CIMMYT MR
International Maize and Wheat Improvement Center

IIAM
Instituto de Investigação Agrária de Moçambique

Australian Government
Australian Centre for International Agricultural Research

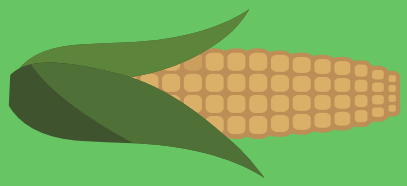
TRACING THE PATH:

What Happens to Maize and Legumes from Research to Farm and Market in Central Mozambique?

Maize is Mozambique's staple, grown by 95 percent of smallholder farmers. Legumes are the most important sources of proteins for rural Mozambicans, especially cowpeas and common beans. Additionally, common beans are a cash crop in Angonia, Manica and Sussundenga. To improve the market for these important crops, it is imperative to capitalize on opportunities and to address challenges along the value chains of each of crop. Equally important is identifying key actors in the seed and fertilizer sectors. Such information is crucial for the government and other development agencies to appropriately prioritize interventions to tackle the crippling problems along the maize and legume value chain presented in this brief, as well as to seize and build on the opportunities. This socio-economic research was undertaken through the Sustainable Intensification of Maize–Legume Systems for Food Security in Eastern and Southern Africa (SIMLESA) Project.

Recommendations

- Improve rural roads and warehousing: poor infrastructure increases costs of seed and fertilizers
- A more effective national seed system to assure adequate foundation seed for seed companies
- Policies that attract more private companies to seed and fertilizer sectors should be emphasized
- Strengthen public agricultural extension system, since this is the main source of information for farmers
- Better credit access for seed and fertilizer companies and for farmers



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How do farmers get market information and extension services?

Accurate and timely information is what enables farmers to profitably engage with markets. Reliable and efficiently-delivered information eliminates doubt. This increases farmers' certainty about new practices and varieties thus reducing perceived risks that helps them adopt technologies and other inputs. This survey found that about 290 and 184 of the households out of 510, obtain information about new varieties of maize and legumes respectively from extension agents.

290

of the households out of

510,

obtained information about new varieties of **maize** from extension agents

184

of the households out of

510,

obtain information about new varieties of **legumes** from extension agents

30 Km

average radius of one extension officer covers

Given the importance of extension agents as a key source of information for farmers, enhancing and optimizing extension services is crucial, particularly in view of the below facts:

- One extension officer covers farmers within an average radius of 30 kilometers.
- Extension support and transport infrastructure are poor in rural Mozambique.

The average distance between farm and the nearest market is 1.7 kilometers, with Angónia having the furthest distance (2.2 kilometers) and Manica the shortest (0.9 km).

Walking from the farm to the nearest market takes approximately 26 minutes (Figure 1).

