Driving smallholder agriculture in maize and soybean value chains in Zambia

Griffin Services Ltd.

Service Delivery Model Analysis

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idh transforming markets

GRIFFIN ZAMBIA

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.

Report outline

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Executive summary

About Griffin Services Ltd

Griffin Services Ltd.

- Griffin Services Ltd. (Griffin) is one of the subsidiaries of CHC Commodities Ltd. (CHC). Griffin is a Zambian agricultural input provider, sourcing company, and service provider.
- The CHC Group sources wheat, maize, soybean, sorghum, sugar, and cassava through brokers, commercial farms, and smallholder farmers.
- Griffin, which engages in the maize, soybean and sorghum value chains, aims to transform its supply chain by operating an agent-based sourcing model that sources directly from and sells input directly to smallholder farmers (SHFs). With this model, Griffin aims to unlock the potential of increasing and securing traceable sourcing volumes from SHFs.
- The company has a three-layered structure of service provision consisting of depots, extension officers, and agents. Each depot has a dedicated extension officer, who oversees 10 agents, 5 who serve the role of an aggregator.
- Griffin aims to source from 50,000 smallholder farmers by 27/28 through 50 depots, 50 extension officers, and 500 agents (of whom 250 aggregators).

Operations

- CHC acquired Griffin services to increase uptake of its inputs by smallholders and allow better control and streamlining of its sourcing processes by moving from a broker model to an agent-based model.
- Griffin operates an e-commerce platform (web-shop) and depot from where farmers can source agricultural inputs at competitive prices.
- Griffin plans to update the web-shop which will contain over 5,000 products provide a platform through which farmers can order and buy agricultural inputs directly or through agents.
- Through Griffin agents and extension workers, smallholder farmers access training and one-on-one extension services. Additionally, Griffin will provide SMS-text agronomic support to farmers.
- Griffin has been piloting a smallholder input financing program with sorghum farmers and plans to offer input financing to its maize and soybean farmers in future. Smallholder farmers will be contracted to supply all their produce to Griffin with a check-off system through which input loans are prepaid.
- All of Griffin produce is supplied to CHC Commodities who then sells to off-takers such as InBev and WFP.

Objectives and/or targets | Griffin seeks to build a smallholder inclusive business model by providing inputs, agronomic support and market access related services to smallholders in the maize and soybean value chains of Zambia.

		Envisioned outcomes per stakeholder		
	Objective	**Farmers**	**Griffin Services**	**IDH Farmfit Fund**
Core objective	Develop a robust and commercially viable smallholder grain sourcing and input supply model while remaining a financially sustainable business	• Higher incomes, financial and food security, climate resilience, and improved long-term business case	• Stable input sales growth • Increased revenue from higher sourced volumes • Contribution to smallholder farmer impact	• Improve the long-term sustainability of Griffin • Scale service delivery to a substantial number of SHFs • Acquire and disseminate learnings on integrated sourcing and input supply businesses and the Zambian grains industry
Secondary objectives	Provide bundled input supply and off-take services to farmers	• Higher maize and soybean yields. • Better quality produce	• Grow a customer base for inputs and secure input offtake • Increase sourced volumes of maize and soybean	• Contribute to smallholder impact - food and income security. • Improve sustainability of the grains sector in Zambia
	Set up a robust farmer extension services infrastructure	• Lower production risks • Increased farm yields from improved support	• Improve farmer performance • Increase sourcing volumes of maize and soybean	• Improve Griffin's long-term sustainability • Acquire and disseminate learnings on integrated sourcing and input supply businesses and the Zambian grains industry
	Improve business systems to support an increasing number of farmers and sourcing volume targets	• Increased farm yields from improved support	• Streamlining operational systems for smallholder engagement • Increase sourcing volumes	• Improve the long-term sustainability of the business

Summary (1/3) | Griffin's model establishes a business case for the company and the farmers, although with the need for piloting and testing some initiatives before scaling. We have identified the below pathways to scale

Pathway	Rationale	Observations
Build organizational capacity in line with the projected scale.	• Enhanced internal capacity results in effective and efficient service delivery to and grain sourcing from farmers.	• **Organizational capacity:** The company does not have adequate capacity to support the envisioned growth with gaps identified in the organization capacity and digital infrastructure required to support such scale. Griffin currently plans to upgrade its FMS to a more robust system that can support its business needs.
Pilot, test and design a service provision package to benefit both farmers and Griffin	• Designing a suited service package will create shared value both at farm level and Griffin level • Building and showcasing the evidence of a successful service package can attract partners for service provision and financing.	• **Farmer Input Subsidy Program (FISP):** The Zambia government operates the FISP aimed at ensuring sustained food security for maize and soybean. The program creates a leverage point for easy entrance for private companies to start extension service provision. It however also creates challenges of competitiveness and limitations to scale for independent input suppliers like Griffin due to farmer reliance on subsidized inputs. • **Farmer segmentation**: Griffin has not segmented the farmers they work with, and thus current services are not customised for farmers and farmer performance is not tracked. The farmer base in this analysis consists of three segments. The segments are differentiated based on land size under cultivation and productivity resulting from different last mile delivery of training. • **Farmer performance**: Two SDM farmer segments proposed are projected to perform better than the baseline farmer and have been included in the sourcing model. EO-supported farmers require financing to access inputs that support expansion beyond the 1-ha input package provided under FISP.

Notes: For business sensitivity reasons, we have excluded some sections on Griffin's business case analysis from the summary.

Summary (2/3) | Griffin's model establishes a business case for the company and the farmers, although with the need for piloting and testing some initiatives before scaling. We have identified the below pathways to scale

Pathway	Rationale	Observations
Optimize depot operations and the extension services model prior to scaling	• Creating an expansion plan for depots guided by agro-ecological zones with the highest potential creates opportunities for business growth and sustainability • Refining the extension services model ensures efficient growth of its smallholder service offering and depot network to achieve the projected scale	• **Climate**: Griffin's operations are largely based in the Southern province of the Zambia within the agroecological Zone II which is characterized by good soils and ideal climate for agricultural production. • **FISP**: Under the program, farmers are organized into farmer groups and Griffin can leverage this to create a robust sourcing and input supply model by providing capacity building to these groups through agents. • **Depot infrastructure**: Griffin leverages its 6 depots for service provision services to farmers. Current assumptions for depot economics provide a positive business case. There is, however, need for testing different models to identify an optimal structure that can be scaled. • **Extension services model**: The extension services model while well structured, relies heavily on agents and thus faces risks that are likely to that hinder efficiency and effectiveness in service provision.

Notes: For business sensitivity reasons, we have excluded some sections on Griffin's business case analysis from the summary.

Summary (3/3) | Griffin's model establishes a business case for the company and the farmers, although with the need for piloting and testing some initiatives before scaling. We have identified the below pathways to scale

Pathway	Rationale	Observations
Explore service coalition opportunities with other players within the farmer ecosystem	Collaboration with other value chain players working within the same ecosystem provides opportunities to increase farmer incomes through sharing costs of service provision and value.	• **Diversification**: While farmers working with Griffin increase their incomes above Baseline income, there is a significant gap to the living income benchmark. Diversification is the only income driver that can result in a substantial income uplift. • **Input financing**: To attain the projected scale, farmers will require USD 7.3million in input financing by year 27/28. While it is recommended that Griffin pilots and tests a farmer financing model to prove the business case in the initial phase, there will be need to partner with a financial service provider potentially through a tri-partite financing mechanism.

Notes: For business sensitivity reasons, we have excluded some sections on Griffin's business case analysis from the summary.

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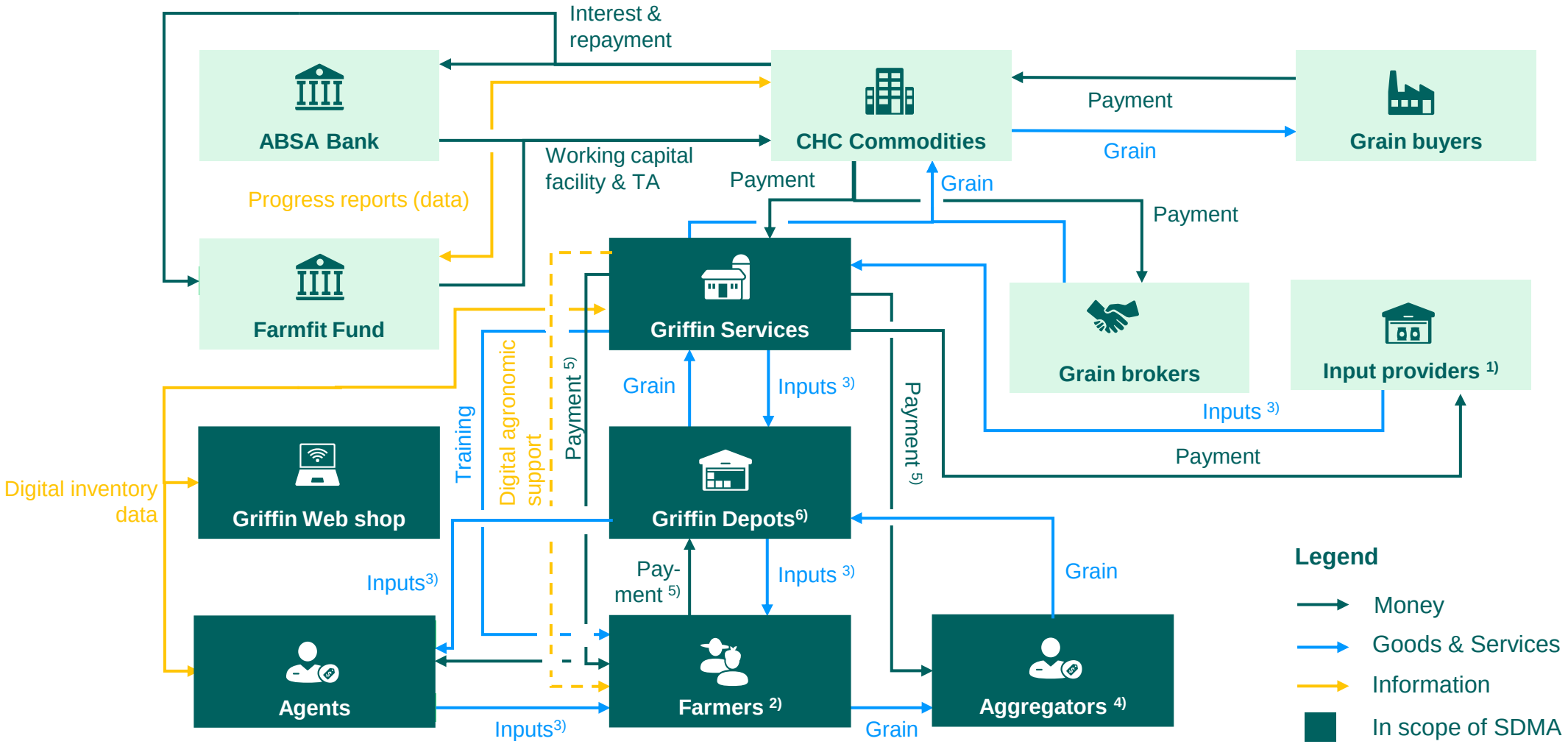
The Service Delivery Model

SDM overview | Griffin aims to streamline its service offering to smallholder farmers through leveraging both physical and digital infrastructure.



