SDM: Case Report Plexus

Service Delivery Model assessment: Short version

October 2017

Location: Mozambique
Commodity: Cotton, maize and beans
Services: Extension services, Seed cotton production, provision of inputs, crop rotation support, climate resilience support, mechanization*

*outside scope of analysis

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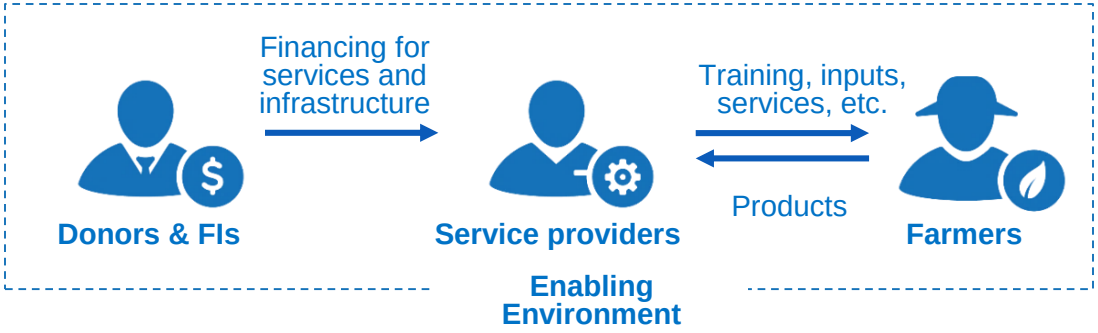
PLEXUS GROUP

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

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

A SDM consists of service providers, often supported by donors and financial institutions (FIs), and farmers receiving the services. All are set within a specific enabling environment.



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

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

Analyzing SDMs brings a range of benefits

Farmers and farmer organizations

- **Enhanced services**, which lead to improved farmer income and resilience, through higher productivity and product quality
- **Improved SDM outcomes**, which lead to an improved social and environmental environment

SDM operator

- Better understanding of your **business case**
- Insights to **improve service delivery**
- Insights to develop **a cost-effective SDM**
- Identification of opportunities for **innovation** and **access to finance**
- **Comparison** with other public and private SDM operators operating across sectors/geographies
- Ability to communicate **stories of impact and success** at farmer level

Investors/FIs

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

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The Plexus SDM and objectives

General SDM information:

Location:	Mozambique
Timing and analysis scope:	2016-2025
Scale (start of analysis):	46,275 farmers
Scale (end of analysis):	65,650 farmers
Funding:	Plexus
SDM Archetype*:	Global sourcing

Plexus Mozambique is part of the Plexus Group, and operates in the northern provinces of Cabo Delgado and Nampula. Plexus operates two ginneries in Mozambique with a combined capacity of around 60,000 MT of seed cotton. Plexus has developed extensive farmer contact networks and systems to enable education, training and the provision of key inputs. All of this is designed to increase yields and income for on average 65,000 farmers with whom Plexus works every season.

SDM objectives:

1. Ensure consistent seed cotton production at cost-efficient offtake costs
2. Improve quantity and quality of seed cotton produced
3. Improve farmer livelihoods and resilience

SDM rationale:

