Seed Security Assessment

Great South (Grand Sud)

Madagascar




July 2023

Report prepared by:

seed system

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SeedSystem technically guided this Seed Security Assessment (SSA) with Consulting Plus spearheading the operational field plan. There were many organizations and professionals involved, and hence many to thank.

The insights of professionals from diverse institutions formed the basis of this assessment. This included extensive and frank discussions with representatives tied to government agencies (FOFiFA, SOC, CMS); development projects (DEFIS); CGIAR centers (CIP, ICRISAT); NGOs (CTAS, CRS); UN Agencies (FAO); and private sector seed companies (Agrima).

Similarly, individuals working in rural areas greatly shaped our understanding of seed security issues. These include men and women farmers, seed companies, agrodealers, traders, agro-enterprise specialists and agro-processors.

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Finally, we extend thanks to the hundreds of smallholder farmers across the Great South who tirelessly answered our questions and helped us to see seed security and seed insecurity with much sharper lenses. Successful farming in the challenging Great South requires keen knowledge and sheer perseverance.

We all aim for this SSA to lead to practical action in the short- and medium-term. The positive opportunities to spur resilient seed systems in the Great South need to be seized upon soon and with vigor.

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Comments and updates are welcome by the SSA team. Please contact the assessment organizations at sperling@seedsystem.org (English report) and cplusmg@gmail.com (French report).

Acronyms

AFAFI	Programme d'Appui au Financement de l'Agriculture et aux Filières Inclusives
AMPROSEM	Association Malagasy des Professionnels des Semences (currently F3M)
ANCOSEM	Agence Nationale de Contrôle des Semences (currently SOC)
BHA	Bureau for Humanitarian Assistance (USAID)
ACF	Action Contre la Faim (Action Against Hunger)
AR	Ariary (Malagasy Ariary: 4570 AR = 1 USD)
CMS	Centre de Multiplication de Semences
CBSP	Community-based seed production
CGIAR	Consultative Group for International Agricultural Research
CIP	International Potato Center
CIRAD	Centre International de Recherche Agronomique pour le Développement
CNEV	Catalogue National des Espèces et Variétés de plantes cultivées
CRCIV	Regional Consultative Committee for the Registration of Varieties
CTAS	Centre Technique Agro-écologique du Sud
CRS	Catholic Relief Services
DEFIS	Programme de Développement de Filières Agricoles Inclusives
DiNER	Diversity and Nutrition for Environmental Resilience (Fairs)
DMM	Dokany Mora hoan ny Mpamokatra (agricultural input shop)F
DRAE	Direction Régionale de l'Agriculture et de l'Elevage
DSD	Direct Seed Distribution
DUS	Distinct, uniform and stable
DVM	Decentralized vine multipliers
DSD	Direct Seed Distribution
EGS	Early Generation Seed
EU	European Union
FFS	Farmer Field Schools (Champs d'écoles paysans)
FOFIFA	Foibe Fikarohana momba ny Fampandrosoana ny eny Ambanivohitra
FIFAMANOR	Fiompiana sy Fambolena Malagasy sy Norvegiana
FAO	Food and Agriculture Organization of the United Nations (also UN-FAO)
GiZ	Deutsche Gesellschaft für Internationale Zusammenarbeit – (German donor)
G	grams
GoM	Government of Madagascar
GPS	Groupement Producteurs de Semences (Groups of Farmers Seed Producers (multipliers) or groups of PMS);
GRET	Groupe de Recherche et d'Etudes Techniques
HH	Household
ICRISAT	International Center for Research in Semi-Arid Tropics
IITA	International Institute for Tropical Agriculture
IPC	Integrated Food Security Phase Classification
ISS	Integrated Seed Sector
Kg	Kilogram
MINAE	Minsitry of Agriculture and Livestock
MT	Metric Tons
NARS	National Agricultural Research System
NGO	Non-governmental organization
OFSP	Orange-Fleshed Sweetpotato
OPV	Open-pollinated variety

PISP	Private Input Service Providers
PICS	Purdue Improved Crop Storage
PMS	Farmer Multiplier of Seed (Producteur multiplicateur de semences)
PVS	Participatory Variety Selection
QDS	Quality Declared Seed (Semences de qualité déclarée)
SADC	Southern African Development Community
SOC	Official Seed Control and Certification Service Service Officielle de Contrôle (de Semences et de matériels végétales).
SMS	Short Message Service
SSF	Seed Security Framework
SSG	Seed Systems Group
SSA/SSSA	Seed Security Assessment/Seed System Security Assessment
SVF	Seed Vouchers and Fairs
USAID	United States Agency for International Development
VCU	Value for cultivation and use
VSL	Village Savings and Loan
WHH	WeltHungerHilfe
WFP	World Food Program

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Executive Summary

A Seed Security Assessment (SSA) was carried out in the Great South of Madagascar in May-June 2023. The assessment focused on the supply side (assessing formal and informal markets) as well as on demand (reviewing community and households' current strategies, needs and purchase patterns). The SSA was comprehensive, covering three regions – Androy, Anosy and Atsimo Andrefana – 9 districts, 19 communes, and 40 fokontany (villages).

The rationale for conducting the SSA in the Great South of Madagascar was threefold:

1. **The Great South has one of the highest malnutrition rates in the world,** with about half the children under five showing significant stunting. Food insecurity and nutritional insecurity are rampant. Tailored seed-security related responses could help boost production system resilience, food security, and overall nutritional profiles.

2. **The Great South has been the focus of substantial humanitarian assistance programs,** at least since 2005. Government, donors, and communities want to move beyond emergency modes and towards more developmental operations.

3. **It is past time to spur sustainable, resilient, and high performing seed systems that work in the South** and for a large range of southern smallholder farmers. There is a good deal of room to boost seed security, if focused planning and action unfold.

The seed security constraints identified within the SSA were diverse and widespread. They included problems involving all the major seed security features (availability, access, seed health and variety quality), with constraints identified particularly in the medium and longer-term. The constraints identified were chronic and systematic, not acute issues.

Note that the SSA did not find an 'emergency' situation requiring urgent humanitarian actions: for instance, there was no identified need for a widespread direct distribution of seed aid. In fact, the seasons being evaluated proved to be to relatively good ones, especially when compared with the two previous (2020-21; 2021-22). While very vulnerable households may still require safety net-type assistance linked to their deeply-rooted poverty, for much of the population there is an immediate need to act quickly and to think more longer term so as to build ongoing and resilient seed systems. Hence, while the SSA did not identify a humanitarian emergency, it did show the need for urgent short-term actions – but urgent <u>developmental,</u> more forward-thinking ones.

This Executive Summary presents major findings first, prior to an extensive set of recommendations as field-based evidence has to drive the practical moves forward.

Findings focusing on farmers and communities

Summary: Acute seed security findings 2022-24

Diverse indicators suggest the seed security of South Madagascar farmers in the short-term is relatively stable and even improving over two previous seasons. This is not an emergency seed situation. That said, the objective indicators suggest that their 'normal' seed security levels are very stressed. Below is a summary of the main trends in the short term.

From the farmer point of view, 2022-2024

1. The season 2022-23 was generally assessed as a good one across major crops – especially in contrast to the two prior seasons, both of which were assessed as very poor.

2. Sowing trends for the 2022-23 main growing season and projected 2023-24 season were both charted as on the rise. For 2022-23, farmers sowed +26.42% more seed than 'normal'; for the 2023-24 season, farmers intend to plant +29.85% more seed.

3. Farmers relied on local seed channels to access over 98% of their seed during the 2022-23. These included: home saved seed, seed from friends or kin, and local markets. Almost 74% of seed sown was sourced from local markets. For the 2022-23 season, no farmers in the sample (N=620) cited using any formal seed sector channel: no agrodealer or government source.

4. Sorghum was not currently not listed as among farmers' priority crops and over 85% of sorghum seed sown was obtained through free aid. It is currently difficult to determine real demand. Moving forward, acceptance and promotion of sorghum (and millet) may require substantial efforts in behavioural change, emphasizing especially its high value for resilience, coupled with initiatives to enhance its monetary value (through novel value chains).

5. For those farmers' sowing less during the 2022-23 season (often a signal of stress or vulnerability), the overwhelming reason given was lack of money. Seed was available but farmers lacked the funds to purchase. Variable weather for select crops was cited as a secondary reason.

6. For the farmers sowing more during the 2022-23 season, the reasons were straightforward, principally the weather had improved (for select crops) and more seed was available due to good prior harvest. There were near nil instances of farmers planting more to respond to the opening markets or because they are trying to intensify aspects of their production, for instance, to focus on the more lucrative crops.

6. Lack of money, or lack of purchasing power – was the major factor constraining farmers' seed use. Seed purchase costs for farmers' three main were calculated at Ar 34013.29 for 2022-23 and Ar 66269.18 for the upcoming 2023-24 season.

7. More generally, in the short-term, there were important indicators of ongoing seed security stress among smallholders. Select farmers are buying 100% of their seed from local markets, season after season; many are not planting highly desired crops at all (such as maize); some are harvesting the crop prematurely so as to eat; many sow 'less' of a given crop; and a good number don't have three principal crops at all – they can afford only two.

On the supply side, 2022-2024

On the seed supply side for 2022-24 seasons, several findings are to be remarked tied to analysis of the formal and informal markets.

1. The few agrodealers in place indicated no remarkable inventory shortages. All focused on horticultural crops, with dealers having a good range of types on hand. As farmers' accessed negligible amounts of seed from this source, the current agrodealer role in seed security was not key for the Great South smallholder

2. For seed supply from formal agrodealers, other trends are notable:.

- Geographic access: they are concentrated near solely in urban areas. (although the growth of PISP and CTAS outlets has been an important advance.)

- Crops focus: The agrodealer prime thrust is on horticultural crops only, with the range of legumes poorly represented. (Again, the PISP and CTAS outlets help to fill this gap.)

3. The seed available on the local markets was relatively plentiful (+37% over previous season) Generally, such seed was assessed by farmers and traders to good or average quality (although the SSA made no objective assessments). A diversity of crops was found in the open market. Also, seed of recognized high quality was occasionally sold, especially certified vegetable seed in packets.

Overall, in the short term, the seed security situation is stable but at a level of 'very stressed stable'. While for the short-term, the SSA focused on only two seasons of monitoring, the acute stresses identified are likely indicative of the kinds of stresses smallholders in the Great South face on a more continual basis. Targeted solutions are needed to address the multitude of constraints.

Summary: Chronic Seed Security Findings + Emerging Opportunities

The review of medium-term trends in seed security the Great South uncovered chronic stress across a range of themes and identified a few moves forward (e.g., there were several cases of agro-enterprise). The seed security of smallholder farmers is very low (compromised) and may be on the decline (as compared to parallel indicators from a similar assessment in 2013). The current chronic seed security trends mirror those identified 10 years ago quite closely.

1. Farming communities grow an impressive array of crops, eight types or more. Most contribute to food security, but most are also high priority for sale. Farmers are selling whatever they can to help secure income. Transformation levels overall have been very low, or near non-existent across communities. Manioc and maize are sometimes ground into flour, but there are not many other products. Farmers are most often selling their raw products and not adding key value that could bring in much-needed income.

2. Seed system channels which farmers use have generally remained static over the least five years and channels have declined in number and quality. Overall, farmers proportionally now save less of their own seed, and are increasingly tied to local market seed purchase, year after year. Aside from a single NGO intervening, communities cited virtually no new sources.

3. Only 8% of households (among N=620) have accessed any new variety in the last five years – whether modern or local variety. Those accessing mainly accessed new varieties via two channels: NGOs/FAO and the local market. Notably, very little variety novelty has come from the government, research, or extension chain (there were only two instances only for the entire farmer household sample). To get new varieties in farmers' hands, there might be a need to expand the types of delivery outlets and the types of packing formats (i.e., pack in smaller sizes for lower cost).

4. Input use (non-seed) was low for both mineral fertilizer and storage chemicals (< 15% farmers). It was highest for pesticide use (45%). The use of manure/compost might also be interpreted as relatively low (37-38% farmers) given the prevalence of large and small livestock in the region. Reasons for farmers' not using select inputs generally involved their not being available; their being too costly; or simply that farmers did not know enough about the options. So, there weren't just product-linked gaps, but extensive knowledge gaps.

5. For input use (non-seed), it is key to signal out the very low use of chemical storage treatments. In an unusual situation, most farmers do not routinely store at all as they lack sufficient food (and eat all stocks) or seek quick income and sell at harvest. For those who did store the previous season, losses were reported as high as 35% particularly for beans, maize, rice, cowpea and groundnuts.

6. Paralleling point #1 – on virtually no agricultural processing in rural communities – very few larger agro-processing enterprises were identified within the entire southern region. The SSA found a single case of a rather large fresh cassava processing set of companies.

7. In terms of aid, most households surveyed (3/4) had not received seed relief in the five years previous (2018-2023.) That said, seed aid is escalating and 2021 and 2022 were relatively prominent years for assistance—due to severe drought. Aid recipients generally received seed once (or 1.4 times) although several received aid 5 times in 5 years! The assistance format was overwhelmingly direct seed distribution (DSD) (81.9% of instances) with vouchers/coupons rising in frequency over the years (18.1% of instances). No farmer mentioned a cash transfer linked to seed relief. As humanitarian aid in Africa is moving away from DSD approaches and towards more market-based ones, aid approaches in the Great South might also move towards more demand- oriented and market-driven responses, with resilience in mind.

8. There are many variations of female-headed households in the Great South: women with polygamous husbands, unmarried mothers, and women 'abandoned by their husbands'. Focus groups suggest that the proportion of female-headed households may rise to 50% or more in select villages. The SSA qualitative and quantitative data suggest that female-headed households may face extensive seed security constraints. For example, many are short of funds at critical sowing periods and female-headed HH often require (i.e. need to hire) outside help for the heavy agricultural tasks. The overall data showed female-headed HH statistically having smaller field plots and sowing less.

In sum, the major stresses encountered which affect seed security are chronic and systemic ones. The SSA identified few sustainable or emerging innovations.

Findings focusing on supply: formal, intermediate and informal sectors

Summary: Formal, intermediary and informal seed systems in the Great South

Plant Breeding and Variety Introduction/Delivery

1. Varieties adapted for the South are listed in the SOC official register. This currently includes 30 FOFIFA modern varieties ('improved') and 37 varieties screened through CTAS (local varieties). CTAS has another 24 local varieties waiting to be approved. While CTAS continues an ongoing variety screening program focused on local germplasm, FOFIFA currently has no operational research anywhere in the South. Spurring a FOFIFA research and seed production center at Behara is under discussion.

2. In terms of modern variety screening and introduction, some dynamism is coming from other sources. For instance, CIP has been working closely with FIFAMANOR and has recently released 3 sweetpotato varieties. Agrima, a private company, has been working to introduce germplasm and upgrade existing entries, especially for maize and sorghum). Agrima is also in discussions to open 5 new breeding sites, including 2 in the South. This on-site expansion of breeding operations could translate to modern variety breeding and screening geared the specific climate- stressed southern agroecologies. There is a vital need

for injections of new germplasm that can reponse to farmer and market needs and to the challenging agro-ecological conditions.

3. Only 8% of households interviewed (out of the large sample of 620) had obtained a new variety in the last 5 years. There may be problems with variety appreciation. (The varieties just are not good enough?) It is key to confirm current variety performance and also to set up an ongoing decentralized variety testing network. At present, there is no organized screening system for new varieties within the southern region (i.e., to evaluate adaptation and preferences at diverse sites). CTAS has its key farmer evaluators. CIP manages its own local trials for the sweetpotato work.

4. Low new variety use may also be due to problems of access. To-date, farmers have largely received new varieties via the NGOs/UN (so, one-off distributions for free) or via local markets. That said, In recent years, the number of delivery outlets and service partners has grown, including the CTAS boutiques, CRS PISPs, and DMM outlet shops, among others. Mapping these delivery locations as a unit may give an idea of the broad locations where smallholders can access new germplasm. Note that there are very few formal sector agrodealers in the South and they focus mainly on horticultural crops (although some respond to humanitarian orders for relief aid crops such as sorghum or millet).

   In brief, there is a broad need to spur breeding dynamism, more comprehensive, realistic variety screening, and expand the outlet channels by which farmers can access performing varieties, especially to address the stress contexts of the South. Government actors alone cannot drive the needed extensive changes. Explicit collations of government, research centers, NGOs and private sector might be essential.

Formal Seed Sector/Intermediary Seed Sector

1. Production of breeder, foundation and certified seed is a prime mandate of several government institutions: FOFIFA, FIFAMANOR and SOC. Unfortunately, early generation seed (EGS) figures are hard to come by (and are still being confirmed), but all experts agree that overall production is very low. (Note that FOFIFA did produce 17 MT of foundation seed for FAO this last season.) FOFIFA does not have an operating seed production site in the South- although land has been designated. Also, there only two main CMS (seed multiplication centers) across the entire region. CTAS supports the center at Agnarafaly; but the second government-backed center, in Behara, is presently 'degraded' (deemed under performing and in need of rehabilitation).

2. Effective seed Inspection and seed certification services for South have challenges. The SOC, based in Antananarivo, has no laboratory located in the South. Many experts interviewed expressed concern about the quality of screening as well as delays in receiving results. There may be a need to revitalize SOC headquarters but also to decentralize operations and add laboratories in the South. (Taolagnaro has been suggested as a site.)

3. In terms of non-governmental early general seed (EGS) production, CTAS has been taking a lead supporting the Agnarafaly multiplication center, producing 10-15 MT year when conditions are favorable. The private company Agrima has been selectively multiplying early breeding parental (175 kgs for three crops in 2022-23) and also delivering 75 MT of certified seed last season (and 88 MT local variety high quality seed). Additionally, CIP has been supporting FIFAMANOR to get basic quality sweetpotato vines and cuttings. While these are much needed contributions, they are currently punctual, not coordinated initiatives, and all could likely benefit by being scaled up.

4. Several organizations have been involved in decentralized seed multiplication, that which is more directly link to farmer end-users. CTAS works with 500 seed producers (PMS), CIP has 57 DVMS, FAO has 200

multipliers, CRS has both vine multipliers and seed producers, about 60-70 in total. The DEFIS project also cited a total 640 PMS in the South, although it is likely the some of the figures above overlap. While it is difficult to sense of the exact total, tallies suggest that between 300- 350 MT/year is being multiplied directly geared for the South (not including commercial company importations). Very roughly estimating, this total amount of seed may be less than 1/5 or might be needed. We say 'roughly' as effective demand cannot yet be estimated due unknown around issues such as variety appreciation, costs of production, farmer willingness to pay, etc.

5. Beyond seed production *per se*, there are as important challenges in seed delivery and marketing. Much of the seed produced is geared to institutional clients such as rural development projects and NGOs involved in emergency and recovery. High quality seed is subsequently given to farmers free: no farm-level high quality seed markets are being stimulated. In select cases where seed marketing is geared to smallholder farmers directly, the seed cost is routinely heavily subsidized, by 50% and more. Development and humanitarian practitioners in the South complain that smallholders won't buy higher quality seed (mainly due to cost but also as they can source more cheaply from local markets). Experience elsewhere suggests that "Good seed PAYS, not costs." If southern farmers see only cost – and not benefit – then seed production and marketing strategies may best be very closely reviewed. Weaning from subsidy will also have to be programmed as an explicit process.

In sum, at all levels of seed production and marketing there have been key constraints identified, some of which are being addressed (e.g., opening up a FOFIFA research station in the South and rehabilitating government seed production). Non-government actors, especially CTAS, but also select NGOs, CGIAR centers and private sector companies, have been key for shoring up seed supply, even starting at the EGS level but especially working on downstream multiplication. In moving forward, there needs to be expansion and coordination in seed production-with many more actors engaged (and incentives may have to be weighed). Equally, critical however there will have to be shifts in seed production and marketing. Smallholder farmers must be engaged as direct buyers, paying for seed at real costs. Institutional buyers alone must not drive seed production and marketing across the South.

Informal Seed Sector

1. The informal system is quantitatively the most important one across crops in delivering over 98% of the seed southern farmers sow. The informal seed system consists of several components- seed saved from own harvest; seed obtained through social networks (friends, neighbors, relatives); and seed purchased in local markets.
2. In the Great South, the local market system is currently the key to farmers' seed security, providing 74% of the seed smallholders sow (this figure is the highest % ever reported for local market use within an SSA, anywhere). Local market use confirms that southern farmers are already engaged commercially in buying seed, local seed. Local markets are also an important source for farmers' accessing new varieties.
3. Traders sell a large range of crops, largely procuring seed stocks from local sources: their own production, seed sourced directly from other farmers, and seed bought via collectors.
4. Many traders aim to tap into a lucrative local seed market, as prices often prove higher than those linked to food grain alone. To respond to the demand for seed to plant, traders in the region have adopted some six select practices for managing potential local seed. For instance, they sort out bad grains and waste (like dust and pebbles), keep freshly harvested stocks apart, and pay extra attention to storage conditions. Unusual is that some traders in the Great South grade stocks and a select few employ methods for germination tests.

5. Traders also engage in unique seed security roles in the Great South: moving stocks from one region to another (for use in emergency); seeking out special new varieties; and serving farmers in hard-to-reach last mile areas.

In sum, given that the informal sector is an important force in the South, and especially the informal markets and traders, it might make sense to explore more explicit linkages to formal and intermediary sectors. There may also be opportunities for strengthening and professionalizing this informal sector further (raising quality, knowledge of modern varieties, storage etc). The challenge is how to leverage its current strengths and address its current weaknesses in a more strategic way.

Cross-sectors: Meeting seed security for the Great South

Many of those interviewed with the SSA expressed an urgent need to move seed security planning and operation forward in explicit ways and quickly. Many also called for more coordinated actions so as to create an Integrated Seed Sector, uniting strengths of formal, intermediary, and informal seed sectors. For this reason, the SSA recommends the convening of **a Regional Seed Security Workshop for the Great South as a priority.**

RECOMMENDATIONS: Across the Great South

The seed security assessment conducted in May-June 2023 encompassed three regions: Atsimo-Andrefana, Anosy and Androy. Coverage was sufficiently comprehensive to allow for overall recommendations – those that can potentially spur seed security across the Great South. Important is that the SSA looked at both the supply and demand side (demand here equated with community and farmer views). Both are key for identifying seed security action points.

The seed security constraints identified within the SSA were diverse and widespread. They included problems involving all the major seed security features (availability, access, seed health and variety quality), with constraints identified particularly in the medium and longer-term. The constraints identified were chronic and systematic, not acute issues.

Note that the SSA did not find an 'emergency' situation requiring urgent humanitarian actions: for instance, there was no identified need for a widespread direct distribution of seed aid. In fact, the seasons being evaluated proved to be to relatively good ones, especially when compared with the two previous (2020-21; 2021-22). While very vulnerable households may still require safety net type assistance to address constraints linked to deeply-rooted poverty, for much of the population there is an immediate need to act quickly but to think more longer term so as to build ongoing and resilient seed systems. Hence, while the SSA did not identify a humanitarian emergency, it did show the need for urgent short-term actions – but urgent <u>developmental,</u> more forward-thinking ones.

Overall, the seed security of smallholder farmers in the South is very compromised. A detailed and priority agenda for action might be developed soon to jumpstart seed security in the South. Recommendation theme #XII – the last one – calls for the convening of an inclusive stakeholder meeting to rethink impact-oriented strategies for ensuring seed security across the South. The meeting might focus on boosting and integrating all seed systems farmers use. The vision would be for an Integrated Seed Sector, working for Resilience. (Annex 3 suggests elements of a program.)

Below, we put forward a set of first order recommendations. These are priority areas for action. We stress <u>priority</u> as not all constraints can be addressed at once: there needs to be prioritizing and sequencing of actions. Together,

as a set, the recommendations, if implemented, should provide a base for boosting seed security in the Great South in 1 to 5 seasons. Specific targets will have to be set.

As an important observation, a good number of the priority areas for action were also identified during a 2013 SSA (which was much more limited in scope, and with diverse teams). There is not compelling evidence of significant seed security progress for the Great South in a full decade, from 2013-2023. There has been an expansion in promising projects and programs but not evidence that farmers' own seed security has been altered on a broad scale. *In fact, the levels of farmers' seed INsecurity stress may have increased (based on concrete signals).*

In devising recommendations, we have tried to be realistic, recognizing:

- conditions in the South: droughts, very poor roads, lack of services all around;
- the current formal breeding and formal seed sector capacities; and
- especially farmers' own circumstances- the high levels of malnutrition, low purchasing power

Any seed security program developed might best be innovative and explore ways to break the stagnation. There should be room for 'Out of the Box' and more integrated approaches.

Seed Security for the Great South. Priority Action Areas

I. VARIETY CONFIRMATION AND DEVELOPMENT

Varieties need to be confirmed that respond to the stress conditions of the South and that meet smallholder needs for both home consumption and market. There are a large number of varieties registered (see Annex 1), but it remains unclear which are really performing and if the levels of performance are sufficient. Remember that the SSA team found very few new varieties in farmers' actual fields, so performance evidence is scant. Several actions that might be given priority:

1.1 Confirm current set of recommended/released varieties (FOFIFA, CTAS and others).

Which varieties: Varieties released by FOFIFA/FIFAMANOR, CTAS, and others should be objectively screened in controlled conditions and employing farmer-realistic management regimes. Which releases perform well and which not? The results could lead to sharper characterization and recommendations for a first set of released varieties across a range of crops. Verification should be tailored for the different regions of the South.

Who? An agency with sufficient expertise, field sites, and well-characterized plots should take the lead. The comprehensive variety screening could be managed by a government research institution but, equally, might be spearheaded on-the-ground by a non-governmental or especially private sector seed actor. The actor taking the lead should be able to perform with speed, rigor and objectivity.

1.2 Collect/import best crops and variety bets from elsewhere (across Africa, international).

No matter what the results of #1.1, The South also needs injections of new, very high performing variety materials. It needs quick boosts. Promising varieties should be brought in from elsewhere, to be tested in controlled conditions – even next season.

Which varieties/sources: Madagascar is a member of SADC and other Africa national agricultural research programs may have very promising candidates. Equally, CIRAD, the CGIAR centers (CIP, IITA, ICRISAT already work in the South), or international and national private sector companies might have _promising germplasm candidates.

Who to organize?: Likely similar to 1.1

1.3 Screen/process the remaining 24 varieties in CTAS' QDS catalogue.

1.4 Revitalize FOFIFA's research capacity in the South (at Behara?). Consider adding select sites in Anosy and Androy.

1.5 Build on private sector breeding expertise for companies with strong orientation to the South.

At time of this report writing, one company, Agrima is in discussions with the MINAE, to spur five breeding sites: Sakay (Bongolava); Maintirano (Melaky region), Antsirabe, Ambomvome, Beloha (South).