Notes: 1) Input providers covers input providers within the CHC group and outside the CHC group; 2) Farmer are organized in groups within the same community; 3) Inputs are seeds, fertilizer and crop protection required for the cultivation of maize and soybean; 4) Aggregators, who sometimes are also an Agent, store the grain until they have a sufficient volume (30 MT) for efficient collection by Griffin; 5) All payments between Griffin, Agents, Aggregators, and Farmers are done through Mobile money. 6) Each depot is managed by an extension officer.

Business canvas | Griffin supplies high-quality inputs and training services to smallholder farmers and sources grain from them for onward selling to off-takers.

Key partners

- Agricultural input suppliers.
- Large off-takers/buyers of grains
- Other CHC Group companies
- Financial service providers.

Key activities

- Facilitating access to high quality agricultural inputs.
- Training and extension service provision.
- Providing smallholder farmers access to markets through sourcing activities.
- Facilitating access to input financing for farmers.[1]

Value propositions

- Offer smallholder farmers easy access to agricultural markets and high-quality agricultural inputs.
- Provide input and grain marketing services and extension support to smallholder farmers.
- Better quality and quantity produce for local and export markets.

Customer relations

Grain:

- Transparency on pricing on grains.
- Timely payment
- Upfront payments with guaranteed price floors

Inputs

- Transparency on input package cost.

Customer segments

Grain:

- Large agricultural produce off-takers.

Inputs:

- Smallholder farmers cultivating maize and soybean.
- Large scale and commercial farmers.

Key resources

- Extension officers
- Commission-based agents.
- Digital infrastructure: web shop, FMS, digital payment mechanism
- Agreements with input, mechanization and equipment suppliers and FSPs

Key channels

Digital:

- Web shop
- Mobile money

Physical:

- Depots and extension Officers

3rd Parties:

- Commission-based agents

Cost structure

- Infrastructure costs
- Input costs
- Grain sourcing costs
- Staffing costs
- Digital operation costs
- Marketing costs
- General and admin expenses

Revenue streams

- Sales of sourced maize and soybean;
- Sales of agricultural inputs
- Technical assistance funding from 3rd parties

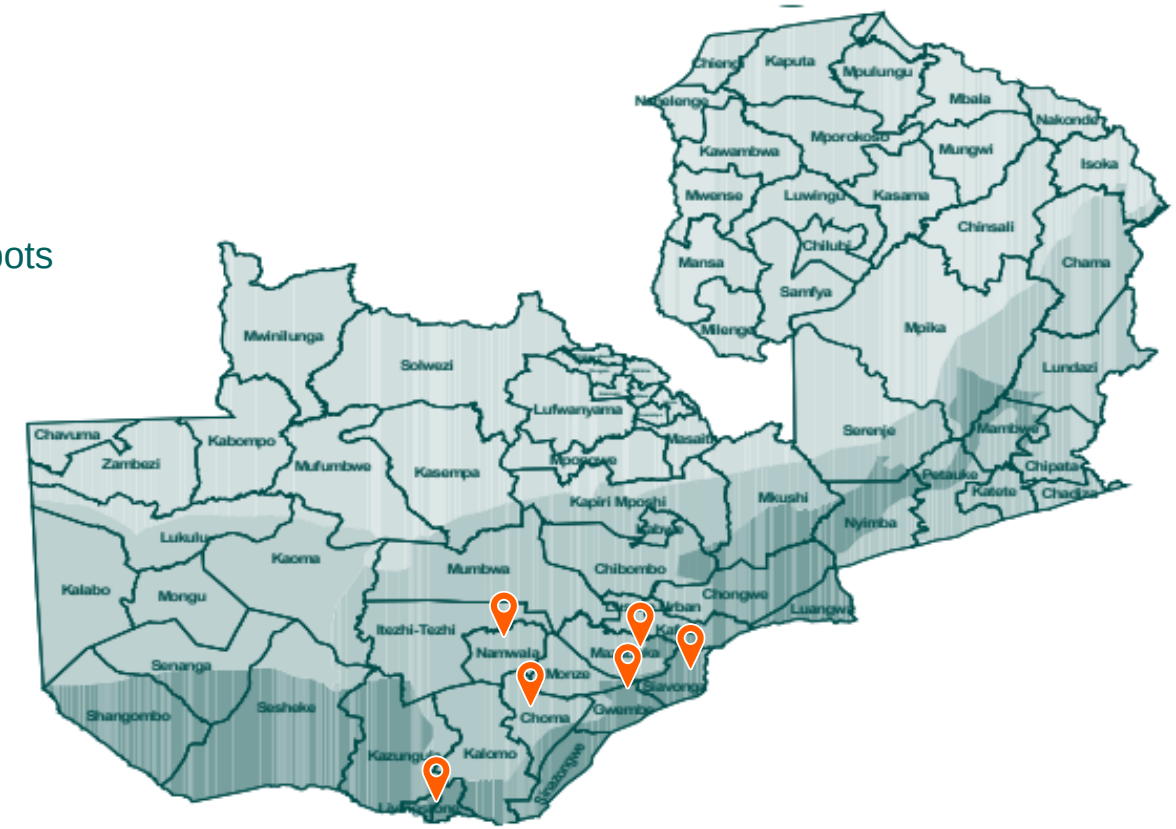
Notes: 1) This is a critical and potential service to be provided in collaboration with financial service providers

Locations | Griffin's operations are based in a suitable zone for crop production in Zambia and expansion is planned within the productive zones of Western, Central, Eastern and Lusaka provinces.

Zambia agro-ecological zones

Legend [1)]

- Zone I
- Zone II
- Zone III
- Current depots



Current operations

Griffin's current operations are exclusively located in the Southern province where they currently operate 6 depots. The Southern province is located in Zone II which is highly suitable for crop production

Expansion plan

The company aims to expand its operations to 50 depots the Southern province and the neighboring Western, Central, Eastern, and Lusaka provinces. The provinces are targeted for their suitability for agricultural production.

Source: World Trade Organization (2002);

Agro-ecological Zones | Zones that are favorable for agricultural production can be found in Central and Southern Zambia where smallholder production systems are largely rain-fed and thus vulnerable to climate shocks.

	Zone I*	Zone II*	Zone III*

Rainfall patterns	• Constitutes 12% of Zambia's land area
	• Location: areas of Southern, Eastern and Western Zambia.
	• Characterized by:
	  ○ Low altitude 300-900 m
	  ○ Erratic rainfall with annual rainfall of 600 - 800 mm
	  ○ Temperatures between 20-25°C.
	  ○ Short growing season of 80 – 120 days.
	  ○ Poor soils that limit crop production
	• Vulnerable to climatic shocks, especially droughts.
		• Constitutes 42% of Zambia's land area
		• Location: most of Southern, Lusaka, Central and Eastern provinces
		• Characterized by:
		  ○ Altitude between 900 -1200 m.
		  ○ Annual rainfall of between 800-1,000 mm
		  ○ Temperatures ranging 23-25°C.
		  ○ Growing season of 100 – 140 days
		  ○ Most fertile soils in Zambia
		• The region is prone to dry spells although distribution of rainfall is not as erratic as in zone I.
			• Constitutes 46% of Zambia's land area
			• Location: lies in a band across northern Zambia. North-Western, North Luapala, Copperbelt and (parts of) Central provinces.
			• Characterized by:
			  ○ Altitude between 900 -1200 m.
			  ○ Annual rainfall of over 1,000 mm
			  ○ Temperatures ranging 16-25°C.
			  ○ Growing season of 120 – 150 days
			  ○ Highly weathered and leached soils

Crop suitability	• Maize, cashew nuts, sorghum, soybean, groundnuts, and millet. • High potential for goat rearing and fishing.	• Sunflower, cotton, maize, beans, soybean, groundnuts, sorghum, vegetables. • Wheat grown by commercial farmers	• Tea, coffee, flowers, banana, orange, pineapples cassava, rice, wheat, sweet potatoes.
Irrigation vs Rain-fed	• Mostly rain-fed with little irrigation done by commercial farmers.	• Irrigation done by commercial farms while small scale farmers carry out rain-fed agriculture.	• Rain-fed agriculture is predominant with commercial farmers irrigating wheat.

Note: All zones are characterized by a single cropping season beginning in November, unless production is under irrigation
Sources: 1. JICA, 2. World bank CSA Zambia Profile 2019, 3. IFAD, 4. Climate change and crop choice in Zambia

Service overview | Griffin aims to provide a bundled package consisting of training, inputs and market access, aimed to increase and secure maize and soybean volumes directly from SHFs.

Category	Service	Impact	Implementation	Revenue model	Status
Training & information	**GAP training**	Physical trainings for improved farm and crop management practices resulting in efficient input use and on-farm productivity	• Extension officers	• Indirect through margins from input sales and sourced volume of grain.	●
	Extension Services	Famers receive both in-person and SMS-based agronomic advice resulting in increased input uptake and on-farm productivity	• Griffin HQ	• Indirect through margins from input sales and sourced volume of grain.	●
Inputs	**High quality crop & livestock inputs**	Improved yields for farmers accessing inputs through Griffin	• Agents • Extension officers in depots	• Margin from input sales.	●
Labor & Equipment	**Provision of used bags**	Improved post-harvest handling and reduced crop losses during transportation	• Griffin aggregators	• Indirect through sourced volume of grain.	●
Market access	**Off take of maize and soybean**	Improved access to markets for smallholders and increased sourcing volumes for Griffin.	• Agents • Extension officers in depots	• Margin on sales of grains	●
Access to finance	**Input finance**	Support farmer working capital to enable access to quality inputs for improved farm productivity.	• External FSP	• Indirect through margins from input sales and sourced volume of grain.	○

● Ongoing ○ Under development

Source: Griffin staff interviews

Stakeholder overview | As Griffin works with a broad range of stakeholders in its service delivery to farmers, it is important to align its value proposition to the interests of all actors.

Actor	**Legal status**	**Function** (within this SDM)	**Revenue model** (within this SDM)	**Incentive to participate** (Within this SDM)
Smallholder farmers	Individuals	• Uptake of training and other services • Source agricultural inputs. • Supply grains	Profit from sales of produce.	• Improved income and livelihood • Improved farm and crop management skills • Access to input financing
Aggregating agents[1]	Individuals	• Last-mile sourcing of grains on behalf of Griffin.	Commissions on volumes sourced	• Improved income and livelihood • Improved business skills
Input selling agents [1]	Individuals	• Market Griffin inputs to farmers • Last-mile delivery channel for inputs	Commission on input sales	• Improved income and livelihood • Improved business skills • Attract new customers
ABSA	Limited Company	• Investor	Interest on loan	• Increased loan disbursements thus increased revenues • Improved access to data to attract new agri customers
IDH	Non-profit	• Investor • Technical assistance provider	Interest on loan	• Create a sustainable farmer business case. • Replicate smallholder sourcing model in other investments

Source: Griffin staff interviews
Notes: 1) The model assumes 50% of agents recruited will also serve as aggregators thus serve both sourcing and input selling roles

Farmer relationships | Given the envisioned scale of the smallholder-focused sourcing model, Griffin will need to develop robust procedures for enhancing farmer relationships and leverage farmer groups for efficiency in service provision

Outreach

- Griffin requires an outreach strategy as demand for its products has largely been through word-of-mouth referrals..
- Griffin requires a marketing strategy s visibility at the farm-level is low. It relies on depots and agents to reach farmers.
- There are opportunities for Griffin to carry out targeted marketing initiatives on an agri e-commerce platform. To do this successfully, there is need to beef-up marketing skills/capacity or leverage existing infrastructure from a DAT.

