

# SDM: Descriptive Case Report

## Union Service Stores, Tanzania

Service Delivery Model Assessment  
September, 2019



# IDH introduction

## Importance of Service Delivery

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

Service Delivery Models (SDMs) are supply chain structures which provide farmers with services such as training, access to inputs, finance and information. SDMs can sustainably increase the performance of farms while providing a business opportunity for the service provider.

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

## About this study

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

## Thanks

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



# Executive summary

- The Union Services Stores Limited (USSL) Service Delivery Model (SDM) was **designed to facilitate a shift in sourcing strategy** for USSL: from sourcing maize grain primarily from traders and commercial farmers, to sourcing primarily from Farmer Organizations (FOs) representing smallholder farmers. This strategic change is expected to increase the security of supply to USSL by allowing higher volumes of maize grain to be sourced that meet USSL's quality requirement. It is also **expected to please the government** as it is designed to be in line with some priorities of the Ministry of Agriculture (i.e. strengthening of position of smallholders through FOs)
- **An important element for USSL to realize the potential benefit of sourcing from FOs is to secure sufficient farmer loyalty rates.** When farmers sell most of their maize to USSL through the FO of which they are a member, the return on investment in the SDM for USSL is higher than when farmers sell their maize to local traders or others (*side selling*).
- While acknowledging that side selling and a lack of farmer loyalty are a result of structural challenges faced by farmers rather than an issue in itself, this SDM analysis focusses heavily on ways to incentivize farmers to sell to USSL through their FOs. To avoid USSL being financially exposed, **the SDM is designed to reward farmers and FOs based on past performance and loyalty**, rather than on future commitments. This reduces the risk for USSL, but does require farmers to invest in service adoption (by purchasing inputs for example) and resisting the temptation of advance payments from local traders, before reaping the benefits of service adoption.
- The SDM analysis confirms the risk that **farmers are not able to afford service adoption**: cash-flow challenges make it difficult to purchase the optimal quantities of inputs at the time they should be applied. In addition this study brings to light the risk that **all farmers will experience a drop in net income in the first year(s) of participation in the SDM**, creating a disincentive for continued participation in the SDM.
- These risks exist for all three farmer profiles analyzed (“North 1”, “North 2” and “South”) but are **most serious for the farmers of group North 1**. This group of farmers generates an income below the poverty line before joining the SDM, and will struggle to incur the significant costs related to participation and graduation to SDM+ before in year 5 reaching a net income that is equivalent to the poverty line. For this reason **USSL is advised to provide additional support to North 1 farmers in initial years**.
- Apart from lowering the barrier to entry for the most financially challenged farmers, **gaining the trust** of the FOs and more importantly of the individual farmers, **is considered to be of paramount importance to the success of the SDM**. Therefore **USSL should consider the contractual agreements between them and farmers as almost sacred**, meaning that it's made clear upfront what room for flexibility there will and will not be. For example: USSL can clean and dry at a fee if delivered volume doesn't meet the quality specifications for 100%, but USSL expects the agreed quantities to be delivered and will commit to not buying from traders (*side buying*) if FOs are able to provide the quantities that were contractually agreed. In addition the **qualification criteria as well as benefits of graduation to SDM+ need to be highly transparent and consistently applied**.
- Under current assumptions **USSL is able to generate a healthy return on investment** from the SDM from the start of the operations. Even though the costs of offering the services to farmers are not offset by charging farmers or Farmer Organizations for the services, the commercial growth that is facilitated by it, is larger than the investment required.

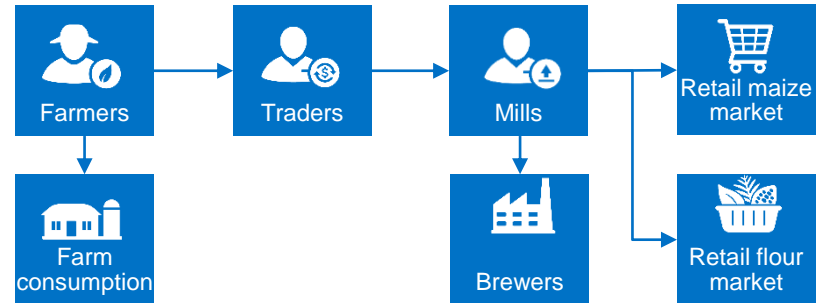
# Context – USSL and Tanzania

## SDM Operator



- Union Service Stores Company Limited (USSL) is a Tanzanian family-owned business founded in 1992
- Headquartered in Moshi, Kilimanjaro region, USSL specializes in the production of animal feed, maize flour and agricultural inputs
- USSL currently sources maize, sorghum and barley primarily from a combination of traders and commercial farmers. However, this meant there wasn't sufficient security of supply particularly when it comes to pricing
- As a result, USSL aims to significantly increase the proportion of its sourcing from smallholder farmers. USSL has contracted 25 farmer groups (~5,000 farmers) in the Northern Zone with ambitions to also contract farmers in the Southern Zone

## Overview of the country value chain







- Maize is the staple food for the majority of Tanzanians. Maize accounts for around 30% of the country's total food production and over 75% of cereal consumption
- Tanzania's maize value chain is disaggregated and disorganized, consisting of 3.5 million farmers
- Total annual maize production is around 6-7 million MT but average yields lag behind other East African countries. Average yields are reported at 1.5MT/ha compared to up to average yields of up to 3.7MT/ha elsewhere in the region
- Maize production is driven by a strong dietary preference for maize over more drought-resistant crops such as sorghum and millet, even in areas of low rainfall
- Around 57% of maize production is consumed by farming households themselves, with the remainder purchased by millers (16%), used for animal feed (10%), exported (12%), and bought by the National Food Reserve Agency (NFRA) to be stored and saved for food security purposes (4-5%)

Sources: FAO (2015) The maize value chain in Tanzania; FEWS NET (2018) Tanzania market fundamentals summary; Harvard Kennedy School/Technoserve (2017) Climate risks, small scale farmers and business: The case of the Tanzanian maize sector

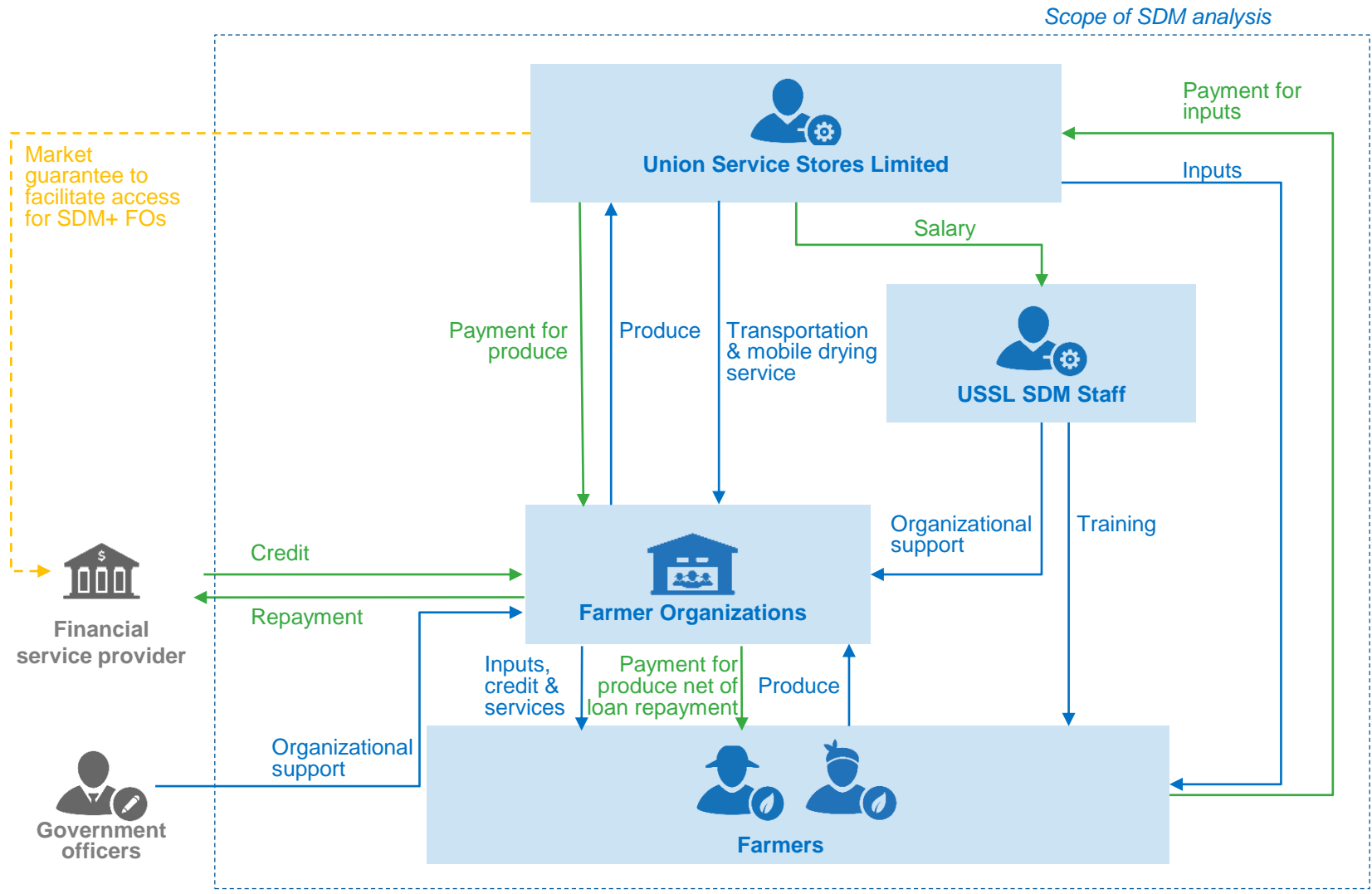
# SDM Objectives

## Outcomes per Stakeholder

		Farmer 	USSL 	Service Providers* 	Government 
CORE OBJECTIVE SECONDARY OBJECTIVES	<b>1</b> Secure supply in terms of volume, quality and product safety at competitive prices	<ul style="list-style-type: none"> <li>Guaranteed markets for produce</li> <li>Higher financial and food security</li> <li>Increased income</li> </ul>	<ul style="list-style-type: none"> <li>Increased predictable maize volumes at acceptable prices</li> <li>Better traceability of produce</li> </ul>	<ul style="list-style-type: none"> <li>Increased customer base</li> </ul>	<ul style="list-style-type: none"> <li>Ensure development of domestic industry</li> </ul>
	<b>2</b> Improve smallholder livelihoods	<ul style="list-style-type: none"> <li>Higher income</li> <li>More predictable cash flow</li> <li>Reduced exposure to price fluctuations</li> </ul>	<ul style="list-style-type: none"> <li>Improved farmer loyalty</li> </ul>	<ul style="list-style-type: none"> <li>Lower default risks on loan portfolio</li> </ul>	<ul style="list-style-type: none"> <li>Poverty alleviation</li> </ul>
	<b>3</b> Improve access to finance	<ul style="list-style-type: none"> <li>Invest in own farms</li> <li>Smoothed out cash flow</li> </ul>	<ul style="list-style-type: none"> <li>Improved farmer loyalty</li> </ul>	<ul style="list-style-type: none"> <li>Increased loan volumes</li> </ul>	<ul style="list-style-type: none"> <li>Financial inclusion of rural population</li> </ul>
	<b>4</b> Improve farming practices	<ul style="list-style-type: none"> <li>Improved yields</li> <li>Higher margins</li> </ul>	<ul style="list-style-type: none"> <li>Higher volume bought per farmer</li> <li>Better quality maize</li> </ul>	<ul style="list-style-type: none"> <li>Higher farm incomes</li> </ul>	<ul style="list-style-type: none"> <li>Higher impact at farm-level</li> <li>Poverty alleviation</li> </ul>
	<b>5</b> Improve farmer loyalty	<ul style="list-style-type: none"> <li>Stable market to sell produce</li> <li>Higher margins from premiums</li> </ul>	<ul style="list-style-type: none"> <li>More predictable supply</li> </ul>	<ul style="list-style-type: none"> <li>Higher likelihood of farmers buying inputs and acquiring credit</li> </ul>	<ul style="list-style-type: none"> <li>More sustainable value chain</li> </ul>

\*IDH and unnamed FSP

# SDM Overview







# Overview of Services



## Farmer training

- Training on Good Agricultural Practices, Post Harvest Handling, gender equality, environmental sustainability & setting up of FO
- Group training is provided by USSL agronomists
- Training is provided upon signing of contract. The requirement for future training beyond the first year will be based on whether expected productivity increases have been made



## Mobile grain drying service

- For larger FOs grain drying and cleaning can be done at the location of the FO using USSL's mobile grain drying service
- FOs are charged a fee for the use of the mobile drying service
- For other FOs drying is done at USSLs aggregation and processing facilities



## Transportation

- USSL offers a transportation service to collect maize grain from FOs who are unable to deliver directly to USSL's factory
- Alternatively, FOs can also deliver to USSL's collection center in Karatu where USSL will organize the delivery to its factory in Moshi



## Organizational Support

- USSL provides a weighing service to FOs purchasing maize grain on the basis of weight rather than volume
- USSL assists FOs in monitoring and controlling quality
- In the long-term USSL would like more services to be provided by the FOs to farmers. To support this USSL pays a fee to FOs based on volumes in addition to covering local government fees



## Access to inputs

- USSL sells fertilizer, crop protection (inc. to combat aflatoxins) and seeds to farmers within the FOs
- Farmers who are members of SDM+ FOs are able to receive a discount on purchased inputs



## Access to finance

- USSL establishes relationships with financial service providers who are willing to provide finance to FOs who have an off-take contract and a track record of meeting requirements
- This enables farmers to access credit at manageable interest rates
- In the future, this may be coupled with crop insurance

Sources: Management interviews

 SDM+

# Role of Farmer Organizations (FOs) in this SDM



Union Service Stores Limited



Farmer Organization



Farmers

## Relationship between USSL and FOs:

**Establishment:** USSL works primarily with FOs that are already registered. In the event that FOs are dormant, USSL helps with re-registration

**Commercial relationship:** Tanzania has instituted a requirement that will prohibit farmers from trading directly on markets. This means all farmers must be in FOs. As a result, USSL has established off-take contracts with FOs for the production of maize. Delivery of services is channeled to farmers via the FOs

**Funding:** FOs are not given capital funding by USSL, but USSL pays local government fees on behalf of FOs as well as paying a margin on all sales to USSL via FOs

**Capacity building:** USSL supports FOs through the provision of training, which supplements the capacity building provided by the government.

## Relationship between farmers and FOs:

**Ownership:** The FOs are owned by their (farmer) members

**Financial relation:** Farmers sell their product via the FO, with the FO guaranteeing them a specific price and handling the payments for produce

**Service provision:** All services are currently (and in the future) coordinated and provided to farmers via the FOs

- **Financial access:** Loans are provided to FOs who then administer the provision of loans to individual farmers
- **Input access:** Purchases of inputs are coordinated by FOs and undertaken on FO premises. However, input purchases are made directly by farmers.

There are three levels of FO: Primary cooperatives – formed at the local level; Joint enterprises (secondary cooperatives) – registered at the District level; National level cooperatives. Some cooperatives take the form of AMCOs (Agricultural Marketing Cooperative Organisation) or SACCOs (Saving and Credit Cooperative Organisation). SACCOs operate as financial institutions, holding savings and making loans to members. In many cases, farmers may be a member of a SACCO as well as the FO.

