 6 years Male Female Phone and functionalities Main market HH size and Age Loans in the past 12 months N = 71 N = 71 N = 71 N = 71 3% 23% 5 14% 46% 0 Kilifi 30% 87% 60 43 42 40 Local market No phone 20 **Regional market** In kind No Phone with text and call 0 Local market/village/regional market Cash or mobile money Female Other loans Male Phone with internet Other

Pineapple farmer characteristics | Most pineapple farmers are male who entirely own the land they farm on. Access to formal credit remains limited

Source: Household survey carried out by Akvo (2022). More information on the methodology can be found in the annex

Pineapple farmer satisfaction | Most pineapple farmers would recommend Goshen and are mostly satisfied with the quality of services provided

Reason for positive feedback

Recommendation from farmers

How likely is it that you would recommend Goshen to a friend/peer?



N = 71

• In general, farmers are likely to recommend Goshen to other farmers in the community

 High quality services, market access and access to farm management services, are key in influencing the positive feedback provided by farmers in the SDM

Source: Household survey carried out by Akvo (2022). More information on the methodology can be found in the annex



Reason for negative feedback

Why would you <u>not</u> recommend using the services of Goshen?

No negative feedback has been given.

The SDM

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Summary



State of the sector

Production trends | Although experiencing positive growth in recent years mango and pineapple production is highly challenged by unpredictable weather patterns and pests and diseases.

Mangoes and pineapple production (000 Mt) and productivity (Mt/ha) trends

Mango production in the country has experienced growth in the last 4 years with a slight decline in 2020 due to weather and climate shocks as well as pests and diseases. Mango is the second most produced fruit in the country mainly in Makueni (20%), Lamu (19%) and Kilifi (10%). Kenya is almost at par with the Eastern Africa mango productivity average. **Pineapple** is the third most produced fruit in Kenya with presence of large commercial farms such as Delmonte. It's mainly grown in Murang'a (43%), Kiambu (15%) and Kilifi (10%) Despite multiple challenges limiting production, the country's productivity levels are almost double the Eastern Africa average.



Exports | The increasing demand for dried fruit globally – led by Europe - presents major opportunity for value addition of topical fruits in the country.



Note: Most reports/databases do not report disaggregated dried pineapple numbers. Sources: 1. CBI.EU, 2021

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Proportion of dried mangoes imported by type (%), 2020

The proportion of organic dried mangoes consumed is expected to increase further as more markets focus on organic certified produce.



Mango value chain | The majority of the mangoes produced in Kenya are consumed locally largely traded through middlemen; with minimal value addition undertaken.



Inputs

Cultivation & Logistics

- 1. There are more than 200 registered mango tree nurseries in Kenya.¹ Many informal, unregistered nurseries operate at the side of the road, selling seedlings of unknown quality.
- 2. Fertilizer and fungicide use tends to be quite low due to high cost, inadequate knowledge and no perceived need for it.
- 3. Government policy is contributing to the accessibility of fruit fly traps, after the self-imposed ban on mango export due to food safety issues.²
- 4. 55% of SHFs have 0-10 trees, 44% have 11-500 trees and 1% is a business orchard. Harvesters are hired by off takers. As soon as they pick a fruit, ownership transfers. Processors or brokers purchase mangoes either directly from organized farmer groups or indirectly from agents.²
- 5. 80-95% of SHF produce is estimated to be sold through middlemen.²
- 6. The market glut, high perishability of the crop, poor packaging, hot weather, and the lack of cold chain infrastructure results in high post-harvest losses (PHL) of between 25-40%.³

Processing & exporting

- 7. Processors are finding more ways to capture value from the crop by product development to juice, dried fruit, frozen fruit etc.
- 8. Exporters keen to serve global/premium markets, face stringent certification requirements and high initial cost. Additionally, Kenyan mangos lack presence in Western markets due to misalignment between product variety preference and quality.²



Pineapple value chain | Kenyan pineapple value chain is characterised by several levels of intermediaries between farmers and end markets necessitated by poor physical infrastructure.