Selection

- There is a need to define a selection criteria for farmers that Griffin provides high-attention services to. These could be farmers who already supply Griffin with other products (e.g., farmers in the sorghum program), subsistence vs emergent farmers etc.
- All farmers who require Griffin inputs are able to access service through depots based on their willingness and ability to pay.

Contracting

- Griffin currently does not use contractual agreements with the maize and soya farmers.
- Previous input financing experience under the sorghum out-grower program highlights the need for proper record keeping and contractual processes. This will be critical for the tripartite financing mechanism that Griffin is exploring.

Segmentation

- Griffin farmers are homogenous and there are no stark differences on land size, region, gender and crops grown to form a basis for segmentation
- Embedding Griffin's service provision on farmer groups creates prospects for segmenting groups based on their level of professionalism and size .

Graduation

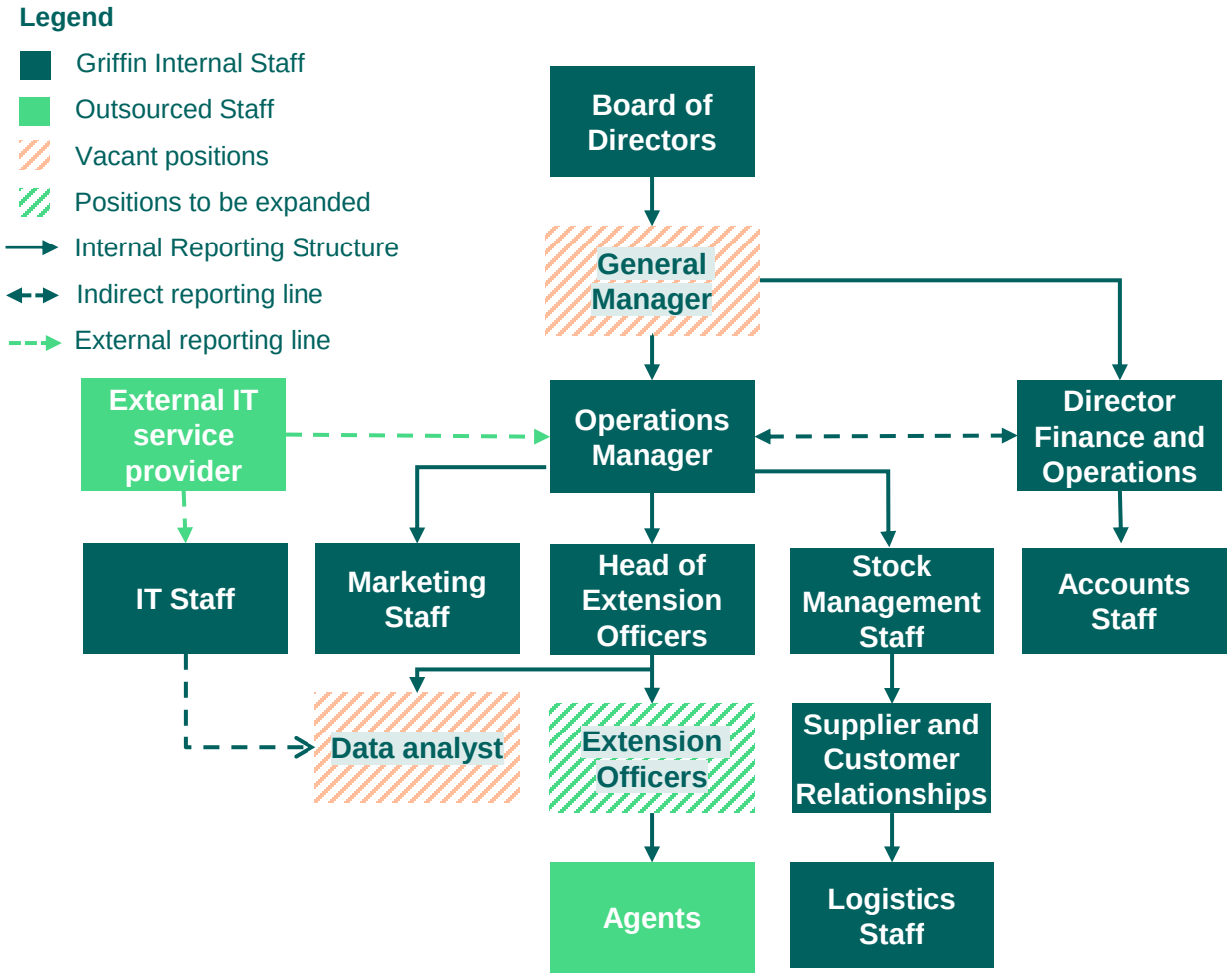
- Since farmers are homogenous, there is no need for developing a graduation approach at individual farmer level. There may be a need for implementing a model farmer approach.
- At the group level, farmers may be able to access additional or better services as the groups graduate.[1]

Data collection

- Although Griffin currently uses AVENUES for data collection, the company is looking to acquire a more robust system for the purpose.
- Due to reliance on the agent model, there is limited data on the exact number and type of farmers they work with.
- A better system is crucial for Griffin to tailor programs and glean insights on their target farmer base.

Notes: 1) Farmer groups have not been assessed as part of this analysis but can be leveraged for efficient service delivery

Organizational structure | To support in the integration of the SDM within the wider organization of the company, Griffin will need to recruit a general manager position to oversee the operations of the business



- Griffin's shares a board of directors with CHC Commodities. The Board oversees the operations of the business. The core management team has experience in business administration and marketing.
- Griffin employs 48 full-time staff (12 female and 36 male). Of the 48, 14 from the head office in Mazabuka oversee operations of all the 6 depots. Additionally, there are 20 staff in the last-mile delivery depots, 8 of which are extension officers.
- The depots are supported by a sales network of commission-based agents supervised by the extension officers. The agents and depots are used to buy and aggregate crops from farmers as well as supplying inputs. The extension workers are responsible for selecting, training and supporting the agents.[2]
- Griffin also operates a website platform which is supported by an external web developer and a team of 3 IT personnel.
- Griffin needs to recruit for a qualified General Manager to oversee the operations of the business and a Monitoring and Evaluation/Data analyst for the FMS implementation
- At the depot level, there will be need for additional extension officers in line with scale.

Sources: 1. Griffin Services Depot HR document 2. Griffin Management 3. Griffin strategy documentation

Gender assessment | Griffin Services is executing a gender strategy that targets to increase women participation in the value chains that Griffin operates in.

Questions	Answer	Explanation
Gender strategy: Is gender equality a strategic goal for Griffin which is communicated in documents?	**Yes**	Griffin has developed a gender strategy. The company plans to contract external consultants to carry out a gender strategy training for their staff.
Data collection: Does Griffin collect data on staff or customers/farmers disaggregated by gender?	**Yes**	Employee data is collected in a gender-disaggregated manner. Griffin has also started collecting gender-disaggregated farmer data collection which is expected to improve with the implementation of the FMIS.
Inclusive workplace: Does Griffin have policies or practices to make the workplace inclusive for both women and men?	**Yes**	Griffin's gender strategy targets inclusion of women in all operations and activities to close the widening gender gaps in the sector.
Inclusive consultation: Does Griffin speak to or consult both male and female customers (farmers) to learn about their different needs and preferences when designing a product?	**No**	There is no consultation that takes place at the farm level to identify the unique needs of women. This is expected to improve with implementation of the new gender strategy. The company, however, expects local cultural practices to influence gender decisions at farm level.
Inclusive tailoring: Does Griffin tailor services based on how needs may be different for men and women?	**No**	Griffin has a one-size-fits-all service offering for its farmers. With the implementation of a gender strategy, Griffin will be able to identify opportunities for tailoring services to both genders.
Independence and control over resources: Do services enable women to improve their independence, control over resources and/or value capture?	**No**	Griffin works with individuals and without discrimination of services by gender. However, Griffin's farmer base is made up largely of males by virtue of land being owned mainly by men.

Gender journey| Griffin and its farmer base could benefit from the implementation of a gender strategy which outlines measurable gender targets.

Where is Griffin on its gender journey?

Gender unintentional | Gender intentional | Gender transformative

Griffin is under way to become gender intentional

Griffin's previously employed business model created limitations on its capacity to take a data-driven approach to understand the different needs and constraints of women and men.

The business therefore did not have sufficient data to be able to tailor services to ensure either that men and women have access to resources, control over the benefits of those resources or are working in an inclusive workplace

The company has recently started working on its gender strategy which initially focusses on staffing with a plan to implement this at the agent and farm level

Griffin could strengthen its gender strategy:

Taking a data-driven approach to understand the different needs and constraints of women and men in its internal and external processes with the goal of ensuring that both women and men have access to resources, have similar control over the benefits of those resources and/or are working in an inclusive workplace.

Best practices to implement

Collect and analyze gender-disaggregated data:

1. on farmers (e.g., age, socio-economic status, crops, control over household resources and willingness to adopt new products), when making service delivery decisions
2. On extension staff and agent ability to reach male and female farmers to identify those able to attract a diverse group and capture lessons
3. on employee recruitment, retention, pay, promotion, skills training, to understand opportunities to better support employees, reduce turnover, and ultimately save recruitment costs

Consult women and men about norms around movement to understand preferences around meeting time, location or format, and on **needs and preferences on inputs** (e.g., taste, maturation, yields of seeds)

Bundle inputs provision with training specific to known skills gaps for women and men (e.g., negotiating skills, literacy and agronomic training)

Investigate factors of productivity (e.g., seeds, irrigation) and market access to understand differences in income based on gender and identify actions for improvement in equalized access.

Sell inputs directly to both men and women customers, whether or not they are the household heads, and tailor timing and length of trainings on application of inputs to men's and women's existing responsibilities

Barriers to be lifted

Economic: women's access and control of resources particularly land and finance is comparatively much lower than that of men.
Practical: access to high quality inputs is a challenge to most women

Benefits to Griffin

Adapting training to women's capacities, literacy rates, time schedules and location leads to **improved yields and quality of produce**[1], leading to higher supply.

Results in enhanced **business reputation, competitiveness and performance**

Creating a **gender strategy** and embedding this into the business can lead to improved **farmer and employee engagement and retention**

Inclusive consultation can result in enhanced reputation and competitiveness

Women's financial resilience is beneficial in household and community resilience and **fosters stable market and constant supply** chains[2].