Sources: Expert interview (Dalberg, 2019), Management interviews



# Farmer segmentation based on a graduation model

In this SDM farmers are divided into three profiles, based on inherent characteristics: North 1, North 2 and South.

Farmer Organization will be encouraged to graduate from the basic Service Delivery Model to access the SDM+ services based on past performance. Both segments apply to all three profiles leading to an analysis of nine scenarios (including baseline scenarios).



## Minimum criteria

FOs should meet the following minimum criteria in order to be eligible for service provision

Minimum criteria	Farmer organization	All farmers must be registered members of a registered Farmer Organization	
	Performance	N/A	<ul style="list-style-type: none"> <li>Has met requirements of prior contracts for both quantity and quality for 2 years in a row</li> <li>No critical findings in government inspection of Farmer Organization</li> </ul>

## Scenarios

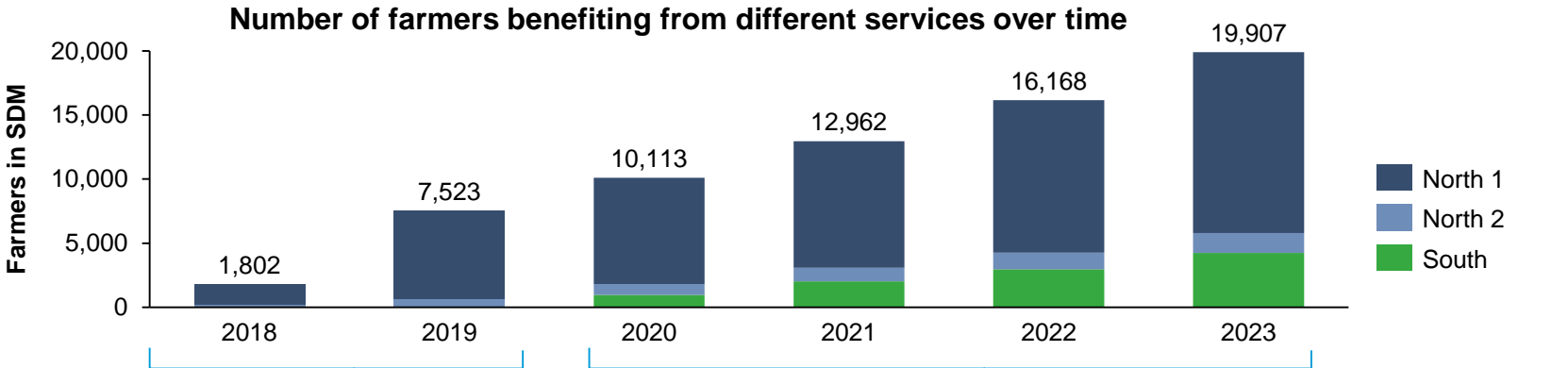
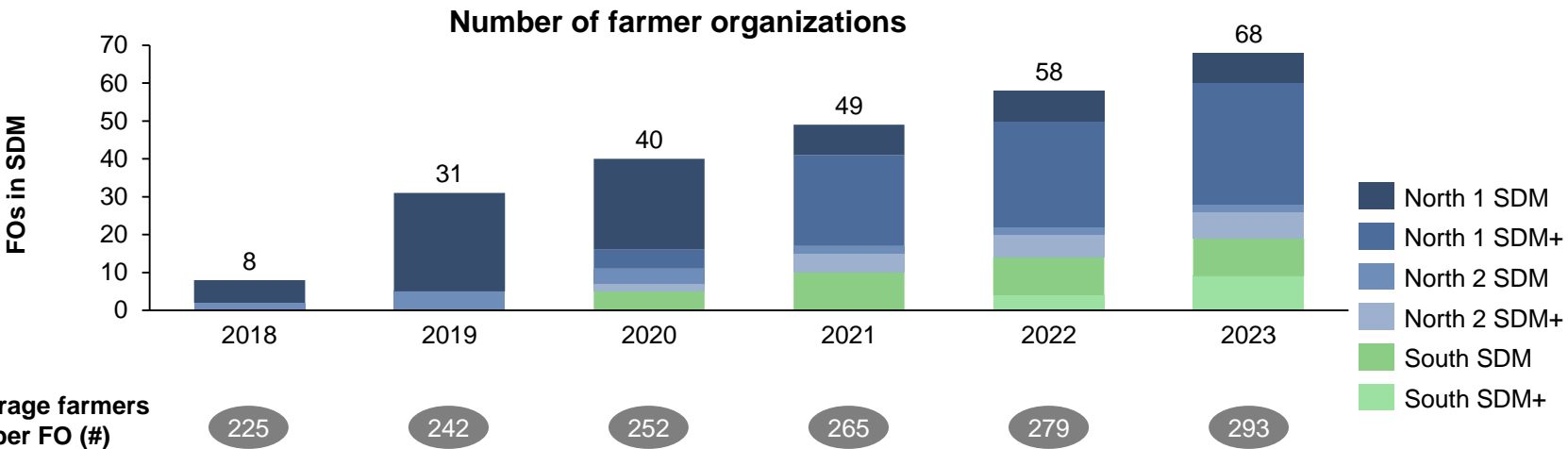
Segmentation of Farmer Organizations is based on past performance and influences the services offered.

Segments	Training	Yes	Yes
	Org. Support	Yes	Yes
	Weighing service	Yes	Yes
	Mobile drying	Yes	Yes
	Transportation	Yes	Yes
	Access to Inputs	Yes	Yes, with discount
	Access to Finance	No	Yes

Profiles reflect distinct groups of SDM beneficiaries that differ in terms of farm characteristics.

Profiles		North 1	North 2	South
	Geographic location	Northern Zone	Northern Zone	Southern Zone
	Watershed access	No	Yes	No distinction made

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



**2018/19: Start of SDM operations**  
 Since its new focus on sourcing from smallholder farmers, contracts have been signed with 25 FOs (~5,000 farmers) in the Northern Zone

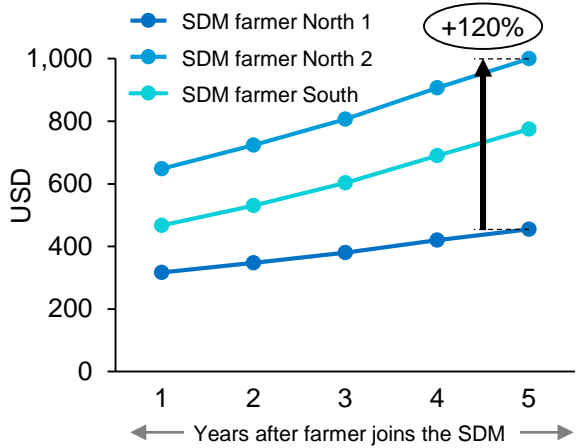
**2019 - 2023: Scale-up phase**  
 Over the next three years, USSL wants to increase its sourcing from smallholder farmers from 4,000MT to approximately 60,000 MT. Contracts will be signed with additional FOs in both the Northern and Southern Zones.

Sources: Management interviews



# Profile comparison | Strong growth in revenues is tempered by disincentives to continued participation in the SDM for all profiles

Farmer maize revenues per hectare (USD/ha)



### Maize revenues per hectare by profile

Maize revenue development per hectare allows a comparison between different farmer profiles:

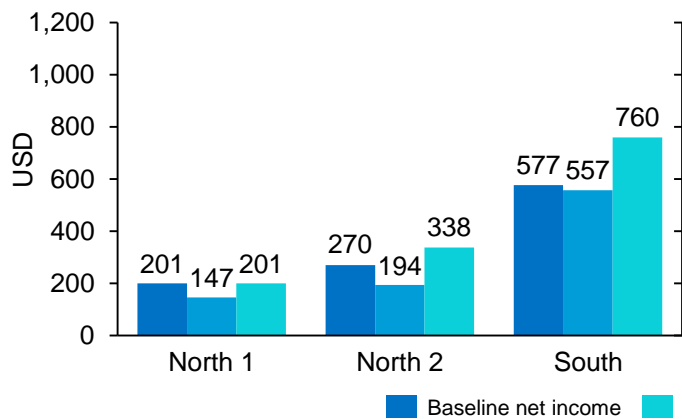
Two rainy seasons in the North versus a single longer rainy season in the South influences productivity differences across the regions

North 1 farmers have no access to a watershed, limiting them to only participating in a single season

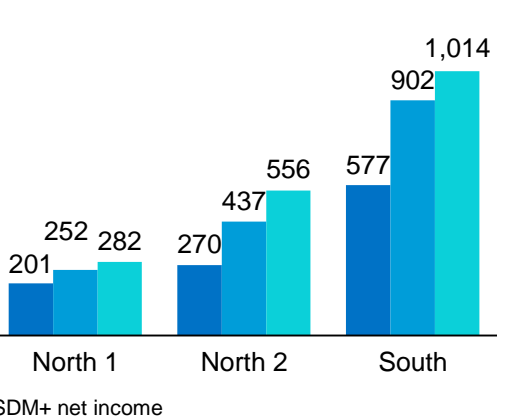
North 2 farmers using increasing levels of irrigation generate more than double the revenues than North 1 farmers due to both the ability to harvest twice per year, as well as an irrigation-caused increase in productivity

A more favorable climate allows South farmers to achieve higher revenues than North 1 farmers, but the single harvest means revenues are lower than those for North 2

Net income per scenario Year 1



Net income per scenario Year 5



### Impact of segmentation for different farmer profiles

All farmer profiles are expected to incur a negative impact in year 1 after joining the SDM, but benefit from participating in the SDM in the long run. Once farmers graduate to SDM+ their net income is expected to increase even further without an initial dip in income.

The negative impact on the net income in the first year(s) heavily influences the likelihood that a farmer will be able to afford service adoption in year 1 and benefit in future years. In other words: the disincentive to continued participation in the SDM is high.

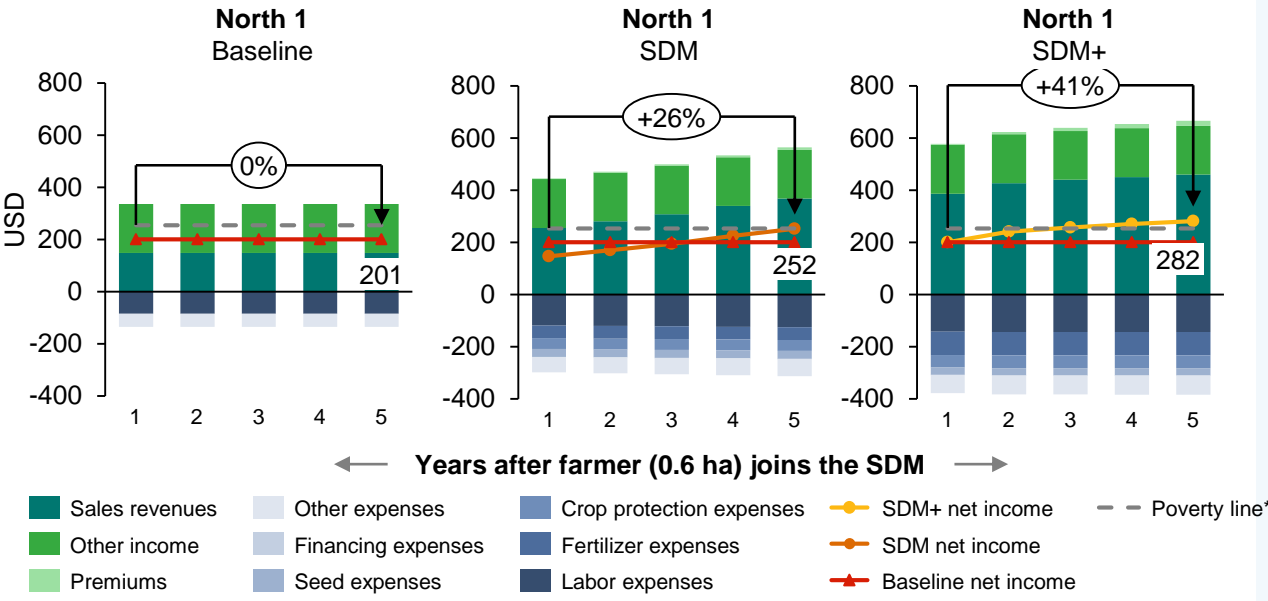
In particular North 1 farmers are expected to struggle to reach the adoption rates assumed for the purchase and application of inputs. Lower levels of input application will hamper the productivity increase required for an increase in revenues and net income.

If farmers don't start to see an increase in their net income soon after starting to sell to USSL through their FO, this will have a knock-on effect on their faith in the benefits of the SDM.

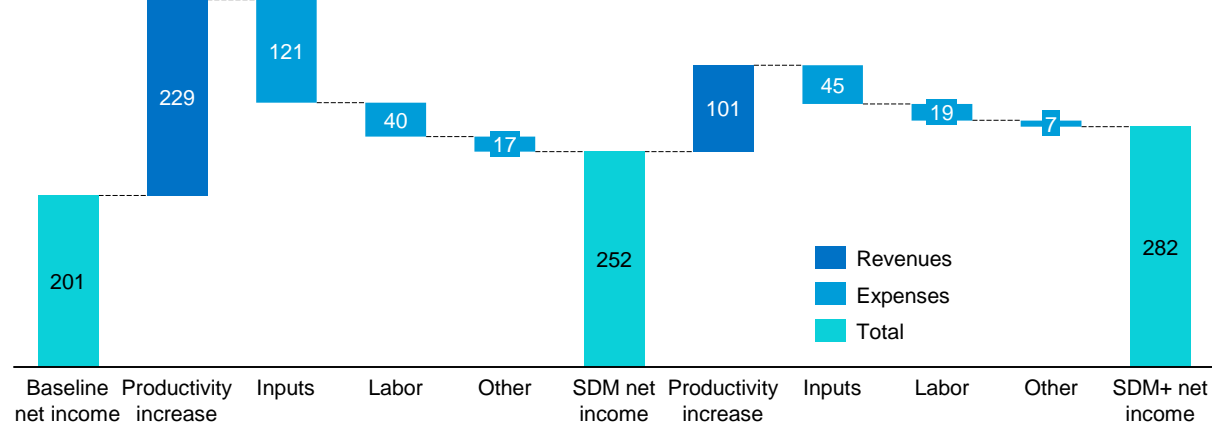
It is imperative that USSL implements the SDM in such a way that this disincentive to continued participation is significantly reduced. One solution could be expanding the discount on inputs to both SDM and SDM+ farmers, as well as increasing the percentage. This would result in USSL making a loss on input sales but this could be covered from the increased sourcing implied by a higher retention rate of farmers



# Farm P&Ls | North 1 farmers will struggle most to justify continued service adoption



## Impact of service adoption on year 5 farmer net income



### Economic sustainability at farm level

- Relatively small farm sizes, low application of GAP and an unfavorable climate limit starting productivity for North 1 farmers.
- Appropriate use of inputs and implementation of GAP can increase by more than double. However, the inability to introduce (or improve use of) irrigation for North 1 within this SDM constrains the potential productivity gain for North 1
- Adopting SDM services has a negative impact on net income until year 4 due to the material and labor costs of applying inputs – in the first year this impact is 54 USD, 27% of their Baseline net income. This increases the risk of SDM farmers discontinuing adoption
- At SDM+, the implied consistent application of inputs and implementation of GAP only bring the farmer net income above the poverty line in Year 3