II. DECENTRALIZED VARIETY TESTING NETWORK

Linked to Recommendation I, varieties need to be screened on farm, with farmer feedback in decentralized plots. A regionwide decentralized testing network needs to be catalyzed, across the varied regions of the South. Not one site, but many sites.

2.1 Set up decentralized testing of promising varieties that are screened under realistic agroecological conditions.

Plots could potentially be commune-managed, community plots, or individual farmers' fields, particularly with lead farmers. Coverage has to include all key landscapes of the South.

2.2 Ensure authentic farmer feedback of decentralized variety testing sites.

Evaluations have to take place at different points in the season, with feedback from varied farmer-clients (men/women, more subsistence and market-oriented, farmers with different asset levels).

Who: The formal research institutions, even if functioning with high levels of expertise and funds, probably cannot handle the range of sites needed. FOFIFA/FIFAMANOR might have the lead role in oversight, but the actual testing might practically be devolved to organizations already working with farming communities, in well-defined zones, and on an ongoing basis. The FAO, NGOs such as CTAS or CRS, and even CGIAR centers, all have a presence in the South—and the agricultural expertise. Private sector companies committed to the South and perhaps two current CMSs could also host decentralized sites. The broader vision is to have many decentralized organizations untied in a coordinated decentralized testing plan.

How: Key is that testing site members agree to use the same protocol; varieties should be tested under realistic farmer conditions; and there has to be rigorous and systematic farmer feedback. Widespread training in participatory varietal selection (PVS) methods might also be useful. Practical protocols, easy and streamlined, need to be negotiated.

III. SEED PRODUCTION: EARLIER GENERATION AND SOC AND GOVERNMENT MULTIPLIERS: BREEDER, FOUNDATION, AND INITIAL CERTIFIED

High quality early generation seed, of guaranteed quality, needs to be on offer. As this issue has been explored in recent reviews (i.e. Rabenasolo, I. 2019), we focus on key immediate actions.

3.1 Schedule a collaborative review of the Service Opération Contrôle (SOC).

Such a review needs to be open to a frank assessment of current functioning and to set standards for desired future functioning. Specific calculations might be put forward in terms of what is needed: equipment, training, field funds and the like.

3.2 Consider establishing branches of SOC service based in the South.

Taolognaro has been suggested as one site. Setting up several might be a preferred option so as to effectively offer decentralized services.

3.3 Revive the degraded CMS center of Behara.

Assess what is needed: e.g. tractors, sprayers, etc. Put in place a longer-term, not stop-gap, operational plan.

3.4 Review overall CMS/PMS modes of operating.

Why are they geared near-exclusively to institutional clients rather than to the public, i.e., smallholder farmers, in the South?

3.5 Engage explicitly private sector organizations who have the technical capacity to produce breeder and basic/foundation seed, as well as subsequent generations.

Anticipate what legal arrangements may need to be clarified.

IV. DECENTRALIZED SEED PRODUCTION GEARED TO SMALLHOLDERS

There is not sufficient quality seed, which organizations can use as a base for further multiplication – whether certified, QDS or simply very high-quality farmer-produced seed. Despite the heroic efforts of several implementers, overall volumes remain low, the quality is not always as expected, and seed sales are subsidized. Further, while the work of CTAS is impressive, one organization alone cannot serve as the seed security backbone of a region as large and agroecologically stressed as the Great South.

The challenges in identifying and promoting sustainable seed production models are not isolated to the South (or even to Madagascar!) but they are urgent and are hindering not only supply of good seed but also the spread of new varieties (Recommendation V). The recommendations put forward here directly parallel recommendations put forward in the 2013 SSA. Nothing has significantly progressed in the decentralized seed production domain, except for the increasing of subsidy. As a general recommendation, sustainable seed production models might be confirmed and scaled-up, especially for the legumes and vegetatively-propagated crops. Some specific actions are listed below.

4.1 Review decentralized seed production experience elsewhere.

Commission an internal review (to other regions of Madagascar) and external – other countries in Africa. The review could be a quick review (1 month?) but should focus on why promising seed production models have endured and in what operating context.

4.2 Set clear and transparent guidelines for decentralized seed production development.

Some features that have proved important elsewhere include:

a. Decentralized seed multiplication programs must assess the cost-effectiveness of their production. Subsidized seed production and purchase should be discouraged. Subsidized programs should have a phase-out strategy (like the use of graduated vouchers.)

b. Production groups should be required from the start to have a clear business strategy. They should be encourage to produce only if a) viable markets/delivery mechanisms are identified; b) their own agro-enterprise and marketing skills have been enhanced (training) ; and c) they have a realistic business plan.

c. Seed production programs need to multiply *the* most promising and appreciated varieties (not just what is easily available).

d. Decentralized producers should be actively linked to new sources of germplasm. This helps keep their business dynamic. Variety turnover stimulates demand.

e. Seed multiplication and delivery should also be geared toward a smallholder farmer client base. Institutional buyers (e.g. FAO, WFP, NGOs) should not be the only main driver/client of the seed business – if it is to be sustainable.

V. VARIETY DELIVERY TO ALL FARMERS AND LAST MILE AREAS

New varieties, whether modern or highly performing local, are not reaching farmers in the South. Only 8% of households reported received a new variety in the last 5 years, with most of these deliveries being received free from the NGOs/UN, that is, in a subsidized manner. The main non-subsidized venue was the local market, but the new variety accession rate was still very modest.

New varieties (really good ones, as emerging from Recommendations I+II) need to be put on offer in channels that are geographically-accessible and financially-accessible to farmers.

In all cases, enhanced delivery options need to be complemented by vigorous media campaigns helping farmers to make informed decisions about whether to use the new materials. This latter process could benefit from the rural radio programs already in place, texting/SMS, etc. (see Recommendation IX).

5.1 Expand channels where new varieties can be legally sold.

Promote sales in venues that farmers frequent; venues that sell seed, venues that sell food, places where they seek nutritional help (e.g. health centers), etc. Seed tracing services (codes on packs) might help shore-up accountability and authenticity.

5.2 Pack new varieties in 'affordable' units.

Encourage public, private, and intermediate sector to pack in small, well-sealed units (100g, 200g, 500g). Packs can be transported and, if handled well, maintain viability.

5.3 Engage new actors in the knowledge and sale of new varieties.

Market traders, for instance, are already selling new varieties. Actively provide them with the information needed to follow the variety pipelines and to be able to pass on information to their customers. Think beyond seed-specific sellers. Broaden the notion of 'seed security actor' (e.g., women's organizations?)

5.4 Avoid built-in subsidies for seed.

Good seed pays, not costs. If farmers are not buying new varieties (sometimes linked with better quality seed), it is because the varieties are not promising enough or the cost of the seed doesn't outweigh the benefits. Subsidies on the client side (e.g., vouchers) can distort farmers' assessment of the real value and create a false assessment of demand. If subsidies are practiced, they should be used on a limited time basis, and with a clear vision to phase them out.

VI. SORGHUM CONFIRMATION AND PROMOTION

Sorghum is clearly a crop that is adapted to the Great South and that could help bolster farming system resilience. At this point, farmers within the SSA did not include it among their priority crops and many seem to hold negative stereotypes, possibly linked to its use in seed aid. Sorghum's potential for the South needs to be further explored, confirmed, and actively programmed. Several thrusts might be pursued simultaneously.

6.1 Confirm high performing varieties for sorghum.

High performing varieities need to be identified and confirmed for both farmer and market acceptance (linked to Recommendations I and II).

6.2 Promote awareness-raising and behavioural change campaigns for sorghum.

Farmers may require more information on sorghum (including its management and processing for home use). There may also have to be active campaigns to battle stereotypes.

6.3 Identify value-added and/or novel market value chain possibilities for sorghum.

Identifying added value possibilities – including sorghum's use in commercial value chains – may be appropriate for select areas of the South and could possibly spur faster adoption

VII. SEED STORAGE (MINIMIZING LOSSES)

The SSA found that most farmers don't save seed at all: risks of loss are too high, families need all harvests for food, or stocks are immediately sold to generate cash. That said, those farmers who did manage to store experienced important losses, even up to 35%.

As a range of storage technologies for different types or crops have been initially tested and confirmed in select regions of the South, there some clear recommendations forward. Important in all cases is that options be reviewed for their social as well as technical suitability. Also, clarifying the supply side (how the innovations will be manufactured and marketed) will be as important as enhancing farmers' own product access and awareness.

7.1 Review post-harvest practices and farmer storage needs further.

The SSA identified the problem of storage but did not review the causes, current methods, and possible preferences in depth. Any action plan should be preceded by a solid analyses of farmers' current management practices and the kinds of agricultural commodities to be stored.

7.2 Promote promising storage techniques for the cereals and legumes (if these are priority crops).

Farmers need to be equipped with the knowledge to preserve their seed (and grain) using airtight containers. A general Training of Trainers on hermetic storage (PICS, silos, jerrycans, etc.) might be a first step. If Purdue Improved Crop Storage bags (PICS) bags (a technology tested by CRS) are seen as a promising option, a local supply chain for bags might be established. (Note that Tanzania has a large manufacturer capacity). The cost of bags have to factored in as a constraint from the start.

7.3 Promote promising storage techniques for the tubers (especially sweetpotato, if this is a promising crop.)

In-depth work has already been done on the storage constraints and opportunities for sweetpotato. CIP has led the work on a triple sand technology that has been tested in several areas of the South. The technology should be promoted further.

VIII. FEMALE-HEADED HOUSEHOLDS + SEED SECURITY

Initial insights from women's only focus groups suggest that seed security constraints of female-headed households particularly merit more general attention and specific analysis. Many are short of funds at critical sowing periods. Female-headed HH also may require, and need to hire, outside help for some of the heavy agricultural tasks.

There are many variations of female-headed households in the Great South: women with polygamous husbands (3,4,5 wives), unmarried mothers, and women 'abandoned by their husbands', among others. Also, female-headed households seem to represent a rather large portion of households in the South: 4 of the 8 women-only focus groups estimated that 50% of the households in their village were female-headed. Note that different types of female-headed households may have diverse needs. Suggested first actions forward:

8.1 Commission a specialized study on female-headed households and seed security challenges.

Ensure that seed security specialists and gender specialists work jointly.

8.2 Consider innovative financing possibilities for women, especially to coincide with the timing of critical sowing periods.

IX. INCOME GENERATION, MICROFINANCE FOR FARMERS, ETC.

While the SSA did not specifically look at financing options, farmers' money issues – or lack of money – loomed large as the key constraint shaping farmers' current seed insecurity problems. Even if seed is available (whether high quality or just local market seed), many farmers cannot afford to buy the amounts they need.

The future of farmers' seed security in the Great South will be as linked to raising farmers' buying power as it is linked to specific seed issues. There are several avenues to explore here that fall outside the terms of an SSA but which merit signaling:

9.1 Explore value-added products at the community level.

The SSA found very few value-added processing with rural communities. Those existing brought modest income, e.g., processing manioc flour. Additional processing opportunities could help farmers diversify their income sources.

9.2 Expand Village Savings and Loans Programs.

VSL programs are 'accumulating savings and credit programs' that allow farmers to generate funds In a relatively short time (12 – 24 months). The VSL funds are also often large enough to allow members to borrow enough money to access key agricultural inputs such as seed or storage chemicals. This type of farmer group-managed assistance needs to be expanded. (These programs have various labels. CRS uses the term *Savings and Internal Lending Committees – SILCs* – for their own work).

9.3 Review whether Fonds de Developpment Agricole (FDA) can integrate the financing of seed acquisition in their financing plan.

For example, consider beneficiary contribution, IMF credit, or FDA subsidy. Clearly, there are many other options, for example, expanding larger-scale agroenterprises in the South. With expanding sorghum markets (tied to poultry feed, being a current example), this area of increasing finance and income generation for stressed farmers opens up many areas for reflection.

X. INFORMATIONAL CHANNELS GEARED TO SMALLHOLDERS

Simply, across the board in the South, farmers need access to more technical and marketing information. Farmers have insufficient information on: new varieties, where to find quality seed, how to use select inputs, advice on options for combatting climate stress, etc. SMS, radio programs, posters, and online videos are all options for better ensuring that farmers have information to make informed choices. (see Annex 2 for several examples linked to improved storage).

This recommendation is put forward only to remind us that any product (including seed) is only as good as the information clients have to access and manage it. If investing in seed systems, also invest in accompanying information systems.

10.1. Invest in information systems related to variety, seed, and seed management that smallholders need to make informed choices.

XI. MARKET-ORIENTED EMERGENCY/RECOVERY APPROACHES

Only a small portion of the households interviewed within the SSA had received emergency aid over the last 5 years, but this type of humanitarian assistance had been well established in the South, at least since 2005 with its incidence is growing. Currently, the dominant form of aid in the South is Direct Seed Distribution (DSD), with other, more market-based options rarely implemented.

Recent globally-published technical guidelines for emergency aid recommend moves towards market-based assistance and away from direct distributions.

> *Market-based assistance should be given priority if the approach can also address the seed security constraint identified. Market-based assistance has the potential to deliver immediate assistance to*

farmers while encouraging longer term functioning of regularly used markets. ***Humanitarian assistance should support, not undermine, critical market functions.*** *(Sperling et al., 2022)*

Note that market-based emergency responses can be applied on the supply as well as demand sides.

11.1 Make available, disseminate, recent guidelines for 'best seed aid practice.'

Found within the Seed Emergency Response Tool (SERT), best practice guidance should be shared with NGOs, donors and other seed stakeholders intervening in the Great South. A common set of 10 Principles for Good Seed Aid Practice has been published and disseminated, which can provide a joint vision for seed aid response.

11.2 Avoid routine use of any response options (including repeat use of vouchers).

Avoid creating unnecessary and unproductive farmer dependencies. When the same response option is used repeatedly, it signals that the system is not responding to the intervention. This SSA provides detailed information as to the seed security problems, potential solutions, and response options. Anyone looking to intervene in the seed system in the Great South should carefully consider their response modality.

11.3 (As USAID recommends), If seed-related aid is given three seasons in a row in the area with the same response, governments and donors should require a field review of the seed security situation and the responses implemented.

For more information on the USAID guidelines, visit https://www.usaid.gov/document/bha-emergency-application-guidelines-annex-technical-information-and-sector-requirements.

XII. GREAT SOUTH SEED SECURITY STRATEGY- REGIONAL WORKSHOP: INTEGRATING SEED SECTORS FOR RESILIENCE

Across the Great South, the seed security of smallholder farmers is severely compromised—for all key seed security parameters-- availability, access, seed health and variety quality. There are well-defined problems on the supply side, and an equally extensive set of challenges from the community and farming households' point of view (linked to the demand side).

More practically, there are few ongoing means to introduce, multiply, access or market new varieties and higher quality seed (whether certified, QDS, or just good farmer seed). Also concerning, is that the level of seed security among southern farmers is not just static – it seems to be in the decline.

It might be time for a major reflection of seed security strategy for the Great South and the holding of a regionwide workshop might be one important key step. Initial ideas for a draft workshop program are sketched in Annex 3. These are suggestions meant to stimulate concrete discussion.

Some of the guiding principles for such a workshop, might be the following:

1. The solutions have to practical and realistic, taking account of the unusual challenges in the South;
2. The vision should be for resilient systems. (not just any commercial system);
3. Both the seed supply side and demand side (communities, farming households) should be considered with equal rigor;

4. Strategies developed might best leverage all the seed systems farmers' use: formal, informal, and intermediary. Catalyzing an Integrated Seed Sector and identifying specific points of integration might be among the goals;

Actors who might to be invited include: government, plant breeder, formal seed sector and Intermediary sector specialists, NGOs, private sector, local seed and grain traders, climate and nutritional specialists, gender specialists, and more. It will be important to go beyond seed actors and include those with more holistic, resilience thinking.

In brief, these 12 thrusts form the core of the SSA recommendations. All recommendations have emerged from data-driven field insights. Recommendations should be implementable in 1-5 years.

I. INTRODUCTION

Rationale for assessment

A Seed Security Assessment (SSA) was carried out in the Great South of Madagascar in May-June 2023. It reviewed the functioning of the seed systems farmers use – formal, informal, and intermediate – and assessed whether farmers could access seed of adequate quantity and quality in the short and medium term. The assessment focused on the supply side (assessing formal and informal markets) as well as on demand (reviewing community and households' current strategies, needs and purchase patterns). The SSA was comprehensive, covering three regions of the South, 9 districts, 19 communes, and 40 fokontany (villages).

The rationale for conducting the SSA in the Great South of Madagascar was threefold:

1. **The Great South has one of the highest malnutrition rates in the world,** with about half the children under five showing significant stunting. Food insecurity and nutritional insecurity are rampant. Tailored seed-security related responses could help boost production system resilience, food security, and overall nutritional profiles.

2. **The Great South has been the focus of substantial humanitarian assistance programs,** at least since 2005. Government, donors, and communities want to move beyond emergency modes and towards more developmental operations.

3. **It is past time to spur sustainable, resilient, and high performing seed systems that work in the South** and for a large range of southern smallholder farmers. There is a good deal of room to boost seed security, if focused planning and action unfold.

Structure of report

The report presents the results of an SSA in the Great South across the three regions. (For detailed region-specific data tables, contact Consulting Plus (cplusmg@gmail.com.)

In terms of report structure, Chapter II reviews the concepts of seed security and specific features of resilient systems. Chapter III describes the context, range of methods used, and site choice.

Chapter IV presents the main field findings from the demand side: its focus is on seed security from smallholder farmer (men and women) and community perspectives, The analysis differentiates between seed security issues in the short term (the 2022-2024 seasons) and those that are medium and longer-term chronic stresses and opportunities.

Chapter IV provides an overview seed systems structures and organizations in the Great South Madagascar: its focus is on supply. The Chapter reviews the formal breeding and seed supply system, including lists of performing varieties and sources for better quality seed, and it describes the modest decentralized seed system operations. The Chapter ends with a quick review of the informal seed sector, including insights on how local traders and informal seed markets function. Throughout the chapter, the supply focus is always linked to smallholders: e.g., which varieties are appreciated, which outlets can serve them, where are the gaps.

Chapter VI presents the recommendations across the three regions and groups them into 12 larger priorities for action. After the detailed set of recommendations, two synthesis review tables match the recommendations to:

a) the seed security constraint identified, and b) to the seed system features that might lead to a resilient seed system functioning. Questions are posed as to whether the set of proposed actions can together lead to meaningful seed systems transformation in the Great South—towards resilience and sustainability.

Select references back up the evidenced-based fieldwork results.

The three annexes: i) post the full list of varieties recommended for the Great South; ii) give examples of informational tools urgently needed by smallholder farmers; and iii) sketch some elements for a Regional Seed Security Workshop Program for the South.

The Great South is a very challenging region. Seed security responses here need to innovative, flexible, and, foremost, impact-oriented. Seed systems developed need to be driven by smallholder farmers' needs and must be able to reach all—men, women, the poor, and even those at the last mile. Systems developed also have to function and respond in the challenging climate-stressed context. This is the kind of vision for a resilient seed system.

II. BACKGROUND TO SEED SECURITY + RESPONSE

This chapter reviews quickly the necessary background to understand an SSA. Distinguishing seed security from food security is relatively new in development and relief circles and the methodology for doing so is only 15 years old. An SSA is not about counting seeds and then deciding how much seed aid to give. Rather, the assessment aims to figure out if seed systems are functioning—on the supply and demand sides—and, if not, how to identify the exact problems and design specific strategies that alleviate the targeted constraints. This chapter describes the basic concepts linked to seed systems and seed security. It also distinguishes between acute and chronic stresses and presents a framework for choosing immediate response and longer-term action.

Seed systems farmers use

Smallholder farmers use multiple channels for procuring their seed.

The **formal seed system** provides farmers with new 'modern' varieties that are offered as certified or sometimes quality-declared seed (QDS). Formal channels normally include government bodies and commercial companies. Within formal systems, seed and grain are produced differently, with clear standards dictating what may be labeled as seed.

The **informal seed system** centers on farmer or local varieties, but it also routinely moves modern ('improved') varieties. The informal system includes the ways farmers themselves produce, disseminate, and procure seed: from their own harvest; through barter or sale among friends, neighbors, and relatives; and through local grain markets and traders. In the informal system, local seed is also produced, but as an integral part of grain production, not as a discrete enterprise.

Intermediary seed systems refer to various small-scale, often local enterprises, between formal and informal seed systems. They might include community-based seed producers or farmer cooperatives or NGOs producing seed (see Figure 2.1 for charting of seed system types and their interactions).

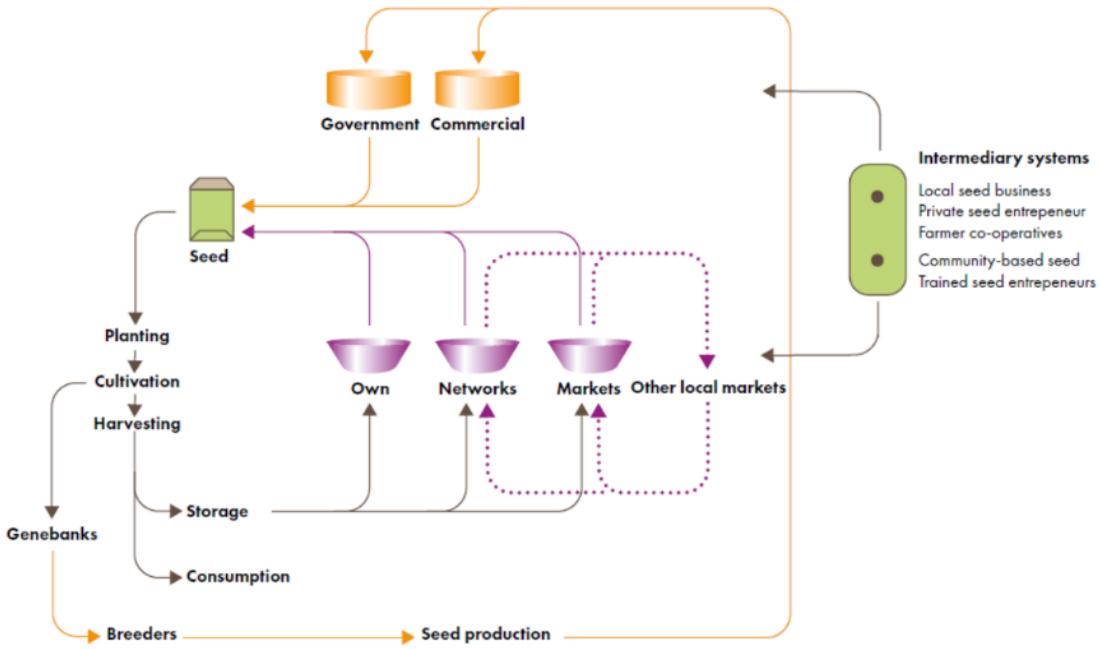


Figure 2.1. Channels through which farmers procure seed. Adapted from Almekinders and Louwaars (1999).

Recent global evidence shows smallholder farmers access over 90% of their seed from the informal system with local markets being particularly important – providing about 50% of seed. The formal system accounts for only about 3% of seed sown (dominated by maize) and the intermediary system's share is less than 0.5% (McGuire and Sperling, 2016).

The figures reported in the Great South are even more striking (see Chapter V table 5.1). Great South farmers access over 98% of their seed via informal systems, with 74% coming from informal local markets. Less than 1% of the seed southern farmers sow presently comes from all formal seed sector sources combined.

Globally, smallholder farmers access over 90% of their seed from the informal system.

In the Great South, that number rises to 98% overall, with 74% coming from the informal local markets.

Concept of seed security

Seed security exists when men and women within the household have sufficient access to quantities of available good quality seed and planting materials of preferred crop varieties at all times in both good and bad cropping seasons (FAO 2016). Helping farmers to obtain the planting materials they need (considering all possible seed channels) enables them to produce for consumption and sale.

Achieving seed security is quite different from attaining food security, despite their obvious links. One can have enough seed to sow a plot but lack sufficient food to eat, for example, during the 'hungry season' prior to harvest. Conversely, a household can have adequate food but lack access to appropriate seed for planting. Despite these important differences, determinations of seed security are normally food security-based. This is incorrect and indicates a lack of understanding of basic seed security issues.

The dimensions of seed security

The concept of seed security embodies several fundamental elements. Differentiating among these is crucial for promoting those features that foster seed security as well as for anticipating the ways in which seed security might be threatened.

A seed security framework (SSF) outlines the four fundamental elements of seed security that are critical for smallholder farmers:

1. Seed has to be **available**.
2. Diverse groups of farmers need to be able to **access** it.
3. **Seed health** (quality) must be sufficient to promote good production.
4. The varieties on offer have to be adapted and acceptable to male and female smallholder farmers and other groups aiming to use the seed (**variety quality/suitability**)

While features 3 and 4 are sometimes grouped together under the heading 'seed quality', they concern quite distinct aspects of seed: the first focuses on health/sanitary aspects, the second on genetics/varietal traits. Table 2.1 summarizes the features, with further explanation below.

In situations of stress, it is rare to have constraints in all four seed security elements at the same time. The challenge is to identify the real problem(s) and then target actions to alleviate them.

Table 2.1: Seed Security Framework, basic elements

Element	Seed Security Feature
Availability	Defined narrowly as whether enough seed of target, adapted crops is present within reasonable distance to farms (spatial availability) and in time for critical sowing periods (temporal availability). It is essentially a geographically-based parameter, and is independent of farmers' socioeconomic status.
Access	A parameter specific to farmers or communities. It largely depends upon the assets of the farmer or household in question: whether they have the cash (financial capital) or social networks (social capital) to purchase or barter for appropriate seed and have physical access to multiple seed sources.
Seed health/quality	Seed is healthy: i.e., has good physical, physiological, and sanitary attributes (such as germination rate and the absence of disease, stones, sand, broken seed or weeds).
Variety quality/ suitability	This consists of genetic attributes, such as plant type, duration of growth cycle, seed color and shape. It also includes user preferences, such as the preferences of men and women farmers, traders, and those variously geared to direct use or market sale.

Source: Adapted from Sperling et al., 2022

Acute and chronic seed insecurity

Analysis of seed security also requires consideration of the duration of the stress – whether it is 'acute' or 'chronic' – while recognizing that the divisions are not absolute. In most cases where humanitarian or developmental assistance is being given repeatedly, there tend to be both acute and chronic seed insecurities; that is certainly case for the Great South of Madagascar.

