

A photograph of a soybean field with green leaves and a blue sky with light clouds. The image is used as a background for the slide.

# Mozambique's Soy Value Chain: Review of development to date and future opportunities

MAPUTO, NOVEMBER 2018



# Background to ISP and project objectives

**TechnoServe has been supporting soybean agriculture in Mozambique for the last 8 year, creating a tangible impact across the value chain.**

**Following the 2014 Soybean ISP, the current study aims to provide an holistic value chain update, focusing on:**

- **Evaluating the impact of TechnoServe's so-far efforts**
- **Developing a vision for the local soy processing industry**
- **Identifying and accessing the feasibility of priority interventions**

## Deliverables

The full ISP comprises the following deliverables:

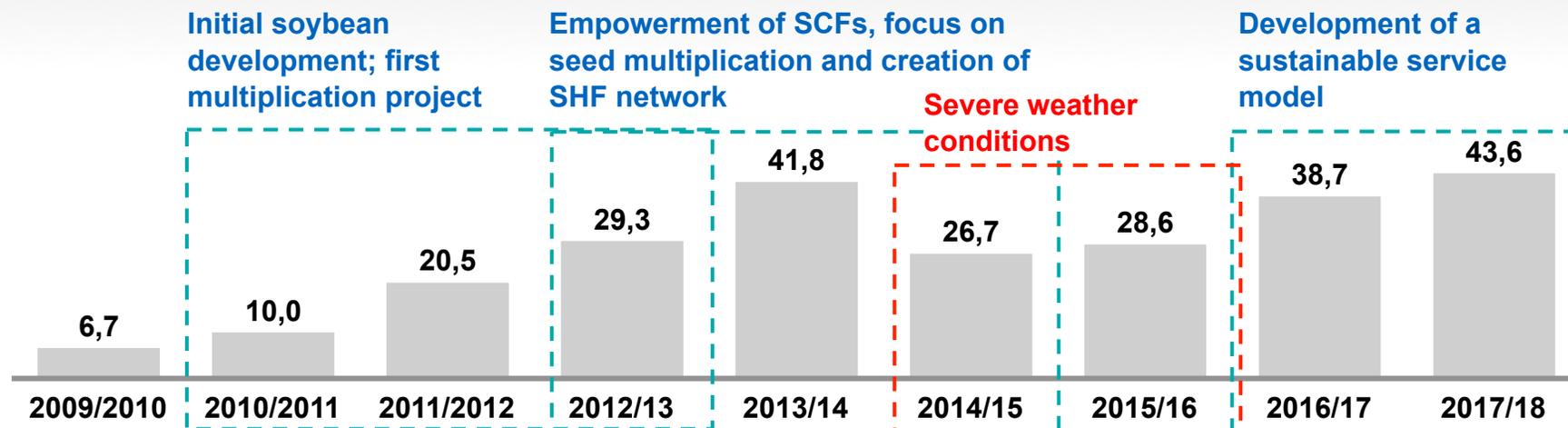
- Update on soybean production, related costs, and required inputs
- Market demand for soy products
- Overview of trade/exports
- Learnings from other countries
- Future vision for the industry
- Action plan/ Interventions

## Methodology

- Two full-time Fellows were allocated for this project, with the support of a team manager
- The Fellows have travelled around the country and in Malawi, interviewing current and potential stakeholders
- The ISP started in mid-August and took 3 months of work

# TNS support to soy industry over the last decade has been focused on developing a sustainable and replicable system of service provision to SHFs

Soybean production, 2012-18, '000 MT



**2005-2010**

- TechnoServe poultry project
- created a new local demand for soybeans

**2010 – 2013**

- TechnoServe - Bill and Melinda Gates Foundation project
- increased soybean production and started first seed multiplication project in the area

**2012 - 2015**

- TechnoServe - Embassy of the Kingdom of the Netherlands (Dutch) project
- creation of a group of strong Small Commercial Farmers (SCFs)
- established the cooperative COPAZA

**2016 - 2018 Production,**

- TechnoServe Dutch project 2nd phase
- improved the cooperation between SCFs and SHFs
- assisted in the creation of seed company SBS

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**1** Soy industry overview

**2** Market demand for soy products

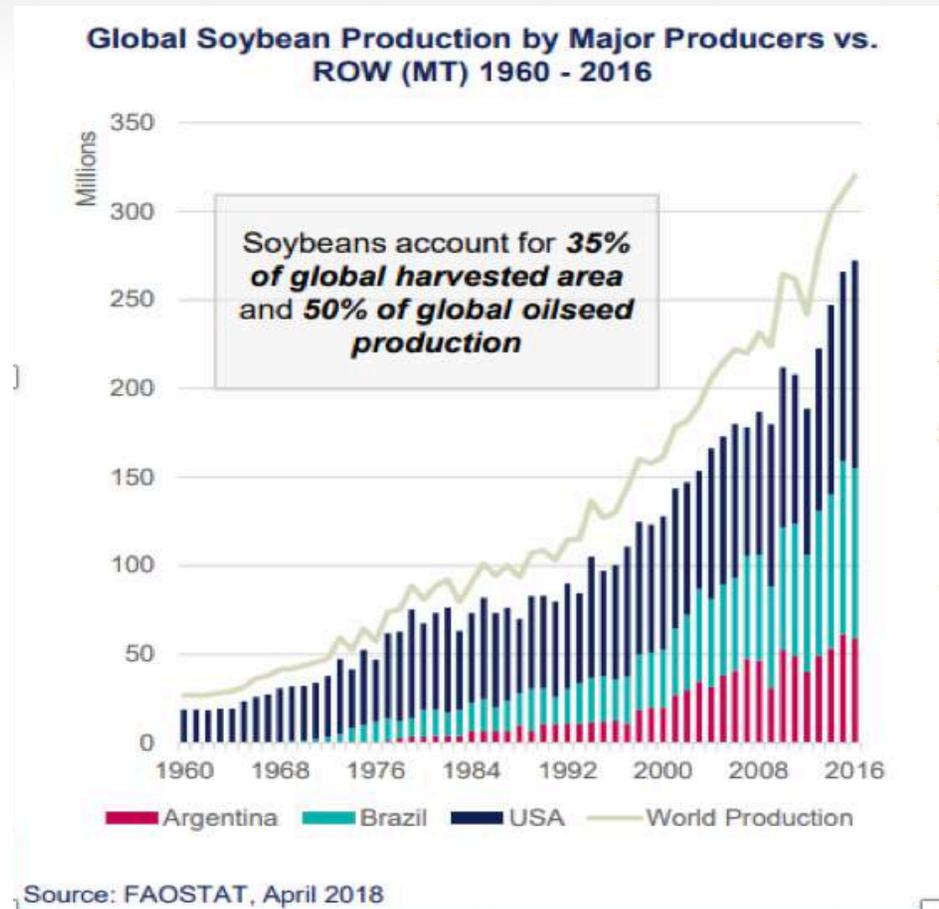
**3** Vision and key intervention areas



Global soybean production has grown rapidly over the last several decades, but Sub-Saharan Africa is still a marginal producer (<1%)

### Growth drivers

- Demand growing with
  - Poultry & livestock consumption
  - China, increasing incomes and policies
  - Global population growth
  - GDP increase
  - Global trade policies
- Production growing with
  - Improved genetics
  - New land opening up
  - Increased yields, farm size and advancement of farming techniques