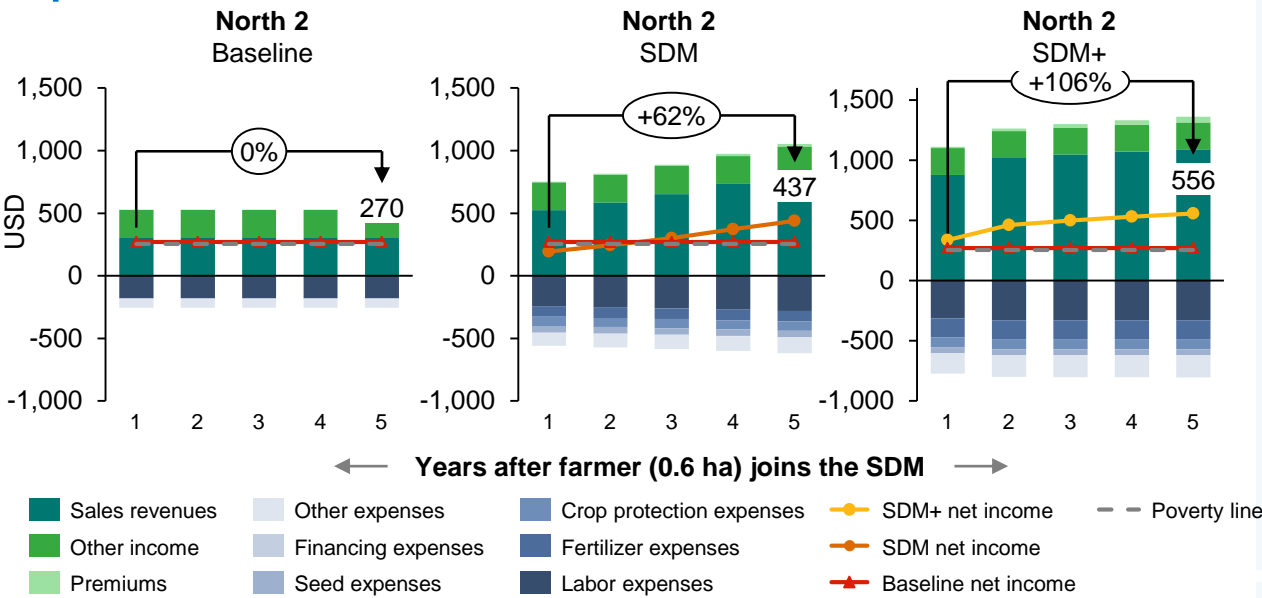
### Main revenue drivers

- Applying inputs combined with GAP increases production
- As the volume sold to USSL increases, so does the average price received per kg: the **debe penalty** is incurred on a lower portion of the produce

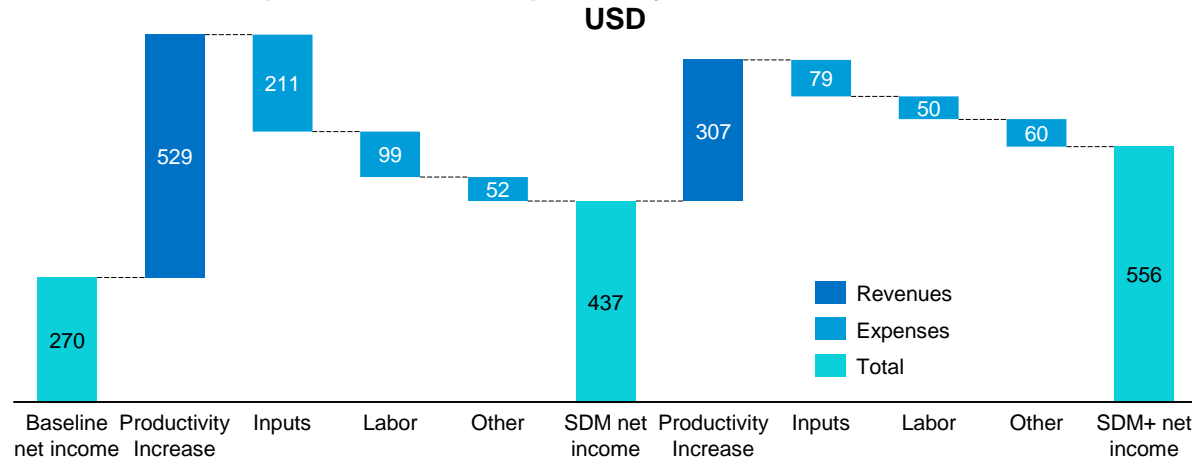
### Main cost drivers

- Labor is the biggest cost driver across all cases. However, labor cost as a proportion of overall costs decreases as input application increases

# Farm P&Ls | North 2 farmers have high potential benefits provided they overcome the initial years



Impact of service adoption on year 5 farmer net income



## Economic sustainability at farm level

- Baseline farmers generate a net income slightly above the poverty line
- Baseline North 2 farmers use irrigation sporadically. Improvement in the use of irrigation allows for a substantial potential productivity increase.
- Irrigation allows North 2 farmers to earn 185 USD from other crops, but the additional labor required for two harvests means there is limited income generated from non-farm activities (38 USD)
- Baseline farmers need to overcome a dip in income of 76 USD (29% of in their Baseline income) in the first year of joining the SDM. By year 3, the SDM is expected to have a positive impact on net income

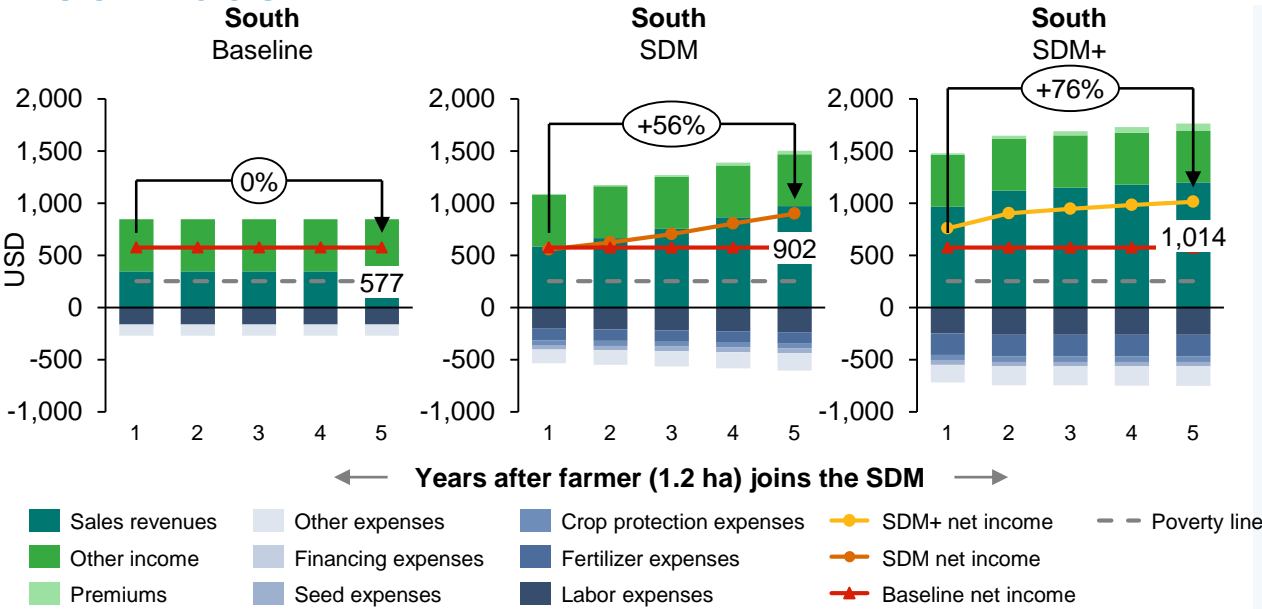
## Main revenue drivers

- Two harvests, application of inputs and GAP increases production
- Farmers are assumed to apply irrigation more consistently as they graduate from Baseline through SDM to SDM+, having a positive impact on production

## Main cost drivers:

- Compared to Baseline farmers, SDM farmers incur high costs for inputs. As they graduate to SDM+ they save 23 USD in discounts on inputs purchased from USSL
- North 2 farmers require additional labor to accommodate 2 harvests, and more intensive land preparation for irrigation

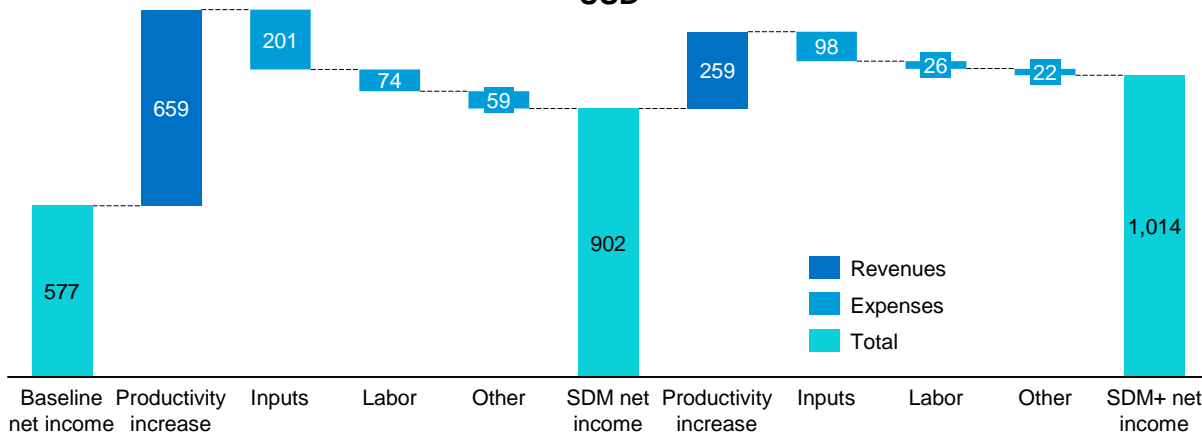
# Farm P&Ls | South farmers are best positioned to adopt services



## Economic sustainability at farm level

- Baseline South farmers are able to generate a net income well above the poverty line, due to larger farm sizes and more favorable climatic conditions that also preclude a need for irrigation
- However, input usage and knowledge of proper agricultural techniques is low
- Buying inputs reduces net income below Baseline income in the first year of participating in the SDM, but the impact is relatively low at 4% of Baseline income (22 USD) and outweighed by productivity gains in later years. This should result in higher adoption rates
- The different rainfall pattern in the South enables farmers to generate a diversified farming income from other farming activities (often beans)

## Impact of service adoption on year 5 farmer net income



## Main revenue drivers

- Baseline South farmers tend to apply GAP less consistently than Baseline farmers in the North, meaning that the benefit of applying GAP is larger, leading to higher productivity and revenue increases

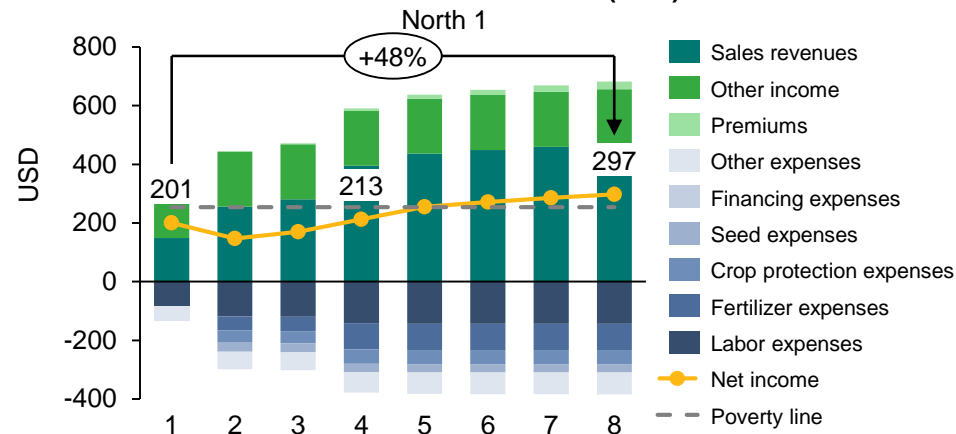
## Main cost drivers

- Costs of service adoption are primarily borne when moving from Baseline to SDM. Additional costs of graduating to SDM+ are limited (38% vs 15% of net income for SDM and SDM+ respectively)



# North 1 deep dive | USSL needs to consider additional support to North 1 farmers to ensure continued adoption

Evolution of farmer net income (USD)



## Income graduation

This graph demonstrates the typical expected trajectory of the net income of a North 1 farmer, operating as Baseline in year 1, as SDM in years 2 and 3, and as SDM+ in years 4 through 8.

The lack of incentive for the continued participation of North 1 farmers in the SDM becomes clear when considering that it takes the farmer four years to surpass baseline income and five years to reach an income level equivalent to the poverty line. The loss of income relative to the baseline over the first four years of 71 USD would likely discourage farmers from continued adoption. Furthermore, by the time the poverty level is surpassed on an annual basis, the cumulative loss of income relative to the baseline is 17 USD. Only by year 6 does the farmer recover cumulative lost income.

## North 1 farmer net income year 4\* (USD/ha)

Varying maize prices and productivity increases

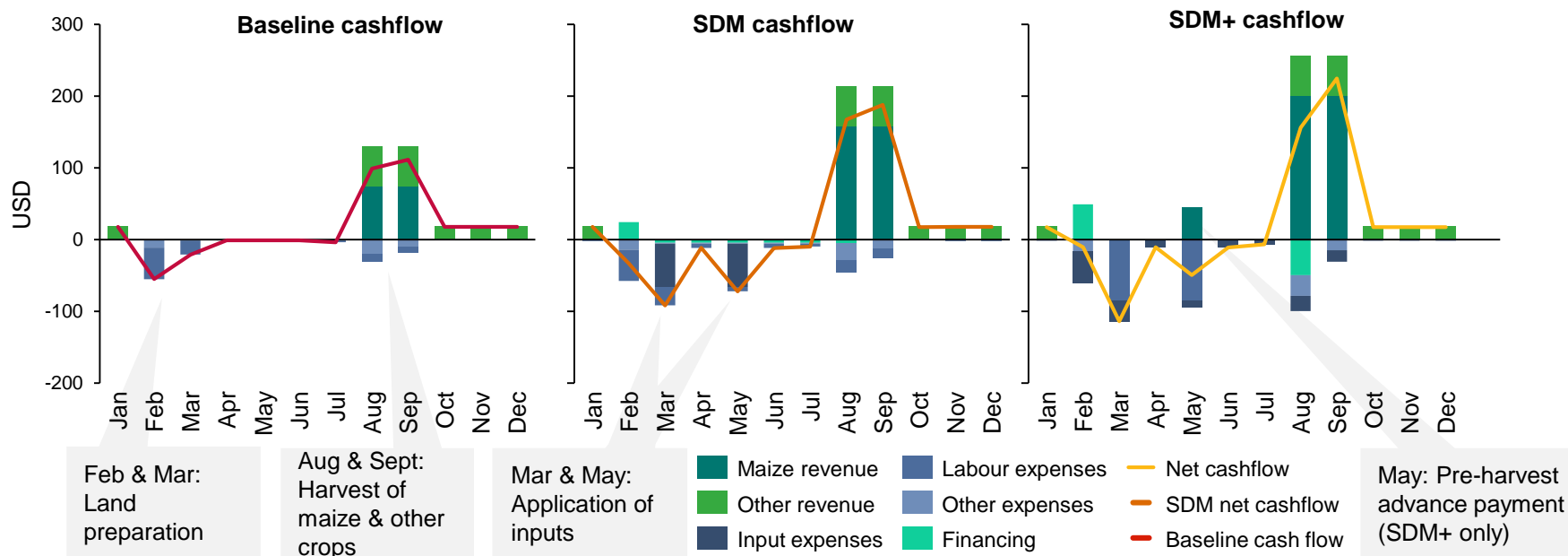
Farm-gate price (TZS/kg)	SDM					Current projection	Below poverty line	SDM+				
	Change in productivity vs. assumption (%)							Change in productivity vs. assumption (%)				
	-30%	-15%	0%	15%	30%			-30%	-15%	0%	15%	30%
350	69	106	144	181	218	350	70	120	170	220	271	
450	116	166	217	267	318	450	135	203	270	338	406	
550	162	226	290	354	417	550	201	286	371	456	540	
650	209	286	363	440	517	650	267	369	471	573	675	
750	256	346	436	526	617	750	332	452	571	691	810	

## Sensitivity of farmer income

The net income for a North 1 SDM and SDM+ farmer for year 4\* were subjected to a stress test across two parameters: farm-gate prices and productivity changes relative to that assumed for the projections. Current projected incomes are hovering around the poverty line, demonstrating the vulnerability of farmers to price shocks and more importantly the significance of reaching at least the assumed productivity increases. However, contracted floor prices at the cost of production +10-17% (350-400TZS/kg) insulate farmers from significant price declines. In addition, when productivity falls due to drought, this is often associated with price increases, meaning situations of both price and productivity declines are rarer

\* Year 4 was selected as this is the year when GAP application is expected to reach full impact on productivity.