- 1. Pineapples are vegetative propagated by lateral shoots.¹ This means that farmers grow their own suckers. Within the 22 months they need to mature, they require farmyard compost. Overall, input use is very minimal.
- 2. In Kenya, pineapple growing is dominated by large scale producers. Governmental contracts with some large multinationals are ending, showing a change in market dynamics and policy in favor for local businesses.² Farmers propagate the Smooth Cayenne Sweet cultivar and MD2 varieties. Small-scale production is concentrated at the Coast, Central and Western regions.³
- Village collectors, brokers, and wholesalers are the main off takers of pineapples. Smallholders encounter marketing constraints such as information asymmetry, lack of storage facilities, high transactional costs, little financial support, and more³
- 4. Transport is also a major challenge with many farmers located in remote areas with poor infrastructure.
- 5. Large PHL (30-50%)⁵ occur due to a lack of fruit processing factories, and the local market unable to offtake all produce.

- 6. Village collectors or brokers sell directly to local markets, or via retailers.⁶
- 7. Farmers that sell to local markets are competing with imports from Tanzania and Uganda.
- Less than 5% of the harvested pineapples are sold to the export market.⁷ Kenyan pineapple export volume was 22.3M MT in 2020.⁸

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Enabling environment (1/2): Reliance on rain-fed agriculture and limited use of inputs has limited productivity of mangoes and pineapples.

Category	Situation	Impact on SDM
Technology	 Mobile penetration: there were 59.24 million mobile connections in Kenya in 2021,¹ mobile money penetration stood at 73.8% in 2022.² Internet penetration was 42% in 2022, an increase of 7.4% from 2021.¹ Digital agricultural technologies (DATs): Kenya has about 113 institutions offering digital solutions for agriculture.³ 	 Digital technology can be leveraged to enhance engagement with the farmers i.e., sharing market and price information, climate/weather information and timely payment. Further it can be leveraged to create visibility on production for better logistics management.
Natural Environment	 Production systems: Only 7% of Kenyan agricultural land is irrigated, making the sector heavily dependent on rainfall with rain patterns becoming more irregular due to climate change ⁴ Pests and diseases: Fruit fly infestation is a common challenge in the mango value chain leading PHLs of upto 36%.⁷ Pineapple farmers grapple with mealy bugs, which can lead to total crop destruction. 	 Worsening and less predictable environment increase the risk of harvest losses and instable sourcing volumes. This also presents an opportunity to promote uptake of climate smart technologies.
Infrastructure	 Road networks: rural infrastructure is poor with transport accounting for upto 40% of cost of production due to scattered farms.⁴ Cold chain: Cold chain infrastructure consisting of pre-cooling and refrigerated storage/transport is highly underdeveloped. 	 Goshen incurs high transport costs to collect from farmers increasing overall cost of operations. Large investments are needed to purchase refrigerated trucks.
Labor	 Farmer age: The average age of farmer is high (61 years) resulting in difficulties in executing certain farm activities e.g., harvesting, pruning.⁸ Labor availability: Farmers largely rely on household labor. The high rural-urban labor migration results in labor scarcity and high labor costs 	 Goshen works with harvesters (youths) to pick the fruits. The rural-urban migration would result in shortage of harvesters impacting timely harvesting.
Inputs & Financing	 Input use: There is limited use of inputs (both organic and chemical) for fruit growing in Kenya. Financing: Low input use is partially due to limited access to formal credit. Only 37.5% of rural population borrow money from a formal financial institution or uses mobile money. ⁹ 	 Inadequate financing limits farmer productivity and consequently the volumes that Goshen can source. There is potential for the SDM to equip farmer groups to offer group loan and savings to the farmers.
1. Digital 2021: Keny	a 2. CA Kenya, 2022. 3. Digital Agriculture Profile – Kenya. 4. Soehn & Bien, 2022. 5. International	trade administration, 2022. 6. WUR, 2021. 7. Journal of Scientific and

Research, 2021. 8. AGRA, 2019 9. Worldbank, 2021

Enabling environment (2/2) | Multiple levels of middlemen lead to unfair value distribution in the value chain. Significant unexploited opportunities exists in the export market.