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

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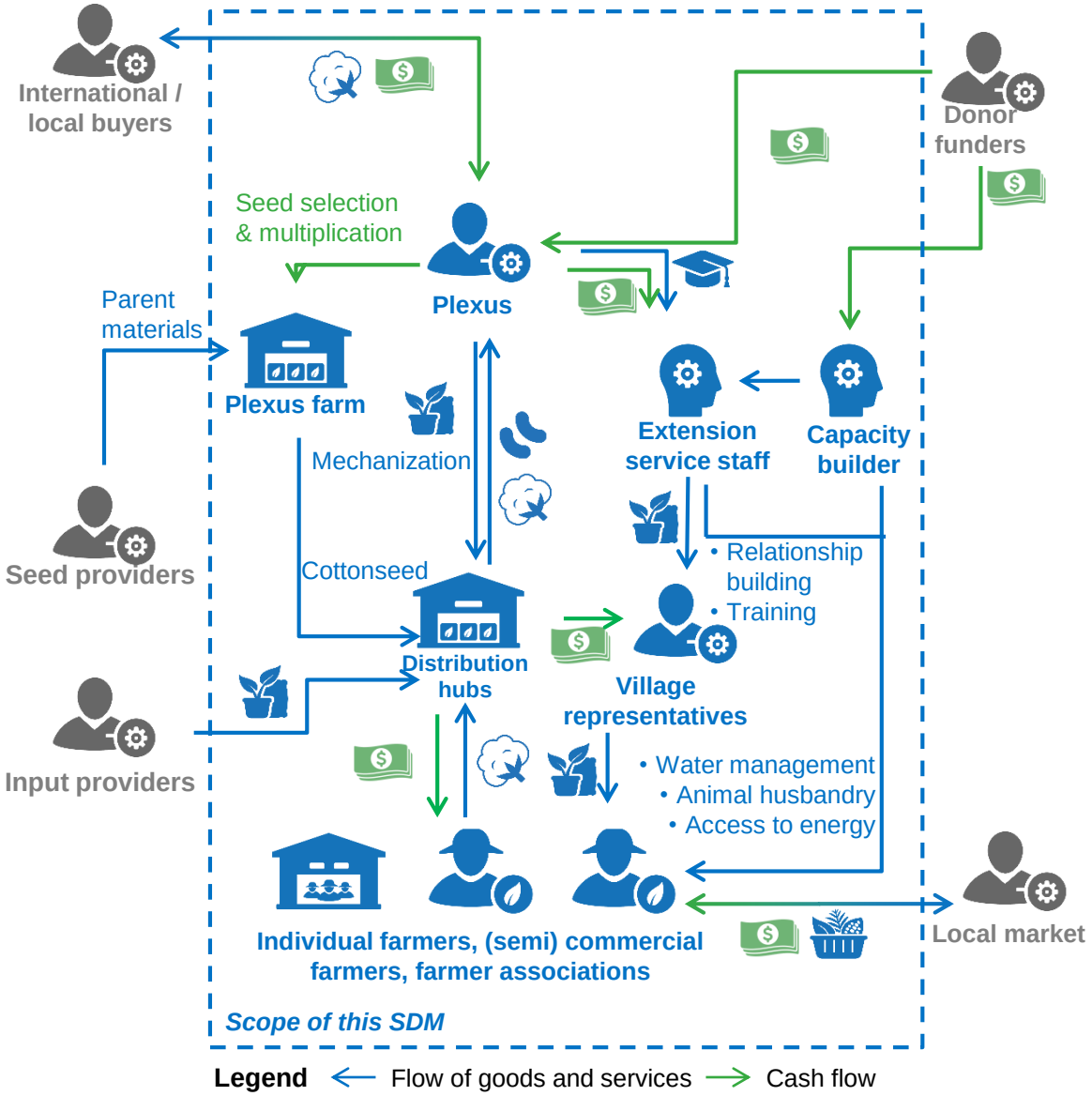
Overview of services and revenue flow in the Plexus SDM



Enabling environment

Farmers and Plexus are impacted by several factors within their enabling environment. Most important are:

1. Trading system

The cotton sector is not fully liberalized. The sector is regulated by IAM (cotton institute) and there is a concession system providing ginners a monopsony over large areas.

2. Environmental

Floods and droughts significantly impact cotton (and other crop) yields. There are few measures in place to mitigate climate risks.

3. Inputs & financing

Farmers depend on Plexus for affordable inputs and credit due to absence of input suppliers and banks in the region.

4. Pricing & competitiveness

Fluctuating cotton prices determine the attractiveness of cotton versus competing crops, driving production volumes.

5. Social

In bad years (i.e. Low prices and adverse climatic conditions) communities suffer from food insecurity. There is limited access to health and education.