# North 1 Cashflow | Financial products are key to reducing the volatility of farmer cashflow



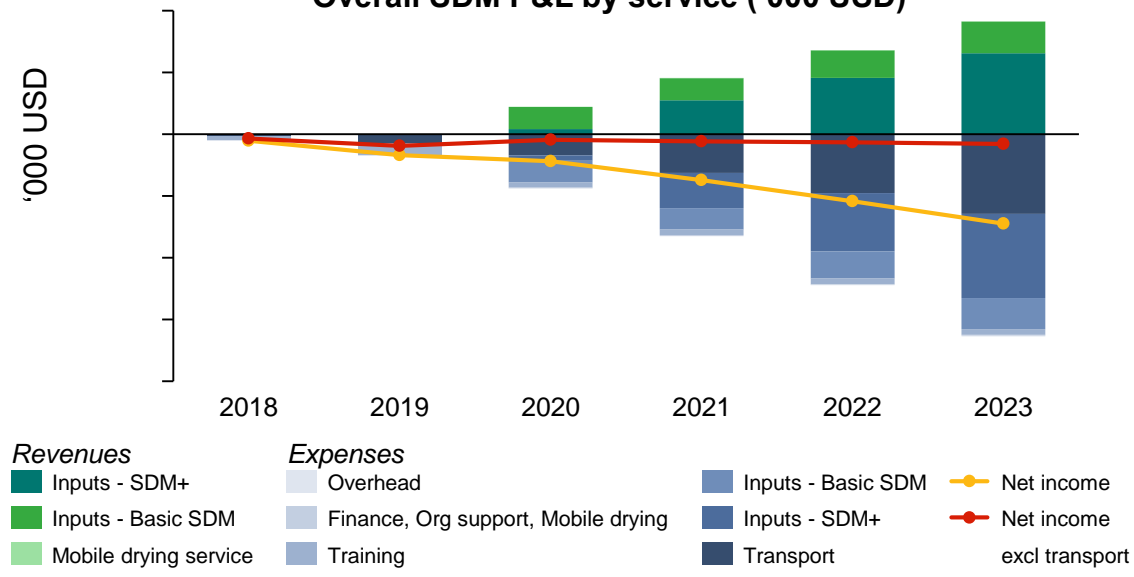
## Discussion

- Despite farmers being economically active outside of the farm, they receive 77% of their income across the harvest months of August and September. Although SDM and SDM+ farmers earn more, the proportion of income concentrated to these months increases to 85% and 88% respectively
- A CGAP study reported that only 10% of Tanzanian smallholders have a bank account registered in their own name, yet around 50% have mobile money accounts<sup>1</sup>. Both a lack of access to financial products as well as inadequate financial literacy can inhibit the saving that is necessary to smooth out the sizeable fluctuations in cash flow
- The SDM tries to address these issues through both training and access to finance. Training includes farming as a business where farmers are taught about financial planning whereas access to finance helps with the payment of input expenses in addition to an advance payment to cover harvesting costs (SDM+ only)
- However, cash flow volatility is significant at SDM highlighting the challenge to convince farmers to make the initial investment in moving from Baseline to SDM. Furthermore, for farmers reaching SDM+, the impact of access to finance in reducing volatility is visible through the advance payment and increased loan size (2x) but a considerable degree of volatility remains.

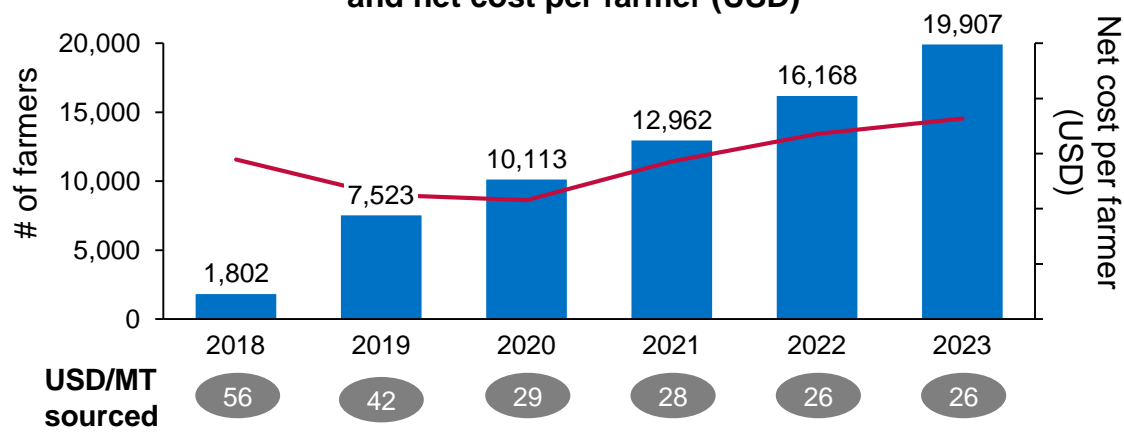
Sources: 1) CGAP (2016) – National Survey and Segmentation of Smallholder Households in Tanzania; \*North 1 farmers were chosen for analysis as they are the most vulnerable from a cash flow perspective

# SDM P&L | The cost of transport drives the SDM returns

Overall SDM P&L by service ('000 USD)



Number of farmers in the SDM (#) and net cost per farmer (USD)



## Economic sustainability of the SDM

- USSL did not design the SDM to be economically sustainable as a stand-alone P&L, so the costs of offering services to farmers are not offset by charging farmers or FOs for the services

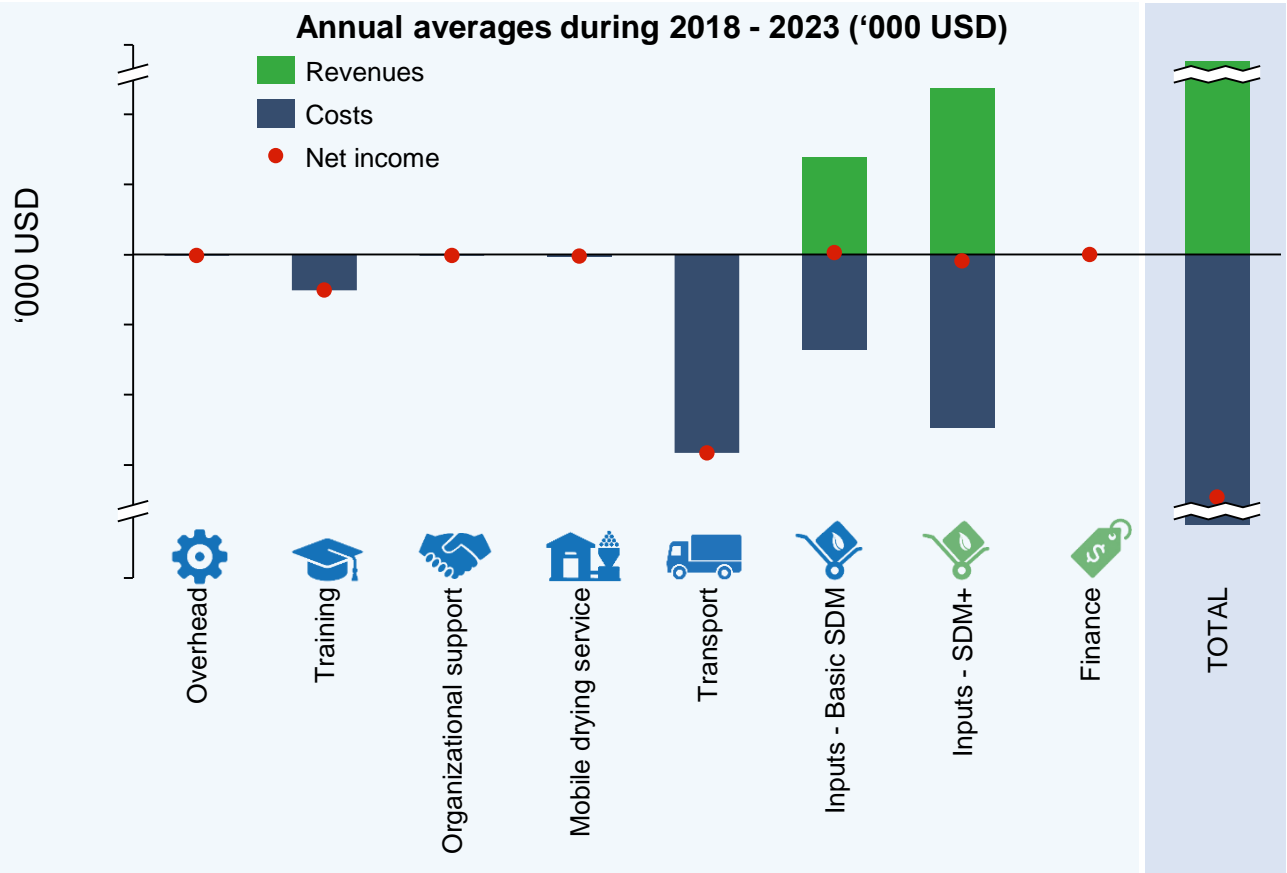
## Main revenue drivers

- The biggest revenues comes from the sale of inputs. However, the margins made in the SDM+ model are not sufficient to cover the cost related to transporting inputs for selling on-site at the FO with expenses are currently 4% higher than revenues. This is justified as it is designed to be a reward for increased volumes of maize supplied and implies an increase in volumes of inputs sold

## Main cost drivers

- The expenses related to the provision of inputs (COGS and cost of sales) are the main cost driver
- Although transport from the FO to USSL is considered a service as it plays a critical role in allowing farmers to sell to USSL, it could also be considered a standard operating cost for USSL (so out of scope of the SDM P&L), bringing down the net loss of the SDM by 89% in 2023
- As training is only offered in the first year that FOs are onboarded, expenses are low (~7% of total cumulative expenses). These costs will increase if experience shows that one-off training is not sufficient for GAP to be fully adopted.
- Cost per farmer goes up as one of biggest cost categories scales with volume (transport).
- Cost per MT goes down as volume sourced per farmer rises faster than costs per farmer
- Cost per MT sourced decreases as a % of fully loaded cost, from 22% in 2018 to 13% in 2023

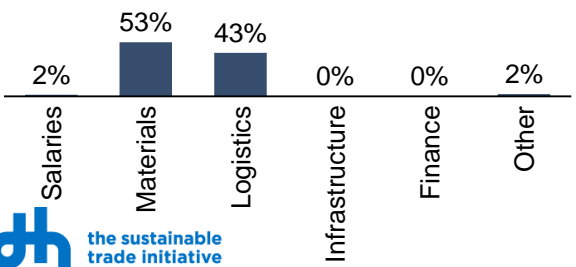
# Service profitability | Input provision for SDM is the only internally profitable service



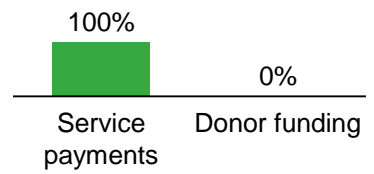
### Discussion

- Input provision in the basic SDM model is the only service which is profitable. The margins made on the sale of inputs are sufficient to cover the cost of sales at the FO. The discounts offered to farmers in the SDM+ model are too high to cover the cost of sales and could be reduced to be lower than the profit margin.
- However, to ensure that farmers start purchasing inputs from USSL, a bigger and earlier discount seems to be required, negatively impacting profitability
- The transport service weighs most heavily on the net loss of the SDM and needs to be considered in the context of being critical to the success of the SDM, but at the same time a standard operating expense related to sourcing

### Expense categories



### Revenue sources



### Expense categories

- Materials expenses consist of inputs.
- Logistics expenses are related to the cost of providing transport to USSL's facility in Moshi.

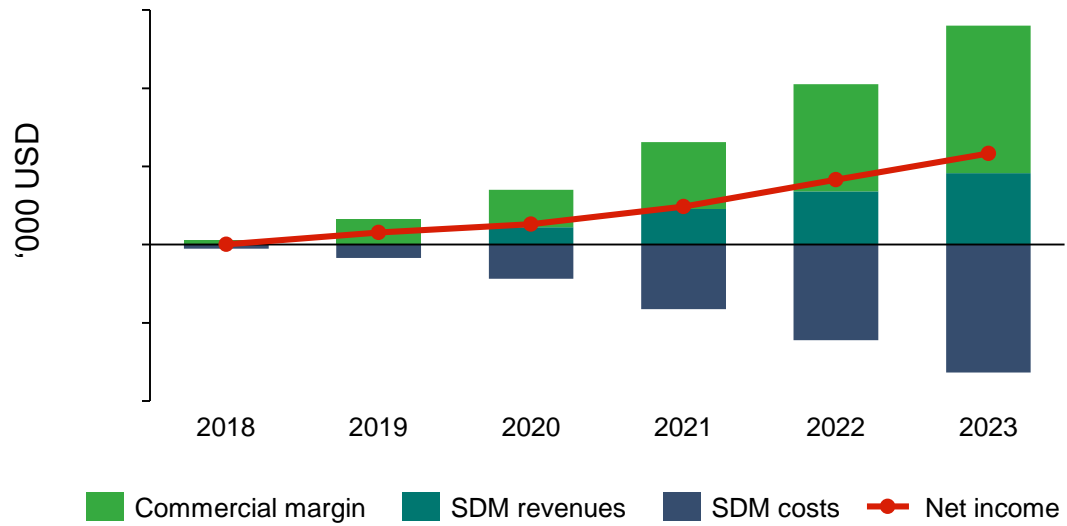
### Revenue sources

- In current projections no donor funding has been taken into account.