Acute seed insecurity is brought on by distinct, short-lived events that often affect a broad range of the population. It may be spurred by an extreme flood or drought, or unusual insect attacks, like crickets. While in normal times households may have various degrees of seed security, all may be affected by an acute event.

Chronic seed insecurity is independent of an acute stress or disaster, although it may be exacerbated by it. Chronic seed insecurity may be found among groups who have been marginalized in different ways: *economically* (for example, due to poor, inadequate land or insufficient labor); *ecologically* (for example, in areas of repeated drought and degraded land); or *politically* (in insecure areas, or on land with uncertain tenure arrangements). Chronically seed insecure populations may have ongoing difficulties in acquiring off-farm seed due to lack of funds; or they may routinely use low-quality seed and unwanted varieties. The result is households with built-in vulnerabilities.

In cases where seed-related assistance is frequently repeated − in drought-prone areas, for example − acute problems are nearly always superimposed on chronic problems rooted in poverty. This is the context of the Great South of Madagascar.

*In the Great South, there are **chronic** seed insecurity problems linked to deep-seated poverty, lack of infrastructure, etc. and **acute** problems linked to droughts, locusts, etc.*

Both sets of problems need to be addressed simultaneously.

More refined analyses leading to more targeted responses

Table 2.2 gives examples of how identification of a specific seed security constraint should lead to a targeted response, as we are aiming to do in this Great South assessment. For example, if 'seed availability' is assessed as the problem in the short term, seed-based interventions such as seed importation (for acute shocks) may be appropriate. (Seed availability problems rarely persist over the long term, except if one is focusing also on quality, such as on lack of performing varieties or good quality seed.)

In contrast, if 'seed access' is the identified problem, this might wisely trigger a holistic analysis of livelihood strategies. In the acute phase, providing farmers with cash or vouchers to get their desired seed might be effective. However, if seed access problems are identified on a chronic basis, practitioners might look well beyond seed and seed security constraints. The inability to access necessary goods on a repeated basis is usually linked to problems of basic poverty; thus, initiatives to help farmers generate income and strengthen their livelihoods base would be essential.

'Seed quality' problems, whether they relate to concerns with the varieties or with seed health *per se,* are rarely short-term. Responses usually require significant development programs, linked to plant breeding or seed quality programs, depending on the specific constraint identified.

As will become apparent in the case of the Great South, all of the seed security elements seem to be compromised, and this is happening both in the short and long term (so acute and chronic stress). A comprehensive seed security support program is urgently needed.

In the Great South, all four seed security elements are compromised – seed availability, seed access, seed health and variety suitability.

An urgent, comprehensive seed security support program is needed.

Table 2.2: Types of seed security problems and broadly appropriate responses

Seed Security Element	Response options for Acute seed insecurity	Response options for Chronic seed insecurity
Unavailability of seed	Direct distribution of seed	(Happens rarely overall. There may be constraints in availability for performing varieties or quality seed)
Farmers lack access to available seed	Vouchers Cash (sometimes linked to seed fairs)	Income generation activity Agroenterprise development (value chains) Micro-finance programs
Poor seed quality unhealthy seed	Seed fairs with quality controls Direct distribution of test samples of quality seed	Program to improve seed quality • With seed companies • On-farm (selection and storage) • On-farm (community based seed producers) • In local markets (with traders)
Lack of appropriate varieties/crops	Limited introductions of new varieties	Introduce new varieties and give technical support Variety selection / breeding (better if participatory)

Seed security program goals

Finally, it bears mention that **seed security programs and related seed initiatives may strive towards diverse goals.** Each specific goal should shape program design and implementation.

Increasingly, seed security vision, structure, and programming are moving beyond the basic goal of helping farmers to obtain enough seed to sow, harvest, and achieve food security. Depending on the government vision, the implementer and especially on farmers' visions and needs, seed security programs might also have other goals such as to bolster household nutrition, family income, and farming system resilience. These goals should be set explicitly and each specific goal should shape seed system design, including, among other things, the kinds of crops and varieties put on offer and their specific varietal traits. Table 2.3 outlines some of these connections and suggests practical options for moving forward.

Seed security programs may strive towards different goals requiring different intervention features. Plan accordingly.

Table 2.3: Select design features of seed security programs with different goals

Goal	Crop/varietal issues: broad choices	Varietal features	Awareness-raising, information strategy
Food production (classic approach)	Major staple crops Crops/varieties responsive to inputs	Preferred agronomic traits (e.g., high yield, early maturity, resistance to specific stresses) Preferred end user traits for consumption, especially postharvest processing and cooking qualities Preferred end user traits for market acceptance	Use of 'classic channels' • agricultural extension visits • posters • field days • rural radio Might increasingly use social networking, mobile phones, SMS
Nutrition	Focus beyond calories to include nutritive elements Varieties biofortified with micronutrients Crops contributing to dietary diversity Specialty crops: leafy vegetables, orange-fleshed sweetpotatoes	Key agronomic acceptance traits as well as targeted nutritional traits such as high micronutrient content Diet-diverse germplasm set, maybe including indigenous crops, leafy greens, legumes, and biofortified varieties and crops	Information strategy geared to showing value of the 'invisible' nutrition and guidance on food preparation (cooking demonstrations) Targeting decision makers on food consumption and nutrition including men (determining expenditure on more nutritious food) and women (determining who eats what) Sophisticated demand-creation techniques (possibly to reach an unconventional buyer: malnourished, vulnerable)

Goal	Crop/varietal issues: broad choices	Varietal features	Awareness-raising, information strategy
Climate resilience (being 'climate smart')	Crops that tolerate abiotic stress: • heat tolerant crops/varieties • water efficient crops/varieties Crops that add value or diversity to resource base • legumes to fix nitrogen • fodder crops	Diversity that is 'useful': allows for staggered sowing; is robust to challenging conditions Varieties that are adapted to stresses (e.g., moisture, heat, pests, low fertility) Possibly crops that are bundled to encourage better rotational systems, improved soil health and water management	Information geared to zone 'crop portfolio-management' scenarios. Use of decision-making tools focused on real-time farming system scenarios and analysis of adaptation zones
Income generation	Crops geared to markets ('high value crops') Crops linked to value-added/processing chains Crops linked to nonfood livelihood activities (e.g., fiber production)	Varieties/crops that meet rigorous market requirements, including uniformity (note that varieties may be suboptimal in agronomic terms)	Sophisticated demand creation techniques across full value chain (including processors as well as users and buyers of raw products) Successful branding of seed product and packaging

Source: modified from Sperling and McGuire 2012

Resilience

Achieving greater resilience has become central to seed systems operations in climate-stressed zones. Planners aim not just to help diverse populations build back (recover), but also to build back better for the long term. The features of resilience programming in seed system support are still being debated and refined. Climate variability requires special consideration, and some basic elements of resilient seed systems are listed in Box 1. Certainly, this list of features can and should be expanded for the Great South.

Box 1. Features of seed systems which aim for resilience

1. Stress tolerant crops and stress-tolerant varieties are identified as performing, adapted, and accepted.
2. A wide portfolio of crops and varieties (linked to #1) is identified so that farmers* can alter their planting profiles according to fluctuating conditions.
3. Seed of stress-tolerant crops and varieties is multiplied with seed production scaled up. Seed is available.
4. Delivery mechanisms are spurred that give farmers access to needed crops and varieties. Multiple channels may be needed so as to reach different kinds of farmers, including those at the last mile, and including those in stress zones.
5. Delivery formats (prices, pack sizes…) are developed that enable even poorer farmers to obtain, or purchase the seed they need.
6. Information systems are fostered in ways that strengthen farmers' ability to strategize and deal with fluctuating conditions. Farmers need to be helped to make more informed choices.

**For ease of reference: 'farmers' always refers to diverse farmers: male/female; subsistence and more commercially-oriented; of different wealth levels.*

III. THE STRESS CONTEXT, METHODS, AND SITES

The Great South: quick overview

This assessment took place across the Great South (Grand Sud) of Madagascar. Covering three regions (Androy, Anosy and Atsimo Andrefana), the Great South covers nearly 20% of the national territory, more than 11% of the total population (about 3.5 million people), and is the most isolated and least developed area of the country. Poverty, as measured by the number of people living on less than US$1.90 per day (PPP dollar, 2011) shows the entire Great South to be very poor. The poverty incidence is 91 percent in the south compared to 77 percent for the rest of the country (Healy, n.d.).

The soils of the Androy region are mostly sandy, low in humus, fragile but nevertheless very cultivated. In the coastal zone, ox plowing is widespread, which increases soil erosion factors. Low and variable rainfall, violent winds, few water resources all combine to brand this region as one with regular deficits in agricultural production. The Great South is plagued by chronic droughts and in recent years, also locust and fall army worm attacks.

Traditional agriculture as practiced in the Great South is not very intensive, with low yields, and oriented towards self-consumption. Agriculture is mainly based on an agro-pastoral system, combining cattle-sheep-goat raising with extensive rainfed subsistence farming. The subsistence nature of much of the agriculture is paralleled by a lack of basic infrastructure and lack of substantial public investment including, among others, in roads, energy and storage. Healy (n.d.) gives an excellent overview analysis of constraints in the Great South.

In a period slightly prior to the this SSA (November 2022 – March 2023) a UN food security assessment predicted 2.23 million people, 36% of the Great South, would be in acute food insecurity (Phase 3 of the Integrated Phase Classification [IPC] or more), with 4% (252,000 people) in an emergency food situation (Phase 4 of the IPC).

In brief, the Great South is a very challenging area and in dire need of more forward-thinking, developmental strengthening across a large range of sectors. Here, with the May-June seed security assessment (SSA), we focus on an important issue – seed security – recognizing throughout this analysis that advances in other (such as finance) will influence possible advances in strengthening seed security systems themselves.

Figure 3.1. Select images of The Great South

Crops: overall profile

A large range of crops is grown in the Great South (see Chapter V, section on crop diversification) and designation of the priority crops was determined in the SSA by smallholders themselves. For the short-term review, the SSA focus on two seasons: October to June 2022-23 and October to June 2023-24, so the one just finished and the one soon to start. Households indicated their three most important crops (by their own key criteria), focusing on crops for which planting material/seed might be needed (i.e., annuals and not trees, coffee, or perennials such as sugar cane.)

Across the three regions of the assessment, **manioc** was designated the most important crop in the Great South, for both seasons assessed (2022-23; 2023-24).

Maize also figured as a crop priority across all sites and for both seasons. For the rest, there was slight variation in crop priorities, including in Androy where rice was not included among the central choices. The continuity in priority crops is notable from one main season to the next: farmers were not altering their basic crop profiles (see Table 3.1).

Table 3.1: Farmers' top priority crops over two seasons: 2022-23; 2023-24

Recent Season (2022-23)		Next season (2023-24)	
Crop	% of HH	Crop	% of HH
Atsimo andrefana			
Manioc	59.6	Manioc	56.7
Cowpea	46.7	Cowpea	41.5
Maize	37.0	Maize	38.5
Rice	33.3	Rice	32.6
Common bean	25.2	Lima bean	24.8
Anosy			
Manioc	48.2	Manioc	41.2
Sweetpotato	45.3	Rice	39.4
Maize	40.0	Sweetpotato	35.9
Rice	37.1	Groundnut	29.4
Groundnut	23.5	Maize	24.7
Androy			
Manioc	75.0	Manioc	68.3
Maize	51.7	Groundnut	50.6
Groundnut	46.7	Maize	42.8
Cowpea	32.8	Cowpea	26.1
Sweetpotato	22.8	Sweetpotato	25.6
Great South, all regions			
Manioc	61.0	Manioc	55.5
Maize	42.1	Maize	36.1
Cowpea	31.9	Rice	31.1
Rice	30.0	Groundnut	31.0
Groundnut	27.4	Cowpea	27.7

Seasonal assessment: three most recent seasons

The seasonal patterns of crop performance around the period of the seed security assessment were also particularly important. In community meetings, farmers assessed performance, by key crop, for each of the last three major season (from Nov 2020 onwards). Crop performance (mainly harvest) was rated as good (***); medium/average (**); or poor (*). Table 3.2 reports the farmer ratings.

There was some variability across this large region, but general patterns emerged. Many sites had had two bad seasons in a row (2020-21 and 2021-22) with the most recent season, the one assessed 2022-23, being rated as relatively good, at least in comparison to the two previous. Also, in many of the villages, harvests were assessed as not only 'low' but 'none'—i.e., there was total harvest failure. Reasons for low harvest were variable, with communities being battered by stresses such as: low rainfall/drought; insect/pest attacks (especially on maize); and poor water management (linked to rice cultivation needs).

The SSA took place during a relatively good season (2022-23), in contrast to the two prior, very poor ones. There is important volatility in the region.

Table 3.2: Community assessment of crop performance over three past seasons;
****= good; **=average; *= poor*

Principal Crop	Current season Nov 2022-June 2023	Season previous Nov 2021-June 2022	Season before last Nov 2020-June 2021
Site: Bekily- Ambahita-Antsakoampolo Nord			
Groundnut	***	*	***
Rice	**	**0**	*
Manioc	***	**0**	**
Maize	*	**0**	**0**
Site: Bekily-Bekily-Betania			
Groundnut	***	**0**	**0**
Rice	***	**0**	**0**
Manioc	***	**0**	**0**
Sweetpotato	***	**0**	**0**
Site: Ambovombe-Maroalomainty-Vahavola Kilemasy			
Maize	**	*	*
Cowpea	**	*	*
Manioc	**	*	*
Site-Beloha-Beloha-Ankilibehara			
Manioc	**	*	*
Sweetpotato	**	**0**	**0**
Cowpea	*	*	**0**

Principal Crop	Current season Nov 2022-June 2023	Season previous Nov 2021-June 2022	Season before last Nov 2020-June 2021
Site: Tsihombe-Tsihombe-Ambovo			
Manioc	***	*	*
Cowpea	***	*	*
Maize	***	*	*
Site-Amboasary-Atsimo-Behara-Ankasikitoka			
Rice	**	*	*
Common Bean	*	***	**
Sweetpotato	*	***	*
Site-Amboasary-Atsimo-Berano-Berano Lovasoa			
Common Bean	*	**	*
Maize	**	*	*
Sweetpotato	***	*	*

Methods

An SSA reviews the functioning of the seed systems farmers use – formal, informal, and intermediary systems. It assesses both the demand and supply sides of seed and broadly asks whether seed of adequate quality is available and whether farmers can access it. The SSA also promotes strategic thinking about the relief, recovery or development vision needed.

For an overview description of the SSA method, see https://seedsystem.org/assessments-and-e-learning-course/ or FAO, 2016. This type of assessment has been effected in many countries and many stress contexts over the last two decades, including in Madagascar in 2013 (https://seedsystem.org/field-assessments-action-plans/; https://seedsystem.org/wp-content/uploads/2014/03/Madagascar-SSSA-2013.pdf).

The recommendation section (Chapter VI) suggests some comparisons between the 2013 and 2023 assessments.

Specific methods used in 2023

The methods used in the 2023 Great South assessment are sketched out in Table 3.3. They covered varied thematic issues, drew from a range of qualitative and quantitative tools, and included multiple stakeholder insights. Of special note is that the sample sizes were quite big for a rapid assessment: 620 household interviews, 8 community focus group discussions (often with 30 men/women or more); 8 women's only focus groups; and select agrodealer, large trader and local market analyses.

Table 3.3: Investigative themes and methods used in the Madagascar SSA, 2023

Type of Investigation	Commentary
Background information collection	☐ Plant breeding and varieties released ☐ Formal sector seed supply (SOC, FOFIFA, CTAS, CMS, GPS, PMS)
Database utilization	☐ Population characteristics ☐ Agricultural production figures ☐ Vulnerability data
Key informant interviews	☐ Government officials/regional authorities ☐ UN and civil society project personnel ☐ Local Seed producers ☐ Agro-processors
Focus group discussions Community-based (N=8) Women's groups (N=8)	Separate community and women-only FGDs, discussing: ☐ agricultural and variety use and trends ☐ seed source strategies, by crop ☐ women's crop/seed constraints+ opportunities ☐ livelihood/coping strategies
Household interviews (N=620)	seed source patterns/ manure-fertilizer use seed aid and new variety access
Agrodealer visits (N=9)	☐ seed types, and other input supplies ☐ business trends; constraints/opportunities
Seed/grain market analysis (N=50) Large trader interviews (N=9)	☐ crop and variety supplies on the market ☐ sourcing areas and pricing patterns ☐ seed quality management procedures

The specific field instruments employed were largely based on those publicly posted on the website seedsystem.org (https://seedsystem.org/assessments-and-e-learning-course/seed-system-security-assessment/). The field implementation lead, Consulting Plus, refined the toolset for the context of the Great South and additionally translated them into Malagasy. Several of the key tools were also loaded onto android tablets to encourage greater speed in data collection and entry.

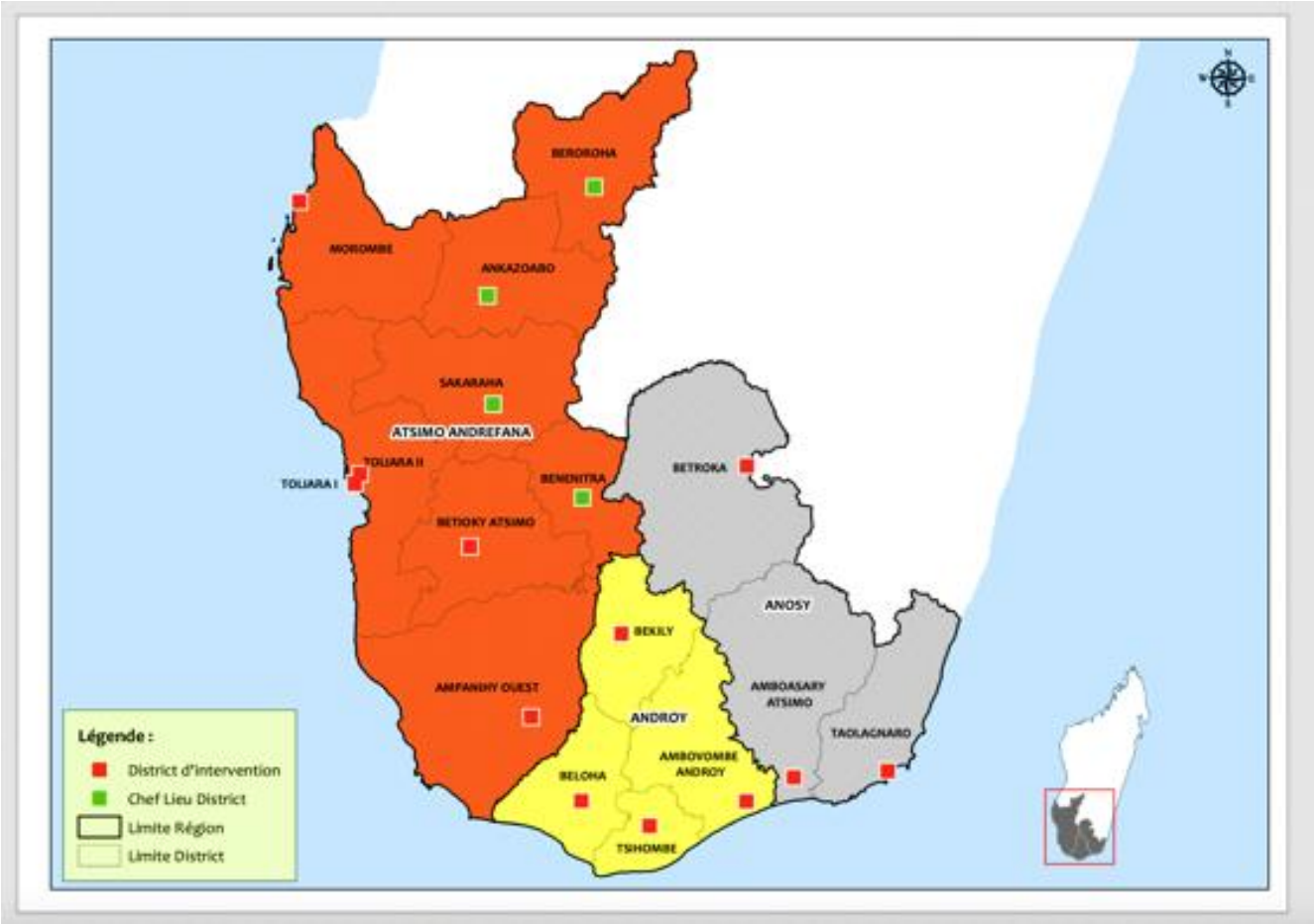
Site choice

The site choice, led by Consulting Plus, was guided by a set of clearly stated criteria. Namely, (i) the concentration of agricultural households; (ii) the existence and type of farming household in each municipality; (iii) the accessibility, geographical location, and security of possible sites; and (iv) sites recommended as a priority by the Direction Régionale de l'Agriculture et de l'Elevage (DRAE: Regional Directorate of Agriculture and Livestock-Ministry) and partners in the field. Nine sites were chosen, of which three sites (Betioky Atsimo, Morombe and Tulear II) are in the Atsimo Andrefana region; two (Ambovombe Androy, Bekily, Beloha and Tsihombe) in the Androy region; and the rest (Amboasary Atsimo and Betroka) in the Anosy region (Figure 3.2). At the second level, two or three fokontany (villages) in each municipality were selected via a random draw (Figure 3.2 and Table 3.4).

Table 3.4: Specific sites of the Seed Security Assessment, May-June 2023

Region	District	Commune	Fokontany
ATSIMO ANDREFANA	BETIOKY ATSIMO	BETIOKY	ANKETRAKE
			ANKILIVALO
			BELALITSE
			FENOARIVO BEHISATSE
		BEZAHA	AMPIHAMY
			ANJAHA
	MOROMBE	AMBAHIKILY	AMBAHIKILY
			ANDRANOMANINTSY
		ANTANIMIEVA	AMBORONDOLO
			ANTANIMIEVA
		BEFANDRIANA SUD	BEFANDRIANA
			BEKIPAY
	TOLIARA-II	ANKILILOAKA	ANKILIABO
			TANANDAVA MANDROSO
		ANKILIMALINIKE	ANDOMBIRY
			BENETSE
		MIARY	ANKORONGA
			ANKOTSAHOBIHIA
ANOSY	AMBOASARY-ATSIMO	BEHARA	ANKASIKITOKA
			ESATRA BEVIHA
		BERANO	BERANO ANJAHA
			BERANO LOVASOA
		SAMPONA	ANDRAPASY CENTRE
			ANKILIMASY SOAJORO
	BETROKA	BETROKA	ANDAKANA
			MORARANO
		ISOANALA	ANTANAMBAO BEROROHA
			ISOANALA NORD
ANDROY	BEKILY	AMBAHITA	AMPISOPISO
			ANTSAKOAMPOLO
		BEKILY-CENTRALE	BETANIA
			MAHAZOARIVO
		BEKITRO	ANTANAMANITSY
			BEVONDRO CENTRE
	AMBOVOMBE-ANDROY	MAROALOMAINTY	BEHABOBO AMPATIOLOTSE 1
			VAHAVOLA ANKILIMASY
	BELOHA	BELOHA	ANKILIBEHARA II
			KIRIMOSA TANAMANDROSO
	TSIHOMBE	TSIHOMBE	AMBOVO
			SIHANAMENA MAROLAVA EST

Figure 3.2. Geographic location of SSA zones, May-June 2023



Household selection and profile

Finally, in terms of method, a central part of the SSA methodology involved conducting quantitative interviews at the household level. To avoid bias, households were chosen by first creating a numbered list of households and then randomly selecting them at the level of each fokontany (village). The rate of 80 to 90 farming households per site led to a survey sample of 620 farming households.

Table 3.5 below summarizes several characteristics of the households selected. Of note is that almost 40% of the total 620 households were female-headed and that, within the sample, the land areas cultivated tended slightly towards the larger of plot size categories.

Table 3.5: Great South Madagascar household (HH) sample characteristics (n=620)

Feature	Description	% Sample
Type of HH	Adult headed	94.8
	Grandparent headed	1.1
	Child headed	4.0
Sex of HH head	Male	60.5
	Female	39.5
Average age of HH head	39.4 years	
Average size of HH	5.6 persons	
Migration Status	Resident	94.4
	Displaced	5.6
Area cultivated	<0.5 ha	14.5
	0.5-1 ha	30.3
	>1.0-2.0 ha	28.5
	>2.0 ha	26.6

We now move quickly to the actual field findings. The next Chapter (IV) focuses on the demand side, i.e., a seed security analysis from the viewpoint of farmers and their communities during two immediate seasons, 2022-23 (just finished) and the 2023-24 season (starting around October 2024). This real time analysis is key for determining any immediate humanitarian or development assistance but also anticipates more longer-term, chronic stress needs.

Chapter V then looks at the real-time supply side and well as some of the longer-term processes and structures which should render quality seed available and accessible to smallholder farmers in the Great South.

IV. Field findings: focus on farmers

The fieldwork for the SSA took place May-June 2023 as farmers were finishing their one main season, assessing their harvests and planning for the next future planting period (October-November 2023). This chapter presents field findings on seed security across the southern sites.[1] For detailed data tables region by region (Atsimo-Andrefana, Androy, and Anosy) contact cplusmg@gmail.com.

This assessment focusing on farmers and communities considered two major themes. It analyzed the short-term, acute seed security situation (for seasons October 2022-June 2023 and October 2023-June 2024). As the second thrust, the SSA considered medium-term trends, including possible chronic seed security problems and emerging opportunities.

Acute Seed Security Findings

Issues of seed security were scrutinized in the short term: how and where did farmers obtain seed for the main 2022-23 season? Did they plant a 'normal' quantity of planting material? How did they assess their seed security prospects for the 2023-24 season? Note that seed system stability and resilience are best assessed by looking at multiple seasons in a row.

Seed sources and quantities planted, 2022-2023 main season

Table 4.1 and Figure 4.1 show the sources and quantities of seed planted by farmers for the main 2022-2023 season. Information is given in both table and graph form to make highly visible the relative use of sources and the scale of seed use from each. Several features are of note.

- **Overall, upwards of 98% of the seed farmers sowed came from local channels**, including from farmers' own stocks, through social networks of neighbours, friends and relatives and especially local markets. This suggests the importance of informal seed systems as the core seed sources used by farmers in the South.
- **The dominance of local markets is particularly notable, 74% of seed planted.** Seed obtained from local markets was the main source for most crops monitored. The extent of use of local market seed was very unusual- ¾ of the total seed planted. (This high a rate for local market use has not been recorded in other SSAs, including those conducted in stress regions and emergency contexts.)