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Services delivered and farmer segmentation

Extension

Plexus employs and trains extension staff, which:

- Provide GAP training to farmers to improves productivity, profitability and farmer management skills
- Encourage farmers and provides training on crop rotation
- Build relationships with farmers and communities

Seed cotton production

- Plexus produces cotton seed on own and out grower lands
- Seeds are distributed to distribution hubs and distributed to farmers in coordination with the village chiefs
- Plexus seeks to increase seed performance through improving local and testing other varieties
- Plexus treats seeds to improve germination

Inputs

- Plexus offers inputs, e.g. herbicides, pesticides, fertilizers and supporting equipment to farmers, in cash and on credit
- A selection of farmers receives an improved range of inputs, which are paid for through increased yields and quality of produce
- The use of sprayers and jute bags are offered for free

Crop rotation support

- Plexus encourages the production of rotational food crops (such as maize and beans), which improves soil quality and provides additional income. Plexus provides assistance to farmers that implement crop rotation systems
- Plexus aims to trade the produce, increasing farmers' income from crop diversification

Climate resilience support

Climate resilience support is provided on:

- Alternative livelihoods
- Access to energy, technology and information.
- Improved water and land management
- Better agricultural practices & access to agri-tools
- Increased alternative livelihood opportunities

Mechanization*

- Plexus owns a fleet of tractors and ripping, planting, and spraying equipment
- Machines are rented out on credit, on a per activity basis to private farmers or associations that do block farming (large blocks of 30 ha and above)
- Machines are also used on Plexus' own farms

**Mechanization is out of scope of this case study.*

Farmers are segmented in this SDM:

Farmers that are part of the concession area can enter the SDM and gradually move from small-scale farmers to semi commercial and private farmers

Minimum criteria for entry into SDM

- Be part of the concession granted to Plexus

Segment 1 (Average farmer)

- Have an average yield of 300 kg/ha
- All farmers can voluntarily attend trainings and apply for inputs on credit

Segment 2 (Model farmer)

- Have an average yield of 445 kg/ha
- Receive additional insecticides and herbicides

Segment 3 (Semi-commercial farmer)

- Top 12% of farmers in terms of yield (510 kg/ha)
- Capacity to expand land
- Grows cotton for more than 2 years
- Willing to follow GAP
- Receive additional insecticides and herbicides
- Are provided seeds and inputs for maize and beans
- Receive small premium on cotton sales

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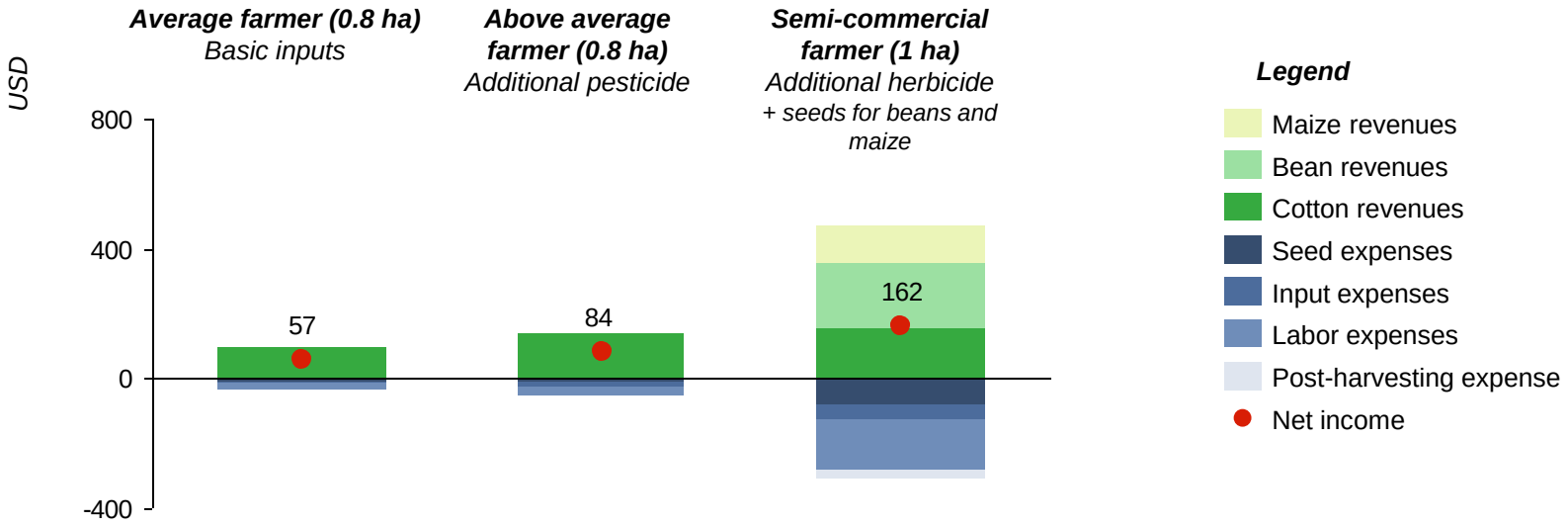
Farm P&Ls: overall impact