# SDM P&L including sourcing | Investment in the SDM is justified by the increase in commercial revenues

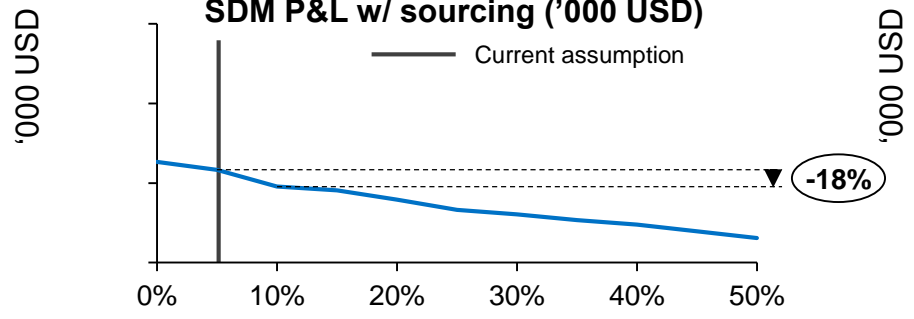
P&L including commercial revenues ('000 USD)



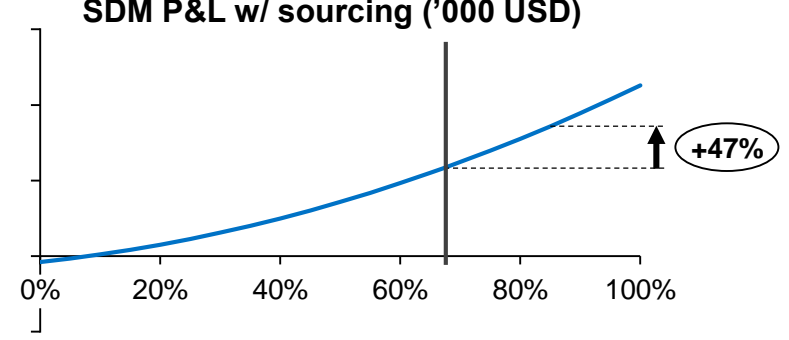
## SDM sustainability including sourcing benefits

- Once the commercial benefits of USSL's operations are taken into consideration, the annual SDM costs are instantly recovered
- The SDM facilitates a growth in USSL's operations, which leads to increasing return on investment in the SDM: from 9% in 2018 to 71% in 2023
- These returns are the result of net profit margins on maize products (between 10% and 15%) which can overcompensate for the relatively low cost of implementing the SDM
- Retaining FOs over time is important for profitability: if 10% instead of the currently assumed 5% of FOs stop working with USSL towards 2023, this reduces 2023 profits by 18%. This is because the first year of an FO onboarding to the SDM includes the one-off expenses related to farmer training, making onboarding expensive
- Ensuring that side-selling is limited is equally key to maintaining sound profitability: net income is 47% higher at 85% loyalty than at the currently assumed weighted average loyalty of 67% for 2023

Impact of FO attrition rate on 2023  
SDM P&L w/ sourcing ('000 USD)

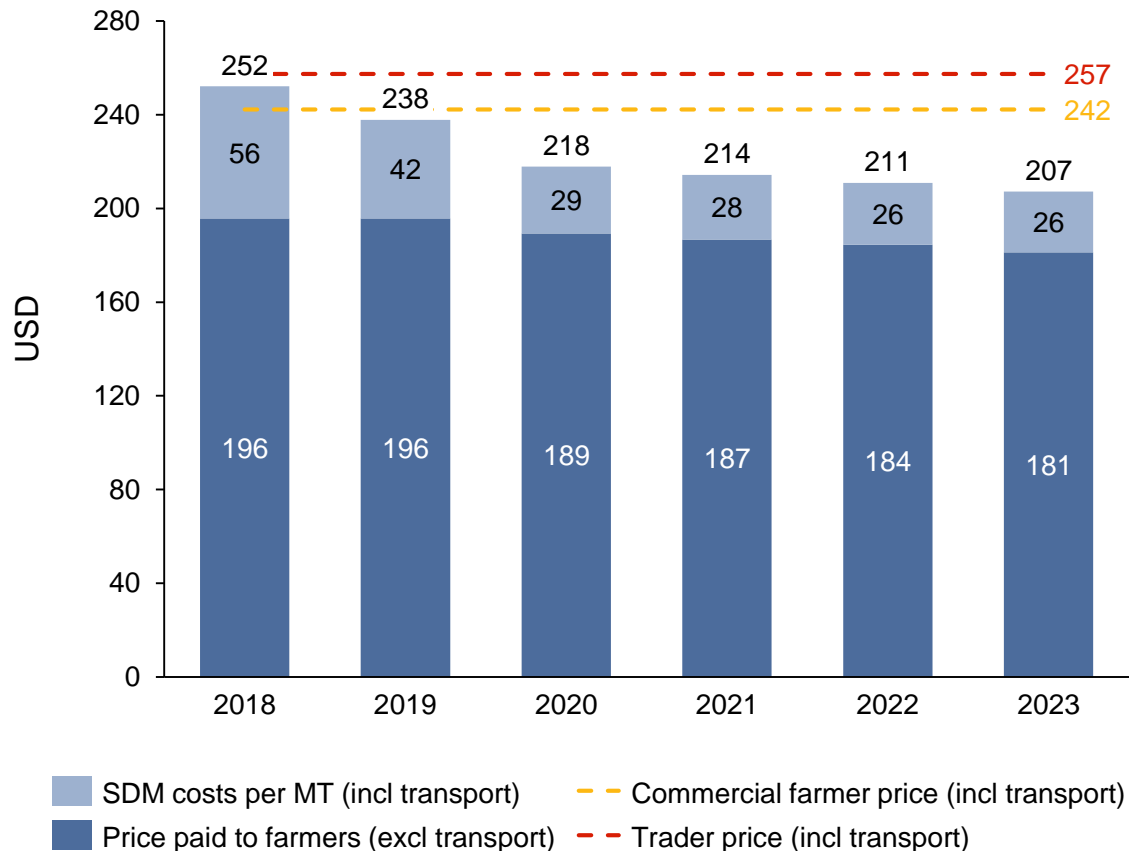


Impact of loyalty rate on 2023  
SDM P&L w/ sourcing ('000 USD)



# Sourcing strategy | Sourcing from smallholders is cheaper than from others within two years of the SDM's operation

**Comparison of cost of sourcing maize from different suppliers**  
**Cost per MT (USD)**



**Sourcing cost comparison**

- USSL is charged an additional 65 TZS/kg (28 USD/MT) and 100 TZS/kg (43 USD/MT) for maize grain when sourcing from commercial farmers and traders respectively
- When a conservative transport cost of 18 USD/MT is added, this gives the fully loaded price of 242 USD/MT and 257 USD/MT for sourcing from commercial farmers and traders respectively. Cost of transport is taken into account for smallholders as an SDM service cost
- Within two years of operation, the fully-loaded cost (including cost of service provision) of sourcing maize from smallholder farmers is more economical than via either commercial farmers or traders
- Over the course of 2018-2023, the cost of delivering services per MT falls whereas the average price paid to farmers falls as sourcing from the South increases
- In addition to cheaper raw material costs, sourcing from smallholder volumes also creates value through increasing supply security – reliance on commercial farmers and traders makes USSL’s raw material supply much more vulnerable to unpredictable market fluctuations over which they have limited control





# Conclusions | Key drivers of success and key risks



## Key drivers of success

- USSL's SDM is expected to have a **very healthy return** on investment, and sourcing from smallholders through FOs compares favorably to sourcing from commercial farmers and traders within a short timeframe. This means **there is room for providing additional financial support** to farmers as compensation for the drop in net income in initial years of participation in the SDM
- Through this SDM, USSL strengthens smallholder farmers' position by investing in FOs. By doing that USSL **supports the priorities of the Tanzanian Ministry of Agriculture** and will continue to be seen by the Ministry as a leading company worth listening to
- The SDM focuses on increasing farmer loyalty by providing tangible incentives for farmers to participate, and an important but less tangible driver of success is related to **creating more trust** in the Tanzanian maize value chain. USSL aims to do so by positioning itself as a reliable business partner and working on the basis of **transparency and predictability**. Volume, price and quality agreements are captured in contracts, and the **consequences** of meeting and not meeting the contractually agreed commitments will be communicated clearly



## Key risks

- The key risk for this SDM lies in the **high barrier to entry** for farmers: farmers with an income just around the poverty line are unlikely to be in a position to purchase the inputs required to fully benefit from the SDM
- And even if they start to participate, all farmer profiles incur **a decrease in net income** when joining the SDM, and **North 1** farmers are expected to only surpass the Baseline farmer income in year 4, creating a disincentive for continued participation in the SDM beyond the first year
- While the low level of income heavily influences farmers' **ability to adopt services**, adoption determines whether **farmer loyalty** increases – in other words whether USSL is able to reap the benefits by increasing the volume sourced per farmer as a result of investing in the SDM
- It is therefore reasonable to expect that this group will **need additional support** in initial years in order to benefit from the SDM and for USSL to secure the additional maize volumes. Such additional support is likely to have an impact on USSL's **working capital and profit margins**
- The assumption is that the number of members per FO increases over time, however training is only offered in the first year that an FO is onboarded. **USSL may need to consider training new FO members**, as well as offering refresher training of existing members. Training is critical to ensure that farmers reach the projected potential productivity, so this is likely to require additional investment



# Conclusions | Opportunities of improvement and key factors in replication



## Opportunities for improvement

- USSL will need to consider the best way to convince farmers to participate in the SDM, and to what extent it is willing to risk financial exposure to achieve it. The effectiveness of providing input on credit has proven to be very limited. Other forms of **temporarily subsidizing farmers** could be:
  - Donating low-tech mechanization equipment to FOs to build trust and loyalty towards USSL, as well as providing a low-cost way for farmers to start increasing productivity
  - Providing inputs at temporarily subsidized prices (rather than on credit). This should only be considered if it is reasonable to expect that it will lead to higher service adoption
- USSL could consider establishing **'best practice' farmers as ambassadors** for adopting services and investing in inputs. This would require extension officers to work closely with FO leadership to identify and monitor individual farmers known to be committed to service adoption. The ambassadors could be offered training in public speaking so that they can confidently convey their experience within the community
- To address the risk of newly onboarded farmers not receiving training, a **train-the-trainer approach** could be considered: ambassador farmers could be trained as trainers and supported by USSL in onboarding new farmers
- Another four potentially high value opportunities are discussed in more detail in the following pages



## Key factors in replication

- The principles based on which USSL sources from FOs (see description of organizational support for details) provide tremendous benefits to farmers in the form of **off-take security**, even if farmers are not able to commit to their side of the deal from the start. Over time USSL will demonstrate to farmers and FOs that they are a **reliable business partner** that takes breaches of contract by FOs very seriously but also rewards the fulfilment of contractual commitments.
- As USSL starts to engage with FOs in the South, it will be challenging to establish the same level of **visibility** of USSL towards farmers as in the North, but this should be considered an important element of the implementation strategy in the South



# High value opportunities | We recommend further researching four additional opportunities

	What is the opportunity?	Why is it important?
<p>1</p> <p><b>Own trucks for transport</b></p>	<p>USSL purchases its own trucks in order to source maize from FOs in a more timely manner</p>	<p>Currently USSL is reliant on third party logistics companies meaning it is often unable to arrange transport for maize in a timely basis, contributing to side-selling</p>
<p>2</p> <p><b>Service provision by FOs</b></p>	<p>USSL leverages financial support of FOs to offer services directly to their members such as training and equipment (shelling machines, ploughs, irrigation). This contributes to the sustainable empowerment of farmers and FOs</p>	<p>Many FOs currently do not have the working capital or expertise to provide an extensive range of services to farmers. Better equipped FOs could reduce the service delivery burden for USSL going forward (e.g. repeat training)</p>
<p>3</p> <p><b>Crop insurance</b></p>	<p>USSL facilitates crop insurance as an additional service for farmers who are members of FO's that have graduated to SDM+. This service can be combined with the access to finance service</p>	<p>Crop insurance improves the climate resilience of farmers, making them more willing to invest in their farming operations. It also reduces the risk to loan providers who would be more open to lending to FOs without requiring USSL guarantees</p>
<p>4</p> <p><b>Farm management system</b></p>	<p>USSL establishes a farmer management system to better monitor individual farmer performance and characteristics, and enhance trust by providing transparency towards FOs</p>	<p>Using excel-based tools, USSL is less able to track individual farmer performance and characteristics, limiting its ability to plan and manage incentives (FO graduation, Champion Farmers) and to tailor service delivery</p>

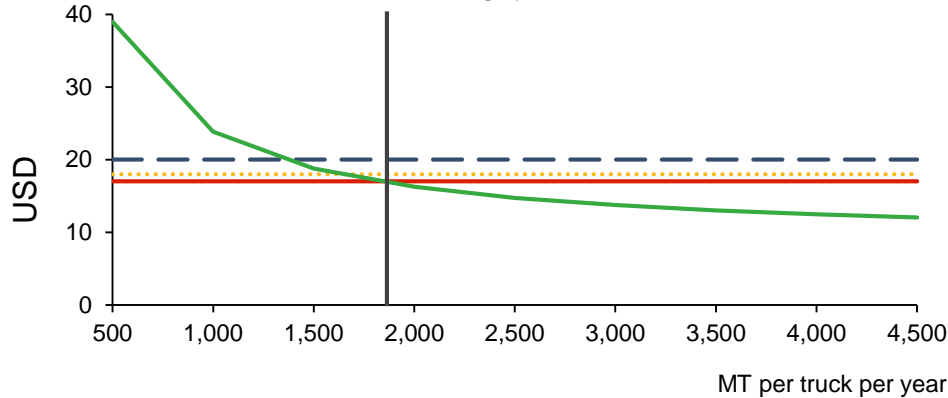




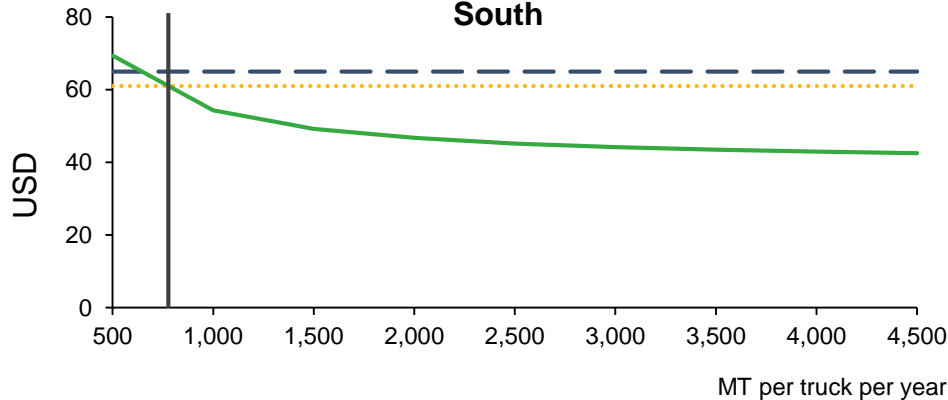
1

# Own trucks | USSL can recover the cost of buying trucks for improved service delivery, with loads from 1,850 MT/yr/truck

