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About the Bulletin

The Bulletin of Tropical Legumes is a publication of the Tropical Legumes II (TL II) project, funded by the Bill & Melinda Gates Foundation, and jointly implemented by the International Crops Research Institute in the Semi-Arid Tropics (ICRISAT), the International Center for Tropical Agriculture (CIAT) and the International Institute of Tropical Agriculture (IITA) in close collaboration with partners in the National Agricultural Research Systems of target countries in Sub-Saharan Africa and South Asia. TL II aims to improve the livelihoods of smallholder farmers in drought-prone areas of the two regions through enhanced grain legumes production and productivity.

Mr Lucas Abrao – Technical Officer IIAM at the groundnut hybridization block.

Tropical legume farming in Mozambique

The population of Mozambique is expanding rapidly (from 21 million in 2007 to an estimated 28 million in 2020), and for this reason, agricultural productivity must accelerate in order to improve rural incomes and satisfy the growing demand for food in both rural and urban areas.

Legumes are being produced in the country, both by smallholders and by large-scale farmers. Smallholders form the majority of farm producers, mostly cultivate legumes intercropped with cassava and maize, do not use improved tools or inputs, and usually cultivate in less than 0.5 hectares, resulting in very low yields. Large-scale farmers, who grow soybean in 5 or more hectares, are slightly better off.

The relative importance of different grain legumes grown in Mozambique is shown in Table 1.

Table 1: Relative importance of different grain legumes grown in Mozambique.

Crop	Area of coverage	% of legume area
Groundnut	315,000	42
Pigeonpea	190,000	25
Cowpea	126,000	17
Common bean	106,000	14
Soybean	15,000	2
Total	752,000	100

Cowpea production in mozambique

Cowpea is widely grown in Mozambique, mainly in warm regions, such as along the costal sandy areas and in the lowlands. About 63,000 MT of cowpea is produced annually on 126,000 ha. Consumers eat the grain and tender leaves, which are regularly picked and eaten as spinach. In many areas of the country, farmers grow spreading varieties, which are photosensitive and low grain yielding, but have high biomass that serves as a vegetable produce over a long period. This situation can be attributed to the importance that farmers give to the leaves for their household consumption as well as for the market. In many parts of the country, higher importance is given to leaves than the grain. Cowpea provides considerable protein in diets, and is hence often called “meat for poor people”, considering its comparative low cost. From production of this crop, rural families variously derive food, animal feed, and cash together with spillover benefits to their farmlands. Cowpea is an important component of the cropping systems in the drier regions and marginal areas of the country. In collaboration with the International Institute of Tropical Agriculture (IITA), the Institute of Agricultural Research of Mozambique (IIAM) is testing a range of improved cowpea breeding lines combining multiple disease and insect resistance, drought tolerance, dual purpose varieties with preferred seed types. Among the most important legumes

cultivated in Mozambique, cowpea occupies 17% of the total area. Cowpea is grown in almost all provinces, with Nampula and Zambezia provinces accounting for about 40% of the total cowpea production in the country. Cowpea research at IIAM started in 1982, with the technical assistance of FAO. Emphasis was given to collection of local germplasm. Later there was massive introduction of germplasm from IITA. These are characterized by different attributes-- dual purpose varieties, varieties resistant to pests, extra early maturing, varieties resistant to Striga, Alectra and so on. An IITA selected dual purpose variety (leaves and grain) IT 18, was released in 1994. This variety is still being grown by many farmers. Table 2 shows the varieties that have been released.

In Phase II of TLII we plan to bring about a mega impact approach where available cowpea technologies would be implemented in the most important cowpea production environment or agro ecologies. We will continue introduction of farmer and market preferred varieties with resistance/ tolerance to major biotic and abiotic stresses. The plan is to develop a sustainable seed systems model (both community-based and medium-scale private producers) for the new released varieties. With the popularization the new and high yielding varieties and the introduction of good agronomic practices, we hope to achieve productivity of cowpea at intervention area to be 1.0+ t/ha and to influence the national productivity from the present 0.4 t/ha to 0.7 t/ha by 2014. The outcomes by the end of Phase II will be cowpea farmers and farm practitioners with higher incomes, increased national cowpea production greater than 63,000 MT and productivity of 0.7 t/ha. There would also be an excess production over the national demand, which should allow for export to other countries.