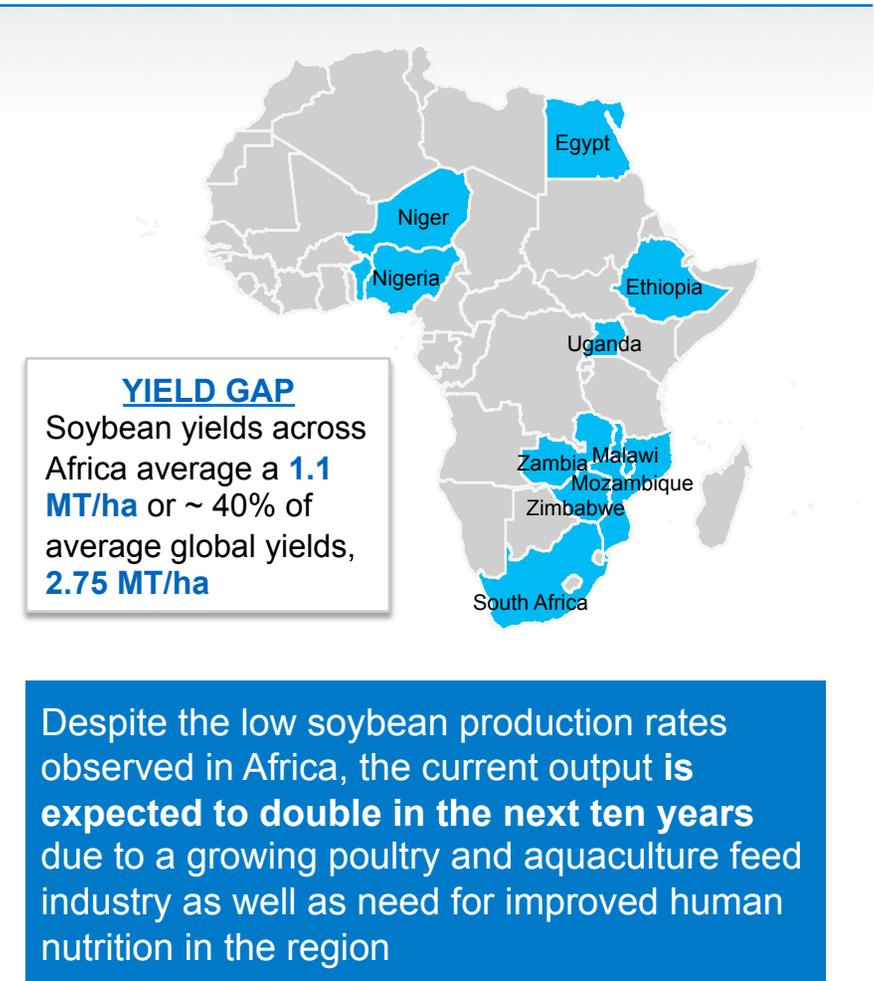
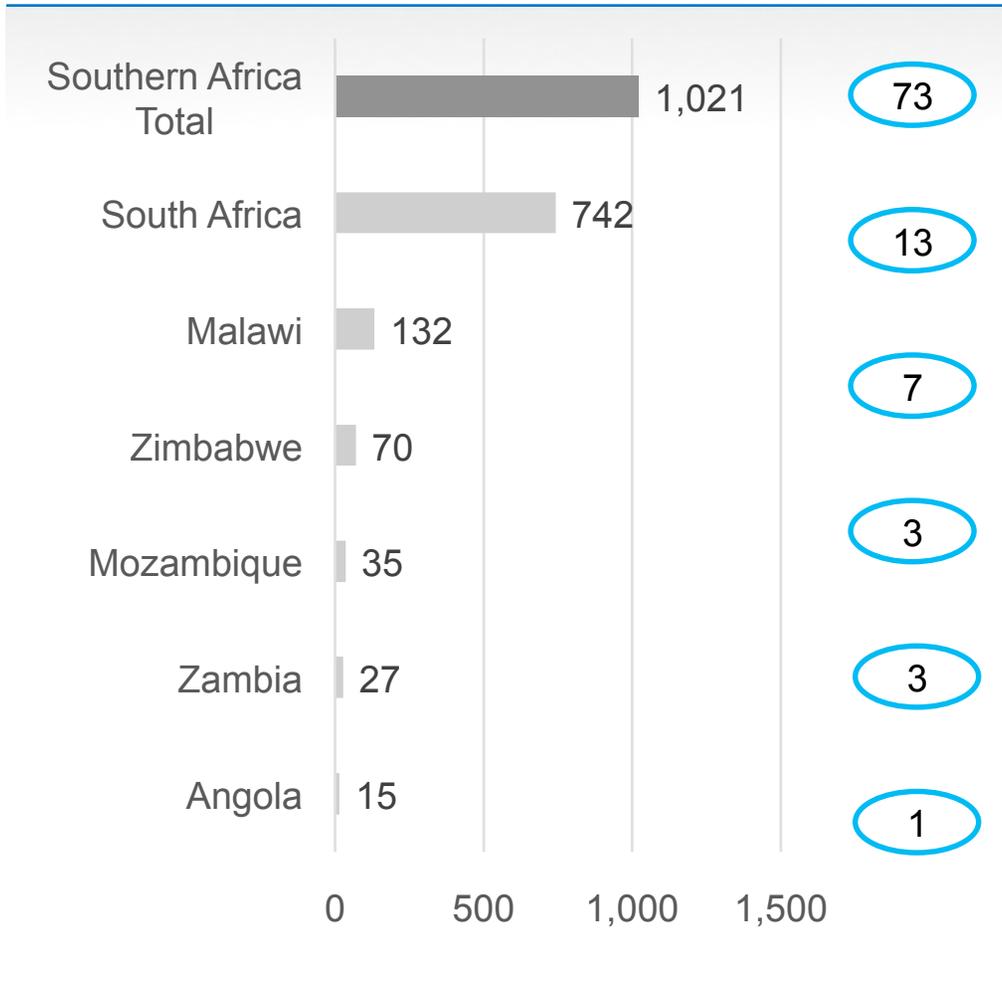
**Sub-Saharan Africa represents 0.6% of the global soybean output**

# Southern Africa produced 1,021 MT in 2016, with South Africa making up almost three-quarters of production

x Share of region, %

**Southern Africa Soybean production, 2016**  
Thousand MT

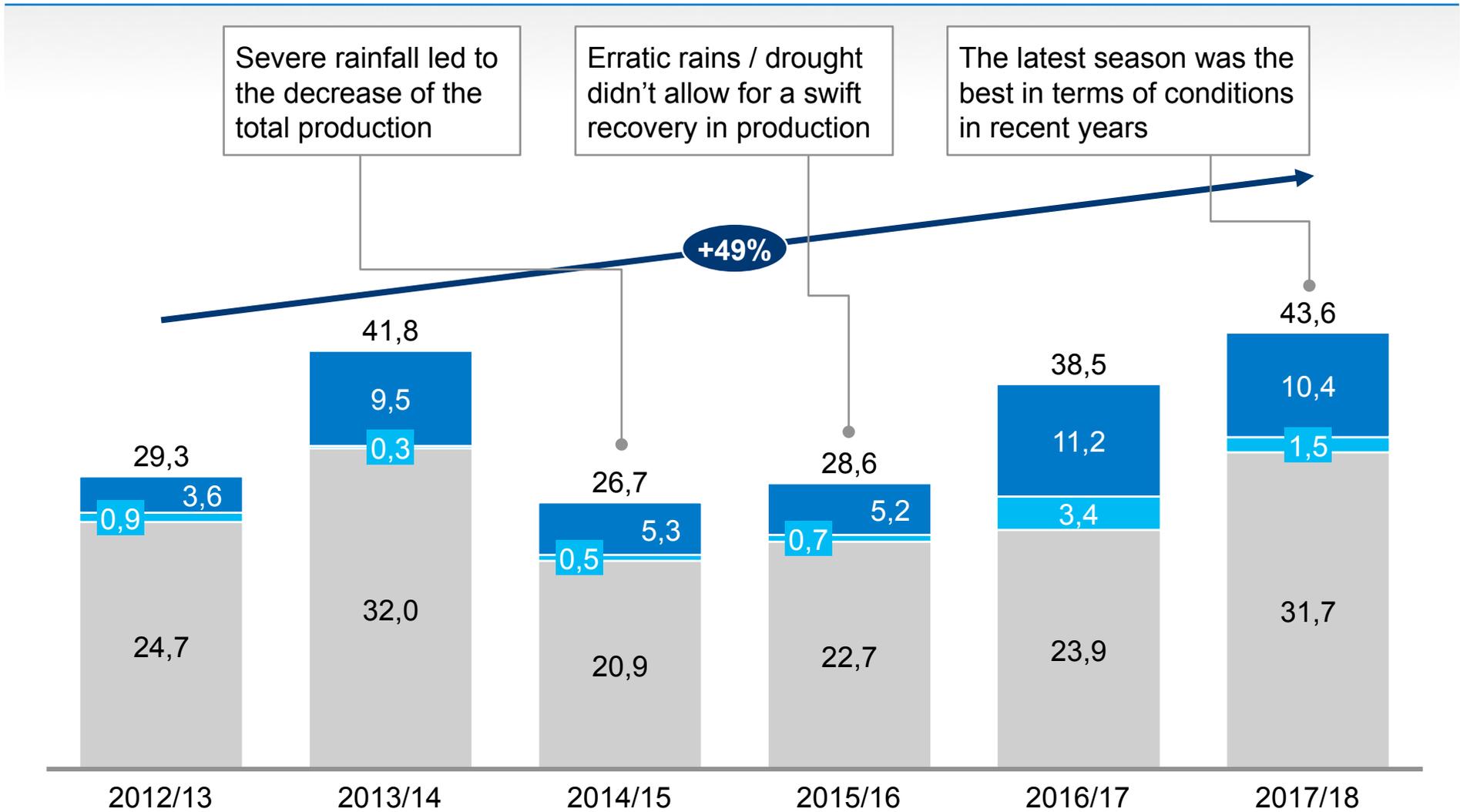
**Countries with production >25 thousand MT, 2016**