**Cost per MT transported by truck utilization North**



**Cost per MT transported by truck utilization South**



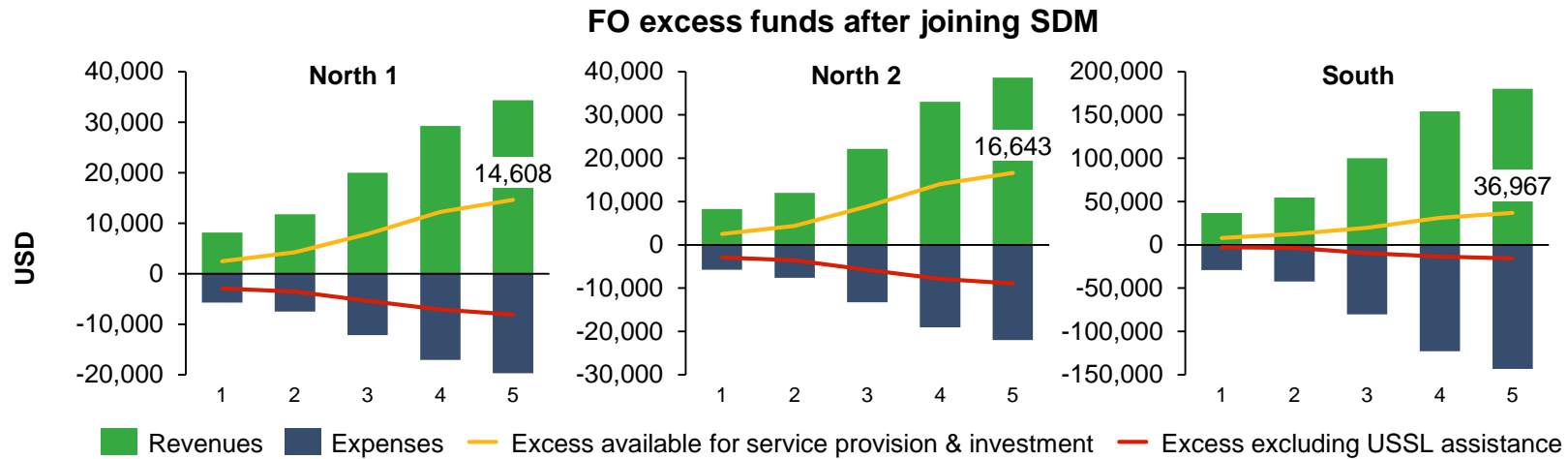
- 1) Reimburse FO
- 2) Pick-up from Collection Center
- 3) Pick-up from FO
- 4) Own trucks
- Point at which own trucks is most economical

## Return on investment in trucks

- The disadvantage of USSL’s current approach to transporting maize from farm to factory has two main elements:
  - Relying on third parties means USSL is often unable to collect maize at a time that suits the farmers and FOs. This can result in increased side-selling
  - USSL pays higher costs per MT than it would if it could collect maize with their own trucks
- Across all locations, a minimum annual delivery load of around 1,850MT is sufficient for the gains from lower transport costs to outweigh the fixed costs of purchasing trucks
- This translates to 62 full loads for a 30MT truck in the North and a utilization rate of 21% (assuming 300 loads can be picked up throughout the year)
- In the South, the impact of having owned trucks on profitability is considerably stronger – only 23 full loads are required (reflecting a utilization rate of 15%, assuming only 150 loads can be picked up annually due to distance).
- Additional benefits may come from using the trucks to transport inputs to the FOs, reducing the cost of sales, and from renting trucks out during low season (only for food products to mitigate the risk of contamination of the trucks)
- Based on this preliminary assessment, the financial benefits alone outweigh the cost of purchasing trucks. When including the non-financial benefit of cleaner transport in a more timely manner, this opportunity is expected to bring high value to USSL
- **Recommended next step** is provided at the end of this section

2

# Service provision by FOs | USSL contributions to FOs can be leveraged to speed up service provision by FOs



## North 1 cumulative excess funds (USD) over 5 years

Annual growth in number of farmers

	-10%	-5%	0%	5%	10%	15%
0	11,040	13,569	16,398	19,553	23,059	26,943
5	14,846	17,894	21,305	25,109	29,336	34,019
10	18,652	22,220	26,213	30,665	35,614	41,096
15	22,458	26,545	31,120	36,221	41,891	48,173
20	26,264	30,871	36,027	41,777	48,169	55,250
25	30,070	35,197	40,935	47,334	54,446	62,327

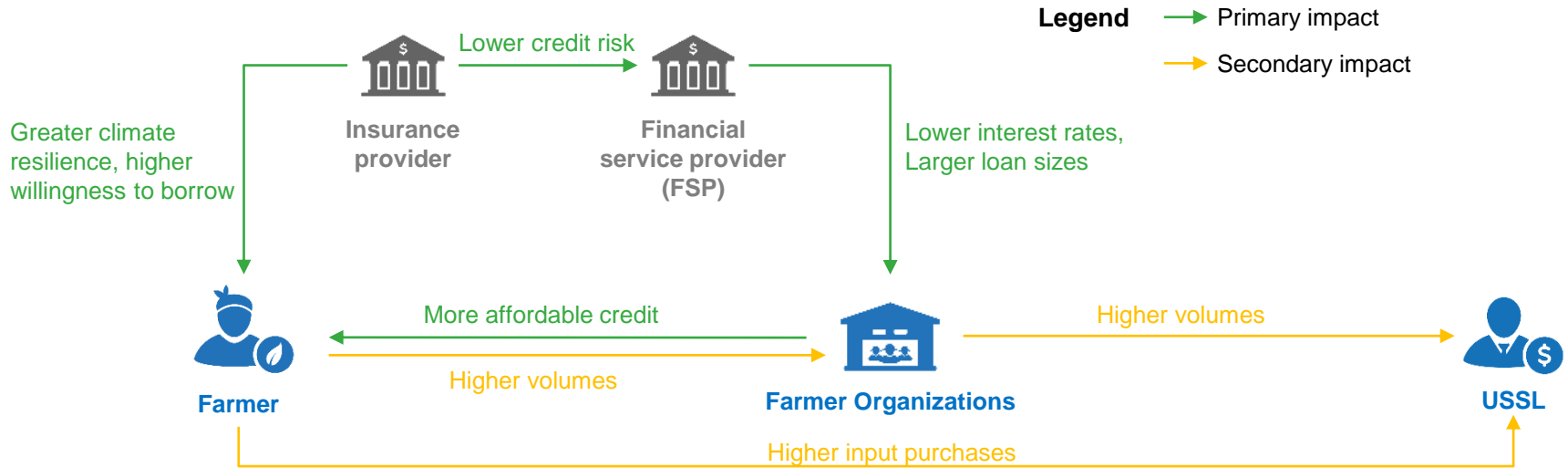
Current projection

### FO P&L

- USSL contributes financially to FOs through two ways:
    - USSL pays 15TZS/kg margin on top of sourced volumes to FOs
    - USSL pays 15TZS/kg local government fee on behalf of FOs
  - In addition, by picking up maize quickly after harvest mitigates many of the costs associated with storage and post harvest losses
  - Without this assistance, FOs can not generate excess funds and are not in a position to provide services to farmers.
  - Farmer numbers within each FO are assumed to grow at 10% annually. Lower than expected growth can constrain the capacity of the FO to finance service provision and would require higher fees paid by USSL to compensate
  - There is also an assumed increase in both farmer productivity and the proportion of volume sold through the FOs without which FOs would generate a loss if it weren't for USSLs assistance
  - USSL can use their leverage over FOs to ensure that ongoing training and equipment are made available to famers. Mature FOs can be supported in implementing a warehouse receipt system
- Recommended next step is provided at the end of this section

3

# Crop insurance | Adding affordable crop insurance to the service package can benefit all stakeholders in the SDM



## Crop insurance for farmers

- Crop insurance is designed to reduce financial losses that farmers incur in years of poor harvests. Currently Tanzanian farmers have very low crop insurance coverage<sup>1</sup> and the Tanzanian government has prioritized farmers' access to insurance. For that to be successful, it is critical that the premiums are affordable and that the pay-out does not merely cover the loan principle, but also creates financial room for the farmer to purchase inputs required for the next season and cover other essential expenses
- In the context of USSLs SDM, the role of insurance would be to increase the willingness of FSPs to lend to FOs<sup>2</sup>: many farmers cannot prove the ownership of their land that would serve as collateral in obtaining loan funding from FSPs. Crop insurance combined with the existing market guarantee from USSL increases the value of the collateral available to farmers
- Although USSL does not benefit directly from the crop insurance, higher lending, better cashflow reduced repayment risk for the farmers should ultimately result in higher volumes from greater production and increased loyalty

**Recommended next step** is provided at the end of this section

Sources: 1) 3% of smallholder farmers have access to a loan that came with an insurance plan (CGAP (2016) – National Survey and Segmentation of Smallholder Households in Tanzania) 2) Interview with current FSP to USSL





# Farm Management System | Software can simplify and professionalise USSL's management of farmers and FOs

## Why is it important?

Side-selling has been identified as the main problem in the viability of this SDM. As a result, the design of services in this SDM has aimed at incentivizing loyalty by rewarding farmers and FOs on the basis of past performance. At the farmer-level, Champion Farmers and premium payments reward quality and volume. At the FO level, the benefits of graduating to SDM+ such as access to finance and discounted inputs reward FOs for meeting contractual obligations and compliance with regulation. To efficiently and effectively monitor performance at both the farmer and FO-level, an improvement to the current approach is expected to be beneficial but will come at a cost. [Recommended next step](#) is provided at the end of this section

Objective	Improve monitoring of farmer and farmer organization performance	Improve operational efficiency	Efficiently communicate with farmers and farmer organizations
Required FMS features	<ul style="list-style-type: none"> <li>✓ Digitization of farmer/farm profile (inc farm area and soil health)</li> <li>✓ Trace input usage at the farm</li> <li>✓ Farmer specific purchase records can track if farmer has reached a quota</li> <li>✓ Generate premium payments from meeting of certain parameters</li> </ul>	<ul style="list-style-type: none"> <li>✓ Crop information (e.g. sowing date, yield estimation, harvest management)</li> <li>✓ Mid-season yield forecasting</li> <li>✓ Can be used to disperse advance payments to SDM+ farmers</li> <li>✓ Monitoring field activities</li> <li>✓ Schedule periodic inspections</li> <li>✓ Field staff management</li> <li>✓ Financial services and payments can be integrated so there is oversight on buying and payment processes</li> </ul>	<ul style="list-style-type: none"> <li>✓ Two-way SMS communication with farmers</li> <li>✓ Export functionality to easily report on Champion Farmers and SDM+ FOs to maintain transparency towards farmers and FOs</li> <li>✓ Farmer specific purchase records can track if farmer has reached a quota</li> <li>✓ Credit scoring functionality</li> </ul>



# High value opportunities | Recommended next steps and eligibility for inclusion in Investment Proposal for TA funding

	Recommended next step	Eligibility for TA funding
<p><b>1</b></p> <p><b>Own trucks for transport</b></p>	<p>As the required investment is big, the recommended next step is to conduct a more detailed investigation into the costs and benefits of purchasing trucks as compared to other scenarios, as well as potential revenue streams from the trucks outside peak season</p>	<p>The costs related to the purchase of trucks is considered a CAPEX investment, which is not eligible for funding by IDH. USSL is therefore recommended not to include this cost in a potential Investment Proposal for TA funding by IDH</p>
<p><b>2</b></p> <p><b>Service provision by FOs</b></p>	<p>Work with the first FOs that reach SDM+ status to pilot a structure in which FOs support in the delivery of USSL services as well as additional service delivery, like ongoing training and equipment (shelling machines, ploughs, irrigation)</p>	<p>Two elements of this opportunity are potentially eligible for TA funding and can be included in an Investment Proposal:</p> <ul style="list-style-type: none"> <li>• Activities related to Cooperative formation and FO capacity building</li> <li>• Year 1 of related staff costs</li> </ul>
<p><b>3</b></p> <p><b>Crop insurance</b></p>	<p>Cooperate with the government to research the expected coverage and cost of insurance premiums. Based on that USSL is able to determine at which point in time an SDM(+) farmer will be able to afford insurance and can set up a pilot project</p>	<p>The staff costs (for year 1) associated with piloting crop insurance are potentially eligible for TA funding and can be included in an Investment Proposal</p>
<p><b>4</b></p> <p><b>Farm management system</b></p>	<p>Refine required FMS features; Identify potential FMS software that offers required features; Conduct a cost/benefit analysis</p>	<p>The staff costs (for year 1) and system costs associated with developing and implementing a Farmer Management System are potentially eligible for TA funding and can be included in an Investment Proposal</p>



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Overview of SDM stakeholders & objectives

Services, scale and organization of the SDM

Farm-level impact

Service entities

Financial analysis overall SDM

Conclusions

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

In this section you will:

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

**Annex**



# Annex I: SDM General Introduction & context

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

In this section you will:

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



# Service Delivery Models (SDMs)

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

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

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



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

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

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

## Service delivery models and the stakeholders that shape them are evolving



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



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



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



Innovative businesses emerge that develop solutions for optimizing service supply

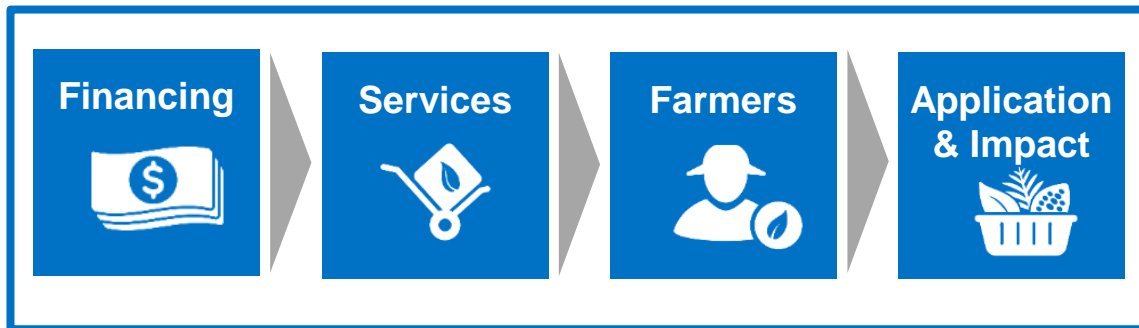


# Levels of SDM Analysis



## SDM Structure

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



Within this structure (financial) resources are invested

Those resources allow for a set of services to be delivered

These services are targeted at a (type of) farmer

The aim of these services is an impact at farm level

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

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

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

# Purpose of the SDM Analysis

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

## Focus learning questions

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

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

## IDH aims to create:

### Action driven analysis

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

### A learning community

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

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

## Individual SDM analysis:



Analyze SDM



Identify key success drivers



Identify enabling environment challenges



Identify opportunities for innovation



Evaluate funding needs

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

### Global knowledge hub

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

### Enabling environment

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

### Blended finance

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

### Technical assistance

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

# Annex II: Context

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

In this section you will:

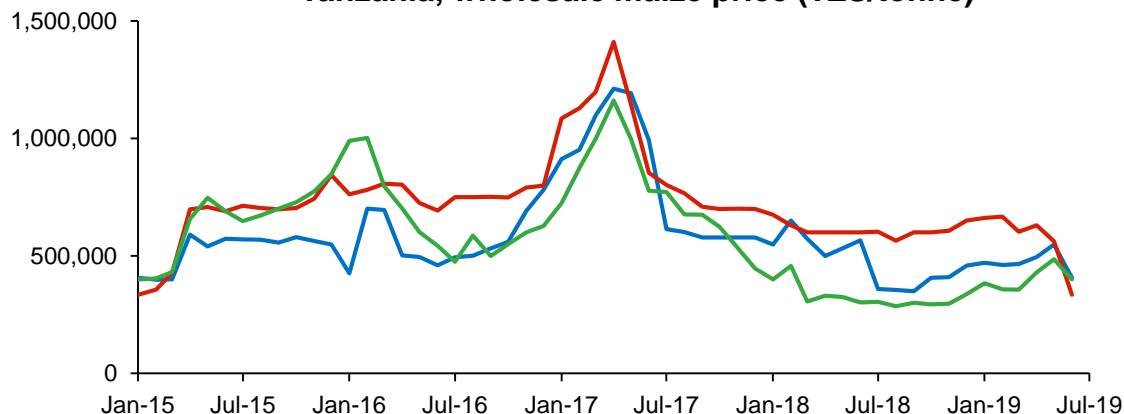
- ✓ Get insights on the development of the commodity sector and characteristics of the farmers in the region under study
- ✓ Get insights on the role of farmer organizations
- ✓ Understand the enabling environment in the region
- ✓ Get insights on the status of gender equity
- ✓ Get insights on the status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



# Context – developments in the maize sector

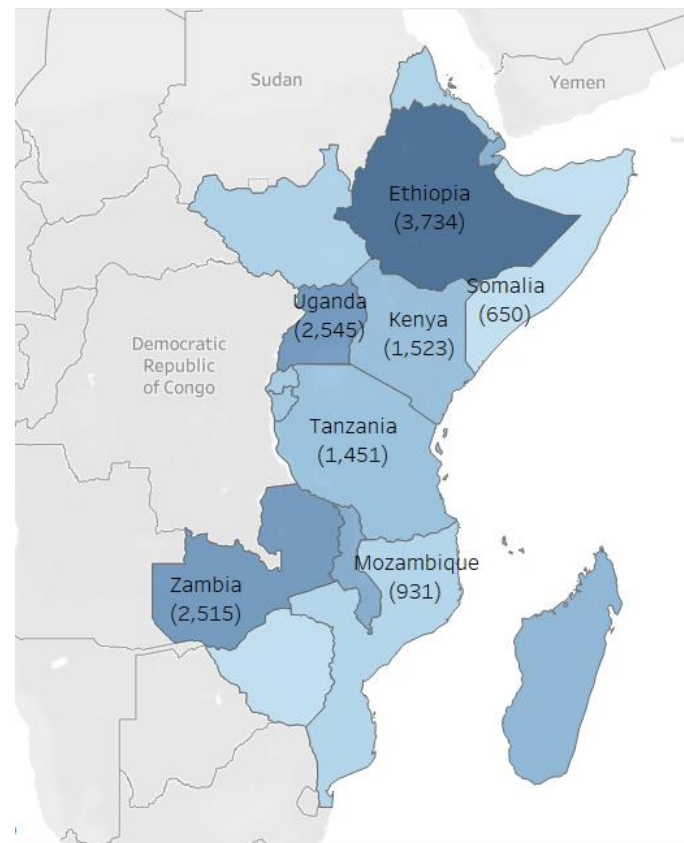
- Productivity levels are low at 1.5MT/ha. This compares negatively against nearby countries such as Ethiopia and Zambia that have yields of 3.7 and 2.5MT/ha respectively<sup>1</sup>. The potential average yield is estimated at almost 3x as much<sup>2</sup>
- The maize value chain consists of lots of intermediate players. Most marketed maize is delivered to local collection hubs by traders purchasing from farmers<sup>3</sup>. The disaggregated value chain often means farmers receiving a disproportionately lower share of the value
- Tanzanian maize prices generally reflect crop availability in the domestic market rather than being linked to international market pricing<sup>4</sup>. Maize prices in Tanzania experience significant fluctuations both on a year-on-year basis and within the year.
- Prices vary regionally and are usually the lowest in the major producing regions, while are the highest in urban and deficit markets<sup>5</sup>
- Control of the commercial maize market by several strong dealers and processors allows them to influence pricing<sup>3</sup>. This often means that prices are lowest at the time of harvest when most farmers are obliged to sell due to a lack of adequate storage facilities.
- However, the National Food Reserve Agency (NFRA) buys maize during major harvests, offering farmers a purchase price based on the estimated cost of production plus a 5% margin<sup>5</sup>
- The frequent use of export bans by the government with the intention of improving national food security contributes to such elevated levels of market volatility<sup>4</sup>. As a result, commercial players are averse to seeking large export contracts<sup>5</sup>

**Tanzania, wholesale maize price (TZS/tonne)<sup>6</sup>**



Sources: 1) FAOSTAT (2017); 2) Harvard Kennedy School/Technoserve (2017); 3) FAO (2015); 4) World Bank (2015) Tanzania Agricultural Sector Risk Assessment; 5) FEWS NET (2018); 6) FAO (2019) GIEWS FPMA Tool

**Regional productivity (kg/ha)<sup>1</sup>**



— Arusha - Northern Zone  
— Dar es Salaam  
— Iringa - Southern Zone

# Context – maize farmers in the SDM region



## The Farm

- Approximately 95% of Tanzanian maize farmers are smallholders producing around 80% of the country's maize<sup>1</sup>
- Average land sizes are relatively low with the typical Tanzanian maize smallholder holding land of approximately 0.7 hectares<sup>1</sup>
- The vast majority of these smallholders operate at a subsistence level with the majority of maize production (57%) consumed at the farmer level<sup>2</sup>
- However, farmer characteristics such as farm size and yield vary between the Northern and Southern areas of the country. Farmers in Southern Tanzania achieve yields that are similar to nearby countries, whereas those in Northern Tanzania underperform<sup>2</sup>
- Maize is usually grown under low input rainfed conditions. Tanzania has historically had a low level of fertilizer use with only 32% of smallholders using fertilizer<sup>3</sup>. Use of irrigation is often not available or selected for maize cultivation
- Use of improved seeds is also minimal; around 80% of seeds used by farmers are those that have been retained from the prior harvest<sup>1</sup>



## Household

- Maize is grown by 3.5 million farming households representing 60% of total Tanzanian farming households<sup>3</sup>
- Around half of the maize farming population is female, though women undertake the bulk of on-field labor with men more involved in commercial activities<sup>1</sup>. Furthermore, female-headed households are less than 20% of the total maize farming households
- The average ages of household heads are 42 and 48 years for male-headed households and female-headed households respectively. Limited participation of farmers in their 30s suggests a generational shift away from farming<sup>4</sup>
- Levels of education are low, with the average years of education around 5. Very few maize-farmers have completed secondary school<sup>5</sup>
- The average maize-growing household size is between 5 and 7. Around 80% of labor is supplied from within the household, with the remainder done by hired workers<sup>6</sup>



## Income

- Many households are completely dependent on farming, with less than a quarter recording other income sources<sup>7</sup>
- Gross margins from maize are low and are generally insufficient to provide a viable proposition for farm households – smallholder farmers make little or no profit from maize<sup>6</sup>
- A lack of market access for farmers makes farmers susceptible to exploitation by traders who capture a disproportionate amount of profit compared to farmers<sup>1</sup>
- 85% of Tanzanian smallholder households are below the poverty line of \$2.50/day, with 55% below the extreme poverty line of \$1.25/day<sup>6</sup>
- Low incomes and volatility of yield and prices mean that farmers have little incentive or ability to invest in inputs for subsequent seasons, resulting in a cycle of low productivity<sup>3</sup>

Sources: 1) FAO (2015); 2) IFPRI (2018) Measuring distortions along Tanzanian agricultural value chains; 3) Harvard Kennedy School/Technoserve (2017); 4) USAID/World Bank (2016); 5) World Bank (2015); 6) World Bank (2018) Smallholder impact evaluation of maize value chain development in Tanzania; 7) CGAP (2016)

# Opportunities and challenges in the enabling environment

## Impact of environment on SDM

P: Preventative

N: Neutral

E: Enabling

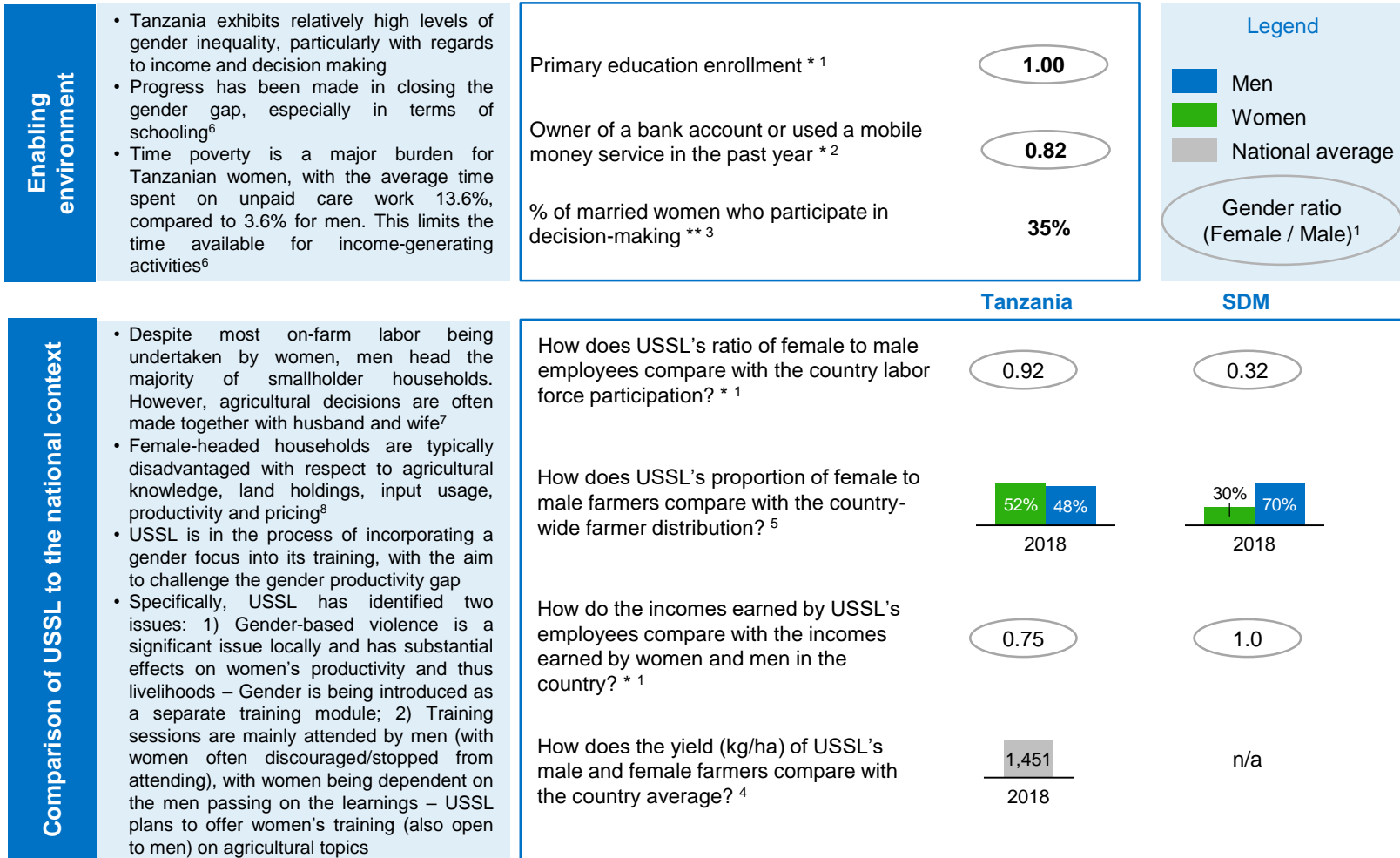
	Definition	Opportunities and challenges	Impact	Measures taken by SDM operator
Governance	<b>LAND OWNERSHIP</b> Existence of land ownership rights / regulations and their enforcement. Ease of purchasing/ transferring land	Many farmers have land usage rights but do not own the land outright (leases, communal etc). This creates uncertainty in land tenure and disincentivizes investment <sup>1</sup>	P	USSL aims to build the capacity of FOs such that they can invest in assets that can be used by their members
	<b>INFRASTRUCTURE</b> Existence and state of roads, water and electricity networks as well as proximity to main trading / processing hubs (e.g. access to market)	Rural, particularly last-mile, infrastructure is often inadequate translating into high transport costs. Access to electricity is also very limited <sup>1</sup>	P	USSL offers transport services to all FOs, ensuring that they adequate access to the market
Farm Inputs	<b>LABOR</b> Cultural norms that restrict /promote people of certain ages, genders or social groups from farm labor. Availability and cost of labor	Maize farming households are primarily male-headed and gendered distributions of resources and opportunities exist in the value chain <sup>2</sup>	P	USSL has incorporated gender equity and equality into its training curriculum
	<b>INPUTS &amp; FINANCING</b> Availability of affordable, quality inputs and the necessary marketing and distribution mechanisms. Availability of credit. Enabling regulatory environment	Banks are willing to provide finance to farmer groups with off-take contracts and a track record of meeting contractual requirements. There is limited appetite for direct-to-farmer lending <sup>3</sup>	E	USSL provides off-take contracts and engages in partnerships with financial institutions to improve access to credit for FOs
Crop	<b>TRADING SYSTEM</b> Organization of the system through which crops are traded from farmer to market, including the number and type of actors involved	Value chain is disaggregated and disorganized with lots of small players. Improved market information systems and linkages represent development opportunity <sup>1</sup>	P	Off-take contracts eliminate the need for traders and intermediaries.
	<b>PRICING &amp; COMPETITIVENESS</b> Market dynamics of the main crop of the SDM, including competition between buyers and possible price-setting by the government or other parties	Tanzania's competitive prices create significant export opportunities. Yet, government intervention (e.g. export bans) struggle to balance improving incomes and food security <sup>4</sup>	N	USSL guarantees a minimum price for maize to reduce the exposure of farmers to price volatility
Sustainability	<b>ENVIRONMENTAL RISKS</b> Climate change, possibility of extreme weather, soil type, water supply and quality, pests and diseases. Potential environmental damages such as deforestation	The main hazards affecting Tanzanian agriculture are droughts and floods. Unpredictability and variability in rainfall has significant effects on productivity <sup>3</sup>	P	USSL aims to source from both the Northern and Southern regions. With both operating on different rainfall patterns, this limits exposure to weather
	<b>SOCIAL CONTEXT</b> Availability and quality of schooling / healthcare. Cultural factors. Potential social externalities like child labor, gender disparity	Trust within the value chain is limited. The value chain is characterized by limited information and goodwill between farmers and buyers <sup>1</sup>	P	USSL uses a weighing system to ensure farmers receive a fairer price for produce. Premiums are used to incentivize loyalty

Sources: 1) FAO (2015); 2) USAID/World Bank (2016); 3) Harvard Kennedy School/Technoserve (2017); 4) World Bank (2015)