Agro-ecologies for Cowpeas cultivation in Mozambique

The agro-climatic conditions in Mozambique, allow the cultivation of a broad range of diverse crops (cereals, legumes, root and tubers, oilseeds, horticulture, fruit culture, and others). Cowpea is amore drought-tolerant crop than many others. It can grow under rainfall ranging from 400 to 700 mm per annum. Adequate rainfall is important during the flowering/ podding stage. Cowpeas are grown on a wide range of soils, but the crop shows a preference for well drained soils, which tend to be less restrictive on root growth. This adaptation to lighter soils is coupled with drought tolerance through reduced leaf growth, less water loss through stomata, and leaf movement to reduce light and heat load under stress. The optimum temperature for growth and development is around 30°C. Varieties differ in their response to day length, some showing insensitivity by flowering within 30 days after sowing when grown under any day length at a temperature around 30°C. It is more tolerant to infertile and acid soils than many other crops.

Cowpea is mostly grown in sandy soils of the coastal area, which is marginal for other crops. Figure 1 shows the area and yield productivity of cowpea in Mozambique.

There are several regions where cowpea is grown on more than 40,000 ha, but regions with highest productivity have only 0.25 t/ha (data from 2006-2008). An effective seed production and delivery system is necessary to make good quality seed available to farmers at the right time and at affordable cost. In Mozambique, there is no formal cowpea seed production and supply system. Approximately 90% or more of the planting material used is from farmers' own-saved seed. Usually, the few seed companies operating in Mozambique prefer to produce and sell hybrid maize seed. Seed companies don't show interest to produce self-pollinated crops such as cowpea. For sustainability of seed production and distribution in Mozambique, it is important

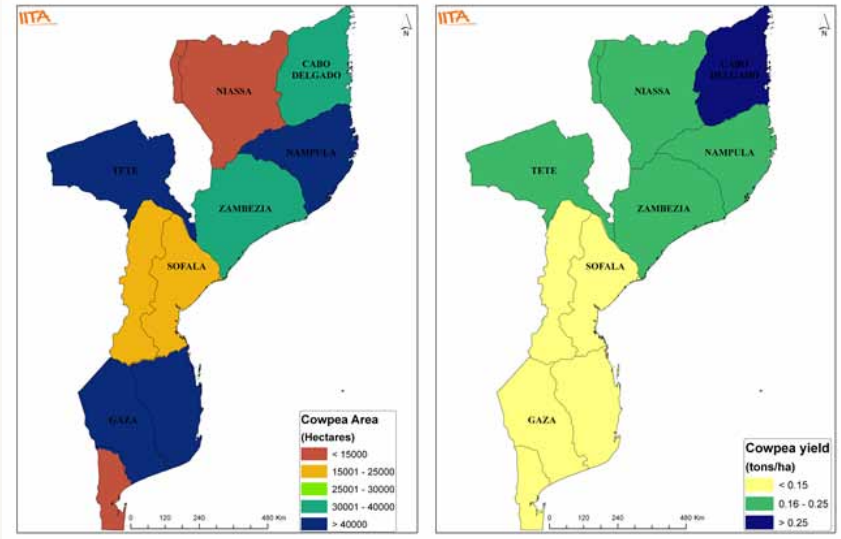

Figure 1: Cowpea growing area and yield in Mozambique.

Table 2: Characteristic features of Common varieties developed in collaboration with the Mozambican research system.