The high extent of local market use for seed, 74%, is the highest ever recorded for an SSA.

- **Seed for sorghum was heavily influenced by the NGOs (with FAO).** Over 85% of the sorghum seed farmers sowed was obtained through NGO/FAO. Part of this high figure was likely tied to emergency operations.[2] Given this aid scenario, it remains to confirm how much the crop is currently in true demand, as seed was given free. Moving forward, acceptance and promotion of sorghum (and millet) may require substantial efforts in behavioural change, emphasizing especially its high value for resilience, coupled with

[1] The seed security focus is on the three crops farmers each consider 'most important' so there may be some under-reporting of secondary crops, which are also key for nutrition and income.

[2] The UN-FAO shared specific data that in 2021-22 they imported 750 kg of seed of millet (varieties CT6, Moro) and sorghum (varieties Sepon 82, Moto maradi). Also, 20T of sorghum (variety Macia) were distributed in the South to vulnerable households (50,000 beneficiaries) about the same time.

initiatives to enhance its monetary value (through novel value chains). Box 2 sketches a new initiative around sorghum seed sale. Both the supply (including seed) and demand sides will need to be strengthened via multiple strategies.

Acceptance and promotion of sorghum may require substantial efforts in behavioural change as well as initiatives to enhance market value (e.g. via novel processing chains.)

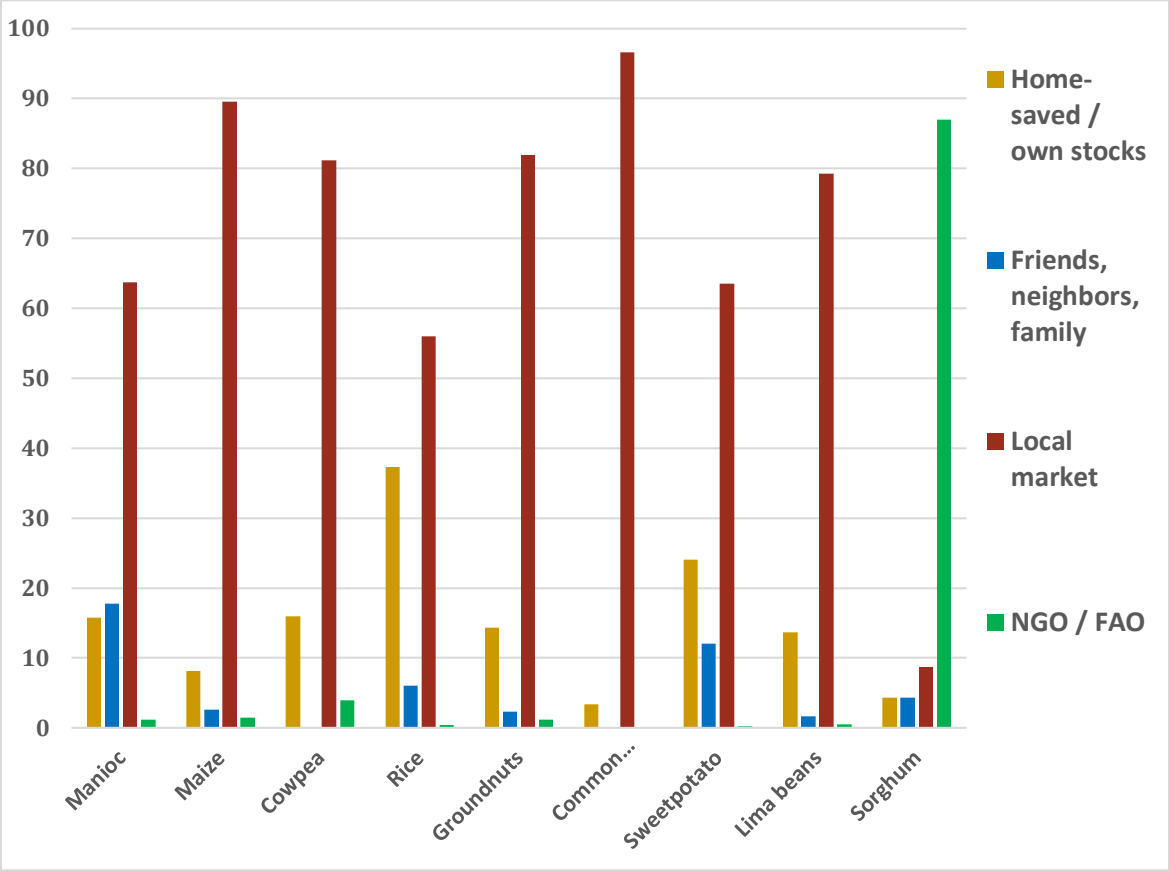
- **Agrodealers** were negligible in terms of importance for seed for the three priority crops. They aren't even visible in the quantitative Table 4.1. (so < 0.1%). Complementary key informant information with agrodealers showed that these shops did provide seed of horticultural crops but for a very select few customers (see Chapter V). Formal agrodealer shops are very few in the South, especially when considering the size of population.

- **Community-based seed producers** and **government** channels provided none of seed cited by households for the 2022-23 season for their principal crops. (Due to column limitations, they do not appear in Table 4.1)

Table 4.1: Seed (%) planted and sources farmers used across the Great South, 2022-23 season

Crop	kg planted	Home saved/ own stocks	Friends/ relatives/ family	Local market	NGO/FAO	Contract producers	Other
Maize	1716.5	8.1	2.6	89.6	1.5	0.0	0.0
Sorghum	23.1	4.3	4.3	8.7	87.0	0.0	0.0
Millets	2.5	0.0	0.0	0.0	100.0	0.0	0.0
Rice	7666.0	37.3	6.0	56.0	0.4	0.3	0.0
Manioc	1178.0	15.8	17.8	63.7	1.2	0.0	1.4
Sweetpotato	33.6	24.1	12.0	63.5	0.2	0.0	0.3
Groundnut	5125.8	14.3	2.3	81.9	1.2	0.0	0.2
Common bean	1905.0	3.4	0.0	96.6	0.0	0.0	0.0
Cowpea	954.7	15.9	0.1	81.2	3.9	0.0	0.0
Chickpea	50.0	0.0	0.0	100.0	0.0	0.0	0.0
Bambara	64.7	0.0	0.0	100.0	0.0	0.0	0.0
Pumpkin	1.0	20.0	0.0	80.0	0.0	0.0	0.0
Velvet bean	3.8	0.0	0.0	100.0	0.0	0.0	0.0
Lima bean	622.6	13.7	1.6	79.3	0.8	0.0	0.0
Tomatoes	5.0	0.0	0.0	100.0	0.0	0.0	0.0
Cabbage	0.3	0.0	0.0	100.0	0.0	0.0	0.0
Onions	2559.1	11.5	2.8	85.7	0.0	0.0	0.0
Watermelon	2.0	100.0	0.0	0.0	0.0	0.0	0.0
Carrot	0.6	0.0	0.0	100.0	0.0	0.0	0.0
Cucumber	5.2	0.0	0.0	100.0	0.0	0.0	0.0
Long bean	25.0	0.0	0.0	100.0	0.0	0.0	0.0
Lentil	12.5	0.0	0.0	80.0	20.0	0.0	0.0
TOTAL-all crops	*21952.2*	***20.6***	*4.2*	***74.1***	*0.9*	*0.1*	*0.1*

Figure 4.1. Farmers' seed sources, all major crops, across Great South 2022-23 season



Box 2. Exploring farmers' real demand for sorghum seed through Private Input Sector Providers

Zafitoe, father of 18 from Vohibola, Tranoroa is successfully supporting sorghum production in the Great South Madagascar. While sorghum is much better suited to the dry southern areas, people generally plant maize for a variety of reasons, including the fact that sorghum seeds are hard to access. For two years now, Zafitoe has been a lead farmer in his fokontany (village), where staff from the USAID-funded, Catholic Relief Services (CRS)-led Maharo and Tabiry projects have trained him on agricultural techniques such as wind breaks to protect crops.

Zafitoe's experience has led him to understand the many challenges in accessing sufficient local seeds and quality seeds. Given these challenges, he has seized an opportunity to improving the seed situation and also earn revenue to support his large family. With plots near the river of Tranoroa, Zafitoe is in his second year as a seed multiplier: CRS has given him 4.4 pounds of starter sorghum seeds of the Rasta variety, which increases yield significantly compared to the local variety, and provided him the technical support as well—advice on when to plant, spacing and depth of planting, intercropping and green manure cover cropping (i.e., covering up the ground to retain soil moisture).

The combined dynamism and skills as a lead farmer; as well as seed support from Tabiry, has enabled Zafitoe to produce seeds in compliance with the required standards. Following a favorable quality control visit by the government, he awaits formal declaration that his seed is legally certified. Zafitoe produced 1,058 pounds of certified sorghum seeds, which he intends to sell in the Private Input Sector Provider (PISP) boutiques of Maharo with prices that are much higher than in the local markets. This is twice the production compared to last year and he plans to further increase production next season. He anticipates using his seed profits to invest in a restaurant and to support his children's education.

Source: vignette provided by CRS

Are farmers seed-stressed 2022-23? (Are the amounts of seed sown in this main season more, less or the same as usual? What about the yields?)

To understand further possible vulnerability, farmers were asked to compare the 2022-23 quantities of seed sowed, by crop, with what they would normally sow at the same time each year. Basically, the question was this: Were the 2022-23 amounts 'normal' (same) or 'different' (more or less) than what farmers usually sowed.

Farmers reported, overall, they had increased the quantities sown, across crops, with the season showing dynamism. **Sowing amounts for 2022-23: increased +26.42 over the previous season.** While an optimistic trend, this overall increase might be interpreted with caution as in many communities, the two seasons previous were particularly bad ones, with the season under direct assessment, 2022-23, being a relatively promising one.

Table 4.2 shows that planting material/seed use in manioc and rice were particularly increasing (crops for which seed is largely saved and drawn from home stocks). In contrast, for key crops such as maize, cowpea and groundnuts, seed use showed deep declines (with seed sources here normally being dependent on purchase).

Table 4.2: Farmers' sowing amounts for 2022-23 season - more, less, or same?

Crop		% Households			Average change
	N	MORE	SAME	LESS	%
Maize	261	6.1	41.8	52.1	-32.26
Sorghum	15	6.7	60.0	33.3	8.33
Rice	185	10.8	53.0	36.2	174.44
Manioc	378	8.5	44.7	46.8	89.58
Sweetpotato	158	8.2	61.4	30.4	-11.02
Groundnut	170	7.6	21.2	71.2	-44.30
Common Bean	45	13.3	53.3	33.3	-18.48
Cowpea	197	6.1	42.1	51.8	-43.02
Bambara	31	29.0	22.6	48.4	-76.00
Pumpkin	9	0.0	77.8	22.2	-50.00
Lima bean	68	14.7	45.6	39.7	-19.78
Onions	57	3.5	61.4	35.1	-26.06
TOTAL	*1603*	*8.5*	*47.4*	*49.0*	***+ 26.68***

Note that farmers also judged the quality of the seed planted to be quite acceptable, with their giving overall ratings of 'good', 'average' and 'poor' being assessed as 69.3%, 26.6% and 4.1% respectively. Farmers did not assess seed quality as a problem.

Seed sources and quantities to be planted 2023-24 + possible stress

Farmers were asked the same questions on actual seed sources and quantities to be planted for the next season, slated to start a few months away, around October 2023. While 'planned seed sources' are not proven 'hard' data, they are a good indicator of whether farmers expect seed stress or other related troubles. The results below show a strong (continued) trend towards increase. Because the main season 2022-23 was relatively good, **farmers projected to be able to get over half of their seed (54.7%) for the upcoming season from their own stocks** and to use the local market to get the rest (45.0%). Also, in terms of overall seed use, farmers projected significant seed use increase of +29.85%.

Table 4.3: Farmers' seed sources, all major crops, across Great South, 2023-24 season

Crop	Total kg planted	Home saved/own stocks	Friends/ neighbors/ family	Local market	NGO/FAO
Maize	2414.4	37.0	0.5	61.8	0.1
Sorghum	118.5	23.9	1.2	73.8	0.0
Rice	12531.8	78.6	0.7	20.5	0.0
Manioc	1676.1	70.4	4.7	20.1	0.2
Sweetpotato	36.5	53.7	4.4	40.7	1.1
Groundnut	14009.5	48.5	0.7	49.4	0.0
Common bean	2287.4	31.3	0.1	68.5	0.0
Cowpea	1281.8	31.6	0.4	65.6	0.9
Bambara	301.7	74.2	0.0	24.1	1.7
Pumpkin	2.0	100.0	0.0	0.0	0.0
Velvet bean	17.5	0.0	0.0	100.0	0.0
Lima bean	861.7	49.2	0.7	46.5	7.3
Tomato	5.0	0.0	1.8	94.7	3.5
Cabbage	3.1	0.0	0.0	100.0	0.0
Onion	3892.2	27.1	5.5	67.4	0.0
Leek	0.6	0.0	0.0	100.0	0.0
Pea	5.2	23.1	0.0	19.2	57.7
Carrot	15.0	0.0	0.0	100.0	0.0
Cucumber	0.2	0.0	0.0	100.0	0.0
Long bean	50.0	0.0	0.0	100.0	0.0
Lentil	52.5	71.4	0.0	28.6	3.6
TOTAL- all crops	*38738.7*	***54.7***	*1.1*	***43.0***	*0.2*

While these sowing rates suggest a stable and even improving seed security situation, it is also important to remember the wider context and scale of need. For instance, 27-47% of children in the Great South suffer from chronic malnutrition (see Box 16, next chapter). Important development challenges remain for agriculture across the region: higher yields, more nutritional quality, and yields that bring in more income.

Focusing on potential problem areas + reasons spurring production

Overall signals of stress

To frame further the findings, the SSA did a comprehensive review of overarching patterns (beyond punctual seasonal data). There are multiple and precise signs that farmers in the South suffer from seed insecurity on an ongoing basis. Some five of these different signs are clustered in Box 3. The seed security of farmers in the Great South is very compromised.

There are multiple and quite precise signs that farmers' seed security in the Great South is very compromised.

Box 3. Seed security in the Great South: signs of extreme stress

Seed security in the Great South of Madagascar goes well beyond having access to performing varieties and good quality seed. For many farmers, it centers on having any seed to plant at all, even for priority crops.

Seed security evaluations have been completed in diverse emergency and chronic stress areas worldwide (e.g. places like Haiti after the earthquake; South Sudan with its instability; in Kenya drought areas). But the Great South the SSA of 2023 is identifying signs of stress among many farmers that are not often found in other 'hot spots' at such a large scale.

Signs of extreme seed security stress include:

1. ***Buying 100% of seed from market, repeatedly*.** Many farmers are buying 100% of their seed from local markets, again and again—because they have to. There are main reasons for this. Farmers are eating all their seed, as children need the food. Also, the risk of storage is too high (e.g. for crops such as maize).
2. ***Not planting a crop at all—a highly desired crop—due to lack of money.*** Farmers are just not planting a crop. ALL 14 women in a focus group im Anketraba did not plant maize this season—even though it is among their priority crops. Maize seed was available in the nearby market, but farmers lacked money to buy it. As for exchange or gift, women said they cannot ask for seed of this crop from family and neighbors as maize seed is so hard to come by. (Note that they can exchange or get gifts for sorghum).
3. ***Harvesting prematurely.*** There were many cases of farmers harvesting well before crop maturity in the Ankiliabo community – to eat (so there is no future seed possibility).
4. ***Sowing significantly less 'than normal'***. Farmers sowed less – mainly due to lack of cash (next section)
5. ***Not having 'three principal crops'***. Farmers cited just two principal crops (so were not able to plant a third). Depending on the region, the two generally included rice and manioc; or manioc and maize.

All these different signs add up to important seed security stress across a large swath of the southern population. This is not 'business as usual' when considering paths forward toward resilient seed system development.

Specific potential problem areas

Pursuing further the issue of seed security (or insecurity), the punctual analysis that the 2022-23 season was relatively good should not obscure that there were vulnerable populations, or other key reasons, why some farmers planted less (which may be important for helping to design critical support assistance). For the main season 2022-23, about half of the farmers interviewed signalled that they had planted less of a given crop (Table 4.2) and for the future season 2023-24, one-fifth (21.3%) stated they were still planting less, despite the unusually good prior season.

Lack of money – not lack of available seed – is driving farmers to 'plant less'.

Table 4.4 documents the reasons why farmers planted less. (It is a detailed analysis in which 20+ constraints were explored). For the 2022-23 season**, farmers cited one dominant constraint, lack of money (or prices too high)** – basically, lack of purchasing power. Lack of seed, that is, 'no seed available', or 'poor-quality seed' barely figured as key reasons for planting less. Similarly, for 2023-2024, purchasing power was cited as farmers' main constraint.

Table 4.4: Reasons (% responses) farmers cited for planting less of certain crops, 2022-23

Reasons	N	% of reponses
SEED-RELATED (or indirectly linked)		
Seed availability		
No seed available in market	17	2.2%
No seed/cuttings available from neighbors	45	5.7%
Seed access		
No money to buy seed/poor finances or seed price high	442	**56.4%**
Seed quality		
Seed available is not good quality or the variety is not liked	22	2.8%
Sub-total: seed-related	*526*	**67.1%**
NON-SEED FACTORS OF PRODUCTION		
No/insufficient labor	10	1.3%
Illness/health problems	11	1.4%
No/insufficient land or land not appropriate/insufficiently fertile	10	1.3%
Lack of tools/tractor/other machinery to farm	7	0.9%
Plant pests/diseases make production not possible	59	7.5%
Animals/predators make production not possible	1	0.1%
Lack of other inputs: controlled water supply/irrigation or fertilizer	5	0.6%
Poor weather/rainfall	142	18.1%
Insecurity (e.g. theft)	0	0.0%
Sub-total: non-seed factors of production	*245*	**31.3%**

Reasons	N	% of reponses
OTHER PRIORITIES/STRATEGIES		
Market for crop or crop products not well-developed	2	0.3%
Change in crop/ crop profiles	0	0.0%
Other priorities than agriculture (e.g. have shop)	0	0.0%
New agricultural methods allow for lower seed rate	0	0.0%
Other	11	1.4%
Sub-total: other priorities/strategies	*13*	*1.7%*
Total	*784*	*100.0%*

Spurring production

To complete analysis of the rationale for farmers' planting decisions, farmers were asked why they planted more of a given crop—for those few who did so (Table 4.5). Households planted more mostly because the weather was more promising, and because they had more seed due to a good prior harvest.

Those who 'plant more' do so mainly because they harvested more or the weather was favorable: VERY few seek market opportunities.

Interesting was the total lack of forward-looking strategy as a reason for planting more. There are near nil instances of farmers planting more to respond to the opening markets or because they are trying to intensify aspects of their production, for instance, to focus on the more lucrative crops. Hence, in the South, the equation for seed use seems unusually simplified. If the weather is good, if farmers have some home stocks from prior harvest and if there are available funds—farmers plant more. In converse, if the weather is bad or when funds are scarce, families retrench.

Table 4.5: Reasons (% responses) farmers cited for <u>planting more</u> of a given crop 2022-23

Reasons	N	% responses
SEED-RELATED (or indirectly linked)		
<u>Seed availability</u>		
More seed available in market due to good harvest	**23**	**16.9%**
More seed available due to free seed	**18**	**13.2%**
<u>Seed access</u>		
More money to buy seed or seed price low	**12**	**8.8%**
Got credit or voucher to buy seed	1	0.7%
<u>Seed quality</u>		
Have especially good seed or variety	2	**1.5%**
Sub-total: seed related	***56***	***41.2%***

Reasons	N	% responses
NON-SEED FACTORS OF PRODUCTION		
Good/increased labor	**0**	**0.0%**
Feeling strong/healthy	4	2.9%
Have more land/more fertile land	**5**	**3.7%**
Have tools/tractor/other machinery to help farm	0	0.0%
Have access to irrigation, fertilizer or other inputs (for example, stakes)	**2**	**1.5%**
Good weather/rainfall	**61**	**44.9%**
Good security (e.g. no theft))	0	0.0%
Sub-total: non-seed factors of production	***72***	***52.9%***
OTHER PRIORITIES/STRATEGIES		
Well-developed/new markets for crops or crop products	**2**	**1.5%**
Have decided to give more priority to agriculture/food security	**1**	**0.7%**
Change in profile of crops	**0**	**0.0%**
Re-sowed due to stress	**1**	**0.7%**
Other	**4**	**2.9%**
Sub-total: other priorities/strategies	***8***	***5.9%***
Total	***136***	***100.0%***

Could the markets deliver seed?

The role of the markets in ensuring seed security was also centrally addressed as markets proved to be the key farmers' seed source. It was the **local markets, not the formal ones (i.e, agrodealers), that were the major source of farmers' planting material.**

Key questions revolved around several issues: "Could the markets deliver enough seed? Would the seed on offer meet farmers' quality needs? Did prices make purchases accessible for smallholder farmers?"

Agrodealer and formal seed supply 2022-23

Agrodealers were interviewed wherever they could be found, but there were very few formal outlets and these were concentrated in more urban areas. The SSA team located three dealers in Tulear and two in Taolagnaro. One agrodealer (based in Taolagnaro) mentioned that she does rotate sales by also travelling among rural markets, so there was some modest outreach.

Important for seed security issues is that dealers provided very small amounts of seed overall (see Table 4.1, for absence of agrodealer role) and gave priority to horticultural crops (Figure 4.2). Several dealers also made sales which responded to specific NGO procurement requests, such as filling special orders for sorghum and millet seed to be subsequently distributed as humanitarian aid. In terms of non-seed items, the sale of mineral fertilizer and especially also proved key to sustaining agrodealer business.

Agrodealers currently contribute negligible amounts to farmers' total seed supply – with their main focus on horticultural crops.

Figure 4.2. Agrodealer shop inventory: examples from Tulear and Taolagnaro

Tulear shop: The packets of the fast movers – carrots and lettuce – had been sold out but select packets are still on display.

Taolagnaro-DMM shop. They stock a wide array of horticultural crops

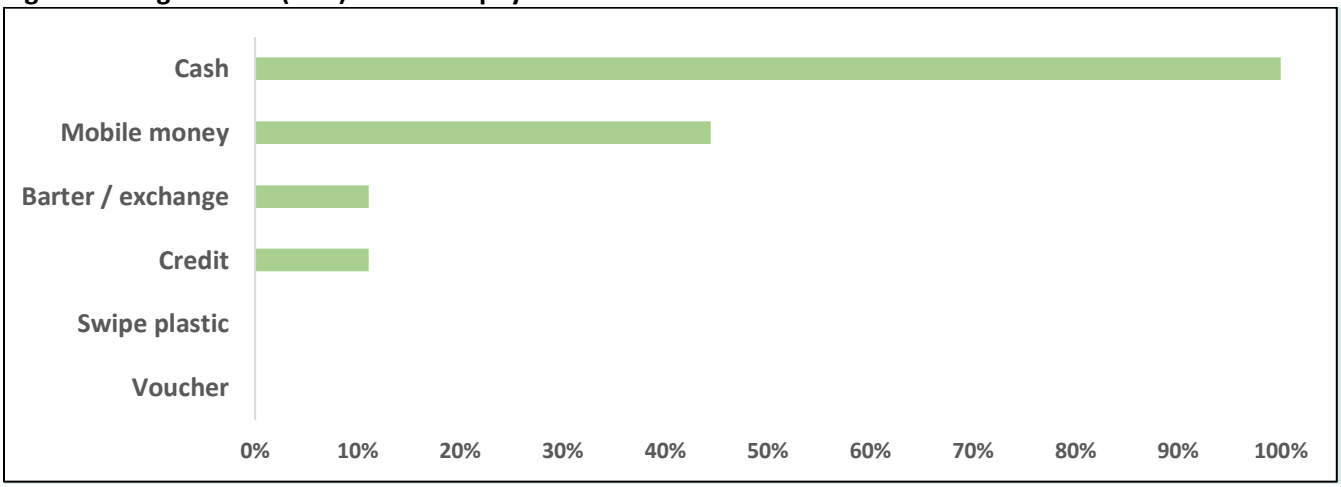
Sharing price information, dealers indicated that prices did and have remained stable during the 2022-24 period. Interesting is that the agrodealers interviewed sourced primarily from international, not national private sector companies (Table 4.6).

Table 4.6: Agrodealer (N=9) sources of seed vended 2022-2023 season

	% seed from each source				
	Research center	**Government seed service**	**National private seed company**	**International private seed company**	**Other**
Peas	0.0	0.0	0.0	100.0	0.0
Cabbage	0.0	0.0	0.0	50.0	50.0
Onions	0.0	0.0	0.0	100.0	0.0
Sorghum	0.0	0.0	0.0	100.0	0.0
Rice	0.0	0.0	0.0	100.0	0.0
Groundnut	0.0	0.0	0.0	66.7	33.3
Pumpkin	0.0	0.0	0.0	100.0	0.0
Lima beans	0.0	0.0	0.0	0.0	100.0
Eggplant	0.0	0.0	0.0	50.0	50.0
Carrots	0.0	0.0	0.0	100.0	0.0
Lettuce	0.0	0.0	0.0	100.0	0.0
TOTAL	*0.0*	*0.0*	*0.0*	***73.3***	*26.7*

In terms of payment mechanisms, only one of the nine agrodealers allowed for credit (or barter), both being potentially important for cash-strapped farmers. None interviewed accepted vouchers which are a form of payment sometimes provided by humanitarian agencies. Agrodealers required cash and mobile money as the major forms of payment (Figure 4.3).

Figure 4.3. Agrodealer (N=9) allowable payment mechanisms



Local seed/grain market-supply 2022-24

Local market functioning for the 2022-23 and 2023-24 seasons was also reviewed, via interviews with larger traders, collectors, retailers, and direct visits to markets. (The processes by which traders manage and farmers' select and manage seed in local market are reported in Chapter V, Tables 5.10 and 5.11). The immediate focus was on the local stocks available, assessments of quality, and costs.