Economic sustainability at farm level

Most farmers rely on the cultivation of food crop for their subsistence. Farmers that see cotton farming as a business, applying good agricultural practices and growing cotton year-on-year manage to obtain higher yields, receive better extension support and higher incomes. Price fluctuations and weather extremes significantly impact farmer livelihoods.

Main revenue drivers

- **Farm management:** Timely planting, weeding, spraying, and harvesting improves cotton yields and quality. Application of herbicides further increases yields and subsequent incomes.
- **Crop portfolio and prices:** Farmers rotating crops earn additional revenues from beans and maize and improve cotton yields through healthier soils. Often, last seasons' prices determine how much of his/her land the farmer dedicates to each crop.
- **Premiums:** Better performing farmers can benefit from a 6% premium on top of their cotton price.
- **Land size:** Land is widely available. Farmers deciding to increase their land can significantly increase their incomes.

Main cost drivers

- **Labor:** Certain activities like land preparation, weeding and harvesting require significant amounts of hired labor, making up the bulk of farm expenses.
- **Inputs:** Pesticides, fertilizers and herbicides for cotton are the main non-labor costs. Inadequate application of these inputs further drives up the costs.
- **Post-harvest:** Proper storage and threshing of non-cotton crops adds to the costs of cultivation.

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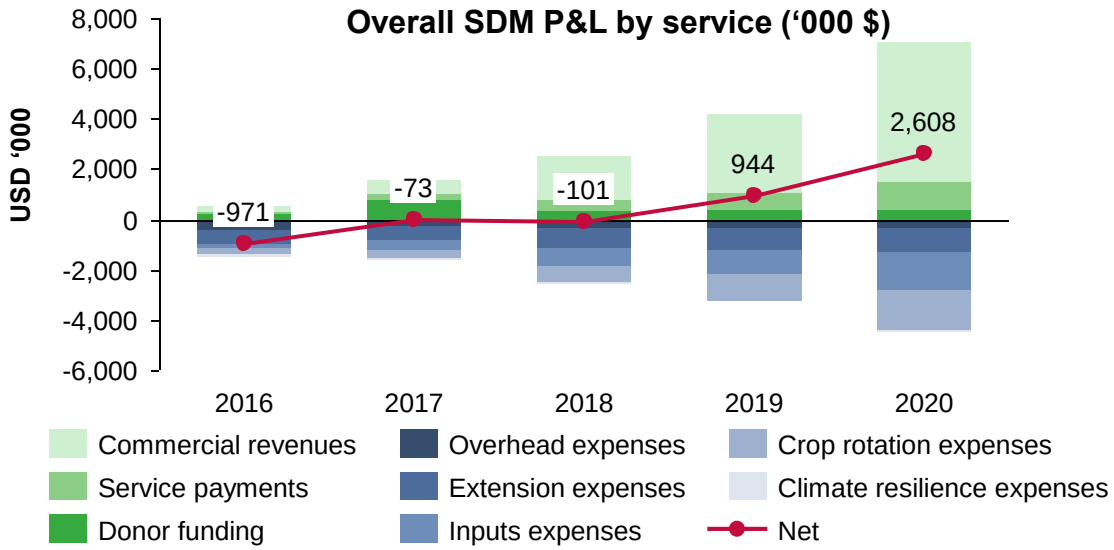
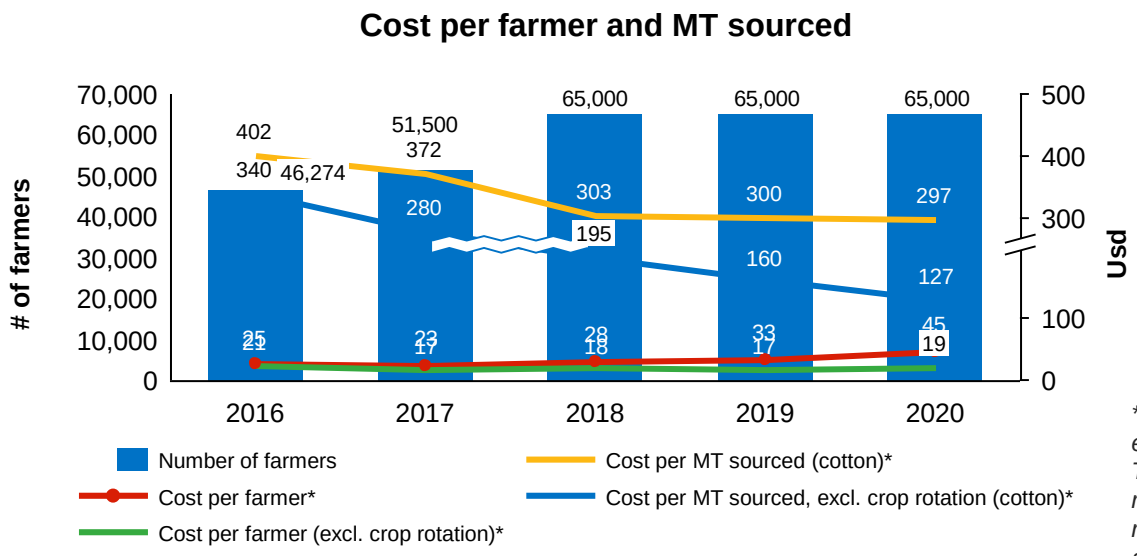
SDM P&L (all services)





Economic sustainability of the program

The Plexus SDM is expected to become economically sustainable in several years, and can over time recover all its costs through a combination of service revenues and additional commercial revenues. Excluding commercial costs and revenues, both cost per MT cotton sourced and cost per farmer is expected to decrease over time.

Main revenue drivers

- **Service revenues**: The SDM recovers a portion of its expenses from service revenues charged to farmers for inputs services. The proportion of costs covered in this way is expected to rise from 6% in 2016 to 28% by 2020.