# Mozambique's production is dominated by SHFs and has increased steadily to 47,000 MT, despite very challenging weather conditions in the last years

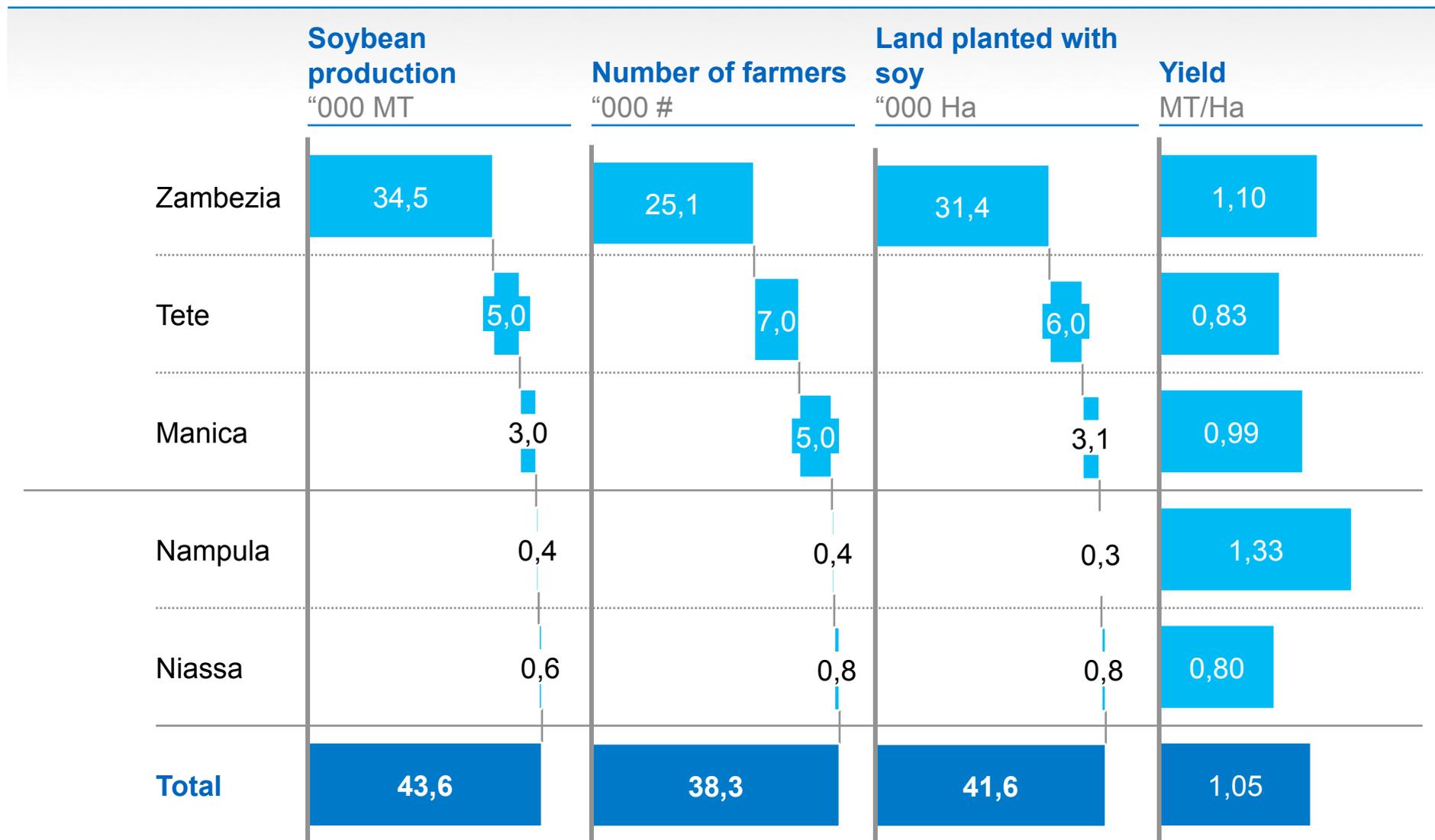
Soybean production, 2012-18, '000 MT

■ ABP ■ SCF ■ SHF



~80% of the total production comes from the region of Zambezia, while the region has one of the highest yields

Soybean production, number of farmers, land and yield by province 2017/18

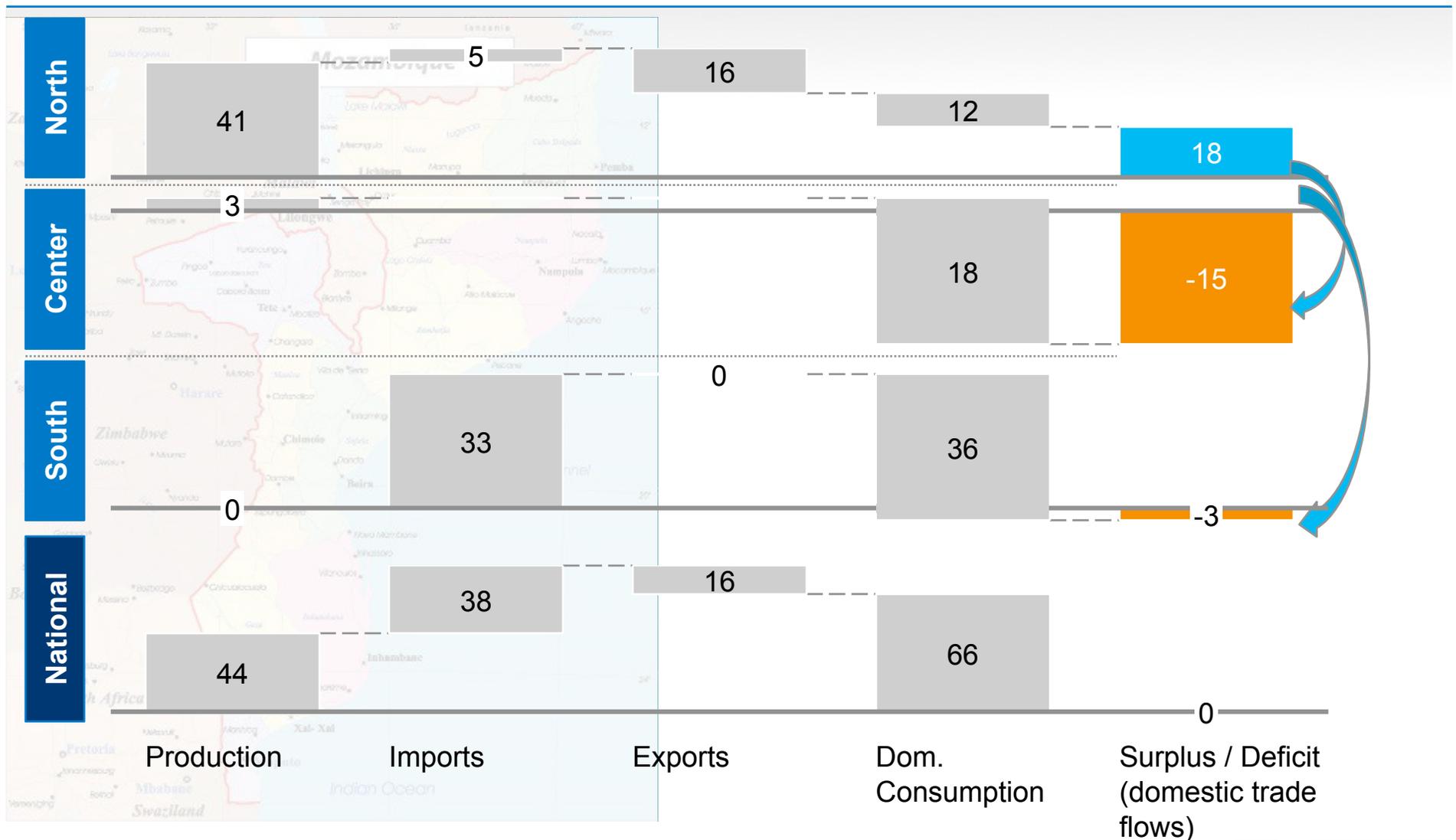




A regional breakout reveals that the North/Center region exceeds its demand through production, while the South has a huge deficit

PRELIMINARY

**Regional Breakout of Soybean Production and Demand,**  
2018 estimates, 000 MT



SOURCE:AMIA, Interviews with stakeholders, 2018

There is very limited north-south trade; in fact, soybeans can be transported to Lilongwe and India more cheaply than to Maputo



Route	Gateway	Approximate Cost (\$/MT)
Gurie - Chimoio	▪ Border - truck	2.5K – 5K
Gurie – Mumbai	▪ Nacala Port	<3K
Angonia - Lilongwe	▪ Border - truck	<2K
Gurie - Maputo	▪ Border - truck	>5K