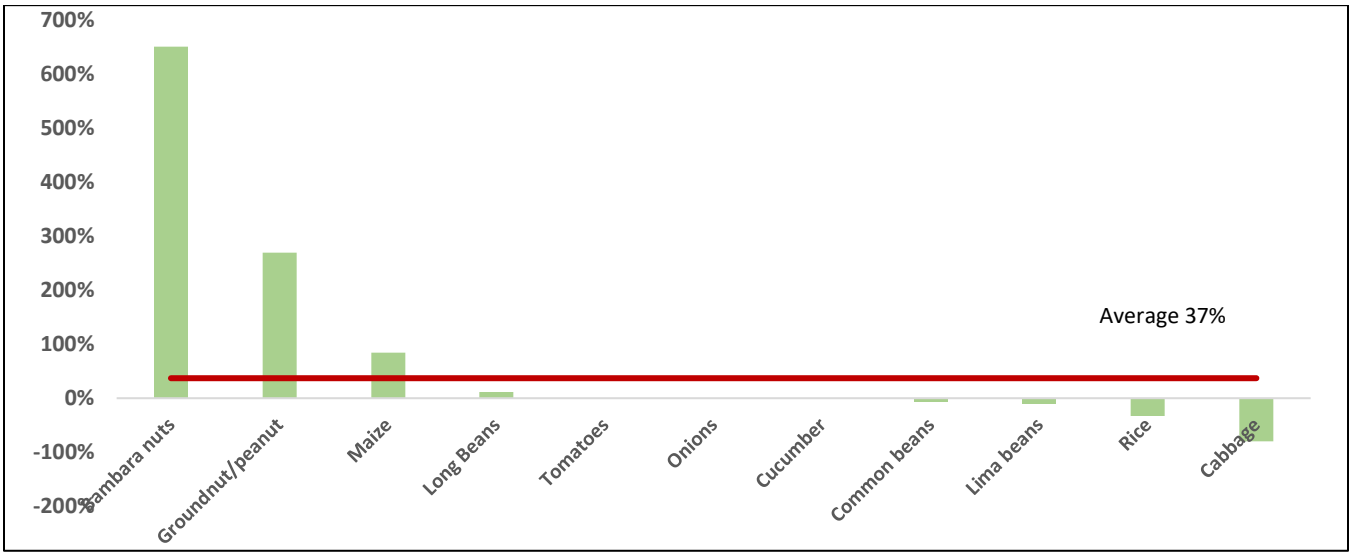
Figure 4.4 Diversity of seed found in local markets (photos)

Diversity of legumes in market, in South	*Vegetable seed packs even in open market*
	

Market seed availability and quality

Traders, among the largest seed suppliers in the South, indicated that their overall stocks were up for 2022-23, +37% in quantity, compared to previous season although some had constraints associated with rice and one could not source cabbage seed. Trader constraints went beyond lack of available supply. Transaction costs (official and unofficial fees), poor quality of roads, and transport costs were also mentioned as key constraints for sourcing supplies.

Figure 4.5. Trader stocks 2022-23 season as compared with previous one



As for the *quality* of seed on offer in local markets, no rigorous researcher or government assessments were made during the SSA. Farmers themselves assessed the quality of seed they purchased overall as 'good' or 'average', with their assessments likely tied to their production results. As assessed by farmers, the quality of seed obtained from the market was not different from the quality of seed obtained from other sources (Table 4.7). (Results are inconclusive here, except that quality of market seed did not emerge as an specific concern.)

Table 4.7: Farmers' assessment of quality of seed they planted, by source, 2022-23

Source	N total	Quality of seed used? % of responses		
		Good	Average	Poor
Home saved /own stock	303	69.3	26.4	4.3
Friends, neighbors, relatives	264	69.7	27.7	2.7
Local market	1137	68.0	27.8	4.2
Community-based seed groups	1	100.0	0.0	0.0
NGO / FAO	120	79.2	15.0	5.8
Contract seed growers	1	100.0	0.0	0.0
Other	4	100.0	0.0	0.0
Total	*1830*	***69.3%***	***26.6%***	***4.1%***

Figure 4.6 Market seed in the South of Madagascar - photos

Market seed access/price – and costs to farmer

Seed price was also reviewed, and specifically the price for total seed farmers purchased 2022-23 and aspire to purchase for the main season 2023-24. Calculations were made focusing on farmers' three major crops, the number growing the crop, and the standard prices collected during field interview.

Tables 4.8 and 4.9 show the total seed cost calculations across sites in the South. For 2022-23, farmers on average spent about 28458 AR ($6.55) for seed purchase, with most of the cost being on maize seed. The total amount is projected to jump for 2023-24 some 61390 AR ($US13.88) as both maize and rice are expected to be key crops for large portions of the population and both are relatively expensive (especially maize). Are these costs 'high' for farmers? Apparently yes, as so many indicated they planted less (or will plant less) due to lack of funds.

Table 4.8: Farmers' average cash needs for seed purchase (AR) 2022-23 season

Three main crops	# growing this crop	Average Spending				
		Neighbors	Local market	Agro-input shops	All sources	% of total
Manioc	378	5554.92	158.84	0.0	**5713.76**	**16.8**
Maize	261	0.0	18854.25	0.0	**18854.25**	**55.4**
Cowpea	197	0.0	9445.28	0.0	**9445.28**	**27.8**
Total (of 3)		***5554.92***	***28458.37***	*0.0*	***34013.29***	***100.0%***

Table 4.9: Farmers' projected cash needs for seed purchase (AR) 2023-24 season

Three main crops	# growing this crop	Average Spending				
		Neighbors	Local market	Agro-input shops	All sources	% of total
Manioc	346	3572.83	68.10	0.0	**3640.94**	**5.5**
Maize	223	0.00	21425.65	0.0	**21425.65**	**32.3**
Rice	193	1305.70	39896.89	0.0	**41202.59**	**62.2**
Total (of 3)			***61390.64***	*0.0*	***66269.18***	***100.0%***

Summary: Acute seed security findings 2022-24

Diverse indicators suggest the seed security of South Madagascar farmers in the short-term is relatively stable and even improving over two previous seasons. This is not an emergency seed situation. That said, the objective indicators suggest that their 'normal' seed security levels are very stressed. Below is a summary of the main trends in the short term.

From the farmer point of view, 2022-2024

1. The season 2022-23 was generally assessed as a good one across major crops – especially in contrast to the two prior seasons, both of which were assessed as very poor.

2. Sowing trends for the 2022-23 main growing season and projected 2023-24 season were both charted as on the rise. For 2022-23, farmers sowed +26.42% more seed than 'normal'; for the 2023-24 season, farmers intend to plant +29.85% more seed.

3. Farmers relied on local seed channels to access over 98% of their seed during the 2022-23. These included: home saved seed, seed from friends or kin, and local markets. Almost 74% of seed sown was sourced from local markets. For the 2022-23 season, no farmers in the sample (N=620) cited using any formal seed sector channel: no agrodealer or government source.

4. Sorghum was not currently not listed as among farmers' priority crops and over 85% of sorghum seed sown was obtained through free aid. It is currently difficult to determine real demand. Moving forward, acceptance and promotion of sorghum (and millet) may require substantial efforts in behavioural change, emphasizing especially its high value for resilience, coupled with initiatives to enhance its monetary value (through novel value chains).

5. For those farmers' sowing less during the 2022-23 season (often a signal of stress or vulnerability), the overwhelming reason given was lack of money. Seed was available but farmers lacked the funds to purchase. Variable weather for select crops was cited as a secondary reason.

6. For the farmers sowing more during the 2022-23 season, the reasons were straightforward, principally the weather had improved (for select crops) and more seed was available due to good prior harvest. There were near nil instances of farmers planting more to respond to the opening markets or because they are trying to intensify aspects of their production, for instance, to focus on the more lucrative crops.

8. Lack of money, or lack of purchasing power – was the major factor constraining farmers' seed use. Seed purchase costs for farmers' three main were calculated at Ar 34013.29 for 2022-23 and Ar 66269.18 for the upcoming 2023-24 season.

9. More generally, in the short-term, there were important indicators of ongoing seed security stress among smallholders. Select farmers are buying 100% of their seed from local markets, season after season; many are not planting highly desired crops at all (such as maize); some are harvesting the crop prematurely so as to eat; many sow 'less' of a given crop; and a good number don't have three principal crops at all – they can afford only two.

On the supply side, 2022-2024

On the seed supply side for 2022-24 seasons, several findings are to be remarked tied to analysis of the formal and informal markets.

4. The few agrodealers in place indicated no remarkable inventory shortages. All focused on horticultural crops, with dealers having a good range of types on hand. As farmers' accessed negligible amounts of seed from this source, the current agrodealer role in seed security was not key for the Great South smallholder

5. For seed supply from formal agrodealers, other trends are notable:.

   - Geographic access: they are concentrated near solely in urban areas. (although the growth of PISP and CTAS outlets has been an important advance.)

   - Crops focus: The agrodealer prime thrust is on horticultural crops only, with the range of legumes poorly represented. (Again, the PISP and CTAS outlets help to fill this gap.)

6. The seed available on the local markets was relatively plentiful (+37% over previous season) Generally, such seed was assessed by farmers and traders to good or average quality (although the SSA made no objective assessments). A diversity of crops was found in the open market. Also, seed of recognized high quality was occasionally sold, especially certified vegetable seed in packets.

Overall, in the short term, the seed security situation is stable but at a level of 'very stressed stable'. While for the short-term, the SSA focused on only two seasons of monitoring, the acute stresses identified are likely indicative of the kinds of stresses smallholders in the Great South face on a more continual basis. Targeted solutions are needed to address the multitude of constraints.

*In the short-term, the seed security situation is stable in the Great South, but at a level of **'very stressed stable'**.*

Chronic seed system concerns + emerging opportunities

The SSA also examined more systemic agricultural trends. Community-level assessments were done at all sites: community meetings, special focus group discussions with women, key informant interviews (with government leaders, business men, NGO staff and others), and market analyses. The varied methods allowed for cross-verification and assessment of medium-term trends and examined issues of: crop diversification, dynamism in use of seed sources, agro-enterprise within communities, access to new varieties, use of inorganic and organic fertilizers, and seed aid.

Crop diversification and (few) value-added products

Communities provided overviews of major crops sown in their area, and rated their respective importance for food consumption, income, and transformation possibilities, from raw agricultural products into value-added products. Sample results are presented below, from the three regions. Several trends appear across sites. An impressive array of crops is grown. While most contribute to food security; most also have importance for income: farmers are selling whatever they can to help secure income. That said, transformation levels overall seem very low, or near non-existent in most communities. Manioc and maize are sometimes ground into flour, but not much else. Farmers are mostly selling their raw products and not adding key value that could bring in much-needed income.

Table 4.10: Atsimo Andrefana, Fokontany: Ankiliabo: crop diversity, little transformation

Crop	Importance for food	Importance for income	Any transformation?
Rice	***	**	-----
Manioc	***	**	-----
Sweetpotato	**	***	-----
Maize	***	**	-----
Cowpea	**	***	-----
Lima bean	**	***	-----
Bambara	*	***	-----
Horticultural crops	*	***	-----
Mung bean	*	***	-----
Chives	*	***	-----
Common bean	**	***	-----
Tomatoes	**	***	
Pumpkin	**	***	

# of stars indicates the importance. *** high; ** medium/average; * low (basically none, unless product identified)

Table 4.11: Androy--- Fokontany Ankilibehara 2 crops: diversity, little transformation

Crop	Importance for Food	Importance for Income	Any transformation?
Manioc	***	**	*
Sweetpotato	***	**	*
Cowpea	**	***	*
Maize	***	**	*
Lablab	**	***	*
Watermelon	**	***	*
Zucchini	*	***	*
Melon	*	***	*
Groundnut	*	***	*
Bambara	*	***	*

# of stars indicates the importance. *** high; ** medium/average; * low (basically none, unless product identified)

Table 4.12 : Anosy - Fokontany Berano Lovasoa: crop diversity, low-level transformation

Crop	Importance for Food	Importance for Income	Any transformation?
Common bean	*	***	-
Maize	***	**	local production of maize flour (Botsako)
Sweetpotato	**	**	- ?
Manioc	**	*	local production of manioc flour
Sorghum	**	*	-
Cowpea	*	***	-
Lablab	*	***	-

# of stars indicates the importance. *** high; ** medium/average; * low (basically none, unless product identified)

Seed system sourcing – dynamic trends

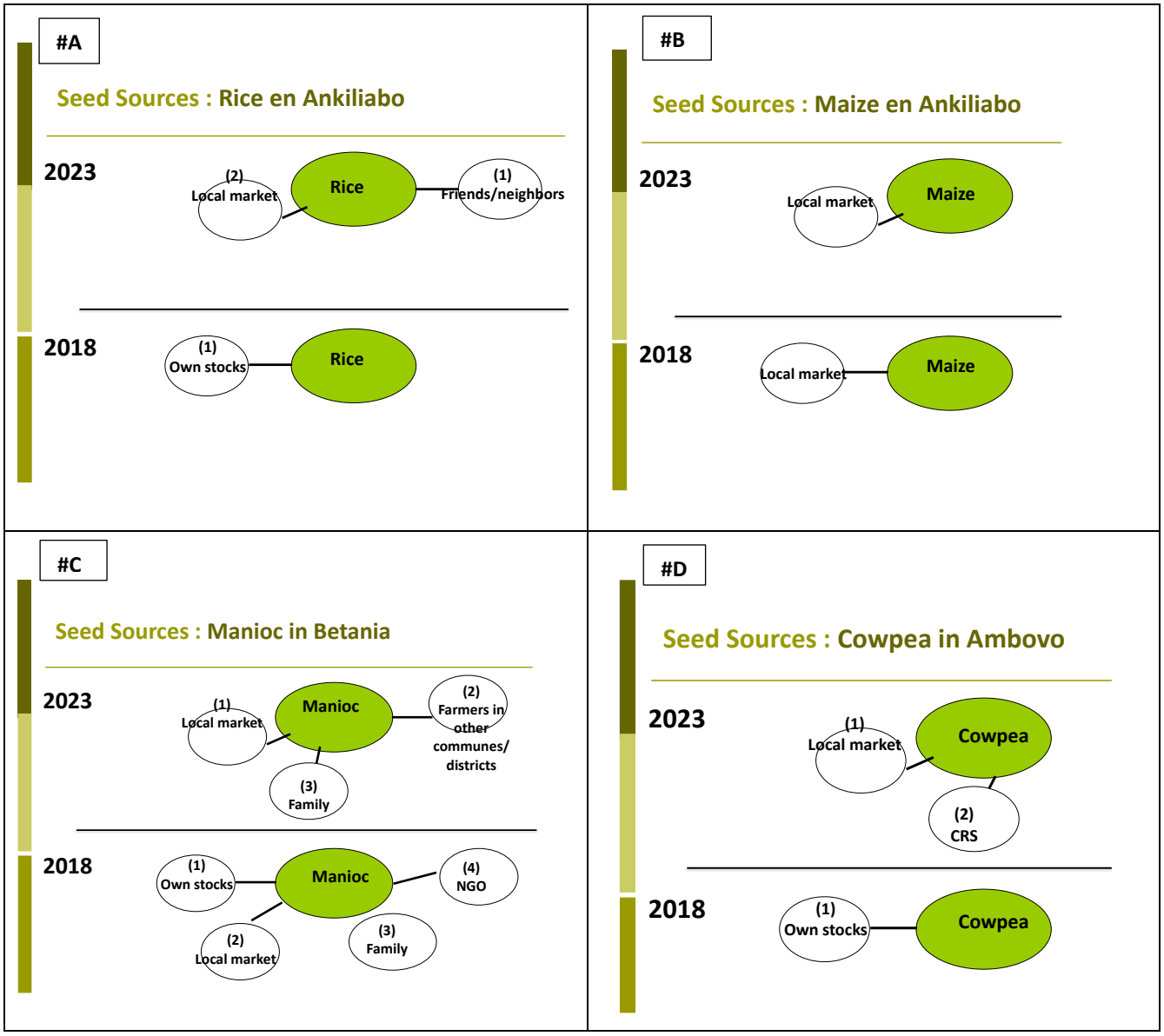
Community mapping of seed sources trace general trends in seed source strategy. Groups mapped their current seed sources for a particular crop and compared them with those used five years previous (so comparing 2018 with the present). Several examples of seed maps are sketched below (Figures 4.7 A,B,C,D).

There has been little positive dynamism, that is, new sustainable seed sources for any crop. One NGO has been noted giving seed (CRS). In contrast, there have been marked downward trends in the last five years, in two senses. Farmers are able to use fewer channels overall: for many crops, there is only one source, which is not a stable or resilient situation. Also, there has been a marked decline in use of home stocks with the gap being filled by a strong reliance on sourcing seed from local markets. Manioc is a special case: getting enough planting material often requires multiple sources as each may provide only a few stems. Also, planting material may come from afar, a process which has implications for disease spread.

Seed systems appear to be in decline, not static.

Farmers are using fewer seed channels overall and use of home stocks for seed has decreased.

Figures 4.7 A,B,C,D: Community seed sourcing maps, four examples



Notes:
#A Rice seed sources shift totally away from 'own stocks/hone-saved seed'
#B No change in 5 years- Maize seed sourcing still totally tied local markets
#C There are a range of sources for manioc- even geographically far (which has disease spread implications)
#D Cowpea seed moves away from own stocks to market but there has been some innovation with CRS assistance.

New varieties

Farmers' accessing new varieties can be important for seed security as new varieties (either modern varieties or performing local varieties) represent an economical way to increase production quickly. Figure 4.8 and Table 4.13 present the result of new variety use in the SSA, across the three regions of the Great South.

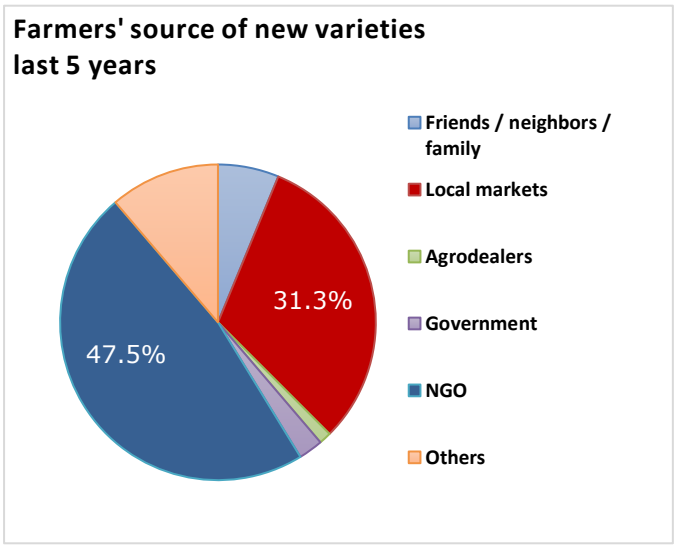
Striking is that **only 8.2% of farmers interviewed have obtained any new variety in the past five years, 2018-2023**. (Note: this is among the lowest rates we have seen anywhere in the world where SSAs have been completed). A range of crops has been included among the new varieties: maize, sweetpotato, manioc, groundnut, and cowpea being at the top. New varieties have mainly been accessed through two channels: NGOs/FAO and local market with 47.5% and 31.3% of new accessions, respectively. The sourcing on innovation from local markets is a positive trend as this channel can operate without donor support. Notably, very little variety novelty came from the government/ research/extension chain (two instances only for the entire farmer household sample).

Only 8% of farmers accessed a new variety within the last 5 years (among the lowest rates noted for an SSA).

New delivery and packaging approaches are sorely needed.

More generally, using the variety problem as a pivot, farmers throughout the assessment zones lamented the lack of access to information: new variety information, novel agronomic techniques, technical information on storage or even advertisements, alerting them that novel products might exist. Many farmers could not even remember the last time they had seen a government agronomist on the ground. This may partly be due to halt in work during the recent COVID-19 period. That said, there is a more general need to revitalize rural information networks, including two-way communication systems linked to a range of seed-related and agronomic information.

Figure 4.8 and Table 4.13: How farmers source new varieties in the Great South: 2018-2023



Crop	# Introductions
Maize	11
Sorghun	4
Millets	2
Rice	6
Manioc	9
Sweepotato	9
Peanut	9
Common bean	2
Cowpea	11
Bambara nuts	1
Lima bean	5
Tomato	1
Onion	2
Carrot	1
Peas	1
Lentil	1

Thinking forward and to increase access, the outlets by which new varieties might be sold and diffused could be expanded and this might be important an area for debate and action (Box 4). The packing of seed in very small packs might be one tool to help with this expansion of sale outlets (Box 5). Small packs are easy to transport, and the seals might help to maintain quality (if other transport norms are respected).

Box 4. Innovative channels for getting new varieties out to many farmers

Farmers in the South need more regular access to new varieties across a broad range of crops. No single conduit currently gives them easy new variety access—except for local markets where the varieties on offer may be limited or of uneven quality.

Vegetable (horticultural) seed is somewhat more accessible to farmers as it is found in agrodealers but also many other types of stores: the sealed packets are easy to transport and display.

A key action might be to link research and formal seed supply to multiple actors who might can render new varieties accessible to the many venues farmers might frequent. Remember that farmers need both the variety (seed) but also the enough information to make informed choices.

New varieties and information should always be on offer together. Possible conduits to explore and support:

- CTAS and other NGOs (current sources)
- Traders on open markets
- Farmers' organizations
- Women's groups (nutritional centers)
- Village committees

Box 5. Could changes in packaging spur farmer purchase of new varieties?

A common complaint voiced during the SSA is that farmers don't want to buy high quality (certified) seed: they find it too expensive. One approach that has proved successful in many countries in Africa is to package seed in small, sealed packs: 50g, 100g 250g versus the more common 5kg,10kg, 20 kg units. This way, farmers may be able to purchase new modern varieties rather than receiving them free through humanitarian aid.

The small sizes prove more affordable and have been compared in price to 'a cup of tea'. The packs basically allow farmers to get ongoing access to new varieties and to test them at low risk. Know also, that if farmers like the seed quality, whether QDS or certified, they can always rebuy in large pack sizes.

The NGO CTAS has been very forward-thinking is using a parallel approach. Their QDS seed is sold in bulk so farmers can buy even a kapoaka unit amount (a tin of about 250g or the equivalent of a 'handful'). That said, the small tin approach remains localized in the South and especially requires strong on-site quality controls.

Sealed packs are fairly easy to transport longer distances. Different types of vendors could potentially be engaged in selling them, even in last mile areas.

Agroenterprise

Most communities reported no transformation at all, aside from grinding maize or manioc into flour for local use. Thus, they had few means to generate value-added income.

One notable exception identified during the SSA concerned cassava procressing, and on a relatively large scale (Box 6). Another small agro-processing enterprise was located. TAZA based in Ambomvombe, sells cactus fruit jam, honey, peanut butters, gari, cookies from different flours, etc.

Box 6. FIVEMA: an association of fresh cassava processing companies in Androy

The company created by the FIVEMA Association of Bekily consists of six fresh cassava processing companies in the Androy Region. With the support of the ILO for the infrastructure, and of DEFIS and WFP for the materials and the training on the transformation, these companies are dispersed in six municipalities of the Region. For the moment, women's associations manage the company, but steps have been taken to evolve into a cooperative, especially in order to be able to find outlets. The raw materials come mainly from the production of the members of the association, but if needed, other farmers may be called to deliver additional roots. The members ensure the manufacturing steps from peeling, washing, grinding, sieving, fermentation, garification/roasting, cooling, and packaging.

The daily processing capacity is 300 to 350 kg of fresh cassava (i.e., a cart). Three carts of fresh cassava required one cart of firewood for roasting. All the equipment for the operation of the company is available (DEFIS financing). For the processing equipment, there is a motorized grinder, cleaning bins, sieving equipment, two roasting ovens, a water storage impluvium, machine rooms, a storage room, and a fine sieve grinding machine for flour.

The finished products are of three types: gari, flour and starch. The association uses modern packaging with quality packaging and labeling.

In the case of the Mangarivotra Bekily company (FIVEMA), the customers are not yet very varied because apart from the sale of products at the association's on-site sales store, the WFP has ordered 200kg of finished product per month to supply a school canteen in the district. It is the members who make the preparation of this meal and soon, this collaboration will extend to other school canteens. In addition, a GALANA station in Antananarivo has been supplied with 100 kg of gari, 50 kg of flour and 50 kg of starch. The NGO Bel Avenir de Tuléar is a future client of FIVEMA insofar as it has provided support by providing two artisanal ovens for baking items such as cassava-based cakes and biscuits.

Going forward, the Association would like to expand their customer base via opportunities such as the development of contracts for the supply of raw products to farmers in the district; the establishment of points of sale in Tuléar and Taolagnaro and perhaps in other cities; and participation in regional and/or national fairs.

These companies ask for support for their activities, namely: the support of nutrition managers for the use of cassava powder in food (reinforcement of the nutritional habit), support to increase supply of cuttings at the time of planting (pre-positioning of the stems), and support from the DRAE, among organizations.

Non-Seed Inputs: Manure/Compost, Fertilizer, Pesticide + Storage Chemicals

Select input use of non-seed products was also examined during the Great South SSA as a complement to the seed security analysis. This included examining farmers' use of a) inorganic (mineral) fertilizer; b) storage chemicals; c) manure and compost; and d) pesticides. Figures 4.9 A,B,C,D summarize the findings.