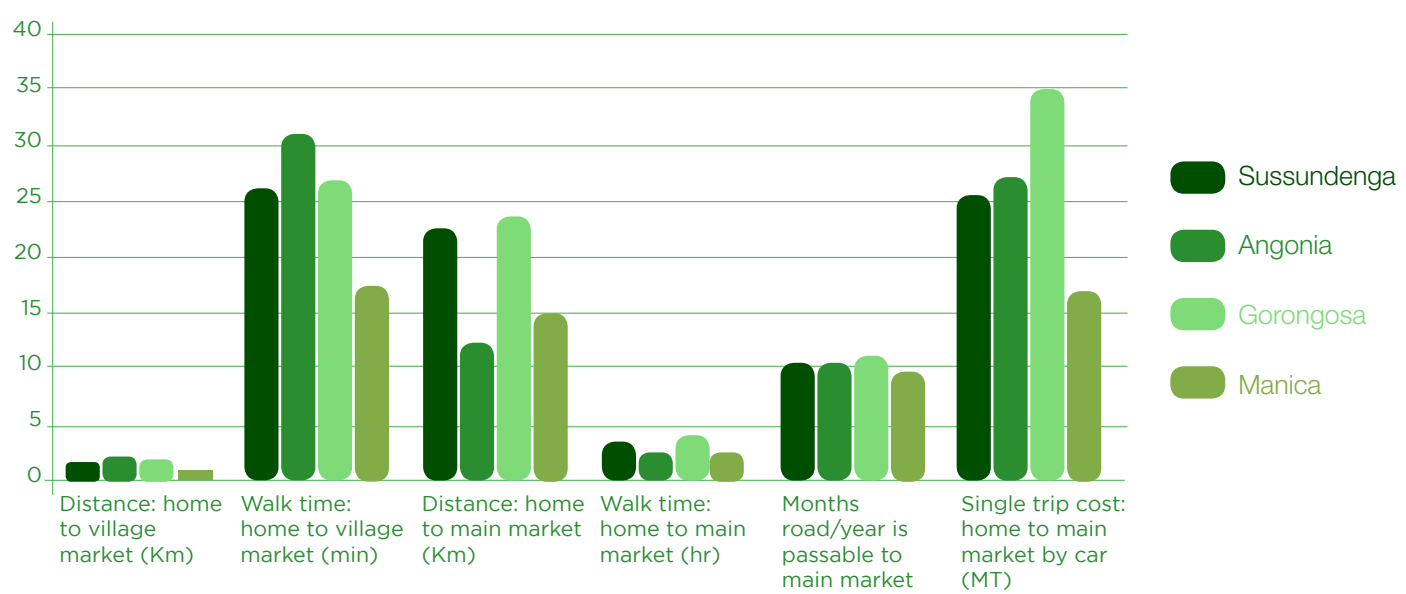


Figure 1: Distances to and costs of accessing markets in Mozambique
Source: SIMLESA baseline survey report (2012)

Typically, the main markets are far from the village. In the project sites, on average, the distance was:

- 18.5 kilometers, requiring 3 hours and 15 minutes of walking.
- 17.7 kilometers to nearest seed dealers
- 20.2 kilometers to the nearest fertilizer dealer.

Extension service stations and farmers' groups are relatively far from one another, at an average of about 11.5 kilometers and 8.7 kilometers, respectively. Given these infrastructure challenges, enhancing the reach of extension services will require the following:

- Transport for technicians so they cover greater distances; and,
- Mobile telephone, and subscribing to free short message services that allow farmers to request and receive information.

Given the importance of extension agents as key source of information for farmers, enhancing and optimizing extension services is crucial

Seeds of hope, but challenges prevent germination

70%

of Mozambican farmers use local maize varieties

ADOPTION OF HYBRID MAIZE IN 2010

20%
male-headed households

13%
female-headed households

ADOPTION OF LEGUMES IN 2010

50%
male-headed households

34.6%
female-headed households

Between 1986 and 2014, Mozambique Agricultural Research Institute (IIAM) released over 30 maize varieties, 12 for common beans, 12 for cowpeas and nine for soybeans. But this remarkable progress was slowed down by several challenges. Owing to inefficiencies along the seed value chain, only about three varieties of each crop are marketed each production season. The development of the seed sub-sector is influenced by the national seed system. However, the approved seed companies are few, and coordination between research and the seed companies remains poor. Consequently, seed production falls far below demand, pushing prices beyond the reach of many smallholder farmers. Nearly three-quarters (approximately 70 percent) of Mozambican farmers use local maize varieties, with poor resistance against pests and diseases, and low productivity potential. Since maize is widely cultivated by 95 percent of smallholders, the effect of the aforementioned constraints will have serious implications on farmers' yield, food security and economic situation.

Gender-based disparities and educational levels are important determinants for technology adoption. Overall, male-headed households tend to adopt new improved varieties more often than female headed households. For example, in 2010, adoption of hybrid maize was 20 percent and 13 percent for male- and female-headed households respectively. For maize there was a small difference with more female-headed households adopting both hybrids and open pollinated varieties more compared to their male counterparts. For legumes, half and slightly more than a third (34.6 percent) of male- and female-headed households adopted improved varieties, respectively. From figure 2, it would appear that women more readily adopt open pollinated varieties (OPVs) of maize and pigeonpeas, both of which are cheaper and require fewer inputs.

Based on the SIMLESA baseline survey results, less than 20 percent of farmers are aware of improved maize varieties, and only 13 percent of those aware adopted them (Table 1).

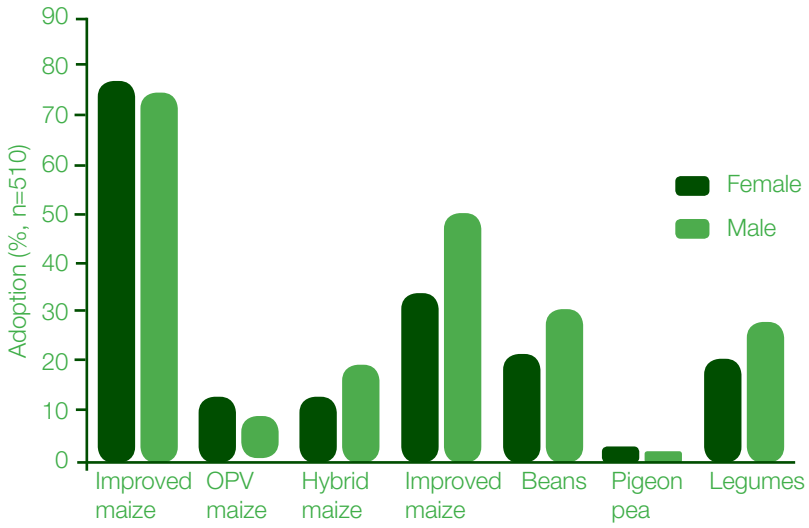


Figure 2: Maize and legume adoption by gender
Source: Adapted from SIMLESA baseline survey report (2012)