In the last years, there has been also an increase in the costs for transportation from the North and Center of the country to the South

This impedes efforts of southern processors to source from the center of the country (mainly Ab. Atunes solvent extraction processing plant), due to increased cost

# Despite rapid growth, the industry continues to face challenges along the value chain



- Limited understanding of SHFs of importance of quality seed
- Inability to afford access to quality seed, inoculants, fertilizers and irrigation for most SHFs
- Sub-optimal agronomical practices
- Limited access to mechanization
- Absence of final product certification for soybeans
- Lack of availability of qualified labor
- Aggregation costs from many SHFs are high and currently inefficient
- High cost of transport from North to South
- Lack of storage and warehousing options can affect the quality of the final soybean product
- Lack of transparency on farm-gate prices
- Volatile / high price of raw material (influenced by global demand / exporters) makes operations less competitive
- Lower quality of local soybeans
- Sub-scale operations
- Currently no processing for human consumption
- High cost of transport from North to South
- Competition from imports

## 7 Enabling environment



- VAT-free and Duty-free import of soy cake makes it harder for producers in north to sell to southern processors
- Limited access to finance
- Limited Government extension services
- Limited R&D in seed / technologies

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1 Soy industry overview

2 Market demand for soy products

3 Vision and key intervention areas



The following section assesses the market opportunity for Mozambique in key soy products



① Soycake

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② Soy oil

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③ Other soy products

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- CSB / fortified porridge

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- Soy chunks

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- Soy milk / yoghurt



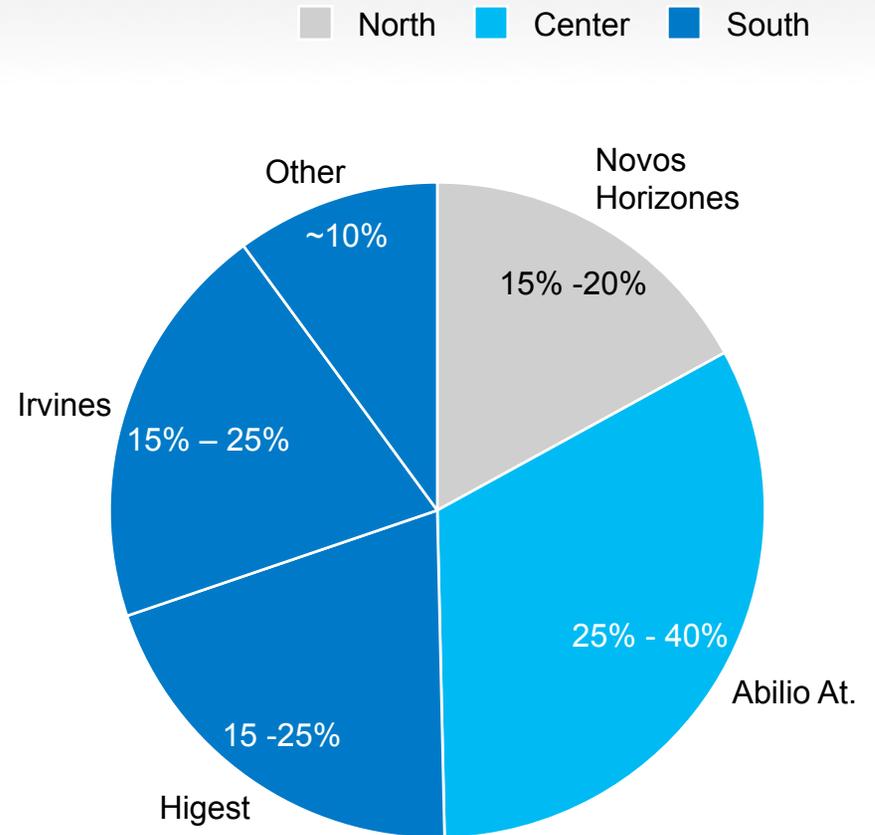
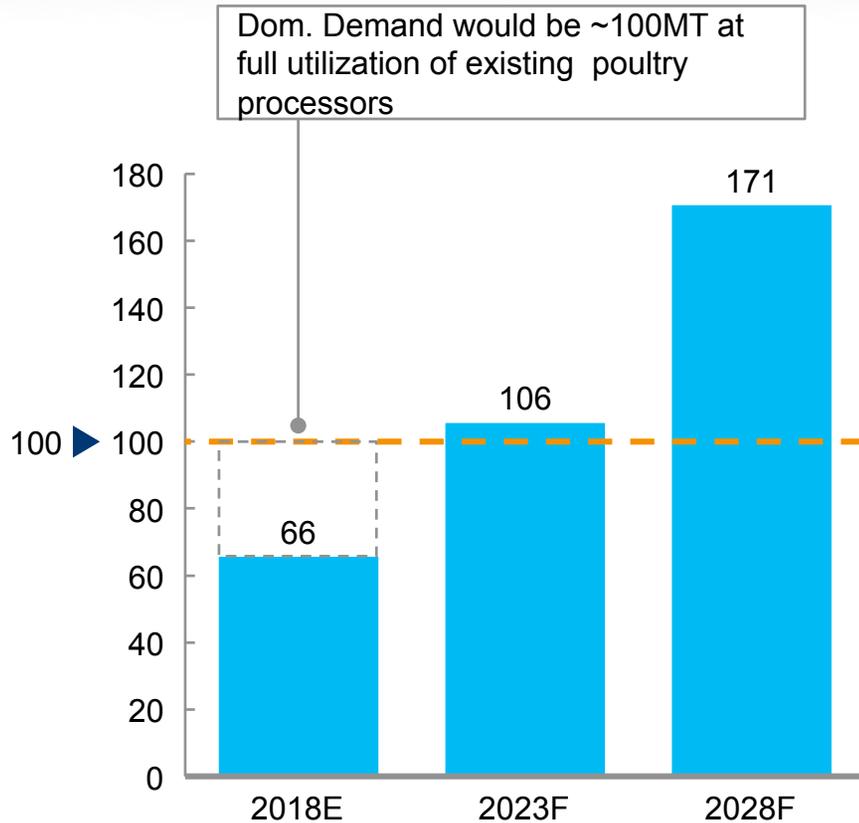
# The projected growth in the poultry sector translates to increasing demand for soycake, though about 50% of that demand is in the south

Soycake demand can grow up to 10% p.a. in line with overall poultry market growth