Increases the probability of attracting impact finance from investors with a gender focus

Sources: IDH Gender tool, Griffin interviews, Focus Group Discussions with Griffin's female farmers.
Notes: 1. 1) Suri, T., Jack., W., (2016); The long-run poverty and gender impacts of mobile money 2. Davies, M. Baars, M., (2017)

Digital Maturity Assessment (1/2) | Implementing an FMS will improve efficiencies in Griffin's farmer engagement both on the input supply and off-take ends of the value chain

FMS design and implementation best practices

1. **Clearly define business needs:** understanding the business needs that Griffin aims to solve at the onset helps in customizing the system to capture the crucial data points that need to be collected. Specific needs on the input supply end of the value chain include managing inventory at HQ, depot-level and agent level, improving order management and enhancing communication between extension officers, agents and farmers, On the grain offtake side, the FMS could be used to streamline procurement processes, ensuring quality control and enhancing traceability. Other important factors to consider include ease of use, customization options and integration with Griffin's existing systems.
2. **Foster a sense of ownership of the system both at Griffin, agent and farmer level:** This is key in ensuring use of the system and continuous feedback that can help with improving user experience and ultimately the effectiveness of the system. Some ways of achieving this would be to involve staff, agents and lead farmers in the design process and recruit a person to oversee the design and implementation including data collection, training/ capacity building of the staff and agents. In addition, Griffin can identify lead farmers/early adopters as champions to drive behavior change and enhance acceptability amongst farmers.
3. **Design clear workflows/roadmap:** Clearly articulate all the activities that need to be undertaken and assign responsibilities between FMS provider staff and Griffin staff involved with implementation.
4. **Training and capacity building for implementing staff:** To ensure success, it is important to equip staff who will be implementing and using the FMS with the required skills. Training may take the form of classroom training, development of user manuals and ongoing support from the FMS service provider. In addition, Griffin should ensure its extension staff and agent network are equipped with smartphones and data bundles to facilitate farmer onboarding.
5. **Scalability:** The FMS should be able to accommodate Griffin's evolving needs that will arise from its future growth. Considerations include the ability for increased storage capacities, enhanced reporting capabilities and integration with other systems
6. **Data security and consent:** Since use of the FMS will involve sensitive data, it is critical to ensure that the selected system has adequate security measures to protect farmer data. Griffin can involve an external expert, if needed, for data security support (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, Griffin should get clarity on additional running 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 budgeted for annually.

Digital Maturity Assessment (2/2) | Implementing an FMS is a significant undertaking and understanding Griffin's business needs and potential risks is key in ensuring success.

	Farmer level	Agent level	Griffin level
Business needs	• Timely communication with farmers (weather information, training tips etc.). • Track production cycles/calendar and follow up of farm activity through automated agronomy support. • Measure performance/ productivity of farmers • Track farmer attrition with an aim to increase farmer loyalty.	• Timely communication with agents on input supply and timing of sourcing of produce etc. • Track inventory to ensure timely supply • Measure performance of agents through farmer recruitment, input sales, volumes sourced. • Track agent attrition with an aim to increase loyalty. • Leverage data to inform additional services such as financing to be provided to agents	• Understand farmer production cycles to ensure adequate input supply for ad hoc demand • Ability to link working capital requirements to the company budgets • Ability to leverage the FMS data to facilitate access to credit for farmers who qualify • Manage loans to farmers. • Ability to create market linkages for farmers
Data points	• Farmer personal data • Production data (production practices, farmer locations, land size) • Farmer mobile details • Service data (Type of services received) • Farmer group details, where applicable	• Agent personal data • Business data • Agent mobile details • Service data (Type of services received)	• Farmer advance orders • Farmer credit details (loan size, repayment period etc.) • Market information data e.g., price
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.	• Reluctance of the agents to share their data. • Accuracy of the data provided/collected • Low levels of digital literacy and mobile phone/mobile money account ownership.	• Ability to onboard people with the right digital skills and potential resistance to change by current staff • Inadequate capacity building support to staff. • Limited budget dedicated to the digitization agenda. • Ensuring data security.

Sources: Griffin management

Enabling Environment (1/3) | While advancements in technology allow for scaling and more efficient service delivery, significant investments are required in environment and infrastructure.

Opportunity | Neutral | Risk

Definition	Situation	Impact on SDM
Technology	• **Mobile penetration**: There were 16.36 million active cellular mobile connections in Zambia as of January 2023[1], representing 80.6% of the population. • **Internet penetration:** Zambia's internet penetration was at 21.2% (4.3 million internet users) at the start of 2023, an increase of 7.4% from 2021. • **Digital agricultural technologies (DATs)**: Zambia has about 12 local and 14 regional ag-tech innovations offering solutions for agriculture-related challenges. Digital advisory offering knowledge and training solutions, agricultural e-commerce and digital procurement, agri-digital financing (input financing, credit scoring, insurance etc.) and smart farming (livestock management, equipment monitoring etc.).[2]	• Adopting a Farmer Management Systems and mobile payments will improve operations, increase efficiencies and enhance access to finance for the farmers. Examples of providers include: AgriPay (Zanaco), AgriPredict Platform (AgriPredict Solutions), Kulima by Agricomm media, Muimi Apunzile (E-msika Services Ltd), eVetCare Livestock eExtension (eVetCare)
Environment	• **Climate**: Zambia's agricultural sector is highly dependent on rainfall, which is becoming more irregular due to climate change affecting productivity. • **Irrigation**: Most farms remain dependent on rain-fed production. A few large irrigation schemes led purely by the private sector and PPPs such as the Kaleya Smallholder Company (KASCOL) are more successful given their ability to afford needed water infrastructure, high electricity grid, and better organization of farmers.[3] • **Regulatory environment:** The government of Zambia heavily invests in its Farmer Input Support Program (FISP) and is rolling out an electronic version in 2023. A total of over 1M farmers will benefit from the program for the 2022/2023 farming season.[4]	• Unpredictable weather patterns increases the risks of low yields and crop failure while creating opportunities for the service provider to offer services that strengthen farmers' climate resilience. • Plug into FISP as a selected input distributor.
Infrastructure	• **Road networks**: Rural infrastructure is poor and farm accessibility is further hampered during rainy seasons. • **Post Harvest Management:** The National Food Reserve Agency has over 1,200 depots countrywide with private sector also providing some aggregation facilities. • **Power Supply**: Persistent electricity rationing is a hinderance to irrigation farming systems and processing.	• Localizing aggregation points will reduce transport inefficiencies. • With the Food Reserve Agency closing the Maize Sales Program, there is opportunity for private sector to offer aggregation services all over Zambia.

Sources: 1. Digital 2023: Zambia 2. Digital Agriculture Country Study Zambia 3. IAPRA 4. Ministerial Statement On FISP Implementation

Enabling Environment (2/3) | Multinationals seek to gain greater control of the production and marketing systems thereby limiting competitiveness in Zambia's grain and oilseed markets.

Opportunity | Neutral | Risk

Definition	Situation	Impact on SDM
Labor	• **Labor availability**: 2/3 of Zambia's population lives in rural areas and the agriculture sector employs over 50% of the workforce.[1] Smallholders in the informal sector largely use family labor, which is not paid for directly.	• Use of farm labor reduces production costs for farmers and thus they may be open to investing in inputs
Inputs & Financing	• **Inputs use:** Although increased private sector participation in seed research and extension services has contributed to the adoption of improved seed, the use of quality inputs is low due to limited access to finance. • **Financing:** Lack of collateral has been identified as a factor that hinders access to finance, especially for women. As coping mechanisms, women often use microfinance institutions and VSLAs (viewed as an understanding of farmers' needs and trustworthiness) to cushion their cash flow. VSLAs also act as reliable guarantors when taking formal and informal loans.[2]	• Inadequate financing limits farmer productivity and impact. • Farmer challenges in accessing financing creates opportunities for Griffin to collaborate with FSPs.
Trading System	• **Local markets:** The government Food Reserve Agency buys at least 500,000 MT of maize annually. However, it only managed to purchase 350,000 tons of maize in 2020/21 due to competitive prices and attractive payment terms offered by the private sector.[3] • **Export markets**: Zambia has preferential and reciprocal duty-free access to regional markets under SADC and COMESA. Trade with SADC countries is substantial and increasing with its neighbors; South Africa, Zimbabwe, DRC and Malawi offering export markets for maize and soybean.[4] Zambia has however periodically installed temporary export bans, most recently in April 2023.	• Trading blocs provide a market for produce, whether directly or indirectly. • However, export bans limit the profits Griffin can obtain.
Pricing & Competition	• **Input Supply:** Farmers face high costs of inputs with the Ukraine war raising fertilizer prices. Most farmers recycle seeds. • **Competition:** There are other big players in the input supply space such as African Green Resources who are diversifying their investments further to irrigation and expanding their grain silo capacity storage.[5] The greatest competition is from the government's heavily invested FISP. However, implementation inefficiencies create opportunities for other service providers.	• The supply gap creates opportunities for Griffin to exploit to increase input sales. • Improving the access and affordability of inputs will be key to the success of the SDM.

Sources: 1. Zambia Agriculture Status Report 2021 2. Mercy Corps 2020 3. USDA 4. Zambia and the multinational trading systems 5. Reuters

Enabling Environment (3/3) | Zambia's land tenure system, low farm gate prices, institutional instability are potential disincentives for investment in maize and soybean production.

Opportunity | Neutral | Risk

Definition	Situation	Impact on SDM
Pricing & Competition	• **Produce competition**: There is stiff competition from government and private sector grain off-takers and input service providers. Off-takers mostly compete on prices and payment terms. The government has also in the past set maize price floors impacting competitiveness of private sector. • **Produce pricing**: Farmers have decried low farmgate prices for maize and soybean produce against rising costs of production with middlemen absorbing much of the value.	• Low market price, especially for maize, disincentivizes investment in production.
Institutional Stability	• **Regulatory Implementation:** There is a lack of implementation capacity, gaps between policy and practice, and a poor coordination of government programs. For example, there have been concerns over inefficiencies of the implementation of FISP. • **Regulatory responsibilities**: The Zambian Food Reserve Agency (FRA) has instances of failing to pay farmers for the maize they purchase for the national strategic food reserve. • The Ministry of Agriculture also plays an active role in creating an enabling environment through subsidies-FISP. There is a lack of safeguards to protect local markets from illegal import activities.	• Opportunity to provide farmers with input packages and extension support that is complementary or supplementary to the government FISP.
Land Tenure	• **Tenure:** The customary land tenure system is highly decentralized in Zambia with the chiefs exercising nearly exclusive power over land administration.[2] The 1995 Lands Act creates a mechanism to transfer customary land into state leasehold tenure. • **Ownership**: Cultural norms still underpin ownership of land with men being the landowners in most rural areas.	• To increase participation of women in farming, there is a need to get buy in from the men
Social Norms	• **Literacy:** Zambia's literacy rate for 2020 was 90%.[3] However, due to land ownership norms in rural areas, most extension services are accessed by men who are also the main decision makers despite women doing most of the farm work. • **Gender on farm:** Some of the challenges women face are the lack of land ownership, financial, and or production information. This is partly due to a long-term culture of giving priority to men. Men also tend to focus on grain farming while women take part in horticultural crops and nuts (groundnuts and sunflower).	• Gender specific data collection and service tailoring should be prioritized to cater for the systemic differences in accessing resources.

Sources: 1. World Grain 2. USAID Zambia Customary Land Documentation 3.WorldBank 4. Women participation in agriculture in Zambia

Farmer-Input Subsidy Program (FISP) | Challenges in the implementation of the subsidy program creates opportunities for Griffin to build a successful out-grower model.

The program

- The Farmer Input Subsidy Program (FISP) is a government initiative supporting small-scale farmers by providing subsidies on inputs. The program served over 1 million farmers in the 2022/2023 season with an aim of increasing maize (and most recently soybean) productivity thereby improving food security and reducing poverty.
- Implementation is done through use of vouchers provided to farmers, who are required to be members of a farmer organization, to purchase inputs from selected suppliers at subsidized costs.
- The FISP was also designed to provide extension services to farmers to improve their farming practices.
- While the program has had positive benefits to farmers such as increased uptake of improved seed varieties and fertilizer, and increased food security, there has been concerns raised about the inefficiencies of the implementation of the program[2]. Some observed challenges include:
  - Diversion of inputs to unintended beneficiaries (such as commercial farmers)
  - Provision of a limited (1 ha for each crop per farmer) one-size fits all package
  - Delayed delivery of vouchers to support access to inputs by farmers leading to late planting
  - Provision of sub-optimal input package quantities thus impacting yield potential
  - Delayed payments to participating input suppliers.