Table1: Farmers' awareness and use of maize and bean varieties in Mozambique

Crop/Variety		Sussundenga (n=131)		Angonia (n=127)		Gorongosa (n=125)		Manica (n=127)		Total (n=510)	
		Aware	Ever used	Aware	Ever used	Aware	Ever used	Aware	Ever used	Aware	Ever used
Maize	Matuba	18	17.1	7.5	3.2	14.1	10.9	17.5	16.5	15.2	13.2
	PAN 67	15.6	13.5	30.7	29.6	18.3	18.2	18.1	15.7	19.2	17.7
	Tsangno	1	0.4	1.1	0.5	0.4	0.4	0.4	0.5	0.7	0.4
	Sussuma	5.2	4.8	1.5	0.5	3.8	3.4	3.7	1.8	3.9	3.1
Common beans	Mateiga	4	4.4	15.4	18.5	5.8	4.5	3.7	4.1	6.1	6.3
	Catarina	1.7	1.6	0	0	0.5	0.4	0.6	0.5	0.9	0.8
Soya bean	Santa Rosa	0.2	0.2	6.7	8.3	0.2	0.2	0	0	1.1	1.3
Cowpea	IT18	1	1.2	0	0	1.6	1.5	0.9	1	1	1.1
	INIA 36	0	0	0	0	0.5	0.4	0.4	0.5	0.3	0.3

Where do farmers get their seeds from?

Smallscale farmers get seeds from formal and informal channels. Nearly three-quarters (about 70 percent) of maize and legume seed planted in the 2009/2010 cropping season was farmer-saved seed. About 8 percent of households purchased seeds from local traders, while 8 percent and 4 percent accessed certified seeds from seed companies or got free samples, respectively. About 2.5 percent of the households obtained their seeds as aid from non-governmental organizations (NGOs) and government.

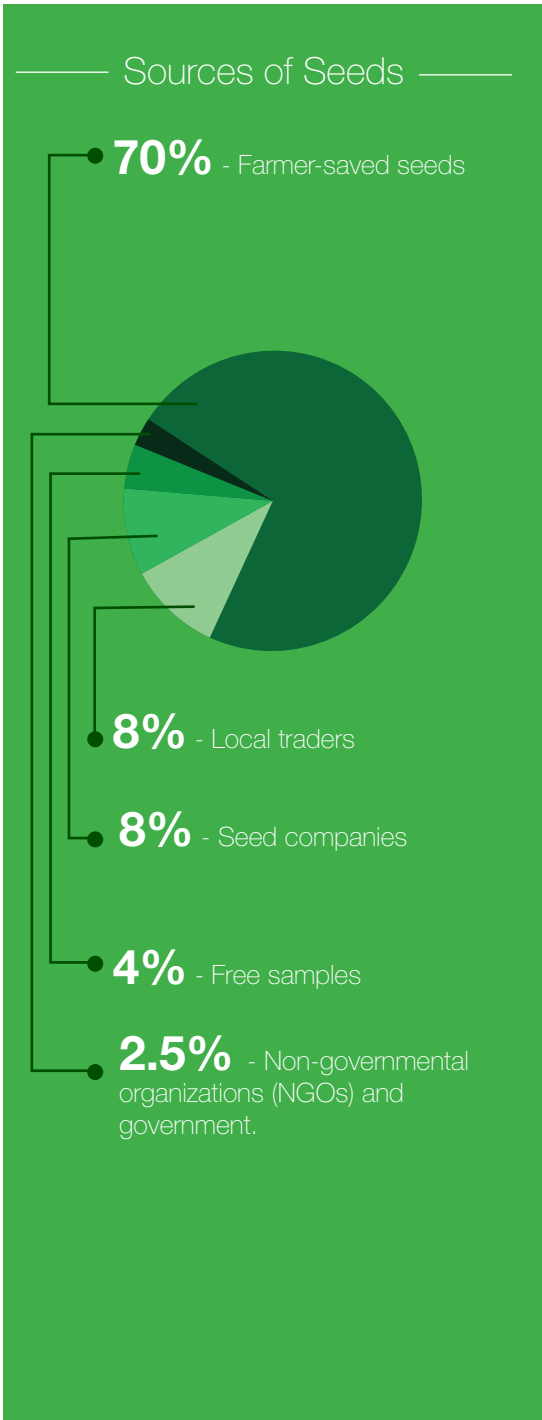
Who are the actors in the seed sector, and what are the issues?