Category	Situation	Impact on SDM
Trading system	 Local market: 95% of the mangos and pineapples produced are consumed locally mainly traded through middlemen. 1 Export market: There is an increasing demand in developed countries for both fresh and processed fruit particularly organic certified. Quality concerns however hinder exports. Trading blocks: Kenya is a member of the EAC and COMESA trading blocks, with substantial cross border trade with Uganda and Tanzania. 	 Training and certification of farmers will be critical as Goshen seeks to explore opportunities in the export market particularly US and EU.
Pricing & competition	 Competition: There are multiple levels of middlemen engaged in the aggregation and distribution of the fruits, who take up significant value of the produce (upto 22%).¹ Pricing: Market glut and perishability results in lower prices and wastage – with many unsold fruits left to rot. In the Coast region, droughts have led to lower production and thereby higher prices.² 	 There is a high risk of side selling of the fruits requiring Goshen to pay the farmers fair prices on time. Further engaging with the farmers throughout the year helps build loyalty.
Institutional stability	• Institutions: There are multiple uncoordinated public and private sector led institutions that regulate/govern the fruits value chain. There have been delays in the enactment of the horticulture crops authority bill to enable better management and support to the industry. ³	 Institutional stability is key to creating a predictable environment that is important in incentivizing value chain investment.
Land tenure	 Ownership: Cultural norms still underpin ownership of land where Only 1% of Kenyan land is women- owned.⁴ Limited land ownership hampers women's decision-making and access to credit. Tenure: Most (65%) of the land in Kenya is under customary law.⁵ 	 Limited land ownership by women hinders their ability to access formal financing.
Social norms	 Literacy rates: Despite significant improvement over the last decades, women literacy (78%) is still lower than the male (85%) counterparts.⁶ Gender equality: While women are instrumental in the provision of farm labor, their decision making is limited 	Intentionally addressing the challenges facing women will be critical to ensure their full participation in the SDM. Opportunity Neutral Risk
Sources: 1) Soehn &	Bien, 2022; HCDA; 2) Nation, 2022.; 3) FPEAK; 4) WUR, 2021; 5) The Borgen Project; 6) UNESC	<u>:0</u>

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Assumptions

Learning questions

With this SDM analysis, we aim to answer the following questions:

Торіс	Question
Impact Case	 What is the business case for all farmer segments, and is this sufficient to reach a living income? How does the business case per farmer change due to Goshen's increased capacity?
Productivity	 What increase is needed in sourcing volume per farmer (total production, productivity, loyalty) and number of farmers to fulfil Goshen their processing capacity?
Organizational capacity	 What is Goshen's organizational capacity and are there any gaps based on their objectives?
Digital	 Under what conditions and how can digital solutions help to drive down costs? How can an FMS reduce cost to source and cost to serve?
Service delivery	 What holistic and tailored services do farmers require to increase production according to Goshen's mix of channels and quality that meets market standards?