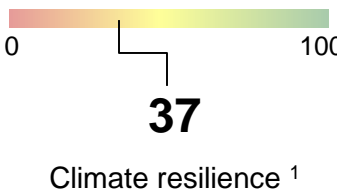




# The status of gender equity in Tanzania and the SDM



\*Divide female indicator by male indicator to get ratio. A ratio of 1 indicates parity between the sexes; a ratio between 0 and 1 typically means a disparity in favor of males; whereas a ratio greater than 1 indicates a disparity in favor of females. \*\*Own health care, major household purchases, and visits to family or relatives  
 Sources: **1)** World Economic Forum (2016): Global Gender Gap report; **2)** World Bank (2017): Global Findex; **3)** USAID (2016): Demographic and Health Survey; **4)** FAO (2018): Global Crop Database; **5)** World Bank (2018) online database. Retrieved from <https://data.worldbank.org/indicator/SL.AGR.EMPL.FE.ZS?view=chart>; **6)** UNDP (2017) Tanzania Human Development Report; **7)** CGAP (2016) National Survey and Segmentation of Smallholder Households in Tanzania; **8)** USAID/World Bank (2016) The effects of gender on Maize production and marketing in Southern Tanzania



# Environmental resilience of farmers in the SDM

	Indicator	Discussion	SDM Risks & opportunities
 <p><b>Climate resilience</b></p>	 <p>37 Climate resilience <sup>1</sup></p>	<p>Ranked 149 in the world, Tanzania is assessed to be low in climate resilience. Tanzania has challenged by a high vulnerability to climate change (55%), coupled with a low readiness to adapt to such challenges (29%). Significant levels of investment and innovation are needed to improve better prepare the country</p>	<ul style="list-style-type: none"> <li>• Year-on-year changes in yield due to climate have material impacts on USSLs ability to source from FOs</li> <li>• Coupling crop insurance with loans may be an approach to improve the climate resilience of farmers</li> </ul>
 <p><b>Soil</b></p>	<p><b>Moderate soil deterioration through water erosion and chemical deterioration</b> <sup>2</sup></p>	<p>The Northern regions (Arusha and Kilimanjaro) suffer from soil deterioration from water erosion meaning the frequent loss of topsoil. The Southern regions also experience moderate soil deterioration from water erosion but also through chemical deterioration</p>	<ul style="list-style-type: none"> <li>• Intercropping with legumes could improve soil fertility</li> <li>• USSL is integrating training on diversification into its training curriculum with the future intention of sourcing beans from farmers on a commercial basis</li> </ul>
 <p><b>Water</b></p>	<p><b>High to extremely high risk</b> <sup>3</sup></p>	<p>Both Northern and Southern regions experience significant water risk. This is particularly driven by poor access to drinking water, insufficient sanitation and substantial drought risk. Maize is often farmed due to consumption preferences over more drought-resistant crops</p>	<ul style="list-style-type: none"> <li>• In this SDM, farmers in the North with access to a watershed are able to participate in both rainy seasons unlike other farmers</li> <li>• However, differing regulations often mean that many farmers in close proximity to a watershed have no guarantee over their ability to use it for irrigation purposes</li> </ul>
 <p><b>Agro-ecosystem</b></p>	 <p>7.0 Human footprint <sup>4</sup></p>	<p>Tanzania has a medium environmental footprint, with the key regions for the SDM in the North and South slightly higher than the national average. Since 1993, both areas have seen a decrease in environmental impact</p>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>

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

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

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

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



# Annex III: KPIs and data

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

In this section you will:

- ✓ Get an overview of the service-specific KPIs used in the analysis for both farmer and SDM operator
- ✓ Get an overview of data sources used to carry out the analysis
- ✓ Get an overview of key assumptions for farmer analytics



# Service KPIs

## Training



Days of training per farmer (year 1)	3
Farmers per training	50
Method of payment for training (free of charge, upfront by farmer, on credit)	Free of charge
Training to be certified (yes/no)	No
Method of training (individual, groups, lead farmers)	Group

## Transportation



Total cumulative volumes transported by FOs (reimbursed)	Not disclosed
Total cumulative volumes picked up from collection center	Not disclosed
Total cumulative volumes picked up from FOs	Not disclosed

## Finance (SDM+)



Average time in months until a loan is repaid	6
Monthly interest rate charged	1.67%

## Mobile drying service



Average service use per year	6
Average load per usage	20MT

## Organizational support



Lead farmers per FO	3
Lead farmer allowance (TZS/year)	20,000
Local government fees covered by USSL (TZS/MT)	15,000

## Inputs



Total cost of fertilizer (per unit) incurred by service provider	150,000TZS
Margin on fertilizer	6%
Total cost of crop protection (per unit) incurred by service provider	5,000TZS
Margin on crop protection	10%
Discount provided to SDM+ FOs	7.5%
Method of payment for inputs by farmers (free of charge, upfront by farmer, on credit)	Upfront by farmer

Sources: Management interviews



# Data sources

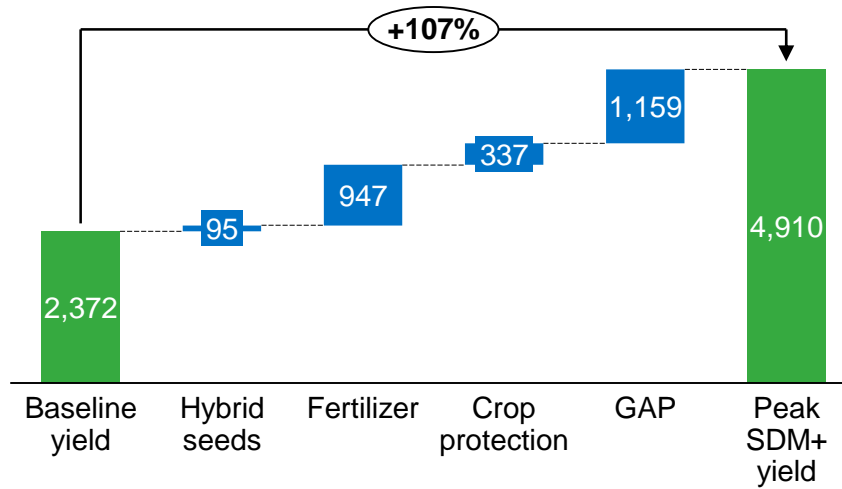
	Data categories	Data collection method	Primary data source(s)	Historic (frequency)	Forward-looking	Key issues	Sensitivity analysis
Agronomic assumptions	Productivity	Starting and potential productivity levels were provided by USSL's agronomist. The impact of inputs and GAP on productivity was sourced from literature.	Agronomist estimates; FAO (2016) - Smallholder productivity under climatic variability: Adoption and impact of widely promoted agricultural practices in Tanzania	N/A	5 years	Single data source for starting and potential productivity. Almost completely assumption based	◀
	Quality	Collected from USSL in interviews	USSL estimates	N/A	5 years	Forward-looking numbers only assumption based	
	Price			N/A	Fixed	Price is historically volatile	◀
	Labor costs	Calculated from USSL's production cost estimate spreadsheet for North, Literature for South	Northern Zone Production Costs spreadsheet; FAO (2015) - The Maize Value Chain in Tanzania	2018/19	Fixed	No estimate of % of labor needs covered by household	
	Input costs			2018/19	Fixed	Variation between North & South	
	Other costs			2018/19	Fixed	Loan sizes could grow over time	
SDM assumptions	Scale	Historical collected from USSL database, projected from USSL management	USSL Database; FO Profile North; USSL estimates	2018-19	2019-2023	FO attrition rate could have substantial impact	◀
	Overhead costs	Data inputted directly by USSL	USSL accounting records	2018,2019 (monthly)	2019-2023	Growth in staff numbers is assumed	
	Service specific costs & revenues	Collected from USSL in interviews	USSL estimates	N/A	2019-2023	Several are assumption based	
	Adoption & loyalty rates	Required loyalty rates determined from USSL, assumed loyalty rates estimated by IDH	USSL estimates; IDH assumptions	2018	2019-2023	Highly assumption based	◀
	Commercial margins	USSL estimates	USSL estimates	2018/19	Fixed	Can vary due to the season	



# Key assumptions for farmer analytics – North 1

	Baseline	SDM	SDM+
Harvests per year	1		
Starting farm size (ha)	0.6		
Starting yield (kg/ha)	2,372	3,378	4,591
Peak yield (kg/ha)	2,372	4,141	4,910
Crop protection expenses (\$ per farm)	0	42	48
Fertilizer expenses (\$ per farm)	0	49	90
Seed expenses (\$ per farm)	0	31	28
Average labor expenses (\$ per farm)	84	121	143

Production differences by segment (kg/ha)



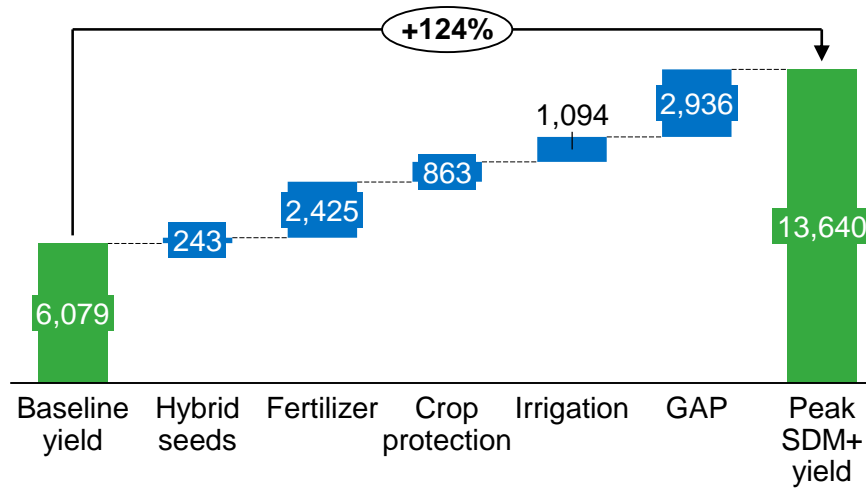
Sources: xxx



# Key assumptions for farmer analytics – North 2

	Baseline	SDM	SDM+
Harvests per year	2		
Starting farm size (ha)	0.6		
Starting yield (kg/ha)	6,079	9,069	12,838
Peak yield (kg/ha)	6,079	10,891	13,640
Crop protection expenses (\$ per farm)	0	73	84
Fertilizer expenses (\$ per farm)	0	85	156
Seed expenses (\$ per farm)	0	53	49
Average labor expenses (\$ per farm)	200	284	351

Production differences by segment (kg/ha)



Sources: xxx

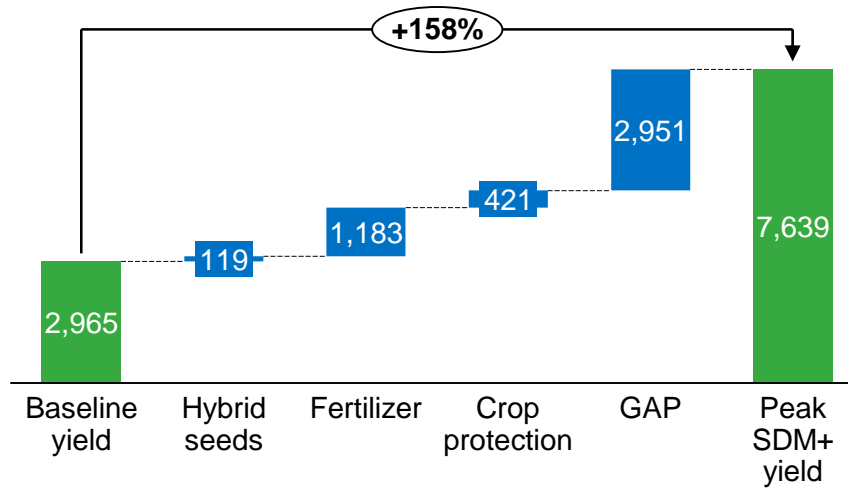




# Key assumptions for farmer analytics – South

	Baseline	SDM	SDM+
Harvests per year	1		
Starting farm size (ha)	1.2		
Starting yield (kg/ha)	2,965	4,403	6,761
Peak yield (kg/ha)	2,965	6,384	7,639
Crop protection expenses (\$ per farm)	0	47	54
Fertilizer expenses (\$ per farm)	0	111	205
Seed expenses (\$ per farm)	0	43	39
Average labor expenses (\$ per farm)	160	214	258

Production differences by segment (kg/ha)



Sources: xxx



# Key assumptions for SDM operator analytics

SDM farmers	
Exchange rate	2,299.5TZS : 1 USD
Scale at time of engagement (# farmers)	5,000
Scale at time of engagement (# of famer organizations)	31
Scale at end of SDM analysis period (# farmers)	19,907
Scale at end of SDM analysis period (# of famer organizations)	68
Adoption rate (training, org support, transportation)	100%
Adoption rate (mobile drying service)	0-40%
Adoption rate (inputs SDM)	0-90%
Adoption rate (inputs SDM+)	0-71%
Starting loyalty rate	42%
Ending loyalty rate	67%
Attrition rate of FOs	5%
Growth rate of farmers per FO	10%

**Sourced volumes (MT)**

- Assumed volumes
- Demanded volumes

Year	Assumed volumes (MT)	Demanded volumes (MT)
2018	~100	~150
2019	~200	~250
2020	~350	~450
2021	~550	~700
2022	~800	~1000
2023	~1200	~1500

Sources: xxx



# Annex IV: Glossary

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





## Standard glossary (2/2)

Acronym	Meaning
<b>Learning Questions</b>	Those questions that drive the analysis of the SDM; the key things IDH or the case partner wants to know out of this specific case
<b>Loyalty</b>	The percentage of total farm production volume sold by the farmer to the buyer in the SDM
<b>NGO</b>	Non-governmental organization
<b>P&amp;L Analysis</b>	A profit and loss statement summarizing the main revenues, costs and expenses incurred during a specific period of time during SDM operations
<b>Post-harvest handling (PHH)</b>	Stage of crop production immediately after harvesting that includes drying, shelling, cleaning and packing
<b>Remote data collection</b>	The iterative process of collecting readily available SDM data from the SDM Operators, both before and after the field trip
<b>ROI</b>	Return on Investment
<b>SDM Database</b>	Collection of aggregated data from all case studies, with the aim to identify broader lessons long-term trends
<b>SDM Snapshot</b>	Overview of SDM objectives, Theory of Change, entities and services
<b>Segment (Farmer-)</b>	A group of farmers that is a sub-set of the total population within an SDM, sharing certain characteristics
<b>Sensitivity Analysis</b>	Analysis to determine how different values of an independent variable impact a particular dependent variable under a given set of assumptions
<b>Service Delivery Model (SDM)</b>	Supply chain structure which provides services such as training, access to inputs and information to farmers in order to increase their performance and sustainability
<b>Service Provider (SP)</b>	Organization that delivers one or more services (e.g. training, inputs, access to finance) to the farmer
<b>Services</b>	List of services to be delivered to farmers in order to attain SDM objectives (e.g. Certification, crop diversification, training)
<b>Theory of Change</b>	Overview of the process of change of the SDM towards achieving the desired outcomes
<b>Tool</b>	An Excel-based tool used to model an SDM's economic sustainability (P&Ls) for the farmer, service provider, and investor.