Official name of release	Year of release	Source of the materials	Genetic background (parentage, pedigree, ancestry)	Area of potential coverage (ha.)	Area of actual adoption estimate (ha.)	Spillover national boundaries	Average yield potential kg/ha (on-farm)	Varietal traits (selected characteristics)
IT18	1994	IITA	IT82E-18	7,060	4,000	Yes	450	High yield
IT16	2011	IITA	IT82E-16	21,180	8,000	Yes	400	Drought tolerance
IT1069	2011	IITA	IT97K-1069-6	21,180	3,000	Yes	500	Better yield, drought tolerance and dual purpose
IT1263	2011	IITA	IT00K-1263	21,180	3,000	Yes	500	Better yield, drought tolerance and dual purpose

that the public research sector be linked with locally operating institutions, such as NGOs, extension services, farmers' associations and other community-based organizations (CBOs) that play an important role in effecting this link. For these interventions to be sustainable, they must be based on training and market development and not on direct government subsidies. During the Phase II of the TL II project, 20% of the current area will be planted with new improved and higher yielding varieties, with the participation of strategic partners. Table 3 shows the seed production plan for breeder, foundation and certified seed, while Table 4 shows the certified seed production targets over the three years.

Seed delivery will be handled mainly in a seed revolving or seed loan approach until the bigger impact and demand is established. The higher demand will then be satisfied by seed growers that eventually grow along with technology promotion. By 2014. at least 50 percent of cowpea farmers at the national level will have access to improved seed through the informal seed system organized in a decentralized way. Effective monitoring and support to validate seed quality in a decentralized manner will be carried out by the Bureau of Agriculture Seed Department, mandate research centers and the seed enterprises affiliated to the seed scheme in a contractual agreement. The opportunities include existence of a functional informal seed system, good market set-up for cowpea in general and cowpea seed in particular, the new strategic plan for agriculture development, which considers cowpea as one of the strategic crops for Mozambique, policy environment that enhances innovative seed system, assured availability of suitable varieties with the presence of IITA in Mozambique, sufficient land mass suitable for cowpea, high consumption level/culture in the country, enhanced linkages to NGO, CBO, and private sector to leverage investments in availing improved legume technologies to farmers; working with farmers' associations (eg, IKURU and others), and farmer groups through Farmer Field School mode of operation. The constraints of cowpea production includes abiotic, biotic, social and physical factors; domination by an informal system that has technical and infrastructural gaps, certification process that does not recognize the informal seed system, non-existence of mechanization at all steps, and unpredictable market prices and lack of quality seed at all times. The vision of success for cowpea in Mozambique is to attain highest productivity level (1.0+t/ha) at the national and global levels that attribute to the wealth of producer farmers with significant contribution for home food consumption and the market.

Soybean production in Mozambique

State of soybean research in Mozambique

Soybean research in Mozambique started in the early 1980s, in the northern highlands of Zambezia Province. This research activity was part of the overall program of the state commercial farm CAPEL (Lioma agro-industrial enterprise). Some varieties released at that time were grown for market purpose. Civil war stopped all the programs and the varieties disappeared. Later, in the 1990s, the Agricultural Research Institute of Mozambique (IIAM) reintroduced some varieties from IITA for evaluation. During the cropping season 2002/3 some promising lines from Malawi, Zambia and Uganda were introduced for massive evaluation both on-station and on-farm, in different agro-ecological zones. The varieties used were: TGx 1485-1D, TGx 1448-2E, Soya, 427/5/7 Ocepara-4, of which TGx 1740-2F and 427/5/7 showed good performance. In the production, farmers were using the varieties Santa Rosa, Solitaire and Storm, all of them introduced from neighboring countries (Zambia and Malawi). As a result of the combined efforts of IITA and IIAM, the first varieties were released and farmers now have more options of varieties. The released varieties are the following: Wamini (TGx 1740-2F), Sana (TGx 1485-1D), Zamboane (TGx 1904-6F), Wima (TGx 1908-8F), Olima (TGx 1937-1F), Ocepara-4, H7, H17 and 427/5/7. The main characteristics of these varieties are presented in Table 5.

Table 4: Cowpea seed production plan over the three years in tons.

	2012	2013	2014
IT 18	83	117	141.2
IT 16	249	349	423.6
IT97K-1069-6	249	349	423.6
IT00K-1263	249	349	423.6
Total	830	1164	**1412.0**

Table 3: Cowpea Seed Production plan.