- Soy cake
- Soy Oil
- Other soy products

Domestic soybean demand by player<sup>2</sup>  
Estimates %

Projected demand for soycake, 000 tons soybeans,



1 Technoserve Interviews with Poultry players stakeholders, Historic analysis of past years' growth rates, AMIA

2 Source: IGC poultry industry study for 2016, figures may differ in reality

### 3. MARKET DEMAND: SOYCAKE

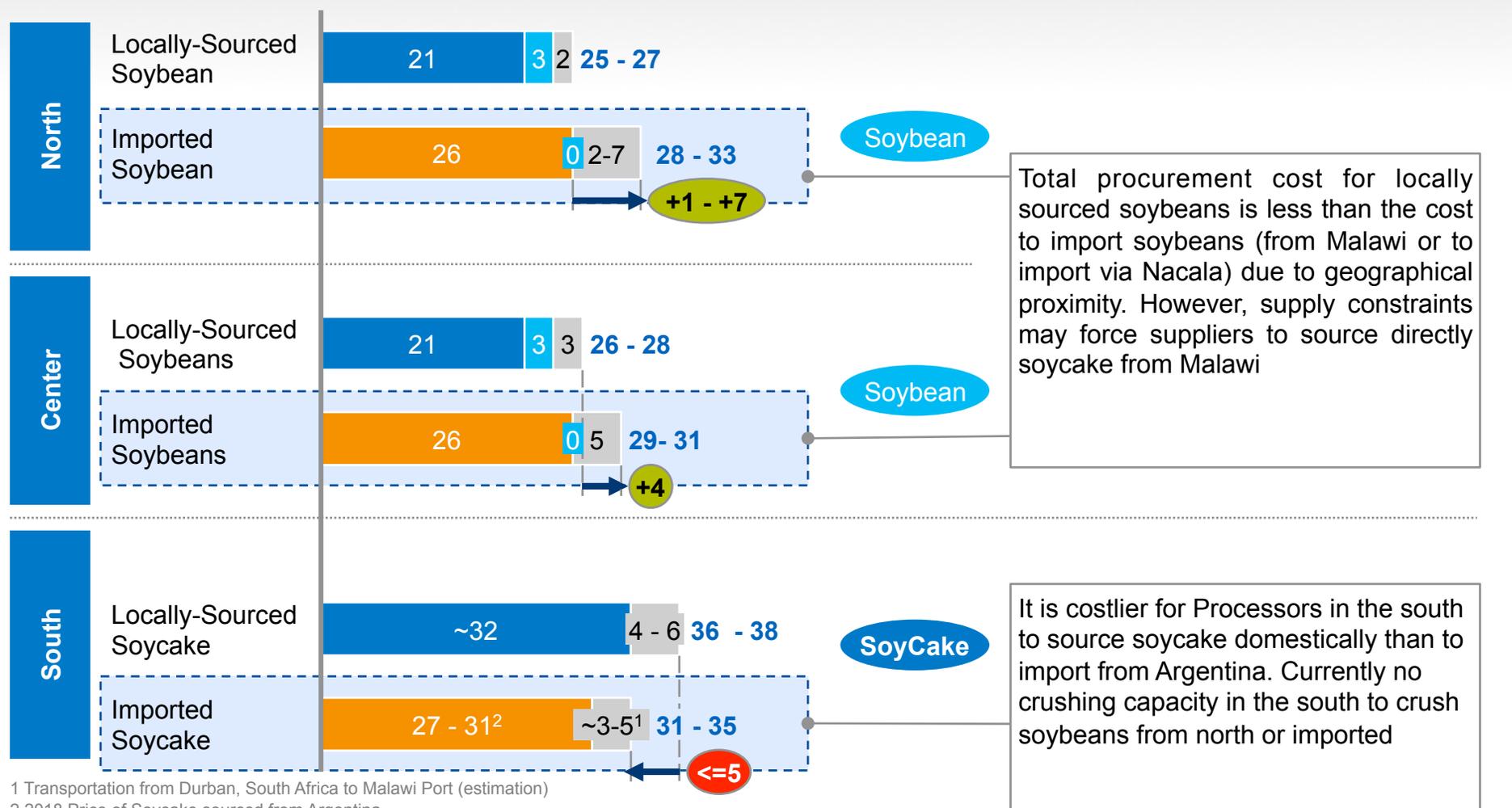
 Soy cake  
 Soy Oil  
 Other soy products

At current farm gate and import parity prices, southern processors prefer to import soycake (although local processing is competitive in the north)

Regional prices for domestic and imported soybeans and soycake, 2017 - 2018, '000 MZN /MT

Main product traded

 Preferred choice  
 Farmgate price  
 Transport Cost  
 Traders Cost  
 Import Price



1 Transportation from Durban, South Africa to Malawi Port (estimation)  
 2 2018 Price of Soycake sourced from Argentina

In addition, quality, consistency and other production related issues have prevented southern processors from buying local

## soybeans Key challenges identified

### Quality issues

- There have been observations for **soybeans falling below quality standards in certain properties** affecting the conversion ratio as well as the solubility of the soycake by - product:
  - Purity
  - Size
  - Humidity

### Supply challenges

- Poultry Players require a consistent supply of processed soycake throughout the year**, in order to minimize the needs for working capital, **and therefore a consistent supply of soybeans, which can only be attained by sourcing from intermediaries and** not directly from farmers

### Aggregation and batch management

- Domestic production in Mozambique is scattered; the latter is a source of disruption for feed mix processing because **processors have to test, aggregate multiple batches of soybeans** and adjust their formula accordingly

### Lack of Crushing facilities

- In the Maputo region, **the vast majority of feed players do not have extruders, expellers or solvent extractors**; thus their only option would be to source directly either domestically (few crushing players in the region) or from abroad

## Key takeaways: soy cake opportunity



### Key takeaways from stakeholder discussion

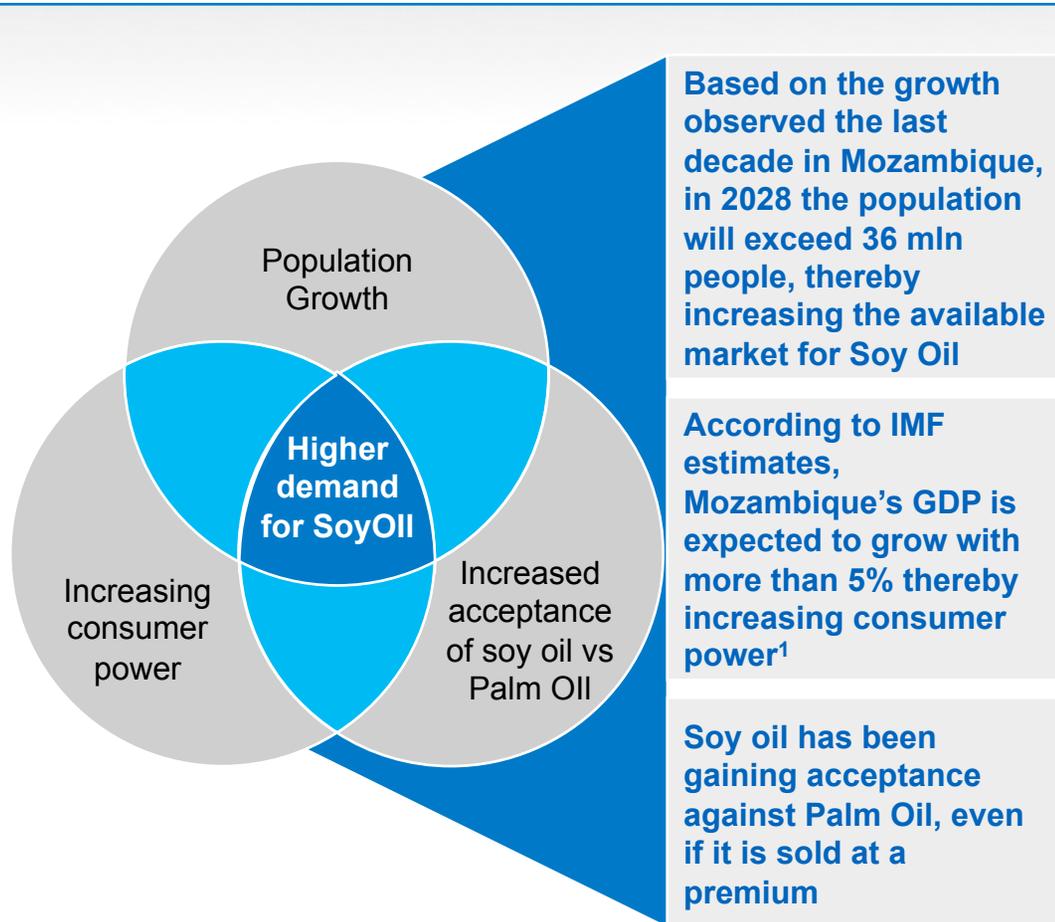


- **There is an opportunity for domestic soybean production to grow significantly, if the South starts to buy domestically**
- **Quality issues can be addressed** if the poultry industry in the south and the processors establish a **continuous communication** and start exploring **sourcing options**; certification schemes could also help in that direction
- Southern processors would be willing to explore buying soycake locally, if **quality issues are resolved** and if the **cost including transport can match the imported price**; **current market conditions do not allow increases in consumer price** due to increasing market pressure from poultry imports
- **VAT free and Duty-free imports of soycake should be re-examined** as this measure has taken a toll on the competitiveness of the local soycake processing industry

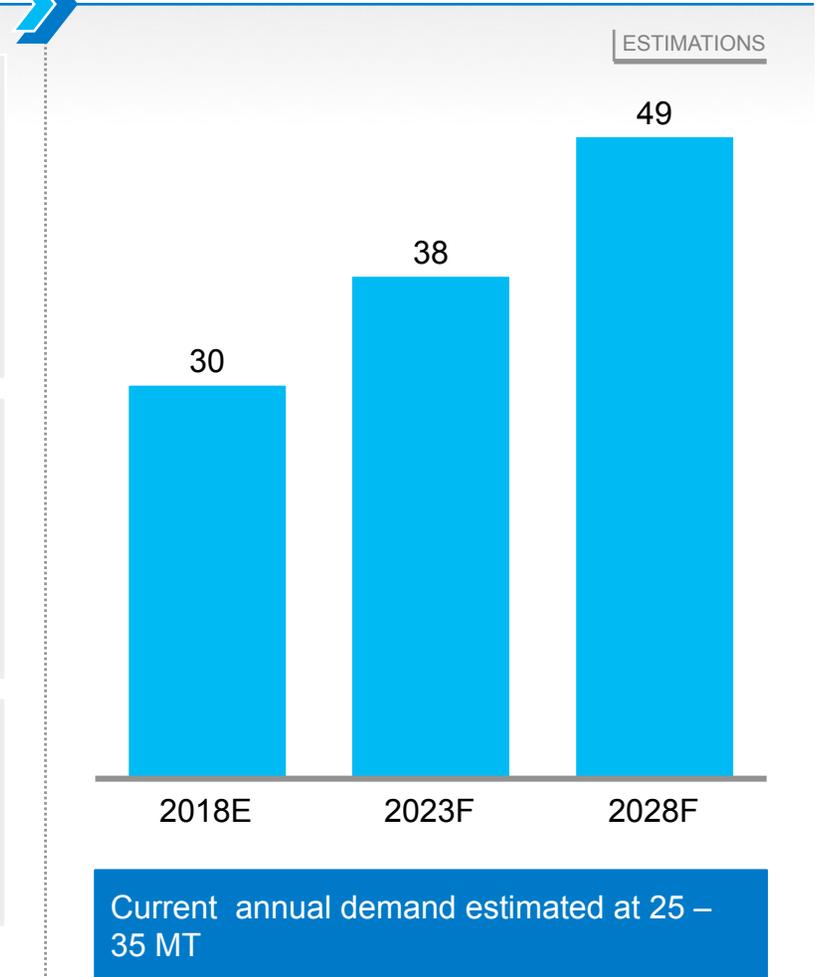
# The demand for soy oil is expected to continue to increase in the coming years by more than 5% p.a.