Figure 4.9 A,B,C,D. Farmers' use of non-seed inputs, 2022-23 season

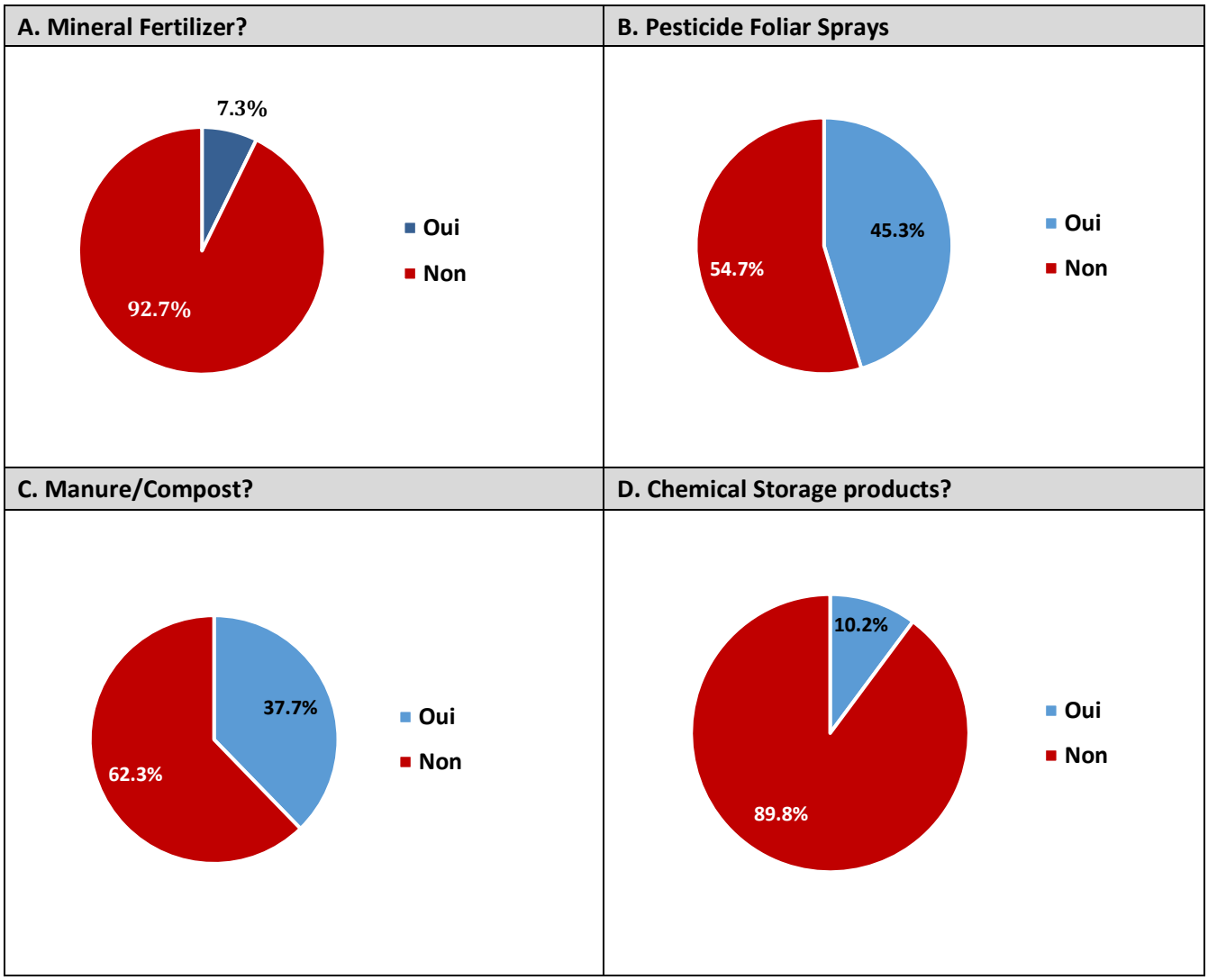


Table 4.14 summarizes the percent of farmers at each site using or intending to use these inputs for the 2022-23 main season and the 2023-24 main season. Discussion of the patterns of use for each input follows.

Table 4.14: Percent (%) of farmers using a select input ('yes') during the season cited

Input	South Madagascar	
	Main season 2022-23	***Main season 2023-24***
Mineral fertilizer	7.3	9.5
Storage chemicals	10.2	12.9
Manure/Compost	37.7	38.5
Pesticides: foliar sprays	45.3	45.2

Mineral Fertilizer use

Mineral fertilizer was/will be applied by less than 10% of those interviewed, with those using giving preference to rice. Farmers generally did not apply mineral fertilizer as they sensed it not needed: soils are relatively fertile. Other reasons for non-use of fertilizer included its non-availability, high costs, and just not knowing how to apply effectively.

Storage Chemical Use – 2022-23 and 2023-24 seasons

Chemical use in storing seed was also reviewed. Many farmers do not store at all, as evidenced by the high proportion of seed being bought on the market season after season (Table 4.1). For those who did store (10-13% of farmers), losses were reported as high as 35%, particularly for beans, maize, rice, cowpea, and groundnuts. Losing any stock is serious and the efficiency of different storage methods merit more analysis. Box 7 shares some promising storage techniques already tested in the South.

Manure/Compost Use

Manure/compost were among the inputs most applied, by slightly less than 40% of households, with large stock manure (cattle/goats) and field residues being the predominant types used. This figure may seem low given the abundance of livestock in the South but those not using largely assessed their soils were sufficiently fertile (49.2% of responses). About ¼ of HH (26.7%) did say that they did not have sufficient availability.

Pesticide use

Foliar pesticides had the highest of use among the non-seed inputs examined, 45% of households. They were mainly appiled to maize, cowpea and rice. Their non-use was largely linked to their cost with secondary reasons being their lack of availability and just not knowing how to apply them.

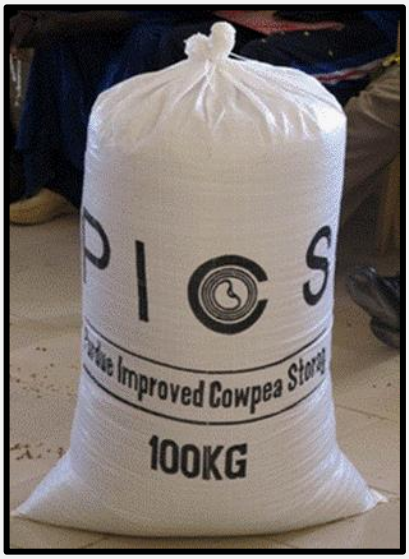
So, in sum, pesticides were used by almost half of households surveyed, but use of other inputs was uneven or low. The low use of manure is to be remarked as many in the South have livestock.

Box 7. Improved storage methods are available, including for the Great South

The rate of storage loss in the South is just too high (rising to 35%) – especially given that harvests are already too low to meet food and seed security needs. Multiple technical options for better storage have been tested and proven in the southern region, tailored for different crops. They now need be promoted on a larger scale, ways that guarantee sustainability in farmer access and use.

For the legumes and cereals, the use of triple layers of bags creates a hermetically sealed environment for storing seed and without chemicals. (See fuller description and commercial opportunities for one of the bag technologies, Purdue Improved Crop Storage bags. https://picsnetwork.org/. These are known as *Tigoun* bags, locally.)

For sweetpotato, a method known as the *Triple S method* – 'Storage in Sand and Sprouting' – provides planting material from storage roots with a long dry season. This is appropriate for households that struggle to keep their vines alive for the next planting season. https://www.sweetpotatoknowledge.org/files/sweetpotato-planting-material-the-triple-s-system-storage-sand-sprouting/. For videos, available in English and Malagasy on the Triple S method, please visit: https://sawbo-animations.org/1312 and /1667.

Storage: Cereals and Legumes	*Storage: Sweetpotato roots in layers of sand*
	

Seed Aid

As the last 'input', seed aid is examined, including both emergency assistance and developmental aid as farmers themselves often cannot make the distinction. Such aid has been a form of punctual assistance on and off in the South since at least 2005.

The SSA results show that most households, ¾ of those surveyed, had not received seed aid in the five years from 2018-2023 (Table 4.15). That said, seed aid is escalating and 2021 and 2022 were relatively prominent years for assistance—due to drought. Seed aid recipients generally received aid once (or 1.4 times) in the last five years, although several did receive aid 5 times in 5 years! The range of crops given was relatively wide: manioc, maize, sorghum, cowpea, groundnut, common beans, sweetpotato, etc.

Table 4.15: Households receiving seed aid, The Great South 2018-2023

# households (responding)	Received seed aid last 5 years?			# HH that did receive	# times aid received			
	Yes	No	Total		Mean	Std. dev.	Min	Max
620	27.3%	72.7%	100.0%	169	**1.4**	0.84	1	5

For seed aid recipients, the assistance format was overwhelmingly direct seed distribution (DSD) (81.9% of instances) with vouchers/coupons rising in frequency over the years (18.1% of instances). No farmer in the SSA sample mentioned a cash transfer linked to seed relief, even though this approach has been tested in the South. In 2022, FAO twice gave cash and seeds and other inputs to 50,000 vulnerable households. In 2019, CRS did a cash fair pilot in Androy.

For general information, Table 4.16 presents several different forms of aid humanitarian and lists select strengths and weaknesses (Sperling et al. 2022). Increasingly, humanitarian in Africa is moving away from DSD and towards more market-based approaches (whether vouchers and cash). In the South, where sustainable and demand-oriented seed security approaches are a major issue, humanitarian assistance might also be guided to become more market-based. Also, in the South, **it is critical that humanitarian aid actively be resilience-oriented.** There is no room for stop-gap aid that has no vision—beyond just dumping seed. Crops and varieties on offer should consist of seed and planting material that has capacity to make farming systems stronger. It will be an important challenge to move huamintarian aid toward these duals goals of promoting resiience and market-based approaches. The shift may not be immediate but rather planned more gradually.

Figure 4.10. Humanitarian seed security approaches: - photos

Direct seed distribution (DSD)	Seed vouchers and fairs (SVF)	Cash
		

Table 4.16 Humanitarian seed security approaches: review of rationale, weaknesses and strengths

Approach	Description/ Rationale	Comment/ Constraint	Strengths	Weaknesses
Direct distribution				
Direct Seed Distribution (DSD), also known as: Emergency seed provision Seeds and tools	Procurement of quality seed from *outside* the agroecological region for delivery to farmers	The oldest and most prominent type of seed relief Assumes the main constraint is seed availability	Familiar to donors, beneficiaries, and implementers Can reach large populations Can control initial seed quality if seed certification procedures have been respected	Crops and varieties on offer may not be those most suited to addressing stress Can undermine markets, both local and formal Can have challenging logistics, in terms of procurement, transport, and storage (which often makes seed delivery late) Limits farmers' choice and ability to strategize
Provision of modern varieties	Procurement of quality seed and modern varieties for direct delivery to farmers A variant of DSD	Assumes the constraint is variety quality Also assumes that farmers cannot access modern varieties themselves (without aid)	Gives farmers access to modern varieties that may not be locally available or affordable Can target specific constraints (e.g., drought, nutrition deficiency)	Risky for farmers, if varieties are not adapted, farmer-accepted or manageable under farmers' own planting conditions. Distribution can undermine commercial sales of these same varieties.
Market-based approaches focused on clients (demand)				
Seed fairs, combined with vouchers given to farmers	Fairs provide an ad hoc marketplace where farmers can access seed of different crops and varieties. Usually in conjunction with vouchers to give farmers more purchasing power	The second major form of seed relief A variant is the Diversity for Nutrition for Enhanced Resilience (DiNER) fair which is actively planned to promote a wide range of crops and varieties. Other variants are 'livelihood fairs' or 'input trade fairs' that focus on seed plus other inputs such as small animals, trees, and fertilizer.	Provides farmers with choice of crop and variety Can put diversity of crops and varieties on offer (if suppliers are offering a range of planting material) Injects funds into local economy Can be important venue for sharing and exchanging information Often supports smaller as well as large sellers, women and men	Labor-intensive in organization and implementation Relatively high implementation costs Requires focused seed quality control and screening measures, including on-site Can reach only relatively small numbers of farmers (compared with DSD) Not suitable for contexts where people should not congregate (e.g., insecure location, or COVID-type restrictions)
Cash	Cash provided directly or via digital transfer to give farmers more purchasing power	Assumes the main constraint is seed access Assumes that there are seed suppliers in the locality with capacity to respond to the demand	Lets farmers determine priorities Injects money into local economy by supporting vendors selling locally Can be done face-to-face or using digital or mobile money Has potential to bolster all seed systems farmers use, informal and formal	May not be used to buy seed as farmers may have other priorities Might be used unproductively (e.g., men buying alcohol) Requires sufficient market insight to ensure that sufficient seed of good quality and the right varieties are available in the locality Sometimes tied to other commitments (e.g., work programs) that increase labor loads Male and female farmers might not have equal access to digital or mobile money.

Vouchers	Vouchers provided physically or via digital means (an e-voucher), to give farmers more purchasing power	Assumes main constraint is seed access The voucher can be linked either to formal seed sector suppliers (agrodealers) or to informal suppliers, such as farmer-sellers at fairs.	Allows farmers to strategize about what they want among the seed options on offer Injects money into local economy by supporting vendors selling locally In contrast to cash, makes it harder for recipients to use the benefit antisocially (e.g., for alcohol or drugs) Can facilitate monitoring of programs	Are tied to supplier type. If formal supplier such as agrodealer shop, there are limited crops and varieties on offer. Vouchers may lead to artificially inflated prices If informal supplier, additional seed quality screening may arise as an issue. May also make it difficult for relief agencies to create formal agreement with informal suppliers for voucher-based transaction Voucher forgery is a potential risk – this should be addressed through voucher design.
Market-based approaches focused on suppliers				
Market-based support to supply side (agro-dealers/traders)	Punctual seed multiplication may be commissioned in advance of sowing for relief purchases. Support most often given to formal sector multipliers, although attention to informal suppliers is increasing	Only in limited use in seed relief Assumes a seed availability problem Used especially in multiplication of vegetatively propagated crops (VPCs) like swee potato	Supports existing markets, formal or informal, depending on the response design Injects money into the local economy	May spur artificial markets, as with sweetpotato vine multiplication, for instance, that has no real market beyond relief Depending on supply type, may have issues with crop and variety suitability (especially with formal supplier) or seed health (especially with informal supply)

Modified from Sperling et al. 2022, CRS 2002, Wlah and Sperling, 2016

Comparing possible differences in seed security-related issues

Male and female-headed Households

Possible differences within populations were also examined, especially focusing on female versus male-headed households for all issues above.

In terms of male and female headed (M/F) households, two statistically significant differences were noted. Female-headed households had a greater tendency to decrease sowing rates (versus those male-headed), so were sowing less. Similarly, and perhaps related, female-headed households had smaller plot sizes.

Table 4.17: Differences in seed security issues between M/F-headed households : 2022-23

Issue	Significant differences? *(t-tests*)*
sowing amounts	*yes: female-headed are sowing less*
use compost/manure	*no*
use of mineral fertilizer	*no*
use of chemical storage products	*no*
use new varieties?	*no*
times received seed aid?	*no*
field sizes	*yes: female-headed have smaller plots*

**p<0.0001*

Special focus on female-headed households

Initial insights from women's only focus groups suggest that the constraints female-headed households particularly face merit a good deal more attention. Their constraints may be formidable (see Box 8 for glimpse). Also, female-headed households may represent a rather large proportion of households in the South. Four of eight women's only focused groups estimates that 50% of the households in their village were female-headed.

Figure: 4.11. Women's Focus Group: Ankiliabo (photo)

There are many and diverse kinds of female-headed households in the South. They seem to have special seed security needs and targeted strategies may be required.

Box 8. Female-headed households and seed security: case of Bezaha and Anketraba

There many variations of female-headed households in the Madagascar South: women with polygamous husbands (3,4,5 wives), unmarried mothers, and women 'abandoned by their husbands.'

Women in focus groups in Bezaha and Anketraba insisted that 50% and 60% of households are female-headed in the respective sites: hence, female-headed and potentially vulnerable is not an occasional phenomenon but one that might merit keen attention in the South. Happily, some of the women own their land (4 out of 10 in focus group of Bezaha and all 14 in Anketraba). That said, one of the key agricultural problems is seed.

Except for manioc, women don't seem to be able to save significant amount of seed (or planting material). They do routinely get small gifts of seed from others but much of the seed has to be bought. For many women, the costs of seed purchase seem very high. They may earn between 2000-3000 AR/day, but may need to purchase 4 kg of rice and a single kilo of rice rises to over 2800 AR. (They buy in installments, maybe 3 staggered purchases).

Women do pick up occasional work such as weeding for ohers; washing clothes; fetching water; transplanting rice; making mats; and selling charcoal. However, all these tasks don't fill the money gaps and then, of course, women have their own need for agricultural services such as for plowing and the like.

This is a difficult situation but what did women in the focus group ask for as priorities? Not seed aid. They want technical training and access to new performing varieties. And yes, maybe some credit near sowing time could make a big difference.

Summary: Chronic Seed Security Findings + Emerging Opportunities

The review of medium-term trends in seed security the Great South uncovered chronic stress across a range of themes and identified a few moves forward (e.g., there were several cases of agro-enterprise). The seed security of smallholder farmers is very low (compromised) and may be on the decline (as compared to parallel indicators from a similar assessment in 2013). The current chronic seed security trends mirror those identified 10 years ago quite closely.

9. Farming communities grow an impressive array of crops, eight types or more. Most contribute to food security, but most are also high priority for sale. Farmers are selling whatever they can to help secure income. Transformation levels overall have been very low, or near non-existent across communities. Manioc and maize are sometimes ground into flour, but there are not many other products. Farmers are most often selling their raw products and not adding key value that could bring in much-needed income.

10. Seed system channels which farmers use have generally remained static over the least five years and channels have declined in number and quality. Overall, farmers proportionally now save less of their own seed, and are increasingly tied to local market seed purchase, year after year. Aside from a single NGO intervening, communities cited virtually no new sources.

11. Only 8% of households (among N=620) have accessed any new variety in the last five years – whether modern or local variety. Those accessing mainly accessed new varieties via two channels: NGOs/FAO and the local market. Notably, very little variety novelty has come from the government, research, or extension chain (there were only two instances only for the entire farmer household sample). To get new varieties in farmers' hands, there might be a need to expand the types of delivery outlets and the types of packing formats (i.e., pack in smaller sizes for lower cost).

12. Input use (non-seed) was low for both mineral fertilizer and storage chemicals (< 15% farmers). It was highest for pesticide use (45%). The use of manure/compost might also be interpreted as relatively low (37-38% farmers) given the prevalence of large and small livestock in the region. Reasons for farmers' not using select inputs generally involved their not being available; their being too costly; or simply that farmers did not know enough about the options. So, there weren't just product-linked gaps, but extensive knowledge gaps.

13. For input use (non-seed), it is key to signal out the very low use of chemical storage treatments. In an unusual situation, most farmers do not routinely store at all as they lack sufficient food (and eat all stocks) or seek quick income and sell at harvest. For those who did store the previous season, losses were reported as high as 35% particularly for beans, maize, rice, cowpea and groundnuts.

14. Paralleling point #1 – on virtually no agricultural processing in rural communities – very few larger agro-processing enterprises were identified within the entire southern region. The SSA found a single case of a rather large fresh cassava processing set of companies.

15. In terms of aid, most households surveyed (3/4) had not received seed relief in the five years previous (2018-2023.) That said, seed aid is escalating and 2021 and 2022 were relatively prominent years for assistance—due to severe drought. Aid recipients generally received seed once (or 1.4 times) although several received aid 5 times in 5 years! The assistance format was overwhelmingly direct seed distribution (DSD) (81.9% of instances) with vouchers/coupons rising in frequency over the years (18.1% of instances). No farmer mentioned a cash transfer linked to seed relief. As humanitarian aid in Africa is moving away from DSD approaches and towards more market-based ones, aid approaches in the Great South might also move towards more demand- oriented and market-driven responses, with resilience in mind.

16. There are many variations of female-headed households in the Great South: women with polygamous husbands, unmarried mothers, and women 'abandoned by their husbands'. Focus groups suggest that the proportion of female-headed households may rise to 50% or more in select villages. The SSA qualitative and quantitative data suggest that female-headed households may face extensive seed security constraints. For example, many are short of funds at critical sowing periods and female-headed HH often require (i.e. need to hire) outside help for the heavy agricultural tasks. The overall data showed female-headed HH statistically having smaller field plots and sowing less.

In sum, the major stresses encountered which affect seed security are chronic and systemic ones. The SSA identified few sustainable or emerging innovations.

V. SEED SYSTEMS IN THE GREAT SOUTH OF MADAGASCAR: FOCUS ON SUPPLY

This chapter focuses on supply and especially on the variety and seed system structures geared to serving farmers in the Great South. The formal breeding and formal seed sectors are briefly reviewed, including intermediary actors- and then the focus shifts to the informal seed systems, including local markets. The chapter also highlights several new initiatives by NGO and private sector partners.

Quality declared Seed (QDS) is a key positive development for serving high stressed areas like the Great South.

National seed laws were most recently formalized on a broad scale in Madagascar in 2010 (with further legal refinements focusing on rice in 2016). There was an unusual development in the South 2013 when quality declared seed (QDS) was recognized. GRET, evolving from CTAS (and with very strong support from the UN-FAO), pioneered the first QDS production. Since 2020, QDS has also been recognized in the Northwest of Madgascar, under the Pro-Sol project of GIZ. In other parts of Africa, parallel programs recognizing QDS seed have been implemented Ethiopia, Tanzania, Uganda, and Zambia, among others. Basically, QDS programs aim to scale up quality seed production and make it cheaper, without exposing farmers to substantial risk.

The informal seed sector is not formally recognized in seed laws nor does it figure in most practical planning initiatives.

While seed laws in Madagascar recognize the formal systems and also the production of QDS, the informal seed sector is not formally recognized nor does it figure in most practical planning initiatives. At this time of writing (2023), a new seed strategy (including possible law revision) is in consideration, being drafted by a committee appointed by the Minister of Agriculture (DRAE). We hope there will be room for stimulating more integrated seed sector development, leveraging the strengths of formal, informal, and intermediary seed actors working more in alignment.

Table 5.1: Laws and Decrees governing the seed sector in Madagascar

Law or Decree	Description
Decree 2010-1009 regulating the production, control, certification and marketing of seeds (MINAE)	General provisions Purpose and responsible persons for the control Permission to control organization of production Conditions of production and control of seed lots Production conditions Production control Seed lot control Conditioning Packaging Fractionation-repackaging Storage Seed Certification Certification and conditions of eligibility and fee Labelling Seed marketing Marketing by producer-distributors and distributors -Export-import Authorization, powers of control officers and punishable acts Final provisions

Law or Decree	Description
Law No. 94-038 relating to seed legislation	General provisions institutions Production and marketing Protection and title of protection Import and export Offenses and Penalties Final provisions
Law °2010-0958 establishing the national catalog of species and varieties of cultivated plants (CNEV)	Institution of the National catalogue and constitution Conditions for registration and applications for registration of new varieties Manual of CNEV registration procedures Technical examination of the variety: DUS (distinct, uniform, stable) and VCU (value for cultivation and use) tests Conduct of DUS and VCU examinations Instructions for the request Registration of the modified form of a variety already registered in the catalog or under study
Decree No. 2006-618 relating to the bodies responsible for implementing the seed policy	Decree No. 2006-618 relating to the bodies responsible for implementing the seed policy

Formal Breeding for South Madagascar

Breeding Institutions: governmental

Multiple government institutions in Madagascar help develop or introduce crop varieties. In terms of food crops, Foibe Fikarohana momba ny Fampandrosoana ny Ambanivohitra (FOFIFA), the main National Agricultural Research System established in 1974, and Fiompiana sy Fambolena Malagasy sy Norvegiana (FIFAMANOR), established 1972 with Norwegian funding, carry out the bulk of breeding and selection activities. FOFIFA has six main research departments of which two focus on variety research and selection: one is responsible for research in rice and the other focuses on the food sectors (maize, cassava, legumes). FIFAMANOR deals with research on tuber plants, including sweetpotatoes.

Both institutions have operated only at modest capacity in recent years and they tend to be financed by punctual projects (e.g. with support from AFAFI-Sud, GIZ, FAO, etc.) rather than being financially supported on a sustainable basis. Also, key is that neither has functional research stations in the Great South. Headquartered in Antananarivo, FOFIFA has regional centers across the Madagascar, but its single existing station in the South, at Toliary in the Atsimo Andrefana region, has been inactive for years and no FOFIFA regional research centers exist in Anosy or Androy regions. FIFAMANOR, headquartered in Antsirabe in the Vakinankaratra region has no southern regional branches. On a positive note, The World Bank has had exchanges with FOFIFA (via the MIONJO project) to set up a research station in the South, in Behara, Atsimo Andrefana region.

Neither of the two main research institutions – FOFIFA and FIFAMANOR – has functioning research stations in the South that could help develop and screen crops and varieties adapted to the challenging stress conditions.

In brief, until very recently, there was no government research station with an ongoing field base in the South which could help further develop and screen crops and varieties particularly adapted to the challenging stress conditions.

Breeding Institutions: not governmental

There are a range of other institutions, not governmental, which have developed varieties that can be grown in the South. Some effect breeding work for many Malagasy regions and their resulting varieties can also be used in the South (particularly in select irrigated areas). Others, like the NGO Centre Technique Agro-écologique du Sud (CTAS- Southern Agro-ecological Technical Center), and several international agricultural research centers – such as International Potato Center (CIP) – screen varieties especially for their adaptation in the southern areas.

Table 5.2 gives a quick overview of institutions doing select breeding work linked to varieties that might be used in the South. More detail follows for some of the other key actors: CTAS, CIP, and a fairly new private sector company, Agrima (short for **Agri**culture **Ma**dagascar).

Table 5.2: Indicative institutions with crop breeding and/or variety introductions that could help serve the South

FOFIFA	FIFAMANOR	Universities/private insititutes	Select NGOS, e.g. CTAS	Private Sector companies	Int's Research Centers
Wide range of crops	Especially sweetpotato	Horticultural crops	Maize, sorghum, collection of local varieties	e.g., Agrima sorghum, maize, potatoes, soybean Tozzi Green	e.g. AfricaRice CIP ICRISAT IITA CIRAD

CTAS

The Centre Technique Agroécologique du Sud (CTAS), based in Ambovombe, has a special role in breeding for the South. It focuses on species and local varieties adapted in the South. The CTAS has perhaps taken on *the* variety development role in the South with its special emphasis on local genetic materials and diverse varieties suitable for their overall agroecological approach. That said, given the seminal importance of CTAS, experts raised concerns during the SSA about their procedures to maintain varietal stability, characterization and seed quality. These might be reviewed and, if needed, strengthened. CTAS is critical for seed security.

In November 2022, CTAS convened a Regional Advisory Committee for the validation of species and varieties cultivated for registration (see Box 9 for CTAS overview). CTAS selectively collaborates with FOFIFA and the Official Seed Control and Certification Service (SOC) in terms of variety registration and seed quality inspection. CTAS has worked toward the development of a specific catalog for the South where three lists are mentioned: **List A**, the varieties registered in the CNEV, the national variety catalogue; **List B**, where species and varieties particularly adapted to the climatic stresses of the South are posted; and **List C**, where local varieties still being characterized for release are officially posted (see Annex I for List A and List B).

Box 9. CTAS: How an NGO serves as a backbone of variety research + seed multiplication

The Centre Technique Agro-écologique du Sud (CTAS) was formalized as a local NGO in 2013. Even prior, when known as Groupe de Recherche et d'Échanges Technologiques (GRET), it had the key role in guaranteeing both variety security and seed security in the two southern regions of Androy and Anosy. CTAS, in collaboration with GRET, was the first group to work with QDS standards in Madagascar.