Agro-ecology				Seed Production (tons)					
				Breeder seed in 2012		Foundation seed in 2013		Certified seed for use in 2014	
Agro-Ecology	Seed demand (ha)	Variety demand	Yield (kg/ha)	Area (ha)	Production (T)	Area (ha)	Production (T)	**Area (ha)**	**Production (T)**
Semi-arid South & Central	7060	IT 18	1000	0.056	0.056	2.8	2.8	141.2	141.2
Semi-arid South & Central	21,180	IT 16	1000	0.169	0.169	8.5	8.5	423.6	423.6
Tropical humid savanna, Northern	21,180	IT97K-1069-6	1200	0.082	0.098	5.9	7.1	353.0	423.6
Humid Savanna Central & Northern	21,180	IT00K-1263	1200	0.082	0.098	5.9	7.1	353.0	423.6
Total				0.389	0.422	23.1	25.4	1270.8	1412.0

Table 5: Major characteristics of the new varieties.

	Characteristics				
Varieties	Type	Yield (kg/ha	100 seed w (g)	Seed color	Agro-ecology*
Wamini	Determinate	3,000	15	Dark brown	Central & Northern
Sana	Determinate	2,500	15	Dark brown	Central & Northern
Zamboane	Determinate	3,500	15	Dark brown	Central & Northern
Wima	Indeterminate	3,500	15	Dark brown	Central & Northern
Olima	Indeterminate	3,500	14	Light brown	Central & Northern
Ocepara-4	Indeterminate	2,500	14	Light brown	Central & Northern
427/5/7	Indeterminate	2,800	15	Crème	Central & Northern
H7	Determinate	3,000	18	Dark brown	Central & Northern
H17	Determinate	3,500	15	Dark brown	Central & Northern

Production constraints are many and diverse due to contrasting agro-ecologies and include non-availability of improved varieties adapted to various production systems, lack of resistant varieties to foliar diseases such as rust, inadequate nitrogen(N) fixation of varieties, lack of varieties tolerant to low phosphorus (P), lack of organized seed production and delivery systems, poor seed viability from one season to the next, lack of drought tolerant varieties and weak market linkage with processors, consumers and exporters.

Agro-ecologies for soybean cultivation in Mozambique

Although Mozambique does not have a long history of soybean production, current results indicate that northern Zambezia, south and southern Nampula, offer good conditions for soybean production. These areas are currently benefiting from increased investments not only in agricultural production but also through a great opportunity for vertical coordination with a processing unit under installation in central Nampula. For the expected commodity flow, the existing railway and road in the southern Niassa district of Cuamba will be key. Manica and Tete provinces in central Mozambique are also suited to soybean production.

Major constraints to soybean production

Production constraints are many and diverse due to contrasting agro-ecologies and include the following:

- Non-availability of improved varieties adapted to various production systems until recently
- Lack of seeds for the farming communities
- Lack of varieties resistant to foliar diseases such as rust
- Inadequate N2 fixation of varieties due to non- availability of inoculants
- Limited use of P fertilizers due to limited availability and high prices
- Lack of organized seed production and delivery systems,
- Poor seed viability from one season to the next
- Frequent drought in some regions
- Weak market linkage with producers, processors and consumers.

Opportunities

There exist considerable opportunities for soybean production such as the demand from poultry and livestock industries in Mozambique for at least 40,000 metric tons of soybeans for feed every single year. In the past, demand was largely being met by imported soybeans from Argentina and Brazil as Mozambique did not have enough supply. With USAID support, IITA in collaboration with IIAM, has led ground-breaking research to identify soybean types that grow well in Mozambique, which has diverse soil types country-wide. The current government policy is favorable to soybean production. There is shortage of edible oil and the government is looking for local production and processing avenues. In this regard, the government is encouraging the production of oil-seed crops. There is a significant market for edible oil, whose annual industrial production is estimated to be as high as 110,000 tons, and finally the presence of several NGOs working in nutrition aspects and using soybean sub-products in their recipes add to the reasons for encouraging soybean cultivation.