- Soy cake
- » Soy Oil
- Other soy products

Demographic, Macroeconomic and behavioral factors seem favorable...



and can boost current consumption by more than 5%<sup>2</sup>...



<sup>1</sup> IMF estimations

<sup>2</sup> Projections for the growth of Soy Oil are based on market estimations of industry stakeholders. A range of 5 – 10% was agreed to be realistic

SOURCE: Technoserve Interviews with industry stakeholders in Mozambique

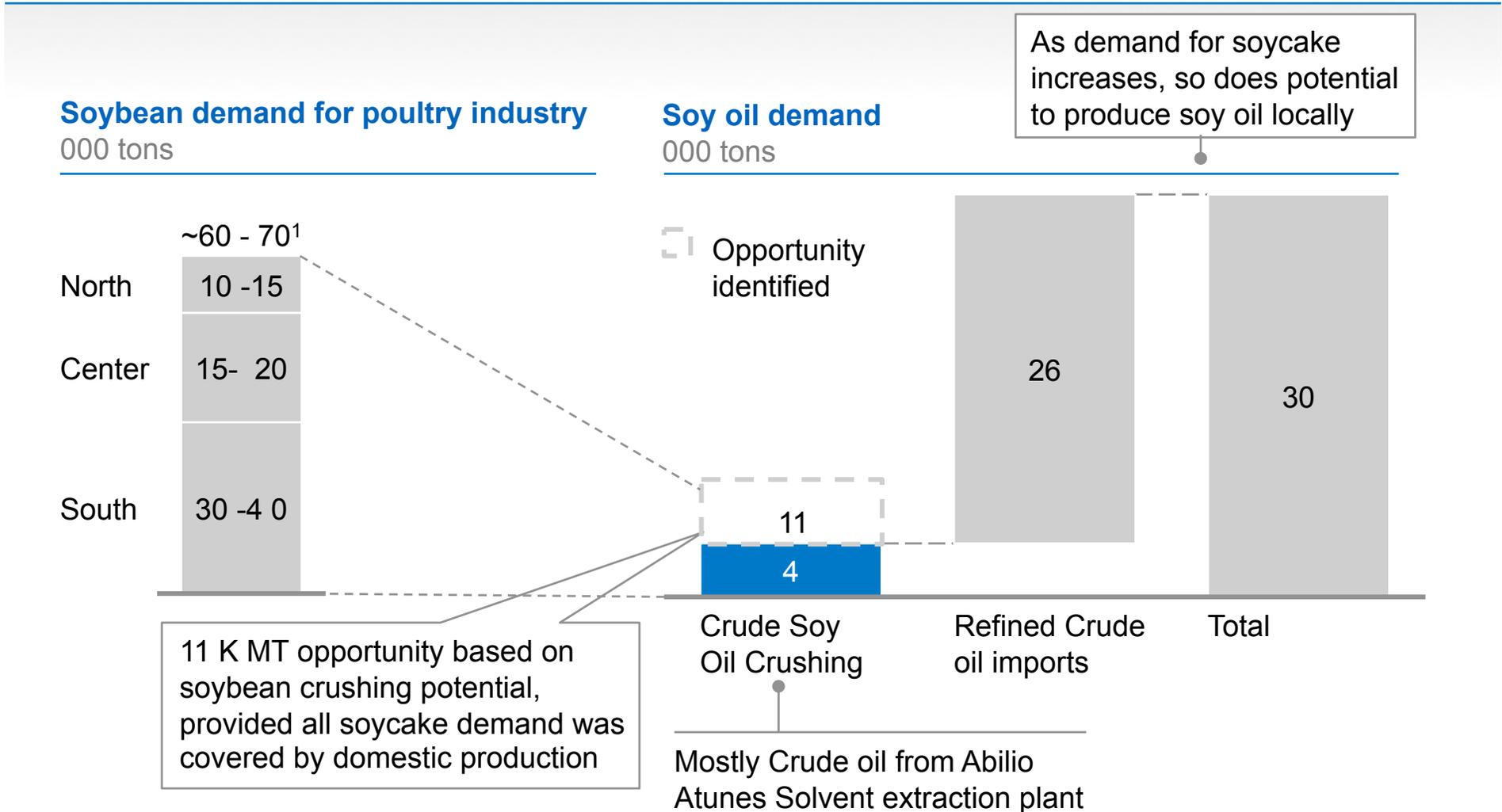
There is an opportunity today for the local feed industry to sell an additional 11kt of crude oil by- product to local refineries or expand operations

Soy cake

**Soy Oil**

Other soy products

Currently, less than 15% of the demand is satisfied by crushing



<sup>1</sup> Current poultry capacity can allow production of up to 100 K MT

Crushing and refining domestic soybeans is currently not competitive vs. oil refined locally from imported crude oil, but may make sense for an integrated player

Soy cake

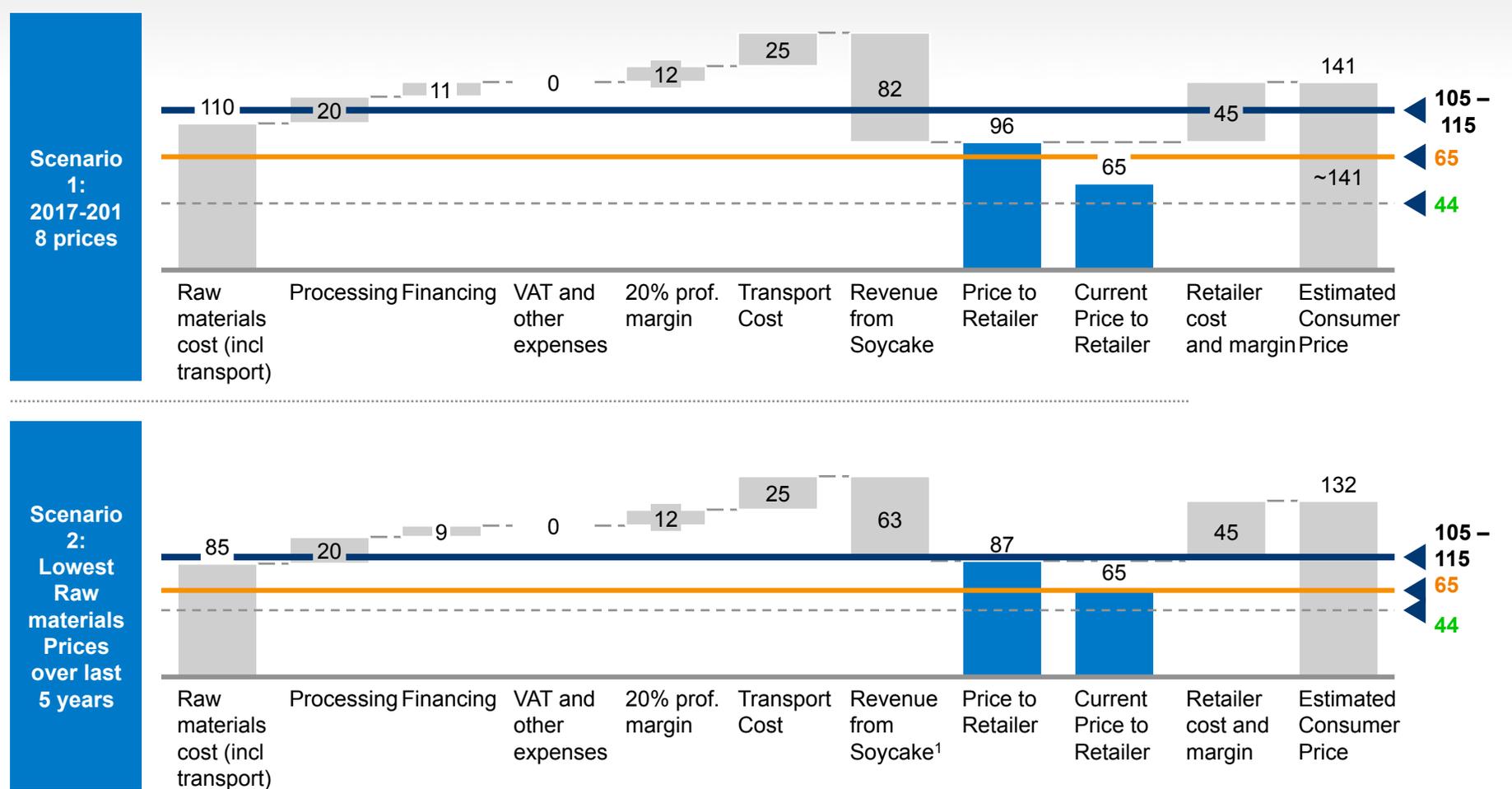
**Soy Oil**

Other soy products

PRELIMINARY

Current Retailer Price Processor gate price of refined soy oil Landed cost of imported crude oil