- **Commercial revenues**: Over time, Plexus expects to generate additional commercial revenues through its relations with farmers in this SDM. The proportion of cost recovery from commercial revenues is expected to increase over time, from 8% initially to over 80% in 2020.
- **External funding: T**he SDM receives some external donor funding to cover certain costs of the SDM, including one-time investments in initial years.

Main cost drivers

- **Services provision**: Main cost drivers of the SDM are the provision of services, with the most costly services comprised of crop rotation, inputs, and extension services, in addition to overhead costs.

** All analyses (cost per farmer and cost per MT sourced) exclude commercial revenues expenses from the SDM. The figures are also shown for the cost excluding crop rotation service, as most of these costs are closely related to commercial (sourcing) activities, and distort the analyses of cost of non-sourcing-related service provision*

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SDM projected outcomes

These results do not represent an official assessment of SDM success or failure by IDH or NewForesight. An indication is given based on the analysis done in this forward-looking study and assumptions provided by the SDM operator(s). Actual assessment should be done during and after the SDM, using measured data

SDM objectives	Projected outcomes
1 **Ensure consistent seed cotton production at cost-efficient offtake costs**	• As area under cotton increases by 76%, up to 65,000 by 2020, total SDM costs per cotton hectare decrease by 10%. • Net costs per farmer (excluding cotton and beans commercial revenues) increase by 72% to $51.
2 **Improve quantity and quality of seed cotton produced**	• By 2020 this SDM supplies an additional MT 5,500 of seed cotton. • A reliable assessment and/or projection of improved cotton quality has not been within scope of this SDM study.
3 **Improve farmer livelihoods and resilience**	• 10-year average farmer incomes improved by 53% • Crop-rotating farmers are more resistant against cotton price and productivity fluctuations. • Some villages have increased and more diversified income streams (e.g., horticulture, animal husbandry).