R4D emphasis in Soybean

- Continue introduction of farmer and market preferred varieties with resistance/tolerance to major biotic and abiotic stresses.
- Develop a sustainable seed systems model (both community-based and medium-scale private producers) for the new released varieties.
- Popularize the new and high yielding varieties
- Introduce and promote good agronomic practices in soybean production

Seed systems for Soybeans in Mozambique

Approximately 60% or more of the planting material used is from farmers' own-saved seed. Usually, the few seed companies operating in Mozambique prefer to produce and sell hybrid maize seed. Seed companies don't show interest in producing self-pollinated crops such as soybean. For sustainability of seed production and distribution in Mozambique, it is important that the public research sector be linked to locally operating

institutions, such as NGOs, extension services, farmers' associations and other community-based organizations (CBOs) that play an important role in effecting this link. For these interventions to be sustainable, training of farmers and stakeholders (and not just government subsidies) as well as market development are critical. During Phase II of the Tropical Legumes II project, 20% of the current area will be planted with new improved and high yielding varieties, with the participation of strategic partners as shown in Table 6.

Table 6. Strategic partners and their role in seed systems.

Partner	Role
National Seed Services Mozambique	Seed systems support, helping Collaborating NGOs and CBOs with Quality seed production/ monitoring
IIAM – Instituto Investigaçao Agraria de Moçambique	Variety development, evaluation and release. Production of breeder and foundation seed
Department of Agricultural Extension Services	Provision of guidance in crop production technologies and associated packages
Farmers	Users of released varieties and associated packages
IKURU	Capacitate farmers in formation of associations for collective production and marketing
IITA	Provide improved soybean germplasm. Capacity building through training. Develops and disseminates technology
Private sector (market intermediaries and emerging small-scale seed enterprises and processors)	Processing and commercialization of seed and products

Groundnut Production in Mozambique

State of groundnut research in Mozambique

Before 1975, research on legumes was neglected in Mozambique. However, literature references indicate that there was some work conducted on groundnut (Baptista 1934; Ferreira 1958 and Wilson 1944) and beans (Carvalho 1970). The crop was mainly grown for export to France, Portugal, the Netherlands and South Rhodesia (Baptista 1934 and Ferreira 1958). The main focus was variety selection and post-harvest control of losses. After 1975, research on groundnut was carried out at the Instituto Nacional de Investigacao Agronomica (INIA). Research efforts at INIA resulted in development of some improved groundnut production technologies in the country (Ramanaiah et al. 1988). During the prolonged civil war, much of the country's infrastructure and expertise in research was debilitated to a great extent. As a result, valuable genetic resources were lost. The strategy used to recover from this was emphasis on capacity building, collection of local landraces, and introduction of improved groundnut varieties generated by ICRISAT. The current average yield of groundnut is very low, with a nation-wide mean of about 450 kg/ha, which is one of the lowest in the world. The dominant varieties are Bebiano Branco, Mamane and Nametil. The target is to move from 450 to 850 kg/ha by 2015. Most recently, new groundnut varieties were released, with good traits for farmers' use. The new varieties are: ICGV-SM 99541, ICGV-SM 99568, ICGV-SM 01513, ICGV-SM 01514, JL 24 and CG 7.

Yields can easily be doubled with the use of rosette, rust and leaf spot resistant varieties, and by following basic cropping practices. There is a distinct difference between groundnut production in the North and the South. In the South, small grain groundnuts (Spanish type) are popular, while in the North a large proportion of the area is allocated to the planting of the large seeded groundnuts (Virginia, Runner types) as shown in Table 9.

Table 7: Soybean Seed Production Plan (tons).