Among its many important variety development and seed sector services, CTAS:

1) Has catalyzed the release of local varieties. As of 2018, 37 of these had been entered in a 'Quality Declared Seed Catalogue' and 24 additional ones are in the process of registration (so, 61 in total). Note that CTAS also selectively tests modern varieties, e.g., in collaboration with CIRAD;
2) Has set up routine variety testing programs to ensure variety materials are screened for their performance, adaptation and acceptance to specific southern conditions. CTAS works with 130 key farmers evaluators to get precise feedback;
3) Effects collections of local germplasm (maize, cowpea, dolichos, cajanus, riz, sorghum, etc.);
4) Manages the Agnarafaly seed production center (Androy) so as to produce 10-15MT of Foundation seed a year;
5) Links with some 500 farmer multipliers (PMS=producteurs multiplicateurs de semences) to further produce QDS seed: 250MT/year;
6) Has spurred development of a network of 120 boutiques to sell seed in Ambovombe and in rural markets/areas.

Clearly CTAS is the backbone of seed security in the South, with no other organization attaining its holistic variety development, seed multiplication, and seed sale roles. Its accomplishments are very impressive, especially as a single NGO. That said, key challenges remain.

- Seed sale to farmers is largely subsidized: around 2500 AR/kg to farmers versus around 5000AR/kg for professionals and institutional clients (CRS, WHH, l'ACF, GIZ-prosol, Tozzi Green, among others);
- The organization relies on developmental aid for financial stability: some nine different projects support the organization as of 2022-23.

CTAS's vision is forward-looking and towards sustainability. For some services, it would like to move toward a set of independent farmer cooperatives taking the lead – especially in seed multiplication – perhaps with some specializing in groundnut seed, others in sorghum seed, etc.

Final note: based out of Ambovombe for over a decade, CTAS recently established a secondary office in Antananarivo to extend its policy and practical reach.

CIP and other CGIAR Centers: breeding insights

A number of CGIAR centers (Consultative Group for International Agricultural Research) have also contributed to germplasm conservation and active breeding in the South. Much of their work has been on a short-term basis, dependent on specific consultancies or special projects. In this vein, CIP recently worked with FiFAMANOR to release three sweetpotato varieties (see Box 16, next section). Also, the International Center for Research in Semi-Arid Tropics (ICRISAT) has been advising CTAS on the sorghums and millets for many years, and The International Institute for Tropical Agriculture (for cassava) and AfricaRice (for rice) are being engaged as recent collaborators with DEFIS project (Box 14, next section).

Private company- breeding insights

Several private companies are becoming more important breeding partners in the South. Agrima only recently arrived in Madagascar but is already making an impact. In terms of breeding, it has delivered important breeder (parental) material to an NGO and imported several varieties important in emergency distribution. Especially key for the future of the South breeding is that Agrima is in discussions to open up five breeding sites, including several to be situated within in the southern region (Box 10). Tozzi Green, establishing itself in in Madagascar in 2010, also is interested in expanding its breeding role and especially in producing basic seeds. Tozzi Green has a large irrigated area in the region between Ihosy and Ranohira, on the plateau overlooking the Great South, where they already grow sorghum, millet and maize.

Box 10. Leveraging the private sector to boost seed security in Great South: focus on Agrima

A South Africa-based company, Agrima established local roots in Madagascar in 2018 and already is filling key roles in ensuring smallholder farmer seed security.

Several features are of note:

- Their scale is impressive: Agrima already has 250 ha under seed production, so has become the largest commercial seed supplier in Madagascar. And In 2023-24, the company is expanding further – adding another 1000 ha (to multiply new varieties as well boost food stocks). Note their certified seed output for 2019-2021 reached 361,288 kg.
- Their crop diversity is expanding: with sorghum and maize as their firm base, Agrima is diversifying to Irish potato, soybean, onion and beetroot (with the latter being a particularly nutritional crop);
- Agrima already supports NGOs working in emergency: In 2022-3, Agrima delivered to CRS humanitarian seed quickly. For new varieties, 30T maize (Okovango Flint), 25 Mt sorghum and 19 Mt millet. For local varieties, 38 Mt sorghum (Rasta) and 50Mt dolique.
- Agrima already supports direct NGO developmental capacity building – providing parental seeds (50 kg sorghum; 75 kg maize; 50 kg dolique).
- The company works especially on varietal adaptation to climate stress. Beyond specific soil choice and screening in high temperatures, Agrima is attuned to finding more wind resistant materials (an especially important elements for farmers' fields around Ambovombe).
- Agrima is the main supplier of CTAS in seeds of sorghum, millet, maize and cowpea, as a 'Private Sector Officer'.
- The company is committed to the South, as of July 2023, it is in discussions with the Ministry of Agriculture to develop 5 separate breeding sites: in Sakay (Bongolava), Maintirano (Melaky region), Antsirabe (Vakinankaratra region), and Ambomvombe and Beloha (in the South).
- And, finally, Agrima brings worlds together: In a range of collaborative activities, the company links private sector skills and resources with government, NGO, and farmer organizations' needs. Real bridge building is key for seed security in the South.

So, given its land resources, dynamism, and honed scientific skills – might Agrima be the kind of collaborative actor needed to help screen massive amounts of varietal material quickly?

(see Chapter VII, Recommendations I and II)

It should be noted that the varieties on offer in Madagascar are mostly OPVs (open pollinated varieties), while the new varieties introduced by private companies are mostly hybrids. Local farming contexts probably call for two strategies here: yield stability (perhaps average but using low inputs) or high performance (high yield, but with use of several inputs very necessary).

Varieties adapted to the Great South

A formal register of varieties said to be adapted for the South is officially posted on the SOC website (https://soc-semences.mg). The register is linked to the QDS system as, in practice, this is the sole type of seed by which varieties are made available in the southern region. Officially known as: *"Register of Species and Varieties exploited in the 'Declared Quality Seed System' in the South of Madagascar," the SOC website states:*

This register is a compilation of the improved varieties of seeds exploited in the South under the system of Seeds of Declared Quality or SQD. The varieties resulting from national or international research (registered or not in the National Catalog of Cultivated Species and Varieties, the CNEV), are registered in list A, and the local varieties produced by Farmers having been the subject of characterization and validation by the Regional Consultative Committee for the Registration of Varieties (CRCIV) before their final transcription, in list B.

There is also a list C of local varieties still in the process of characterization and registration. Homing in on a more practical list of varieties one might find in farmers' fields, the SSA team consulted various experts on the 'most common', most farmer-preferred, 'most popular' varieties diffused in the South. These are listed in Table 5.3.

Table 5.3: Varieties* of FOFIFA and CTAS diffused in the Great South

CROP	Varieties of CTAS (QDS)	Varieties of FOFIFA
Rice	AJÀ MIZESTA, SOAFINTSANGA, MAHAFATROSA, FOFIFA 175, x265 (IR 15579-24-2 ou MAILAKA), VESAINKY,	AJA MIZESTA, SOAFITSANGA, MAHAFATROSA, FOFIFA 175, x265 (IR 15579-24-2 ou MAILAKA) , MAROTEA, SOAMALANDY, KELIMAMOA
Maize	IRAT 200 , VOLASOA, BAKOLY , POOL 16 , POOL 18, MAILAKA; AMANINAGNOMBE	IRAT 200, VOLASOA, BAKOLY, POOL 16, POOL 18
Sorghum	MACIA, IRAT 204; MARITSE, BOTRA, RASTA	MACIA, IRAT 204
Groundnut	FLEUR 11	FLEUR 11
Cowpea	MORAMASAKE, BABOKE, FARIMASO	DAVID
Pois de terre	VATOPILETSE	NYLON
Common Bean	RANJONOMBY, MENANGOE, MANDRONONONO	RANJONOMBY, CAL 98, DRK64, RI5.2,
Manioc	81/00110, TME 14, I 96 / 0191, I 91 / 0427, MM 96/5725	M7, 635, 640, MIANDRAZAKA, MADARASY
Sweetpotato		DONGA, BORA, IRENE (released 2023)

***in green** : varieties diffused by both CTAS and FOFIFA ; **in blue** : local varieties diffused by CTAS; **in black** : varieties diffused either by CTAS or FOFIFA

Variety introduction and delivery

In principle, new varieties in southern Madagascar (whether modern or novel local material) should be made accessible to farmers through multiple and ongoing channels. In practice, the SSA found that only 8% of farmers in the SSA had obtained new varieties in the last five years (Chapter IV, Figure 4.8 /Table 4.13). Farmers using new varieties had accessed them mainly through special projects such as NGOs or the UN-FAO or had bought directly on local markets (so the materials could have been local or modern varieties). Though very limited, farmers accessed new varieties for a range of crops: maize, sweetpotato, manioc groundnut and cowpea being the more common.

Agrodealer networks (private shops)

Theoretically, there is a range of private agrodealers who could potentially also serve farmers with high quality seed and new varieties. In practice, however, throughout the South, such specialized input shops are limited. The SSA found nine in total for all three southern regions. Note that a recent review listed 140 agrodealers in the whole country of Madagascar, including 21 wholesalers and 119 resellers. (Rabenasolo, I. 2019). Also, the SOC had registered thirty-seven (37) agrodealers in the recent review. On average, there would translate to 1 agro-trader for 17,300 farm families which is clearly very insufficient. (Ibid- Rabenasolo, I. 2019).

As is well known, agrodealers focus on seed of horticultural crops, although a select few also multiply cereal or legume seed on demand, especially for institutional clients. For instance, the DMM (DEFIS-supported agro-input shop) in Taolagnaro mentioned they have had a standing order from one NGO for 10 Mt of sorghum and 10 Mt of millet during each of the last few seasons. In all cases, the agrodealer business has been a challenging one, as shared by one business woman in Tulear (Box 11).

Box 11. Starting an agrodealer shop isn't easy: a case in Tulear

Mme X started her store in Tulear a year ago. In the first season, she sold 300 seed packets of horticultural crops. Over twenty types were put on offer but carrots and lettuce went particularly fast. That said, pesticides, insecticides and fungicides were the real sellers – especially insecticides.

This businesswoman estimates that 90% of her customers are smallholder rural farmers, with the rest being urban dwellers who sow small garden patches. Even though seed sales are rising, Mime X senses she has to significantly diversify to stay viable. Happily, she has a farm in the country, which gives her chickens and eggs to sell, and she is contemplating several other emerging enterprises.

While there are only three formal agrodealers in all a of Tulear, a city of 170,000, there are many (many) informal sellers. Staying viable as an agrodealer is going to demand a great deal of business acumen.

Other variety delivery organizations

There are a series of other organizations who could possibly deliver (sell!) new varieties in the South (so beyond NGOs, private agrodealers and local markets). Table 5.4 gathers in one place some of the outlets and service provider types found during the SSA, along with select information on the scale of outlets. There is uneven information about whether these outlet channels: a) offer real diversity; b) move farmer-preferred crops and varieties; and c) reach farmers in large quantity. Box 12 elaborates on one promising model for input delivery used by CRS labelled as PISP- Private Input Service Provider. Figure 5.1 charts the geographic distribution of the current CRS PISP outlets.

Table 5.4: Different types of input providers across Great South, 2023

Organization	# outlets/service providers in South (as of 2023)	Comments
CTAS	120	Sells local varieties- QDS
CRS-PISP (started 2020)	71	Sells local varieties- QDS Sells imported varieties
DMM (started 2022)	3-4	Mostly horticultural seed- certified
ACF_WHH	Information not available at time of report	

Box 12. A promising seed delivery model: CRS' Private Input Service Provider (PISP)

To help reach farmers in last-mile areas with high-quality agricultural inputs, Catholic Relief Services (CRS) has developed a network of Private Input Service Providers (PISPs). PISPs are community members (selected by the community) who become buying and selling agents, and who bring key agricultural inputs directly to the 'doorsteps' (fields!) of communities. The PISPs aim to farmers, even those at the last mile, access to good seeds, small tools and select agricultural treatments.

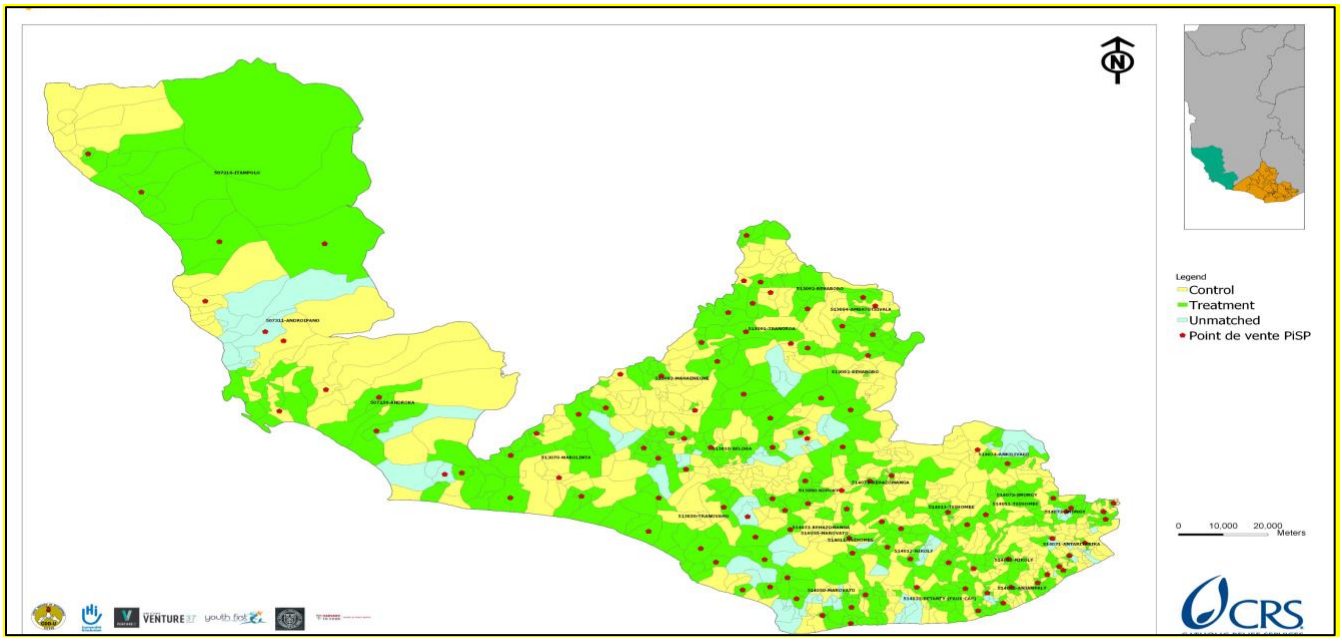
The PISP model was first piloted in Madagascar in 2020 with 3 PISPs developed under the Maharo project. From 2021 onwards, and with the support of the Tabiry project (Box 17) this service structure has been scaled up into 71 PISPs within three districts (Beloha, Tsihombe, and Ampanihy) and 20 communes within Androy and Atsimo Andrefana.

To give an idea of scale, during the last season, 2022-2023, PISPs sold a total of 511 MT of diverse seeds: mung bean, lablab bean, imported maize, millet, and sorghum, and local varieties of maize, millet, cowpea, and sorghum. Generally, PISPs obtain their seed from private sector companies (Agrima), NGOs (CTAS), local seeds multiplier, and even the local market. With this last one, the local market, strict seed screening measures are put in place, aligned with Government control and validation.

Nevertheless, PISP sustainability has challenges, paralleling most inputs delivery services in the South and within the country (CTAS Boutiques, DMM). Currently, seeds are still subsidized using the voucher approach for vulnerable households. This means that sales and incomes are guaranteed for the PISPs: real farmer demand (i.e., paying themselves) remains to be confirmed. CRS has been testing cases in which participants also pay direct cash (although on a limited scale) and recognizing the need for business stability, also has started to help PISPs diversify their products—for example to include vegetable seeds, chemicals and agricultural tools.

To sum it up, this CRS PISP model was among the few expanding seed security innovations the SSA team charted in the South. Moving forward, the features of this particular model may be compared with the few other input delivery services (Table 5.4) to isolate further the features that allow for their sustainability.

Figure 5.1 Location of CRS' Private Input Service Provider sale points, 2023



In sum, there have been some important recent advances in making new varieties available to farmers—although the overall use is still at a very low at 8% of household sample. Outlets for delivery have been expanding, but their full geographic extent might be usefully mapped further so as to understand farmers' possible access locations (i.e., map CRS, CTAS, other outlets together.) Most of the new varieties on offer are local ones (not modern accessions). Also, aside from agrodealer shops, the sale of new varieties is routinely subsidized, by some 50-75%.

Outlets for delivery have been expanding, but their full geographic extent might be usefully mapped further so as to understand farmers' possible access locations.

All the different delivery models might be compared to identify features that foster sustainability.

Processes might best be put in place which spur smallholder farmers to purchase new varieties (and good quality seed) at real cost. Options are suggested at several points in this report. Vouchers, if given, need to graduated, with the client eventually assuming full cost over the course of several seasons. Also, putting very small packs on sale (at no-risk sizes) may prove to spur demand (see Box 5). Much depends not only on farmers' buying power but on the varieties themselves. Are the novel varieties really good enough that farmers are willing to pay for them?

We consider the linked issue of seed – and cost of quality seed – in the next section.

Overview of Formal Seed Sector

The formal seed sector has been well described and reviewed in Madagascar for over a decade including fairly recently (Randrianatsimbazafy, 2010; Rabenasolo, I. 2019.) In very broad overview: 1) several state actors offer ongoing support services in the Great South, such as the DRAE and SOC; 2) government-linkedprojects – The DEFIS and The AFAFI SUD – have extensive plans to boost agricultural programs, including seeds; and 3) a mix NGOs/UN and private sector companies intervene in select areas. Hence, the seed sector in the South might best be seen as a coalition of actors whose efforts can usefully leverage each other if coordinated more fully. Here we make a few key points related to the formal seed sector serving the south.

Early generation materials: breeder, basic, certified

Basic breeder and seed productions is concentrated in FOFIFA and FIFAMANOR, with overall levels of production very modest. (The SSA could not obtain exact figures.) The UN-FAO alone received 17 Mt of basic (foundation seed) for the South from FOFIFA for the 2022-23 season[3]. CIP also has been supporting FIFAMANOR in basic seed/vine production of sweetpotato. In welcome developments, the Government of Madagascar (GoM), supported also by donors such as the EU, World Bank, ADB, IFAD, has also been encouraging private sector actors to contribute in the production of early generation material.

[3] In December 2021, FAO contracted with FOFIFA to multiply 11 FOFIFA varieties popularized in the South at the Ambatondrazaka regional research station, characterize them and maintain them in the FOFIFA germplasm collection. These varieties were scarcely available in the South; if they still existed, the seeds of these varieties were in a state of degeneration. A total of 17 tonnes of pre-basic seed was produced in 2021-2022 for these 11 varieties. Ten tonnes seven hundred (10.7 T) were sent and multiplied into basic seed at the PMS/GPS/CMS level supervised by the FAO, in collaboration with FOFIFA and SOC. The remaining seeds were used to build up genetic resource stocks at FOFIFA. These included three cowpea varieties (David, SPFL2 and Marron); three bean varieties (Lingot blanc, Cal 98 and DRKF); one maize variety (Mailaka); one groundnut variety (Fleur 11); one potato pea variety (Nylon) and two cowpea varieties (Marron, Blanche). During the 2022-2023 season and SSA, these varieties have been in production at seed companies' plots. Estimated production is scheduled for harvest/post-harvest in July/August 2023.

The Official Seed Control and Certification Service (SOC) is the official entity for the certification of commercial seeds. Its headquarters is based in Antananarivo, as is its laboratory for the analysis of seeds. SOC has no regional laboratory to certify seeds based in the South. Concerns about SOC (its overall performance, capacity , and delays) permeated discussions among those consulted by the SSA team. Professionals, internal and external to the SOC organization, sensed it might opportune to formally review SOC structures and operations so as to strengthen this incredibly important seed certification hub (Box 13).

The Official Seed Control and Certification Service (SOC) has no regional laboratory to certify seeds based in the South. Delays are frequent.

Box 13. The Service Opération Contrôle (SOC): Would a formal review be timely?

Throughout the period of the SSA, professionals from many organization lamented that the SOC wasn't operating as well as it should, especially as the service is a key for seed security in the South. The few staff it has have done a commendable job, especially when SOC is funded by other partners. Simply, SOC needs more support and adjustments so as to function more successfully.

Among the issues raised:

- There just aren't enough personnel – 7 professionals for the whole South!
- Long delays are routine when trying to get back seed quality results from Antananarivo
- There is no laboratory based in the South (no where!)
- Laboratory equipment is substandard or lacking all together
- There are few funds to effect the much needed field inspections – on producers' plots
- The seed production and sale is to tied to special projects and institutional buyers, and not enough to farmer clients.

As all seed actors want SOC to function very well, might now be the time for an exhaustive and frank review? How can the constraints be solved, one by one?

Going down the seed chain, there are two main seed multiplication centers (centres de multiplication – CMS) in the whole southern region. The one at Agnarafaly is managed by CTAS and this center alone produces 250 Mt/year (Box 9) if conditions are favorable. (The site is not irrigated). The second, located at Behara, is described by many as 'degraded' (thus assuming that the center worked better in the past). Presently, only 40 ha out of the total 62 ha is being cultivated at Behara and, as highlighted by one manager, the center lacks a tractor, motorpump, sprayers, and even insecticides. It was difficult to get an accurate count of the total seed being multiplied or of its potential capacity. For 2021-22, the manager mentioned 10 Mt of haricot lengo blanc and for 2022-23 about 10 Mt of rice seed (variety -Sebota 281). All seed produced is purportedly sold to seed multiplication producers and their groups (PMS +GPS), not to farmers directly. If the stocks are not sold, the manager confirmed that he just resows himself. To compound challenges, seed production has been very compromised by the droughts of the last few years. Note that this second CMS is also the site that has been proposed for use by FOFIFA to screen varieties for the arid regions in Androy and Anosy – and also to scale up production of high quality seed. In the course of the SSA, two other CMSs were mentioned –that at Isoanala and Beraiketa. Both apparently are in need of significant rehabilitation.

Linked to the CMS are then the more immediate downstream multipliers. The DEFIS project (Box 14) cited 40 seed producer groups (GPS) and 640 individual seed multipliers (PMS) across the entire Great South, many of whom the DEFIS project directly supports. Discussions confirmed that nearly 100% of the CMS seed is sold to GPS

and PMSs. The CMS seem to have no direct strategy to market to farmers and likewise, much of the PMS/GPS seed is bought up by institutional clients. PMSs do not seem structured enough to find outlets themselves (and some experts reflect that part of PMS seed production harvest likely ends ups as food.) Hopefully, the new DEFIS project will be key in ensuring some better coordination, at least among formal seed sector multiplication actors. The levels, roles and capacities along the formal seed chain remain quite unclear and not necessarily in alignment.

Box 14. Possible Contributions of the DEFIS Program

The Ministry of Agriculture and Livestock (MINAE), through the new DEFIS Program, will implement an intervention policy/strategy oriented towards the promotion of the seed system in the south.

Some of the activities envisioned include:

- Rehabilitation of the seed multiplication center (CMS) of Behara;
- Integration of international organizations such as (i) IITA for cassava; (ii) ICRISAT for groundnuts, millet and sorghum; (iii) CGIAR for the coordination of international bodies intervening in the agricultural sector (including ICTA); (iv) CIP for Orange-fleshed Sweetpotato. As such, the DEFIS Program will play the role of contracting authority.
- Revival and/or revitalization of regional seed producer organizations through: (i) capacity building; (ii) linking to the seed multiplication process; (iii) intensification of the networks of seed controllers and inspectors at the level of the SOC/DRAE; and (iv) construction of local seed banks (under the supervision of the Plant Production Support Department), with a view to ensuring the quality of the seeds produced;
- Promotion of QDS with the FAO: (i) revitalization of the seed multiplication strategy; (ii) updating seed legislation (Law, ANCOSEM, AMPROSEM, etc.); (iii) Networking of PMSs (cooperative, union of cooperatives, federation, platform, etc.).

Other Decentralized Seed Multiplication

There are also other seed multipliers in the South. They focus solely on Quality Declared Seed (QDS). These multipliers have direct interfaces with smallholder farmers. It is through these different organizations that southern farmers can potentially get quality seed and new varieties.

The SSA identified several organizations further multiplying seed. Table 5.5 summarizes some of their characteristics. Again (as above with FOFIFA, SOC, CMS), it has been very challenging to get overall figures on production geared to the South. Table 5.6, data shared by CRS, has been among the most precise received. CRS also shared a snapshot of comparative seed prices. *To illustrate price differences, imported maize (Okavango variety) via Agrima is 3 times more expensive than locally sorted maize sold by PISP and 5 times more expensive than local market seeds.*

Note that seed production downstream includes diverse and dispersed actors, sometimes functioning and sometimes not, and not yet well-coordinated. The quality of seed for all these multpilers has been the subject of concern by one actor or another—as has the choice of varieties being multiplied.

Table 5.5. Non- governmental Organizations multiplying seed in Great South: 2022-23

Organization	# seed producers	Quantity produced 2022-23	Distribution
CTAS	500	250 mt/yr (not irrigated- so conditions need to be favorable)	Sale through outlets- direct to farmers 70% Sale to institutional buyers/projects 30%
CRS- vine producers	See table 5.6		
CRS- seed producers	See table 5.6		Sold through PISPs
CIP- vine producers	57 (DVMs- decentralized seed multipliers)	272,812 kg of three OFSP varieties (Irene, Bora and Donga)	Distributed free to beneficiaries
FAO	200	30 Mt (QDS) for all species 500,000 healthy cuttings	Most goes to rural development programs (not to farmers directly)

Table 5.6. CRS vine and seed production 2022-23

CRS OFSP Production	Beloha	Tsihombe	Ampanihy
Vine multipliers (trained#active)	7 (21)	3 (7)	5 (25)
2023 Production (kg)	12,330	1,300	NA
Households 1000 days served (Buy by CRS)	2426 (vouchers)	246 (ongoing activity) (vouchers)	Bought by other actors
CRS seeds production	**Beloha**	**Tsihombe**	**Ampanihy**
Seeds producer trained (identified)	10 (13)	10 (16)	30 (30)
Seeds producer controlled by the GOM	13	10	30
Seeds producer harvested and production accepted following GOM field control	3	3	NA (waiting for GOM mission report)
2023 production waiting for laboratory analyze result	Sorghum: 440 kg, Cowpeas: 229 kg	Sorghum: 275 kg , Cowpeas: 30kg, Maize: 100 kg	NA (waiting for GOM mission report)
Individual Seed producers prepare to shift to Group producers	4	11	5

Figure 5.2 sketches the CTAS seed multiplication chain.