Table 2: IIAM's collaborators in maize and legume breeding

Crop	Collaborator
Maize	CIMMYT
Groundnuts and pigeonpeas	International Crops Research Institute for the Semi-Arid Tropics
Soybeans and cowpeas	• International Center for Tropical Agriculture • International Institute of Tropical Agriculture

Some commercial farmers' associations multiply maize and legume seed with external funding, generally from development organizations or NGOs. However, when such funding ceases, the general tendency is these associations stop producing seed leading to shortage of seeds. A sustainable seed production infrastructure is therefore needed. The government, through the Ministry of Agriculture (MINAG), is actively involved in seed distribution, providing free or subsidized seed. Quantities vary from year to year. Angónia, Manica, Sussundenga and Gorongosa districts are normally prioritized due to their high potential.

Agrodealers in seed marketing are crippled by systemic factors that limit access to improved seed. This include: (i) Unaffordable high prices (ii) poor availability of seeds. Seed distributed within farming communities is often sub-standard and farmers travel to nearby cities – or cross national borders – for seed and other inputs.



Green Belt and Africa Fertilizers Company jointly import or blend

70%

of the fertilizers

USERS OF FERTILIZERS

21.6%
male-headed households,

15.4%
female-headed households,

Only about 400 RETAILERS

are trained on fertilizer market (apart from the provincial and district capitals)

What ails maize production?

The Mozambican government lacks the capacity to monitor and assure quality, leading to poor quality seed. Studies based on SIMLESA research have considered the following factors as the major impediments:

- Large quantities of high-quality foundation seed are imperative for commercial seed production, yet seldom available.
- Most seed companies, especially the smaller ones that mainly work on OPV maize do not have irrigation and seed processing facilities. This means they can only produce seed once a year at the mercy of rainfall.
- Mozambique's smallholders are among the poorest in the world, meaning most cannot afford commercial varieties.
- Most rural areas are inaccessible and market information systems poor, pushing up production costs and compromising market intelligence.
- Small and emerging seed companies lack credit to kick-start or expand their business.

What of fertilizers?

The two main types of maize fertilizers used in Mozambique are the NPK compound and Urea. Other formulations are by special order, typically for research organizations and large scale farmers.

Since it is imported, fertilizer use is greatly hampered by cost and scarcity. However, the government is piloting subsidies to promote access and use by smallholders. In SIMLESA sites, compared to the national statistics, fertilizer use is higher for maize production and other key cash crops. Male-headed households use fertilizer more (21.6 percent) compared to female-headed households (15.4 percent).

Three main companies that import, blend and sell fertilizers are Green Belt and Africa Fertilizers Company, which jointly import or blend more than 70 percent. The third company is Mozambique Fertilizers Company. These companies sell fertilizers to agrodealers, but also operate their own wholesale and retail outlets. Commercial farming companies such as Vanduzi buy in bulk directly from blenders.

The government remains the major key player in facilitating fertilizer trading, with four ministries (Customs, Agriculture, Industry and Commerce and Transport) involved in the fertilizer value chain. The government is also a distributor, with all the major importing companies supplying it with fertilizers.

For the fertilizer situation to improve, policy and regulatory systems must be formulated and effectively enforced, easy credit facilities established, as well as accurate market information made available. Banco Terra and Eco Bank (ProCredito) are the main financiers in the fertilizer and other agricultural inputs value chains, providing credit to private companies and to farmer groups, but not to individual smallholder farmers.
Some of the factors influencing fertilizer use in Mozambique are:

- Poor market development, which limits inputs and depresses produce price.
- Fertilizer retail and knowledge are also inadequate: apart from the provincial and district capitals, there are only about 400 retailers trained on fertilizer marketing.

Table 3: Summary of the maize & legume seed and fertilizers opportunities and constraints

Commodity	Opportunities	Constraints	Required intervention	Responsible organizations	Support services
Maize and Legume seed	Good environment for seed production	Low number of seed companies	Create enabling environment and policy to strengthen seed market	GoM , Development organizations & NGOs	Financial institutions
	Awareness of improved seed by farmers	Low use of improved seed by farmers	Strategies for increasing improved seed use	Government (Extension), NGOs & Research Institutes	
	Farmers engaged on maize seed production	Poor organizations of farmers	Strengthens farmers´ organizations	GoM, Development organizations & NGOs	Policies and financial institutions
		Poor risk mitigation mechanisms	Establishment of insurance policies for smallholder farmers		
Legume seed	Many organizations interested in developing legume production	Lack of grading system	Promote the grading standards	Government and private sector	
Fertilizers	Strategic location of the country for fertilizer import	High transport costs of fertilizer	Improvement on infrastructures (roads, railways and storages)	GoM , Development organizations &private sector	Financial institutions
		Lack of microcredit in the communities	Create microcredit services through contract farming		

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