How can Griffin plug in?

Opportunities within the program

- Become a selected input supplier through leveraging its last-mile depots and agent network.
- Offer extension services as part of the FISP given Griffin's existing infrastructure and expertise.
- Conduct a pilot sub-program with the government to solve for implementation inefficiencies within FISP through leveraging its FMS providing transparency on service delivery to targeted farmers.

Opportunities outside of the program

- Griffin can take advantage of already existing farmer groups and/or cooperatives to support its training service provision and last-mile delivery of input package to farmers.

Sources: 1. Ministry of Agriculture FISP Guidelines for the 2022/2023 farming season 2. Did the e-voucher approach to Zambia's Farmer Input Support Programme (FISP) outperform the traditional FISP?

Notes: Eligibility requirements for the FISP can be found here

SWOT Analysis | Although Griffin has the basic infrastructure for service provision, streamlining some of its activities as well as exploiting existing opportunities will ensure efficient and effective scaling of the business.

Strengths

- Dedicated management team with a clear vision.
- Strong focus on continuous improvement (pilot a few depots then scale)
- Dedicated team of qualified extension officers
- Strategic location of operations to target smallholder farmers.
- Diversified product portfolio.
- Existing input financing model with sorghum farmer that could be leveraged for learnings before extending to the maize and soybean value chains.
- Direct access to off-takers through CHC Commodities.

Weaknesses

- Duplication of efforts from overlap in roles of extension officers and agents.
- Limited access to farmer data due to application of the agent model that reduces Griffin's level of touch-points with the farmers.
- Supply chain inefficiencies in offering timely services and desired products last mile.
- Functionality issues in the web shop limiting usability.

Opportunities

- Existing gaps in smallholder service provision in Zambia which Griffin can capitalize on.
- Smartly integrating sourcing and service provision.
- Gap in providing farmers with a one stop shop for agriculture commodities in the market.
- Prospects of collaboration with FSPs and other businesses working in different value chains in agriculture.
- Collaborating with the government as a shortlisted input suppliers under the Government FISP.

Threats

- Reliance on independent agents who also directly sell inputs from competitors in the market.
- Climate change and unpredictable weather patterns in the influence production of focus crops.
- High costs of inputs versus low access to finance for Zambian smallholder farmers.
- Fluctuation in market prices for inputs and produce.

Sources: Griffin interviews (2023), Observations during client visit

3

Business Case

For business sensitivity reasons, we have excluded the pages of 'Griffin's business case' chapter from the report.

4

Impact Case

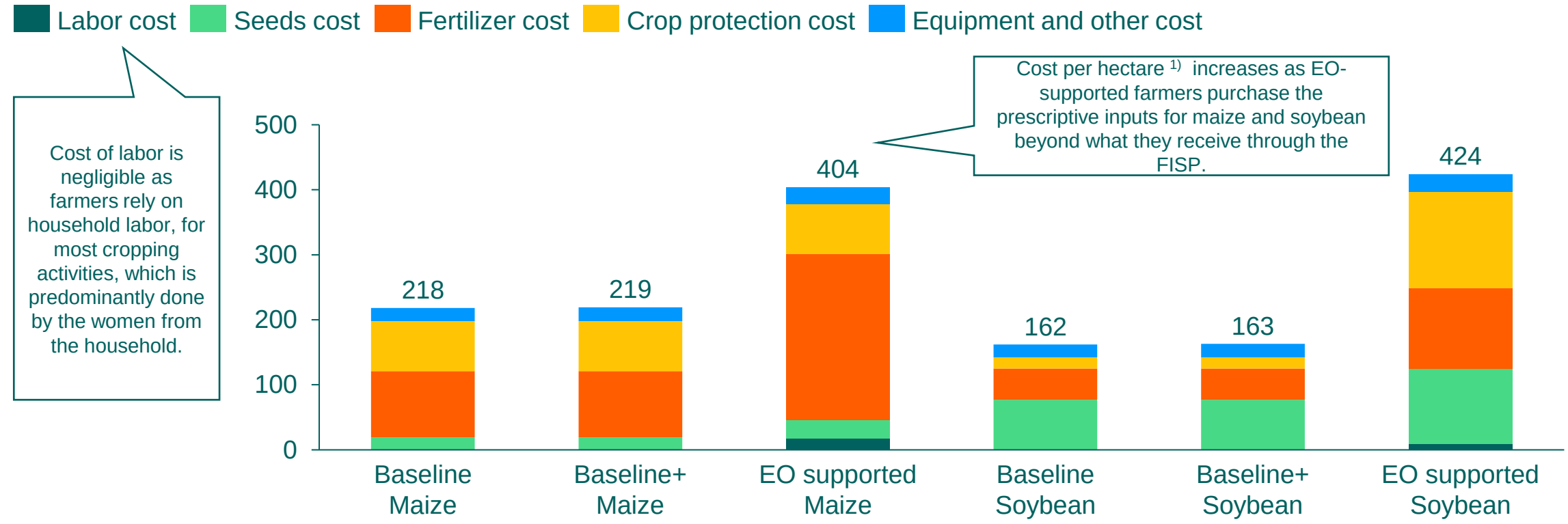
Farmer segments | As farmers are homogeneous, the analysis segmented farmers based on Griffin's existing agent and EO-based extension services structure to determine the farm-level performance.

	Baseline Farmer	Baseline+ Farmer	Agent-supported farmer	EO-supported farmer
Description	• Farmers who grow maize and soybean, breed cattle, and cultivate ground nuts, potatoes, sunflower, and beans. • No access to / use of Griffin services	• Farmers who grow maize and soybean, breed cattle, and cultivate ground nuts, potatoes, sunflower, and beans. • Receives extension services from **independent agents**	• Farmers who grow maize and soybean, breed cattle, and cultivate ground nuts, potatoes, sunflower, and beans. • Cash-based access to seeds and other inputs from Griffin depots. • Receive inputs through FISP program and are member of farmer group. • Receives extension services from **independent agents**	• Receives extension services from **Griffin extension officers**
Challenges	• Pests and diseases • Drought and floodings	• Low income limiting access to inputs and investments in proper post-harvest handling • 1 agricultural crop cycle		
Crop land size (Ha)	1.0 Ha Maize 1.0 Ha Soybean	1.0 Ha Maize 1.0 Ha Soybean	1.5 Ha Maize 1.0 Ha Soybean	2.0 Ha Maize 1.0 Ha Soybean
Productivity	2 Mt/Ha – Maize 0.75 Mt/Ha– Soybean	2.0Mt/ha to 2.25 Mt/Ha - Maize 0.75Mt/Ha to 0.9 Mt/Ha - Soybean	2 Mt/Ha to 3.5 Mt/Ha - Maize 1 Mt/Ha to 1.25 Mt/Ha - Soybean	2 Mt/Ha to 4.5 Mt/Ha - Maize 1 Mt/Ha to 1.5 Mt/Ha - Soybean
Other services received	N/a	• Market access & pricing	• Access to high quality seeds • Market access & pricing • Input financing [1)] • Crop insurance [1)]	• Access to high quality seeds • Market access & pricing • Input financing [1)] • Crop insurance [1)]

Notes: 1) Input financing is to be evaluated based on a to be developed financial instruments and is excluded from the evaluation of profitability of Griffin and Depots;

Service package cost | Expanding land under cultivation through purchasing the prescriptive inputs beyond what is already provided through FISP significantly increases the cost of production for farmers.

Cost of service package on 5-year average (USD/Ha)

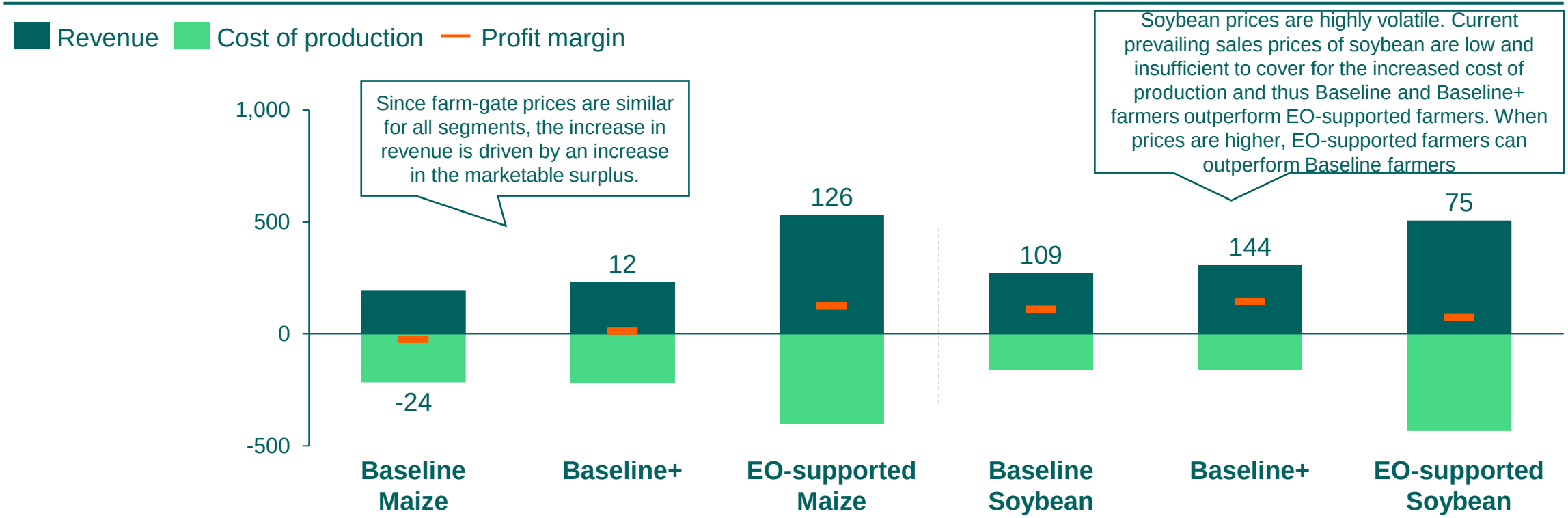


	Baseline Maize	Baseline+ Maize	EO supported Maize	Baseline Soybean	Baseline+ Soybean	EO supported Soybean
Productivity (MT/HA)	2.0	2.25	4.5	0.8	0.9	1.5

Notes: 1) The cost per hectare for the EO-supported farmer takes the FISP into account. 2) The Baseline and Baseline+ farmer cost per hectare is informed by PDC performed in 2022.

Profitability per HA | Griffin's envisioned service package increases incomes for both EO-supported farmers and Baseline+ farmers above their Baseline counterparts.