Ecology	Promising	Seed Production (tons)		Seed (tons) to reach 20% adoption	20 % additional requirement (*1.2%)	Seed production			Partners
	Varieties	Breeder	Foundation			Year 2012	Year 2013	Year 2014	
Semi-arid Central	Sana (TGx 1485-1D)	0.024	0.720	18	21.6	7.2	7.2	7.2	IIAM, IITA, Ikuru, Useba, Dengo Comercial Moz Seeds, Lozane Farm, Phoenix Seeds, Semoc
	Wamini (TGx 1740-2F)	0.019	0.648	18	21.6	7.2	7.2	7.2	
Tropical humid Northern	Olima (TGx 1937-1F)	0.08	2.40	60	72	24	24	24	
	Sana (TGx 1485-1D)	0.080	2.40	60	72	24	24	24	
	Zamboane (TGx 1904-6F)	0.054	1.96	60	72	24	24	24	
	Wima (TGx 1908-8F)	0.054	1.96	60	72	24	24	24	
	Wamini (TGx 1740-2F)	0.065	2.16	60	72	24	24	24	
Humid Savanna Central and Northern	Wamini (TGx 1740-2F)	0.026	0.864	24	28.8	9.6	9.6	9.6	
	Sana (TGx 1485-1D)	0.032	0.960	24	28.8	9.6	9.6	9.6	
	Zamboane (TGx 1904-6F)	0.021	0.785	24	28.8	9.6	9.6	9.6	
	Wima (TGx 1908-8F)	0.021	0.785	24	28.8	9.6	9.6	9.6	
Total		0.476	15.65	432	518.4	172.8	172.8	172.8	

Table 8: Major characteristics of the new groundnuts varieties.

	Characteristics					
Varieties	**Type**	**Yield (kg/ha)**	**100 seed wt (g)**	**Seed color**	**Diseases resistance**	**Agro-ecology**
ICGV-SM 99541	Spanish	3,000	25	Tan	Rosette	South & Central 600 – 800 mm
ICGV-SM 99568	Spanish	2,000	25	Tan	Rosette	South & Central 600 – 800 mm
ICGV-SM 01513	Spanish	3,000	25	Tan	ELS, LLS	600 – 800 mm Central
ICGV-SM 01514	Spanish	3,000	25	Tan	ELS, LLS	Central 600 – 800 mm
CG 7	Virginia	2,800	52	Red		Central & Northern > 800 mm
JL 24	Spanish	2,500	25	Tan		South & Central 600 – 800 mm

Table 9: Differences between the two most important groundnut-growing regions in Mozambique.

Region	South	North & Central
Objective of production	Food (Family)	Market
Characteristics of the varieties	Short duration (90-120 days)	Medium-long duration (120-180 days)
	Small grain	Large grain
	Erect plants	Semi-erect to prostrate pants
	Non-dormant seeds	Dormant seeds
	Low yield (200-300 kg/ha)	High yield (500-700 kg/ha)
	Spanish type	Virginia type
	Pure or intercropped with maize	Pure or intercropped with cassava

The production constraints are many and diverse due to contrasting agro-ecologies and include non-availability of improved varieties adapted to various production systems, lack of organized seed production and delivery systems, drought, poor soil fertility and cultural practices, insect pests, and diseases. Aflotoxin contamination is believed to be a serious quality problem of groundnut in Mozambique, which has resulted in low quality of the nuts, and thus the loss of international/regional export markets. Groundnut is grown by smallholder farmers, especially women farmers, under very low input conditions, without any fertilizers and pesticides, largely as a mixed crop with Bambara groundnut, cowpea, cassava, maize and sorghum. The opportunities for groundnut production includes the new strategic plan for agricultural development, which considers groundnut as one of the strategic crops for Mozambique, both for local consumption as well as for its contribution to the GDP, through export.

In terms of markets;

- In many areas local retailers and traders make up for the bulk of the marketed groundnut, which may then be linked to larger wholesalers and transporters with the responsibility of carrying the product to the final markets, mostly in larger cities like Beira, in central Mozambique, and Maputo and other southern towns.
- Larger companies (eg, V & M wholesalers in Nampula) also buy, store and truck groundnuts to the South. Sometimes groundnuts are shipped in containers by coastal shipping from Nacala to Beira and Maputo
- In Nampula and Zambezia, supported by NGOs like CLUSA, AFRICARE and World Vision, a few farmer associations have been established and became involved in the production and marketing of groundnut.
- The lessons learned and knowledge gained during the first phase of TL II would be an important vehicle to introduce new and high yielding varieties in major groundnut growing areas in the central and northern parts of the country.
- IKURU is a business company partly owned by producer associations of Nampula province and the south of Niassa that promote groundnut production and marketing.