Illustrative breakdown of standalone soy oil processing cost from local soybeans, MZN / kg



1 Assumes soycake revenue falls proportionately to drop in raw material cost

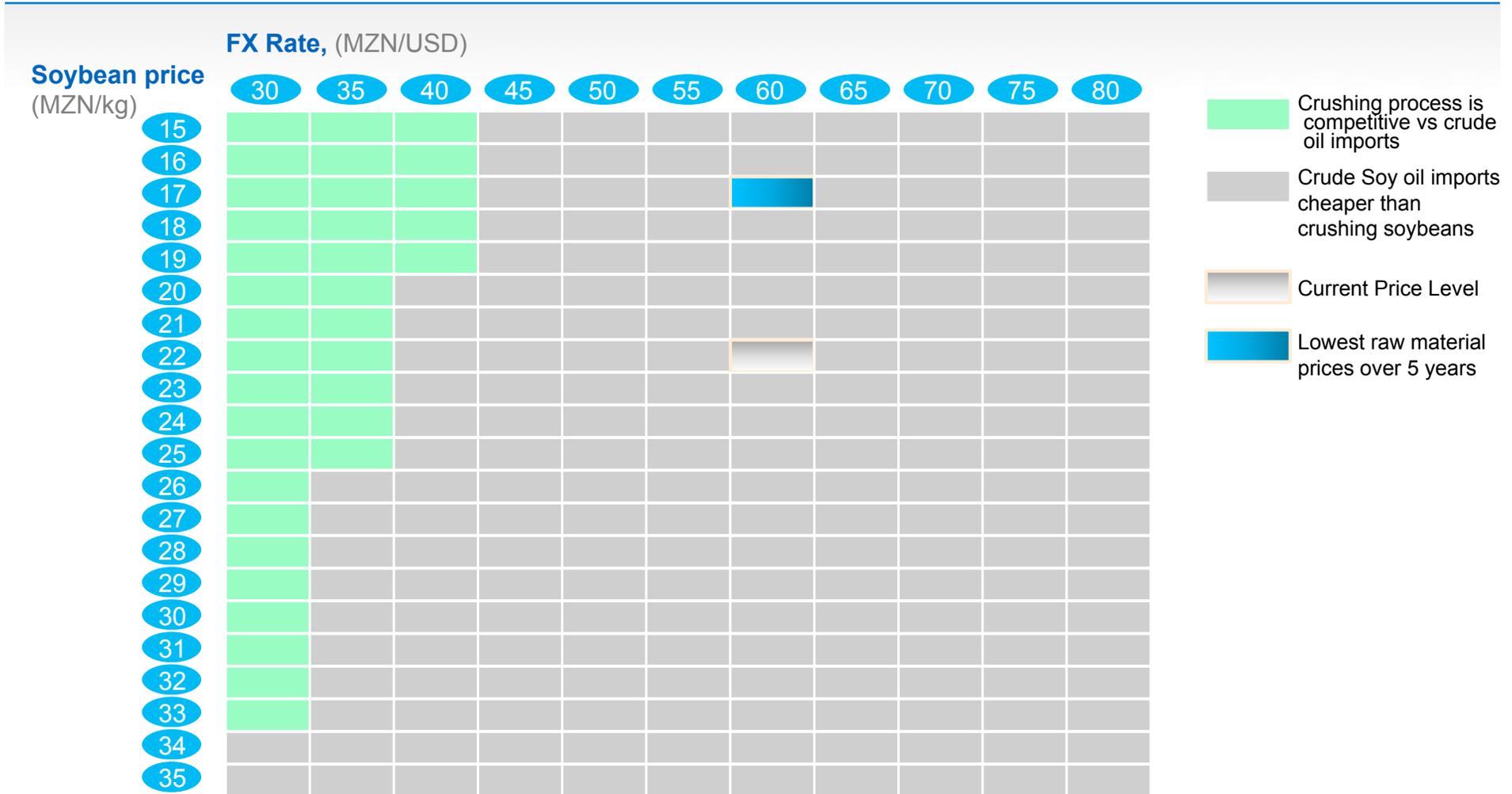
SOURCE: Team analysis. \*Assumes soycake revenue falls proportionately to drop in raw material cost

Only under appreciation of the MZN, a development that would increase the price of imported crude oil, can soy oil crushing be competitive against imported crude

- Soy cake
- » Soy Oil
- Other soy products

PRELIMINARY

**Sensitivity analysis<sup>1</sup> – Cost of Crushing to produce soy oil VS Cost of Refining Crude Soy Oil**



<sup>1</sup> Refining cost for soy oil at 4 MZN/ kg; WACC at 10%; VAT cost at ~1MZN/ kg; Soy cake price adjusted linearly according to soybean price

## Key takeaways: Soy oil opportunity

Soy cake

» Soy Oil

Other soy products

### Key takeaways from stakeholder discussion



- Currently, **few poultry players leverage the soy oil by-product** mainly due to **absence of relevant infrastructure** (i.e. solvent extraction plant); those who do produce crude oil, sell their products to the local markets or to resellers
- **Crude oil can increase the value of the soybean** and the crushing margin
- **Processors may also consider expanding into refining**, adding additional value to their product
- The **biggest impediment to the growth** of the local crushing industry remains its **lack of competitiveness versus imported crude oil**; therefore trade measures could be examined to assist local processing units

Unlike neighbouring countries, Mozambique has not yet branched into soybean processing for human consumption

Soy cake

Soy Oil

Other Soy products

Product	Description	Mozambique	Malawi	Zimbabwe	Zambia
Soycake	Soybean meal is the most important protein source used to feed farm animals representing the two-thirds of the total world output of protein feedstuffs	✓	✓	✓	✓
Soy oil	Vegetable oil extracted from the seeds of the soybean (glycine max)	(✓)	✓	✓	✓
Soy chunks	Vegetable meat - It is prepared from defatted soya flour by the process of extrusion cooking	✗	✓	✓	✓
CSB	Blends of partially precooked and milled cereals, fortified with micronutrients. Corn Soya Blend (CSB) is the main blended food by WFP	✗	✓	✓	✓
Soy milk	Plant-based drink produced by soaking and grinding soybeans, boiling the mixture, and filtering out remaining particulates	✗	✗	✗	✓
Soy yoghurt	Soy yoghurt is made by fermenting soymilk with friendly bacteria	✗	✗	✗	✓

Although demand for other soy products exists, it is currently much smaller in volume than the demand for soy cake and oil

Soy cake

Soy Oil

Other Soy products

**Mozambique**

**Zimbabwe Example**

		Current Annual Demand, MT, 2018	Projected Demand, MT, 2028, Estimates	Current Market Value MIn MZN, 2018	Import penetration, 2018	MTs used for each product %
	Soy Cake	60K – 100K	171K	~1,800	~60% Imported	96%
	Soy Oil	~ 30 K	49K	~1,500 – 2,500	>90% imported	
	CSB, Fortified Flour <sup>2</sup>	9,000	17,000 <sup>3</sup>	tbc	Imported	Most of it attributable to CSB and fortified flour ~4%
	Soy chunks	<1,000	10,000 <sup>4</sup>	~<100	n/a	
	Soy Milk	0	1K	n/a	n/a	

1 Includes ~15K MT of exports in India and China

2 Based on Final product Retail Price; more than 60% w/w is Maize

3 Assuming a 10% penetration in the total addressable market (54% of children 6-36 months belonging to households in urban within targeted monthly income consuming 3 meals of 40g average serving size per day)