Performance of production and profit on 5-year average (USD/Ha)

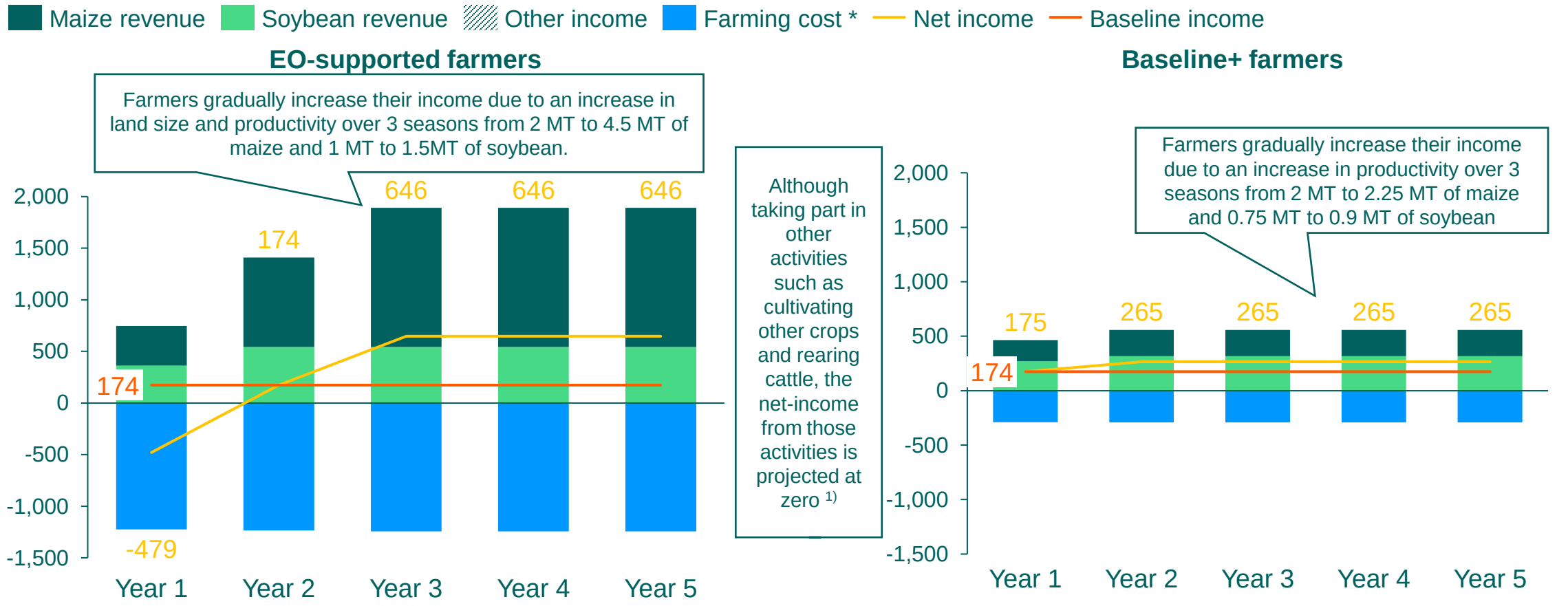


	Baseline Maize	Baseline+	EO-supported Maize	Baseline Soybean	Baseline+	EO-supported Soybean
Marketable surplus [2] (MT/HA)	1.0	1.2	2.8	0.8	0.9	1.4

Notes: 1. Marketable surplus is the part of the productivity, after deduction of household consumption, that is sold to Griffin or other buyers.

Farm P&L | While Baseline+ farmers outperform EO-supported farmers in the initial 2 years, EO-supported farmers break even at year 2 of operations and subsequently outperform Baseline+ farmers demonstrating a positive business case for farm expansion.

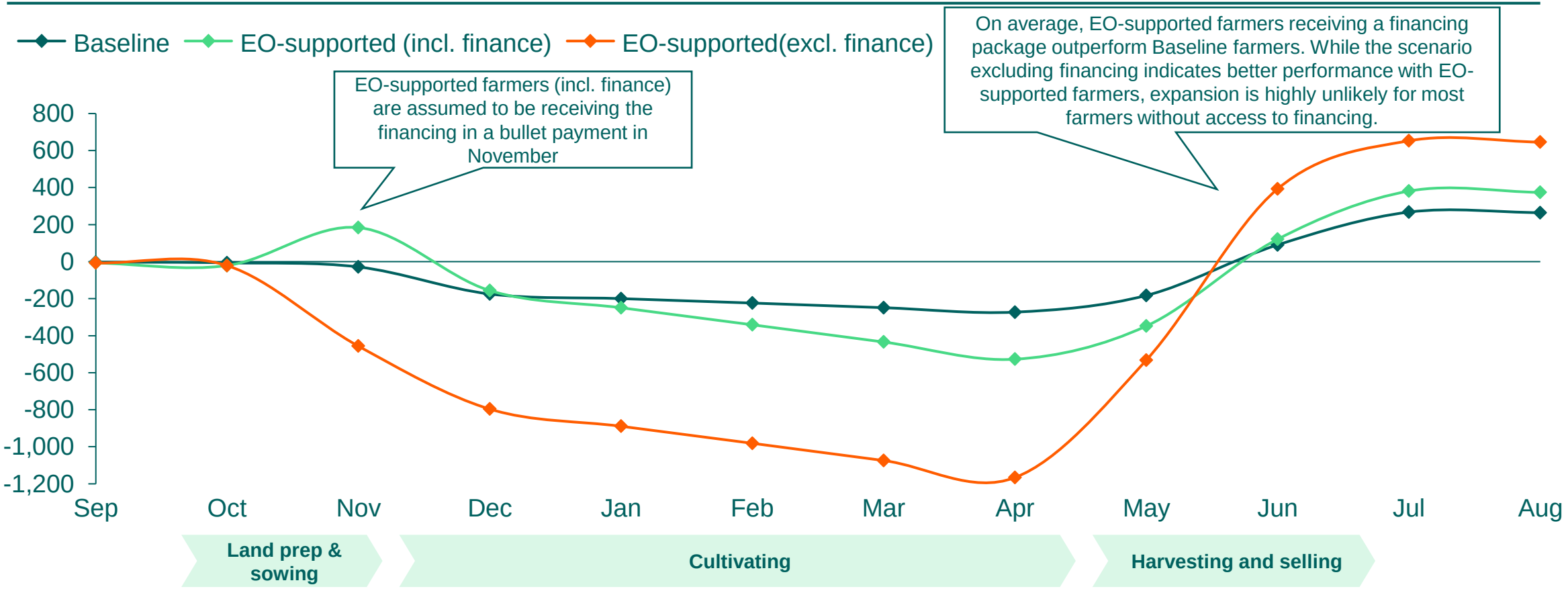
Profit and loss (excluding cost of finance) for a five-year period (USD)



Notes: 1) Estimation of other income from other crops, livestock, and off-farm activities is based on the farmer survey conducted in 2022.
** Farming cost consist of the cost for cultivating maize and soybean excluding finance costs*

Monthly cash flow | Although reducing the magnitude of negative cashflows, partly financing inputs required for expansion of land under cultivation land still leaves EO-supported farmers with negative cash flow in the cultivation period.

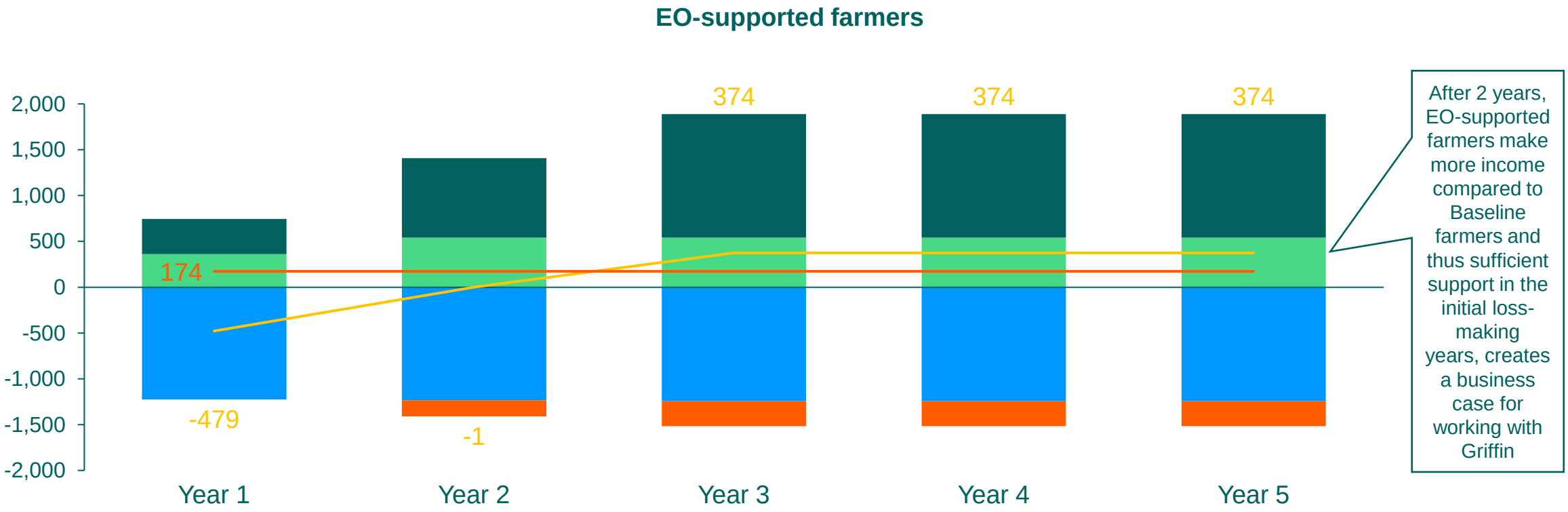
Year 5 cumulative net cash flow from operational activities (excluding household or other expenses) (USD/month) [1)]



Notes: See here for more details on the assumptions that are used to model access to finance.

Farm P&L | Providing access to financing to enable scaling at farm-level generates a positive business case for EO-supported farmers

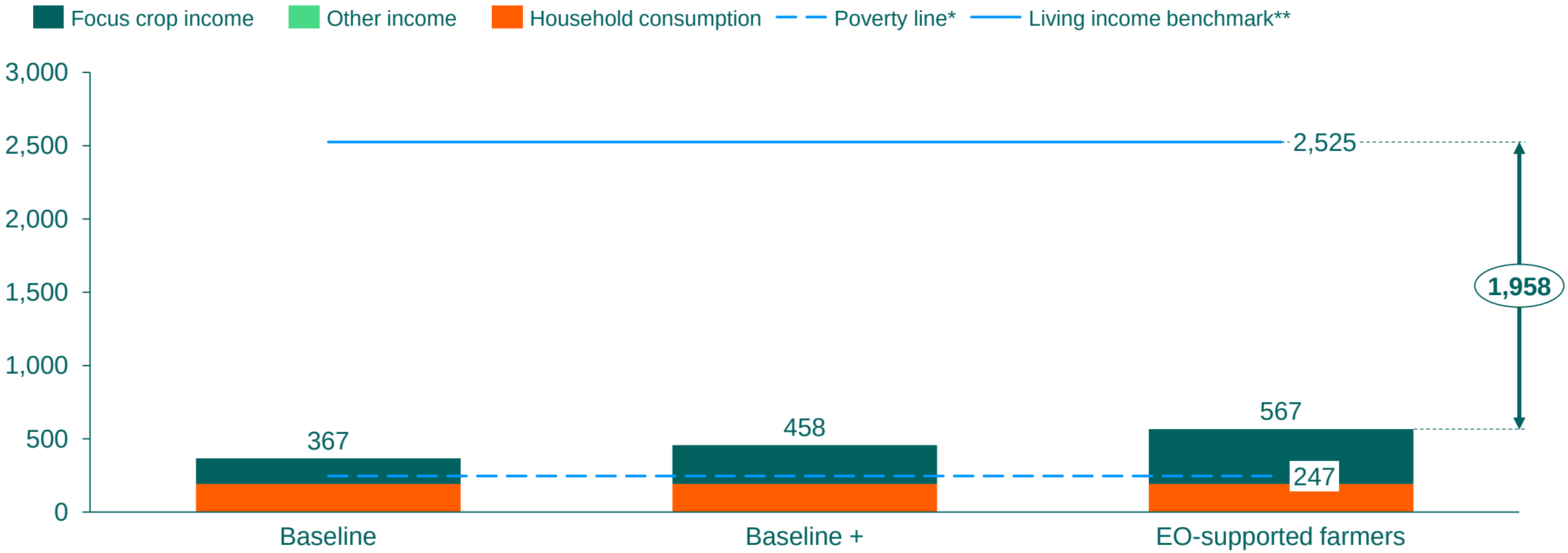
Profit and loss (including cost of finance) for a five-year period (USD)



Notes: 1) Estimation of other income from other crops, livestock, and off-farm activities is based on the farmer survey conducted in 2022.
** Farming cost consist of the cost for cultivating maize and soybean and includes the cost of access to finance*
*** See finance cost assumptions here.*

Living income | Although both farmer segments increase their incomes, there is still a large gap to attaining a living income signaling the need for diversification activities.