Agro-ecologies for groundnut cultivation in Mozambique

Most of the groundnuts are produced in the central and northern provinces of Nampula, Zambezia, and Cabo Delgado and in the southern provinces of Inhambane, Gaza and Maputo (Figure 1). Shorter duration early maturity cultivars are more popular in the south where it is relatively drier with erratic rainfall (≤600 mm per year). In the central and northern regions that receive more rainfall (800-1200 mm), medium to late maturing varieties are grown. Groundnut is grown mostly as an intercrop or in rotation with maize, cassava, sorghum, millet, and plantation crops.

Seed systems for a legumes green revolution in Mozambique

In Mozambique, there is no formal groundnut seed production and supply system. Approximately 90% or more of the planting material used is from farmers' own-saved seed. Usually, the few seed companies operating in Mozambique, prefer to produce and sell hybrid seed. Seed companies don't show interest in producing self-pollinated crops. For groundnut, there are constraints with farmers-saved seed, such as:

- Groundnut seed is not stored for use in the following year due to the perceived threat of storage pests, thus forcing the smallholder farmers to sell their produce and depend on external seed sources for the next crop.
- Recurrent use of farmer's own saved seed for sowing, results in lower returns to farmers

- Lack of storage facilities and the non-awareness regarding opportunity cost to increase their incomes.
- Recurrent droughts cause pods with shrivelled kernels leading to inferior quality seeds.

For sustainability of seed production and distribution in Mozambique, it is important that the public research sector be linked with locally operating institutions such as NGOs, extension services, farmers' associations and other community-based organizations (CBOs) who play an important role in effecting this link. For these interventions to be sustainable, they must be based on training and market development and not on direct government subsidies. During the Phase II of the project, 20% of the current area will be planted with new improved and high yielding varieties, with the participation of strategic partners. The seed production plan up to 2015 is presented in Table 10.

Table 10: Groundnut Seed production plan.

Agro - Ecology	Demand area (ha)	Promising Varieties	Seed required to reach 20% adoption (tons)	Seed Area in Ha and Production in tons							
				Breeder seed 2012		Foundation seed 2013		Certified seed 2014		Certified seed 2015	
				Area	Production	Area	Production	Area	Production	Area	Production
South (Gaza) 600 – 800mm	82,800	Nametil	1324.8	0.06	0.05	2.7	4.0	24.0	36	240.0	360
South (Gaza) 600 – 800mm	55,200	ICGV-SM 01513	883.2	0.19	0.15	16.3	13.0	167.1	117	726.0	1089
Central (Nampula, Zambezia) 600 – 800mm	41,400	ICGV-SM 01514	662.4	0.06	0.05	5.0	4.0	51.4	36	240.0	360
Central (Nampula, Zambezia,) 600 – 800mm	41,400	ICGV-SM 99568	662.4	0.19	0.15	16.3	13.0	167.1	117	726.0	1089
Central (Tete) 600 – 800mm	55,200	JL 24	883.2	0.13	0.10	10.6	8.5	109.3	76.5	483.0	724.5
Central & North Nampula, Cabo Delgado >800mm	18,400	Mamane	294.4	0.06	0.05	5.0	4.0	51.4	36	240.0	360
Central & North Nampula, Cabo Delgado >800mm	18,400	CG 7	294.4	0.19	0.15	16.3	13.0	167.1	117	726.0	1089
Southern (Inhambane) 600 – 800mm	9,200	Nametil	147.2	0.01	0.01	0.6	0.5	5.8	4.05	21.3	31.95
Southern (Inhambane) 600 – 800mm	55,200	ICGV-SM 99541	883.2	0.06	0.05	5.0	4.0	51.4	36	240.0	360
Southern (Inhambane) 600 – 800mm	41,400	ICGV-SM 99568	662.4	0.19	0.15	16.3	13.0	167.1	117	726.0	1089
Central (Tete) 600 – 800mm	41,400	Nametil	662.4	0.01	0.01	1.3	1.0	12.9	9	21.3	31.95
	460,000		7360.0	1.14	0.91	95.1	77.95	974.6	701.6	4389.6	6584.4

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