4 Conservative estimate based on a consumption of 330kgs of soychunks/mln population; current penetration rate of soychunks in Malawi reaches 1000kgs/mln people

SOURCE: Technoserve Interviews, Technoserve analysis

An investment into different soybean subproducts processing can yield high profit margins in a steady state, but demand is currently in a nascent stage

- Soy cake
- Soy Oil
- » Other Soy products

	Estimated addressable market, Estimation	Profit Margin Estimation	Capex equipment required	CapEx Cost USD	Challenges
 <p><b>Soy porridge</b> CSB, Fortified Flour</p>	17,000	~20-30 <sup>2</sup> %	<ul style="list-style-type: none"> <li>▪ Mill</li> <li>▪ Roaster</li> </ul>	<p>700K- 2mln</p> <ul style="list-style-type: none"> <li>▪ 250kg – 1 ton/ day</li> </ul>	<ul style="list-style-type: none"> <li>▪ Volatile pattern of institutional demand</li> <li>▪ BOP / distribution campaigns needed for market entry</li> <li>▪ Substitute product x3 times cheaper (e.g. Maize Flour)</li> <li>▪ Raw material availability challenges (Maize)</li> </ul>
 <p><b>Soy chunks</b> Soy chunks</p>	10,000	~20 <sup>1</sup> %	<ul style="list-style-type: none"> <li>▪ Extruder</li> <li>▪ Dryer</li> </ul>	<p>120K – 500K</p> <ul style="list-style-type: none"> <li>▪ 0.5 – 2 ton/day</li> </ul>	<ul style="list-style-type: none"> <li>▪ Small processing players may produce hazardous products due to production process defects (e.g. Aproximns)</li> <li>▪ Imports risk from neighboring countries(e.g. Malawi)</li> </ul>
 <p><b>Soy milk and other</b> Soy Milk</p>	1,000	>25%	<ul style="list-style-type: none"> <li>▪ Fridges</li> <li>▪ Purifier</li> <li>▪ Mixer</li> <li>▪ Steriliser</li> </ul>	<p>&gt;400K</p> <ul style="list-style-type: none"> <li>▪ &gt;1 ton / day</li> </ul>	<ul style="list-style-type: none"> <li>▪ Niche product with limited target population in Mozambique</li> <li>▪ May only be produced in small quantities unless product is used in NGO campaigns</li> </ul>

1 Assuming 20 MT/kg distribution Cost, 30 MT/kg raw materials and processing cost, 10MT/kg financing and other costs

2 Gain Program Analysis

## Key takeaways: Other soy products opportunity

Soy cake

Soy Oil

Other Soy products

### Key takeaways from stakeholder discussion



- **Product fit, low capex requirements and straightforward processing** create **attractive prospects for a domestic soy chunks industry**
- To kick-start demand for soy chunks, **processors need to heavily invest in marketing efforts**, potentially with some **public sector support**
- On the other hand, CSB represents currently a sizeable opportunity but **imported products competition, customer acceptance risk, heavy investment requirements in marketing as well as processing challenges** can be **significant impediments** to a potential investment

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Vision for a future soy industry in Mozambique

**A strong and growing local processing industry that pays fair prices and a premium for quality to local producers, supported by a growing local production industry with SHFs and SCFs at its centre**



# Snapshot: from 2018

# To 2028



45K MT

Soybean production

140K MT



1.0

Yield

1.5



~70K MT

Soy cake production (eq. soybeans)

~140K MT



~30K MT

Soy oil refining

~50K MT



0 MT

Corn Soy Blend local Processing

17K MT



0 MT

Soy chunks local Processing

10K MT



Non existent grading systems

Quality standards

Set specifications and enforcement of control mechanisms



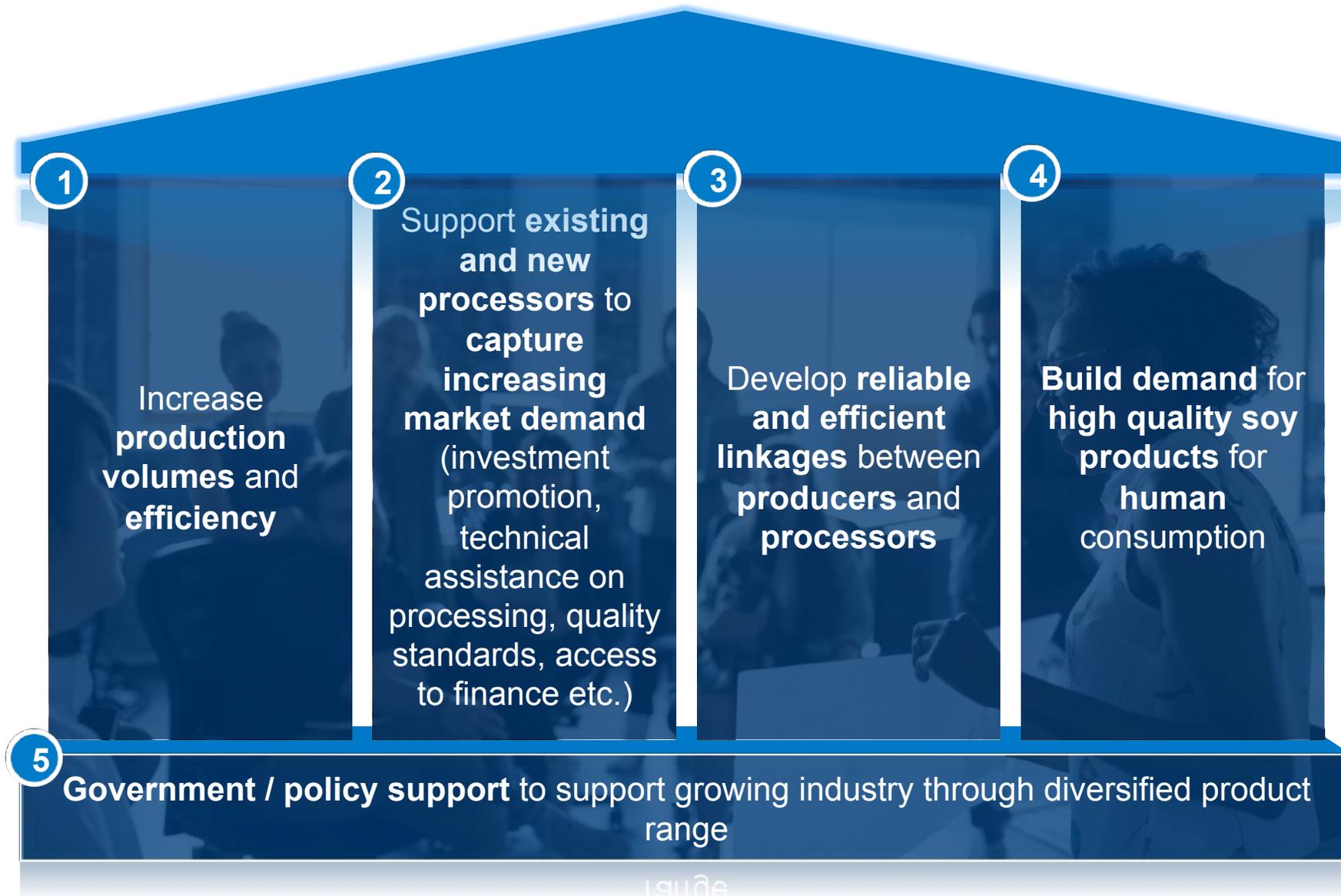
Lack of Government and financial sector support; Lack of policy enablers

Enabling environment

Supportive enabling environment; including policy for imports



## Attaining this vision would require interventions in five key areas



## Growing a more diversified local processing industry could have many positive impacts – and perhaps some negative impacts in the short term

**The growth of the processing industry benefits job creation, product availability and promotes the local farmer market**

-  Reliable market for ±50,000 local producers, less volatile and subject to global dynamics than exporters who may come and go from year to year
-  As local processing industry develops, it may pay premium prices for higher quality soybeans (vs. exporters who may be more likely to export whatever quality is there)
-  Job creation in processing plants and marketing (e.g., network of sales agents)
-  High-quality processed food products for human consumption improve household nutrition, particularly in lower income HH
-  Positive spill – on effect on other industries such as packaging

**If local industry requires protection in the short-term, knock-off effects need to be examined**

-  Export tax could support local processors to buy soybeans in face of competition from exporters, but could also lead to less competition for soybeans and lower prices for SHFs in short-term as well as reduced attractiveness of SHF farming vs other seeds such as corn
-  Import tax for SoyCake could create a stronger opportunity for local soybean producers to supply southern poultry industry, but may also pose sourcing risks for poultry players. Limiting or making imports more expensive could make poultry products, or oil more expensive in Mozambique in the short-term, with knock-on effects on competitiveness of domestic poultry industry