Fifth year household income, living income, poverty line (USD/year)



** The World Bank poverty line was adjusted to a household of 6 members (2 adults and 4 children) and a national poverty line of ZMW 214 per adult per month*
*** The living income benchmark is assumed based on a family composition of 5 people, full-time equivalent workers of 1.76, and the living wage benchmark for rural Zambia of 2,483 ZMW/month*

Income Driver Analysis | Farmer diversification is the most feasible opportunity for increasing farmer incomes signaling the need for Griffin to work with other VCPs serving the same farmer base.

The tables below shows the relative change that is needed (all else equal) for the **EO supported farmer** and each of the income drivers* to increase farmer incomes by 500 USD/year. With a current (5-year) average annual income of USD 684, an income of USD 1,184 is targeted.

Feasible | Neutral | Unfeasible

Income driver	Current value	Required value	% change	Comment
Farm size	3	12	**+299%**	The increase in land size required to reach the living income benchmark is not feasible.
Yield (MT/Ha) - Maize	5.5	13	**+609%**	The increase in yields required for both crops to ensure farmers reach the living income benchmark is not feasible under the current conditions.
Yield (MT/Ha) - Soybean	1.4	3	**80%**	
Farm-gate price (USD/MT) - Maize	193	265	**+38%**	Both crops are low value and even with seasonal price fluctuations and government-imposed price floors, the required sales price for the smallholder farmer may only be feasible for soybean which sometimes fetches higher prices in the season due to increased demand.
Farm-gate price (USD/MT) - Soybean	361	434	**+20%**	
Cost of production (USD/Ha)[1]	428	250	**-/- 42%**	Farmers require a production cost decrease of 250 USD/Ha, which is not feasible given the need to utilize high quality inputs and implement GAP
Other income (USD/year)	0	500	**+100%**	Further research is required to evaluate the extent to which farmers can diversify their income within the limits of capital, labor, and land. A possible option is livestock farming which applies to farmers in the region Griffin operates in.

Notes: 1. The cost of production is a weighted average figure based on production costs and land sizes under maize and soybean cultivation
The different income drivers influence the farm income through the following simplified formula: $Total\ household\ income = Farm\ size \times Yield \times Price - Cost\ of\ production + Other\ income$

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IDH Annual Report 2021

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Thanks

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

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5

Annex

Abbreviations

EBT	Earnings Before Tax
EBIT	Earnings Before Interest & Tax
EO	Extension Officer
FISP	Farmer Input Support Program
FMIS	Farmer Management Information System
GAP	Good Agricultural Practices
HH	House-hold
MT	Metric ton (1,000 kg)
P&L	Profit and loss statement

SDM	**Service Delivery Model**
SHF	Smallholder farmer
SWOT	Strengths, weaknesses, opportunities and threats
TA	Technical Assistance
USD	United States dollar (currency)
VCP	Value Chain Players
VSLAs	Village Savings and Loan Associations
WC	Working Capital
ZMW	Zambian Kwacha

Learning Questions

Learning questions

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

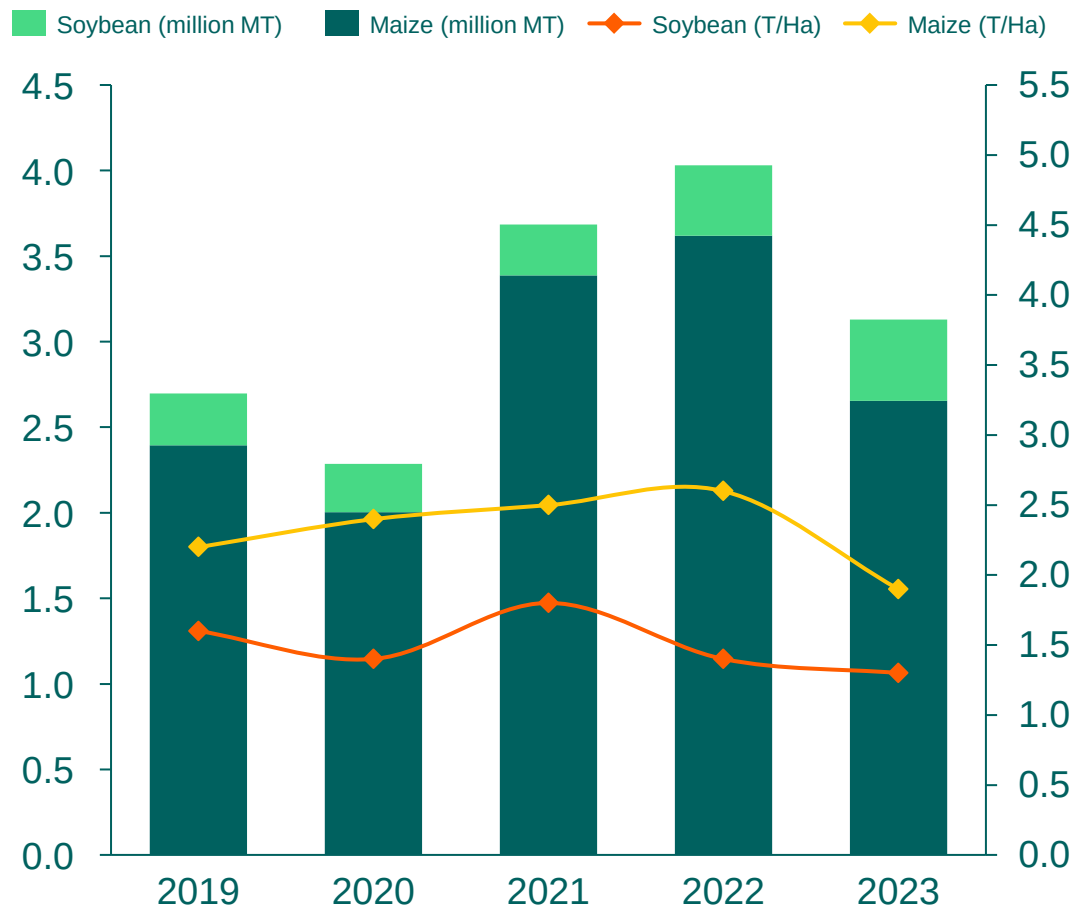
Topic	Question	Assessment/ Analysis
Context	• Enabling environment | To what extent does the enabling environment inhibit/facilitate the roll out of more depots? • Tripartite financing | What are barriers and enablers for the SDM to establish Service Coalitions with local FSPs to enable access to finance for SHFs? • Climate | What are the range of agroclimatic conditions that Griffin's reach of smallholder farmers farm in?	
Business model	• Service offering | What can Griffin do in the way of services, inputs, and access to markets to improve their offering that will have the largest and quickest positive financial and social impact on our target market group? • Agent model | What incentive structures (graduation models, super-agents, bonuses etc.) can be adopted to increase the effectiveness of agents? • Agent model | What are the key risks involved with the non-exclusivity of agents and how can they be mitigated? • Gender | How can we alter the business model to improve the inclusion of women? • Organizational capacity | What is Griffin's organizational capacity in managing the SDM?	
Business case	• Scale | What does our target market group require in relatively large quantities that will help Griffin reach sufficient scale to make it financially viable, and as such ensure its sustainability? • Depots | What is the relationship between the payback period for investments made on the Griffin depots and the level of service uptake? • Sourcing | How do different sourcing channels compare, and what are the key financial incentives for CHC to increase direct SHF sourcing?	
Impact case	• Farm characteristics | What are general SHF characteristics? • Climate adaptation | How can climate resilience of SHFs be strengthened?	

5.2 Supplementary research and analysis

Maize and soybean production in Zambia

- Over 60% of the population in Zambia derives its livelihood from agriculture. Among other agricultural activities, farmers in Southwest Zambia primarily engage in farming maize, sunflower, soybean, wheat, ground nuts, potatoes, and tomatoes and livestock keeping.
- The country's rainfall pattern is unimodal and thus SHFs who largely rely on rainfed agriculture for farming have one cropping season from November to April.
- The current national country production of maize is 3.4 million MT annually and between 80-90% is produced by SHFs. The production of maize is stimulated through the Farmer Input Subsidy Program (FISP) , which is accessible to just over 1 million farmers who comply with specific criteria.
- Soybean has an annual production of 430k MT; partly stimulated by the FISP. Although a food crop, the commodity is recently introduced to SHF as a cash crop with which they can further diversify.
- Among other challenges, farmers are unable to reach their potential due to climatic changes (rainfall patterns and temperature), limited access to high-quality inputs, immature service provision environment, limited access to affordable finance, and knowledge of good agricultural practices.

Maize and Soybean Production in Zambia from 2019 – 2023



Sources: Zambia Soybean Production, Zambia Maize Production

Farmer-Input Subsidy Program (FISP) | Eligibility requirements

- Member of a registered farmer cooperative
- Being a registered small-scale and actively involved in farming within the camp coverage area;
- be cultivating not more than 5 ha of land.
- have the capacity to pay the 400 Kwacha (+/- 20 USD)
- be a Zambian and possess a green National Registration Card (NRC)
- where possible, it is to their advantage if they have an active phone number.

But,

- is not an employee of the Government of the Republic of Zambia
- is not a beneficiary of any other Government support program.

Sources: Ministry of Agriculture FISP Guidelines for the 2022/2023 farming season

5.3 Assumptions

SDM operator assumptions

For business sensitivity reasons, we have excluded the pages of 'Griffin's assumptions from the report.