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Key insights

Key drivers of success

- Plexus maintains a strong **data driven approach** to service delivery. Services are only provided as long as they make **business sense.**
- The **high integration** between the **commercial** (sourcing) and **service delivery portions** of this SDM allows the services to be offered very efficiently and allows most services to be offered for free / subsidized to farmers.
- The **hiring of capable supervisors** has greatly improved the effective implementation of Plexus' strategy.
- **Continuous testing of the impact** of practices on cotton yields and quality allows Plexus to improve productivity on their own farms and those of best performing smallholder and private farmers.
- **Investing time in relationships** with local stakeholders is key in getting things done in a politically and historically sensitive sector.

Key risks

- **Large fluctuations** in annual **cotton production** volumes due to volatile prices and price sensitive farmers that switch crops
- **Unfavorable fluctuations in exchange rates** can lead to significant losses for cotton concessionaires in Mozambique.
- **Inputs are distributed on credit** before the season. Farmers can be unable to repay Plexus at the end of the season.
- Provision of services can be very **politically sensitive**. If farmers feel **mistreated** they can abandon cotton or **negatively impact Plexus reputation** locally.
- Many farmers grow only **a single type of crop** each season, based on last season's highest prices. When **harvests fail** and/or **prices drop** farmers end up without money are food.
- Reliance on **recovery of services costs** from sourcing activities is a risk when commercial performance is less than expected.

Opportunities for improvement

- Plexus could be more involved in **improving financial literacy** and capacity among (especially female) farmers and communities.
- More active and targeted **communication about value creation** at farmer and community levels can trigger the interest of donors or impact investors.
- **Scaling up** of the **climate resilience** impact and efficiency would require working in a larger land area, and the inclusion of mechanization would make sense when working in a larger area.
- **Bundling of services**, and setting **cotton delivery as a condition** for receiving maize services can benefit farmers' incomes and food security, while ensuring cotton supply for Plexus.
- **Improving farmer livelihoods**, whether through encouraging / supporting the cultivation of food crops and/or increasing net incomes, can reduce farmers' dependence on maize and increase room for growing cotton.

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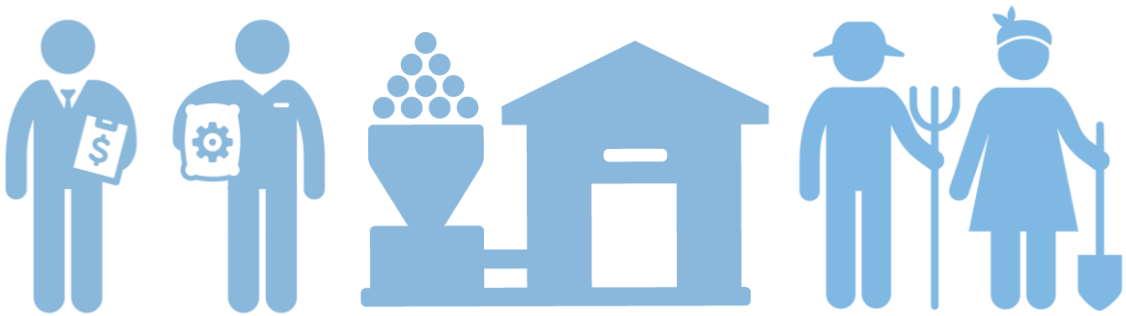

For more information, see the IDH Smallholder Engagement Report. This report, gathered by analyzing over 30 individual SDMs in 16 countries, provides insights into IDH's data-driven business analytics. The findings identify drivers of farmer resilience, cost reduction and financial sustainability in service models and the conditions needed for a supporting enabling environment.