Goshen assumptions

This information is only available in the private version of the report

The SDM

Farmer assumptions

Variable	Unit	Baseline 1	Segment 1	Baseline 2	Segment 2	Baseline 3	Segment 3
Farm size main crop	Acres	1.2	1.2	4.5	4.5	2.5	2.5
Number of trees/crops	#	47	47	26	26	25,000	25,000
Planting density	Tree/acre or plant/acre	39	39	6	6	10,000	10,000
Average tree age	Years	25	25	40	40	2.5	2.5
Weight of variety	Kg	0.25	0.25	0.5	0.5	2	2
Obtainable yield	Kg/tree or Kg/acre	50	218	75	147	20,000	20,000
PHL due to lack of market access	%	40%	15%	40%	15%	50%	30%
Fruit fly infested produce	%	50%	20%	50%	20%	N/A	N/A
Volume sold to Goshen	%	0	55%	0	55%	No data	9%
Farm-gate price	KES/Kg	15.0	22.0	10.0	16.5	25.0	30.0
Cost of fruit fly traps	USD	0	6	0	12	0	0
Foliar fertilizer	Yes/No	No	Yes	No	No	No	No
Fungicides	(Sub)optimal	Suboptimal	Optimal	No	No	No	No
Pruning	Yes/No	No	Yes	No	No	N/A	N/A
Irrigation	Yes/No	No	No	No	Yes	No	No

Source: Company interviews (2022). Household survey carried out by Akvo (2022)

1. Summary

2. The SDM

3. Business

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Yield curve | Mango

Source: previous SDMA work by IDH





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Methodology

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Gender ladder



Gender

intentional

Gender unintentional

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

Digital Transformation Assessment methodology

The Digital Transformation Assessment identifies and prioritizes digital opportunities (tech use-cases) that fit an agri-service provider's needs, with ROI estimates. Additionally, through a digital maturity analysis, areas of improvement are suggested for the agri-service provider. Based on the assessment, the tool allows you to match-make with relevant tech-providers.



The DTA process

- 1. Introduction with the organization: Discuss the overall process
- 2. Identification: Performing the first step of the methodology in the online DTA on the use case database
- 3. Prioritization: Prioritize the earlier identified use cases from the database based on desirability and feasibility
- 4. Digital Maturity Assessment: Conduct the Digital Maturity Assessment to distinguish strengths and opportunities for improvement
- 5. Results: The results include identified and prioritized use cases and DMA analysis with improvement areas

Poverty line methodology

Poverty line

- The general poverty line is 2.15 USD/day for one adult (in per adult equivalent terms), which is equal to 784.75 USD/year
- The PPP adjusted poverty line for Kenya is 0.88*365, which is 321 USD/year1 for one adult.¹
- A typical Kenyan smallholder household consists of 5 people, including 1 male adult, 1 female adult and 3 children.²

Poverty line adjustment

- Simply multiplying the poverty line with 5 would not consider the composition of the household and would not take into account economies of scale
- For a proper representation, the poverty line was adjusted with the OECD-modified scale to better reflect reality
- This scale differentiates between the household head, other adults and other children. The scale assigns a value of 1 to the household head, 0.5 to each additional adult member and 0.3 to each child³
- Using this scale, a typical Kenyan smallholder household consists of 1 + 0.5 + 3*0.3 = 2.4 adult equivalents
- Therefore, the adjusted poverty line for a household would be 321 * 2.4 = 770.88 USD/year

Household survey methodology

- **Description:** IDH uses the household survey to get an understanding of the farmers involved in the SDM and support with the farmer modelling. It is also meant to capture data related to gender, climate resilience and food security. It can also serve as baseline to measure the future impact of an SDM.
- **Sample size:** a sample size of 246 was interviewed using a population of 1403 farmers. 165 farmers were from Makueni, 81 farmers from Tana River.
- Sample location: Makueni (Mbooni and Kaiti Sub Counties) and Tana River (Hola Sub County)
- **Sample period:** December 5th 2022 December 9th 2022
- **Sampling methodology:** Goshen provided a list of outgrower farms from their database, from which Akvo, the primary data collector, randomly selected a sample. On these selected outgrower farms several people were interviewed.
- **Data cleaning:** Farmers are either only removed if they refuse to participate in the survey or their farm size is outside of certain parameters. To determine outliers for numerical questions of the survey, a cut off of three standard deviations from the corresponding mean is set.

LI definitions

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



Next steps

Once gaps are identified, you can take action through a smartmix 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 I he

SDM

Business

Case