Farmer assumptions (1/6)

1. REVENUES

Farm size

		Baseline	Baseline+	EO-supported
Total farmer land size	#/hectares	2.5	2.5	3.0
Size dedicated to maize production EO-supported (Seg 2)				
Y1	#/hectares	0.0	0.0	2.0
Y2	#/hectares	0.0	0.0	2.0
Y3	#/hectares	0.0	0.0	2.0
Y4	#/hectares	0.0	0.0	2.0
Y5	#/hectares	0.0	0.0	2.0
Size dedicated to maize production Agent-supported (Seg 1 / Baseline)				
Y1	#/hectares	1.0	1.0	0.0
Y2	#/hectares	1.0	1.0	0.0
Y3	#/hectares	1.0	1.0	0.0
Y4	#/hectares	1.0	1.0	0.0
Y5	#/hectares	1.0	1.0	0.0
Size dedicated to soy bean production				
Y1	#/hectares	1.0	1.0	1.0
Y2	#/hectares	1.0	1.0	1.0
Y3	#/hectares	1.0	1.0	1.0
Y4	#/hectares	1.0	1.0	1.0
Y5	#/hectares	1.0	1.0	1.0

Seasons

Number of seasons per year - maize	#/year	1.0	1.0	1.0
Number of seasons per year - soybean	#/year	1.0	1.0	1.0

Farmer assumptions (2/6)

			Baseline	Baseline+	EO-supported
Yield/Productivity					
Maize productivity					
Y1	MT/hectare		2.0	2.0	2.0
Y2	MT/hectare		2.0	2.25	3.3
Y3	MT/hectare		2.0	2.25	4.5
Y4	MT/hectare		2.0	2.25	4.5
Y5	MT/hectare		2.0	2.25	4.5
Soybean productivity					
Y1	MT/hectare		0.8	0.8	1.0
Y2	MT/hectare		0.8	0.9	1.5
Y3	MT/hectare		0.8	0.9	1.5
Y4	MT/hectare		0.8	0.9	1.5
Y5	MT/hectare		0.8	0.9	1.5
Production		**HH consumption**			
Maize production		MT/year			
Y1	MT/farm/year	1.0	1.0	1	2.0
Y2	MT/farm/year	1.0	1.0	1.3	4.5
Y3	MT/farm/year	1.0	1.0	1.3	7.0
Y4	MT/farm/year	1.0	1.0	1.3	7.0
Y5	MT/farm/year	1.0	1.0	1.3	7.0
Soybean production					
Y1	MT/farm/year	0.0	0.8	0.8	1.0
Y2	MT/farm/year	0.0	0.8	0.9	1.5
Y3	MT/farm/year	0.0	0.8	0.9	1.5
Y4	MT/farm/year	0.0	0.8	0.9	1.5
Y5	MT/farm/year	0.0	0.8	0.9	1.5

Farmer assumptions (3/6)

Revenue from main crop

		Baseline	Baseline+	EO-supported
Maize				
Y1	ZMW/farm/year	4,000	4,000	8,000
Y2	ZMW/farm/year	4,000	5,000	18,000
Y3	ZMW/farm/year	4,000	5,000	28,000
Y4	ZMW/farm/year	4,000	5,000	28,000
Y5	ZMW/farm/year	4,000	5,000	28,000
Soybean				
Y1	ZMW/farm/year	5,625	5,625	7,500
Y2	ZMW/farm/year	5,625	6,563	11,250
Y3	ZMW/farm/year	5,625	6,563	11,250
Y4	ZMW/farm/year	5,625	6,563	11,250
Y5	ZMW/farm/year	5,625	6,563	11,250

Other income

Other crop income	ZMW/year	0	0	0
Livestock income	ZMW/year	0	0	0
Off farm labor income	ZMW/year	0	0	0
Off farm non-labor income	ZMW/year	0	0	0

Farmer assumptions (4/6)

						Baseline	Baseline+	EO-supported
2. EXPENSES								
2.1 Labor								
Hired labor		ZMW/day	days/HA	%/labor cost for Cashflw	During activity			
Land Prep	#/days/plot	50	1.5	21%	Planting	0%	0%	100%
Planting	#/days/plot	0	0.0	0%	Planting	0%	0%	100%
Weeding	#/days/plot	25	1.5	10%	Cultivating	0%	0%	100%
Fertilizer application	#/days/plot	50	1.5	21%	Cultivating	0%	0%	100%
Crop protection application	#/days/plot	50	0.0	0%	Cultivating	0%	0%	100%
Harvesting & Delivery	#/days/plot	50	3.5	48%	Harvesting	0%	0%	100%
Hired labor cost								
Y1	ZMW/farm/year					0	0	1,088
Y2	ZMW/farm/year					0	0	1,088
Y3	ZMW/farm/year					0	0	1,088
Y4	ZMW/farm/year					0	0	1,088
Y5	ZMW/farm/year					0	0	1,088
2.2 Inputs								
2.2.1 Zambia Farmer Input Supply Program (FISP)								
Access to FISP								
Y1	#/hectares					1.0	1.0	1.0
Y2	#/hectares					1.0	1.0	1.0
Y3	#/hectares					1.0	1.0	1.0
Y4	#/hectares					1.0	1.0	1.0
Y5	#/hectares					1.0	1.0	1.0

Farmer assumptions (5/6)

2.2.1 Zambia Farmer Input Supply Program (FISP)

Seed		ZMW/#	#/Ha Maize	#/Ha Soybean	unit	Baseline	Maize	Soybean
Maize	ZMW/Ha/year	400	1.0	0.0	*10kg bags*		400	0
Soybean	ZMW/Ha/year	800	0.0	1.0	*10kg bags*		0	800
Total cost	ZMW/Ha/year		1	1			**400**	**800**
Fertilizer								
D compound	ZMW/Ha/year	1,111	3.0	0.0	*50kg bags*		3,332	0
Urea	ZMW/Ha/year	1,004	3.0	0.0	*50kg bags*		3,012	0
Total cost	ZMW/Ha/year		6	0			**6,344**	**0**

2.2.2 Griffin Shop

Seed		ZMW/#	#/Ha Maize	#/Ha Soybean	unit	Baseline+ Maize	Baseline+ Soybean	SDM Maize	SDM Soybean
Maize	ZMW/Ha/year	400	2.0	0.0	*10kg bags*	800	0	800	0
Soybean	ZMW/Ha/year	800	0.0	4.0	*10kg bags*	0	1,600	0	3,200
Total cost	ZMW/Ha/year		2	4		**800**	**1,600**	**800**	**3,200**
Fertilizer									
D compound	ZMW/Ha/year	1,111	4.0	2.0	*50kg bags*			4,443	2,221
Urea	ZMW/Ha/year	1,004	4.0	0.0	*50kg bags*			4,015	0
Folia	ZMW/Ha/year	110	0.0	3.0	*[…]*			0	330
Total cost	ZMW/Ha/year		8	5		1,600	1,000	**8,458**	**2,551**
Crop protection									
Glyphosphate	ZMW/Ha/year	256	4.0	4.0	*liter bottle*			1,024	1,024
Insecticide - maize	ZMW/Ha/year	572	1.0	0.0	*liter bottle*			572	0
Insecticide - soybean	ZMW/Ha/year	915	0.0	2.0	*liter bottle*			0	1,830
Fungicide	ZMW/Ha/year	230	0.0	1.0	*liter bottle*			0	230
Total cost	ZMW/Ha/year		5	7		250	350	**1,596**	**3,084**

Farmer assumptions (6/6)

				Baseline	Baseline+	EO-supported
2.3 Equipment & other						
Equipment types						
Non mechanic equipment	ZMW/year			250	250	250
Mechanic equipment	ZMW/year			0	0	600
Other equipment	ZMW/year			300	300	300
Bags	ZMW/year	kg/bag: 50	ZMW/bag: 7.5			
Bag allowance	ZMW/year	50	4.0	No	No	Yes
Equipment types cost						
Y1	ZMW/farm/year			813	813	1,360
Y2	ZMW/farm/year			813	869	1,570
Y3	ZMW/farm/year			813	869	1,745
Y4	ZMW/farm/year			813	869	1,745
Y5	ZMW/farm/year			813	869	1,745

Farmer assumptions | Access to finance

The access to finance is a possible setup and informed by current market characteristics. The design is built on assumptions and should be tailored before implementation.

			Baseline	Baseline+	EO-supported
Credit principle / duration					
Access to finance	Yes/No		No	No	Yes
Tenure	#/months	6			
Interest rate	%/month	4%			
Insurance and other fees	%/principle	13%			
Principle					
Type of credit	Fixed/Dynamic	Dynamic			
Fixed principle	ZMW/growth cycle		0	0	2,492
Dynamic principle **(maize)**					
Land-size					
Y1	ZMW/year		0.0	0.0	0.0
Y2	ZMW/year		0.0	0.0	0.5
Y3	ZMW/year		0.0	0.0	1.0
Y4	ZMW/year		0.0	0.0	1.0
Y5	ZMW/year		0.0	0.0	1.0
Average	ZMW/year		0.0	0.0	0.7
Principle amount					
Y1	ZMW/year		0	0	0
Y2	ZMW/year		0	0	5,427
Y3	ZMW/year		0	0	10,855
Y4	ZMW/year		0	0	10,855
Y5	ZMW/year		0	0	10,855
Average	ZMW/year		0	0	7,598
Dynamic principle **(soybean)**					
Land-size					
Y1	ZMW/year		0.0	0.0	0.0
Y2	ZMW/year		0.0	0.0	0.5
Y3	ZMW/year		0.0	0.0	0.5
Y4	ZMW/year		0.0	0.0	0.5
Y5	ZMW/year		0.0	0.0	0.5
Average	ZMW/year		0.0	0.0	0.4
Principle amount					
Y1	ZMW/year		0	0	0
Y2	ZMW/year		0	0	4,418
Y3	ZMW/year		0	0	4,418
Y4	ZMW/year		0	0	4,418
Y5	ZMW/year		0	0	4,418
Average	ZMW/year		0	0	3,534

5.4 Methodology

Gender ladder

Gender unintentional

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

Gender intentional

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

Gender transformative

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

Why we believe investing in women can work for business

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

Poverty line methodology

Poverty line

- The general poverty line is 1.90 USD/day for one adult, which is equal to 693.50 USD/year
- The PPP adjusted poverty line for Ghana is 106 USD/year*[1] for one adult
- A typical Ghanaian smallholder household consists of 4 people[2], including 1 male adult, 1 female adult and 2 children

Poverty line adjustment

- Simply multiplying the poverty line with 4 would not take into account the composition of the household and would not take into account economies of scale
- For a proper representation, the poverty line was adjusted with the OECD-modified scale to better reflect reality
- This scale differentiates between the household head, other adults and other children. The scale assigns a value of 1 to the household head, 0.5 to each additional adult member and 0.3 to each child
- Using this scale, a typical Nigerian smallholder household consists of 1 + 0.5 + 2*0.3 = 2.1 adult equivalents
- Therefore, the adjusted poverty line for a household would be 106 * 2.1 = 222 USD/year

Sources: 1) Ghana Poverty Mapping report (2015); 2) Ghana Living Standards Survey, p. 29 (2019)
** Conversion factor: 12.3 GHS per USD*

LI definitions

Living Income

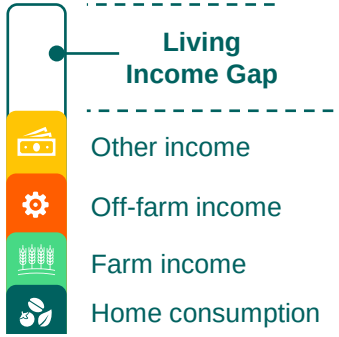
Earning a living income means that all income sources from a farming household are sufficient to afford a basic but decent cost of living for a family

Living Income Benchmark

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

Cost of a decent standard of living for a family
(specific to a time and place)

Living Income Gap



Actual income

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

Next steps

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