Figure 5.2 CTAS Seed Multiplication Operational levels

I. **BASIC SEED PRODUCTION**= (Agnarafaly) 10-15 MT/year

↓↓

II. **FARMER SEED MULTIPLIER** (PMS)- 500 PMS producing 250 Mt total

↓↓

III. **CTAS BOUTIQUE OUTLETS** (120) each receiving 250 kg of seed to sell to direct clients

There are some important summary observations across multipliers which might spur reflections:

- There are modest amounts of seed and vines multiplied, but the scale is growing;
- The cost of seed is being mostly subsidized on recurrent basis;
- The clients are a mix between institutional ones and direct farmers (and the institutional buyers are the lead ones);
- Some multipliers have a marketing strategy, but many do not.

Experience from many programs in Africa suggests that decentralized seed production emerges as a viable enterprise only when a) it can wean itself from institutional clients and b) it sells seed at real cost. During the SSA, many practitioners (governmental and NGO) repeated the observation that smallholder farmers themselves in the South will not pay for high quality seed and that is why it has to be given free or subsidized. But a very wise global seed expert shared the following (Niels Louwaars, head of Dutch farmers- Plantum, *personal communication*):

<< Good seed PAYS, not costs >>

If the variety is right and the quality good enough for the user, the product (variety and quality) appropriate for the context (self-use or market), and the price in alignment with the benefits (yield, market value), farmers will pay for seed.

In the case of the Great South, many of the seed-related cost-benefit variables lack precision:

- Are the varieties good enough? Are they really responding to customer needs? What are the real yields and farmer appreciation scores?;
- Are the costs of production realistic? Can they be streamlined?;
- Does the current price of the seed translate to commensurate benefits (for what crop, what scale of farmer, what kind of markets)?
- And so on.

For all these reasons, basically unknowns, it is currently futile to try to estimate or model demand for different scenarios involving higher quality seed in the South. A review estimation figure (Consulting Plus, *personal communication, draft report*) suggested that current seed production represents only 5% of Great South needs (and it is not clear if 'need' here is correlated with farmer or institutional demand). In all cases, experts agree that there is 'not enough high-quality seed in the South'.

Moving toward realistic figures, **until there is a rigorous review of the on-the ground variety and seed business, sharing guesses about demand may not lead to useful information that can guide solid strategy.**

Special seed initiatives in progress

To round out the formal and intermediary sector seed analysis, examples are given below of important seed-linked initiatives steered by shorter-term or donor-based projects. The examples center on work from led by the UN-FAO, CIP and CRS. For a region as large as the South, one would hope to find many more initiatives – and these may need to be actively spurred.

Box 15: The UN-FAO: a continuing force in shaping seed security policy and seed security implementation in the Great South

The FAO has interventions in improving the seed sector of the Great South through:

- **QDS**: In 2012, FAO initiated the production of Quality Declared Seeds (QDS) in the Great South of Madagascar through capacity building of the staff of SOC, NGO GRET, CTAS and the DRAEs. It continued to provide technical support to the NGO GRET and CTAS on improving the production and distribution of QDS, until 2014. During the same period, FAO provided guidance to FOFIFA, SOC and GRET/CTAS to develop the first register of species and varieties used in QDS production in the South.
- **Support for FOFIFA**: In 2021, FAO signed a letter of agreement with FOFIFA for the production of pre-basic seeds of 11 climate-resilient varieties adapted to the Great South of Madagascar in its regional research station located in Ambatondrazaka. FOFIFA produced 17 tons of seeds: it kept 6 tons to use as genetic resources to maintain the quality and continue the production of pre-basic seeds of these varieties. The rest of the seeds were given to the PMS for the production of QDS.
- **Capacity building of PMS and GPS in QDS production**: from 2018 to 2021, within the framework of the PROACT project financed by the EU and executed by FAO, 684 PMS grouped into 58 Seed Producer Groups (GPS) of the South and South-East, produced 342 tons of seeds of climate-resilient varieties (beans, maize, groundnuts, rice and ground peas). In addition, from 2021 to 2023, as part of the MIONJO project, FAO has strengthened the capacity of 200 PMS in the regions of Androy (Ambovombe, Tsihombe, Beloha) and Anosy (Amboasary, Betroka and Taolagnaro). In 2022, they produced 30 tons of QDS and the estimated production for the first agricultural season of 2023 is around 270 tons of QDS of different climate-resilient varieties/crops (peanuts, ground peas, cowpeas, beans, cowpeas, sorghum and maize). FAO is also using the Farmer Field School approach to promote QDS among smallholders.
- **SVFs:** For March 2024, FAO plans to organize seed fairs by using subsidized vouchers to facilitate access of vulnerable households to QDS produced by PMS/GPS.
- **Support to SOC**: FAO continues to advise and support SOC so that it plays its sovereign role of quality control of the seeds produced by the PMSs of the Great South.

Box 16. *Sweet* Recovery Project links planting material + nutritional gains in the Great South

Led by The International Potato Center (CIP) using vitamin A rich Orange-Fleshed Sweetpotato (OFSP) varieties released by FIFAMANOR, the Sweet Recovery Project links planting material with nutritional gains – both very much needed in the South.

A recent Demographic Health Survey (2021) suggests just how dire the rates of chronic malnutrition are in the Great South: high levels of stunting among young children (<5), especially in Anosy and Androy; very low diet diversity for children at the critical time of life (6-23 mo); and very high levels of thin women—way above the national average in all 3 regions. Among other options, the country has invested in programs to have cheap packets of fortified instant porridges, but farming households have ongoing problems of access to these products, especially in the South.

Indicators of Nutritional Status in 3 Regions of Southern Madagascar Compared to the National Average (Demographic Health Survey (2021))

	Chronic Malnutrition or Stunting	**Indicator of Sufficient Dietary Diversity**	**% of women who are thin (malnourished)**
	% of children < 5 yrs of Age	% of children 6-23 months consuming 5 food groups	% body mass index <18.5
Entire Country	40%	26%	18.5
Atsimo Andrefana	27	11.6	27.1
Androy	45	7.9	42.7
Anosy	47	10.2	30.5
page number	243	217	243

With support from USAID's Bureau for Humanitarian Assistance (BHA), (CIP) recently initiated a project in the Great South entitled: *Enhancing Agricultural Recovery and Combatting Malnutrition in Drought-Affected Southern Madagascar Utilizing Nutritious, Climate-Resilient Vitamin A Sweetpotato or Sweet Recovery Project (SWRP).* The 21-month project has quite ambitious aims: to re-establish sweetpotato production and build forward towards a more climate-resilient and more nutritious food system for some 80,000 drought-affected households (focus on nine districts in the Anosy, Androy and Atsimo Andrefana Regions.

Building on a decade of collaboration between CIP and FIFAMANOR, three drought tolerant OFSP varieties released by FIFAMANOR have been promoted in this effort. Just one small root (125 grams) of an OFSP varieties provides the daily vitamin A needs of a young child. The project's main vision is centered in sustainability – establishing a network of trained vine multipliers with good water access throughout the three regions who will be permanent sources of quality planting material for their areas, and who are also linked to FIFAMANOR so as to renew their pre-basic or foundation stocks – and maintain that quality. The project has strict and rigorous procedures to ensure quality at varied production levels.

Some of the key achievements since fieldwork began in March 2022 include:

- Identification of 4 best Decentralized Vine Multipliers (DVMs) to become multipliers of ***basic*** planting material. Each DVM had a mini-screenhouse installed, and received pathogen tested cuttings from the distant pre-basic seed facility at the FIFAMANOR research station.
- Support of 54 other DVMS with material to become further multipliers. These DVMs are the source of planting material for their nearby communities.
- Identification of 174 Community Agent Pairs (CAPs; one man and one woman), who have been trained in sweetpotato production, nutrition benefits, the storage in sand technologies (Triple S and Double S), and pest management. As of 30 June 2023, 84,433 HHs (50% women representing their HH) were reached with 4 kg each of quality planting material.

- Training of 27,944 HHs in nutrition awareness; with 17,246 HHs (two-third represented by women) participating in practical cooking demonstrations using OFSP storage roots.

- Promotion of three varieties, Irene, Donga and Bôra which are agronomically competitive with dominant local landraces, and in many areas earlier maturing— providing food faster in the current production system.

Key thrusts for the near future in the 2nd phase: 1 July 2023 to 31 December 2024

- Emphasis on training households in storage in sand technologies to have OFSP roots to consume for several months after harvest (Double S method) and for those without good water access during the dry season to use storage roots as a source of seed (Triple S method).

- Intensified behavioral change training on dietary practices for young children and the entire household.

- Additional support for vine multipliers, in terms of small-scale irrigation support and business training to ensure sustained access of the communities to quality planting material.

This project may be modest and relatively new but is already having important impacts quickly – and even among the more vulnerable. As the seed security assessment showed, sweetpotato is among the priority crops across the Great South.

Box 17. CRS' seed projects in the South: Maharo and Tabiry

The Maharo Project, 2019-2024: Androy and Atsimo Andrefana

The overall goal of the Maharo project is to "Prevent and sustainably reduce acute food insecurity for vulnerable households (especially the extremely poor, women, and youth) and communities in Ampanihy (Atsimo-Andrefana), Beloha, and Tsihombe districts (Androy). Within this vision, there is a strong thrust towards improving household nutrition and also improving households capacity "to, manage, and recover from disasters, climate shocks, and chronic vulnerability". Seed-linked activities are important both for the nutritional and recovery thrusts.

Among the key activities relevant for boosting seed systems in the South, the project has:

+ supported Private Input Service Providers (PISPs) – 71 in 3 districts

PISPs:

- have sold drought-tolerant varieties: sorghum + millet

- largely been able to meet phytosanitary standards (81%) and met technical certified seed standards (100%)

- be profitable (71% of vendors)

+ supported Savings and Internal Lending Committees (SILC) – which are key for boosting farmers' purchasing power.

SILCs:

- include 1166 groups with a total of 21,649 members

- have an average return on savings per member of 92,000 AR (20 USD)

- to-date, have shared out 132,000 USD in revenue

The Tabiry Project: October 2021-September 2023: Androy and Atsimo Andrefana

The Tabiry project is all about seed (Tabiry means seed in the local dialect). It has focused on the agricultural development and the supply and distribution of seeds adapted to the local southern conditions. The project is in its second cycle, with the third to start September 2023

Among the key activities relevant for boosting seed systems in the South, the project has:

- distributed cassava cuttings to 36,732 participants (October/ 2022).
- addressed a shortage of seed supply, importing seed via Agrima 30 MT of maize, 25 MT of sorghum, and 19 MT of millet (to complete the local quantities; 38 MT of local sorghum and 62 MT of lablab bean).
- distributed vouchers for farmers to gear their own seed purchases –for both cereals and legumes – 57,957 households
- trained 28,400 farmers in crop protection practices

Ultimately, seed production across the Deep South will only be scaled up if many more partners are involved. Scaling implies not increasing not only the brute quantity, but also expanding the range of crops and varieties bulked up. Obviously, also, outlets for new variety and seed sale will need to be expanded to serve even the difficult-to-reach zones.

Discussions now turns to the informal seed sector as a potentially integral partner to the formal and intermediary seed sector work.

Informal Seed Systems in South Madagascar

The informal system is the major seed procurement system across crops in the Great South. It currently provides upwards of 98% of the seed farmers sow and is also one of the few continuing delivery channels from which farmers can access new varieties. For many development practitioners, the informal system conjures up images mainly of farmers' producing seed themselves (saved from their harvests) or of bartering and sharing seed through social networks (like relatives, friends, and neighbors). In reality, and very much in contrast to stereotypes, the informal seed system is also quite market-based.

In the Great South, the informal seed system is one of the more market-based seed systems ever reported (comparing all published seed security assessments anywhere). Local markets in the South supply farmers with 74% of the total seed they sow—across a range of crops. If seed security is going to be improved in the South, strengthening local markets (in terms of seed quality, varieties, quantity, and diversity), will likely have to figure centrally among the planning initiatives.

If seed security is going to be improved in the South, strengthening local markets (in terms of seed quality, varieties, quantity, and diversity), will have to figure among the planning initiatives.

To understand how the informal, market-based system have been functioning in the South, the SSA pursued several types of inquiry here, on the large seed/grain traders and on seed/grain retailers..

Large Traders

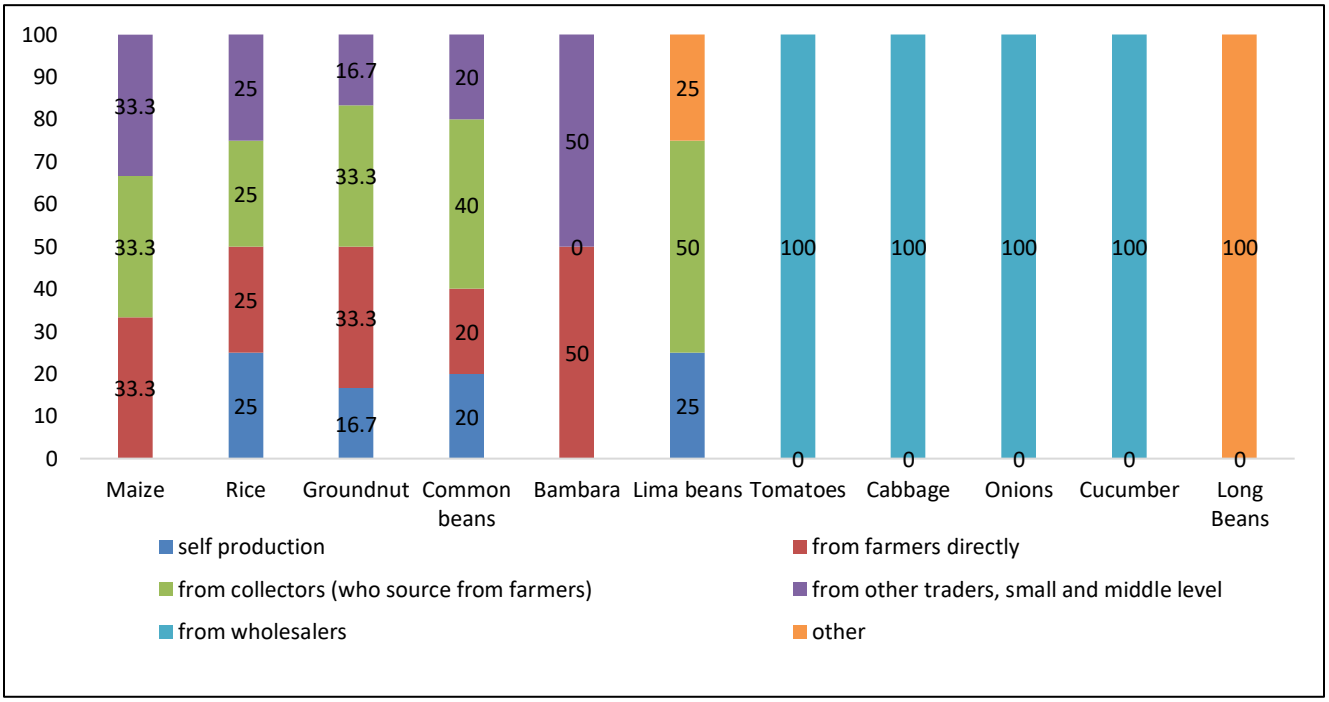
Nine large traders and collectors were interviewed in the course of the SSA. All confirmed they deal in local seed and also move large quantities. On average for a single season, each trader moved 21 Mt per crop sold. Table 5.7 shows that traders, even the large ones, moved an important range of crops.

Traders indicated that they procured local seed from multiple sources, with the large majority sourcing from quite local production, from: their own *self-production*, seed *directly sourced from other farmers* (with no intermediary), and seed *bought via collectors* (individuals who are sent out to look for specific varieties or procure from specifically good farmers—those whose seed might be trusted and renown) (Table 5.8).

Table 5.7: Crops vended by large informal traders interviewed in the 2023 SSA (n=22)

Crop	# traders who sell
Maize	4
Rice	1
Groundnut	3
Common beans	2
Bambara nuts	1
Lima beans	5
Tomatoes	2
Cabbage	1
Onions	1
Cucumber	1
Long Beans	1

Table 5.8: Large trader sources of local seed (N=9). % seed from diverse sources



Traders interviews did show that their facilities were very variable. Most did not have their own transport, and less than half seem to have employed specific conditioning measures, although they did indicate having access to their own storage facilities. Certainly, if local seed quality is to be improved, on a massive scale, trader facilities, including condition and storage, may also need to be improved.

Even though relatively few traders were interviewed, there seemed to be important variability within the small set. Evidence from within the Great South and from zones in Africa similar to the Great South (Box 18), suggests that traders could be especially key seed security actors in emergency periods and in the last mile zones.

Informal traders may have important seed security roles in emergency periods and in serving last mile zones.

Table 5.9: Large Trader facilities, SSA 2023 (N=9)

Large Trader Facility/Practice	% Yes	% No
Own Transport Facilities	33.3	66.7
Own Storage facilities	100	0
Conditioning of their seeds in storage	44.4	55.6

Box 18. Large informal seed/grain traders as possible support for seed security?

As the seed security assessment (SSA) has shown, farmers in the South obtain about 75% of their seed from local markets and traders at different scales use multiple practices to manage local seed (as opposed to grain) because there is high demand and $$$ pay-offs.

Also, evidence from many sites in Africa (Sperling et al., 2020) show that large traders (who deal in seed and grain, so 'seed/grain traders') prove to be a backbone of seed security for smallholders, especially in stress regions like the Madagascar South. They move the range of crops given not priority by the formal sector (so usually everything beyond hybrid maize and vegetable seed).

Could large traders have a great role in supporting seed security in the South? Initial evidence suggests a tentative 'yes', as traders already are practically intervening.

- Traders in the valleys north of the Great South are already helping to supply emergency seed stocks.
- Traders often respond to farmers' seed specific varieties. In a parallel 2023 SSA in Farafangana District, it is key traders who have introduced and moved 4 new rice varieties in the last 10 years.
- Traders are ones who travel to last mile zones. If equipped well, they could move new varieties (in small packs?) as well as important accompanying technical information.
- Traders are key actors in creating and respond to demand- for seed and grain. They greatly influence what is bought (and hence produced).

Obviously, the quality of trader seed is an issue (as is the quality of seed from nearly all sources in this SSA). That said, traders can be leveraged in very strategic ways so as to broaden geographic coverage and crop coverage. There are important opportunities to explore.

Seed/grain markets (retailers)

'Seed/grain markets' refer to a diverse set of actors and institutions, from open-market traders to permanent village shops to long-distance truckers, who buy and sell crops for consumption and, potentially, for seed (i.e., the latter being the large traders cited above). To be clear, much that is sold in local markets is used for grain (for consumption, for livestock feed, for brewing). However, there is a special subset of this grain which can potentially also be used for seed and which is actually sown.

Distinguishing seed from grain: signals

Within the local markets, both farmers (buyers) and traders (sellers) distinguish local seed from just grain and use a range of strategies to access 'good' seed from the markets.

For the farmer buyer: He/she wants to maximize the possibility that the product bought will grow on his/her own farm. Farmers use multiple signals to alert traders that they want seed (Table 5.10).

Table 5.10: Percent of Traders (N=53) who recognize specific signals from farmers linked to seed

Signal from farmer-buyers	% traders who recognize signal
Search for varieties that are not mixed	56.6
Search for seed/grain that is clean (no debris like sticks or pebbles)	71.7
Search for a specific variety by name	28.3
Ask about the provenance of the seed/grain	28.3
Inquire how the seed/grain was stored (length of time/conditions)	11.3
Buy a special quantity	22.6
Directly state that they are buying for seed	77.4
Other	5.7

***For the trader seller*:** He/she wants to tap into a lucrative seed market, whose prices often prove higher than those obtained from routine food grain alone. To respond to demand, traders have adopted select practices for managing potential seed. Out of 11 possible practices, traders in the Great South routinely use six different ones (Table 5.11 below). For instance, they sort out bad grains and waste (like dust and pebbles), they keep freshly harvested stocks apart and pay extra attention to storage conditions. Unusual is that some traders in the Great South grade stocks and a select few even do their own methods of germination tests.

Table 5.11. Trader practices in managing potential seed, SSA sample 2023

Trader practice (% 'traders responding 'yes' that management action is employed)										
Get grain from specific regions	Seek out varieties	Buy from spec growers	Keep varieties pure	Keep apart fresh harvest stocks	Grade stocks	Germ tests	Special storage	Sort out waste	Sort out bad grains/ seed	Sell seed + grain separ-ately
31	**40**	**28**	**48**	**61**	**74**	**6**	**61**	**84**	**76**	**71**

Distinguishing seed from grain: Price

The price of products also signals how grain may be distinguished from seed. During non-sowing periods, grain and potential seed remain relatively undistinguished in terms of price. However, during sowing periods, extending some four to eight weeks prior to planting, several trends have been observed. Generally, prices spike for the most sought-after varieties for sowing, that is, for the varieties that are most adapted, productive or which give the highest income return. In areas of high stress, where few varieties may perform at all, global evidence suggests that prices between desired and non-desired varieties can differ by as much as 25-50% (Sperling and McGuire, 2010).

Table 5.12 lists prices from a large trader (major collector) in the main Ambovombe market for the 2022-23 season. Prices for seed and grain are clearly distinguished, especially for the highly demanded local maize seed.

Table 5.12. Price of grain (non-sowing period) and local seed (sowing) for select crops at the Ambovombe central market, in reference to season 2022-23*

Crop	Non-sowing period AR/Kapoaka	Sowing period AR/Kapoaka	Comments
Sorghum	300	500	-
Cowpea	200	1200	He had to treat with insecticide
Maize	300	2000	Maize seed is very hard for farmers to preserve and very much in demand
Watermelon	200	1000	-

**data provided by one large collector; AR=Ariary. 1 USD = about 4570 AR; Kapoaka= a tin unit which translates to about 4 kapoaka to 1 kg.*

In sum, the informal sector markets operate at large scale and deliver local seed and, occasionally, new varieties. The informal sector is a resource that has many strengths, especially its geographic extent and ability to operate in stress areas. Like almost all sources of seed supply in this SSA, local seed systems need to be improved. This might happen more quickly and effectively if such informal market systems are actively included in seed system planning.

Seed security strategy meeting: across full Great South

This chapter has reviewed seed and new variety supply channels across the Great South to give an overview of their levels of operation. The formal, intermediary, and informal systems have been described in some detail, with as much data as the SSA has been able to gather.

There have been some recent firm accomplishments, and there are dynamic processes in place in the Deep South, but there are also many challenges: The level of operation is well below what is needed for ensuring seed security among smallholder farmers. Concerns have been raised around plant breeding; formal and intermediary seed supply; delivery channels; marketing and demand information; etc. Observations on the ground also suggest that existing seed chain actors are relatively de-linked one from the other.

Many of those interviewed with the SSA expressed an urgent need to move seed security planning and operation forward in explicit ways and quickly. Many also called for more coordinated actions so as to create an Integrated Seed Sector, uniting strengths of formal, intermediary and informal seed sectors. For this reason, the SSA recommends the convening of **a Regional Seed Security Workshop for the Great South** as a priority**.**

This Chapter V has focused on the supply side, but Chapter IV has documented that such higher-level thinking is also urgent on the demand side, that is, to respond to needs of communities and farming households.

Annex 3 has sketched some of the themes that might be urgently discussed and debated in a potential *Regional Seed Security Workshop.*

Summary: Formal, intermediary and informal seed systems in the Great South

Plant Breeding and Variety Introduction/Delivery

1. Varieties adapted for the South are listed in the SOC official register. This currently includes 30 FOFIFA modern varieties ('improved') and 37 varieties screened through CTAS (local varieties). CTAS has another 24 local varieties waiting to be approved. While CTAS continues an ongoing variety screening program focused on local germplasm, FOFIFA currently has no operational research anywhere in the South. Spurring a FOFIFA research and seed production center at Behara is under discussion.

2. In terms of modern variety screening and introduction, some dynamism is coming from other sources. For instance, CIP has been working closely with FIFAMANOR and has recently released 3 sweetpotato varieties. Agrima, a private company, has been working to introduce germplasm and upgrade existing entries, especially for maize and sorghum). Agrima is also in discussions to open 5 new breeding sites, including 2 in the South. This on-site expansion of breeding operations could translate to modern variety breeding and screening geared the specific climate- stressed southern agroecologies. There is a vital need for injections of new germplasm that can reponse to farmer and market needs and to the challenging agro-ecological conditions.

3. Only 8% of households interviewed (out of the large sample of 620) had obtained a new variety in the last 5 years. There may be problems with variety appreciation. (The varieties just are not good enough?) It is key to confirm current variety performance and also to set up an ongoing decentralized variety testing network. At present, there is no organized screening system for new varieties within the southern region (i.e., to evaluate adaptation and preferences at diverse sites). CTAS has its key farmer evaluators. CIP manages its own local trials for the sweetpotato work.

4. Low new variety use may also be due to problems of access. To-date, farmers have largely received new varieties via the NGOs/UN (so, one-off distributions for free) or via local markets. That said, In recent years, the number of delivery outlets and service partners has grown, including the CTAS boutiques, CRS PISPs, and DMM outlet shops, among others. Mapping these delivery locations as a unit may give an idea of the broad locations where smallholders can access new germplasm. Note that there are very few formal sector agrodealers in the South and they focus mainly on horticultural crops (although some respond to humanitarian orders for relief aid crops such as sorghum or millet).

   In brief, there is a broad need to spur breeding dynamism, more comprehensive, realistic variety screening, and expand the outlet channels by which farmers can access performing varieties, especially to address the stress contexts of the South. Government actors alone cannot drive the needed extensive changes. Explicit collations of government, research centers, NGOs and private sector might be essential.

Formal Seed Sector/Intermediary Seed Sector

1. Production of breeder, foundation and certified seed is a prime mandate of several government institutions: FOFIFA, FIFAMANOR and SOC. Unfortunately, early generation seed (EGS) figures are hard to come by (and are still being confirmed), but all experts agree that overall production is very low. (Note that FOFIFA did produce 17 MT of foundation seed for FAO this last season.) FOFIFA does not have an operating seed production site in the South- although land has been designated. Also, there only two main CMS (seed multiplication centers) across the entire region. CTAS supports the center at Agnarafaly; but the second government-backed center, in Behara, is presently 'degraded' (deemed under performing and in need of rehabilitation).

2. Effective seed Inspection and seed certification services for South have challenges. The SOC, based in Antananarivo, has no laboratory located in the South. Many experts interviewed expressed concern about the quality of screening as well as delays in receiving results. There may be a need to revitalize SOC headquarters but also to decentralize operations and add laboratories in the South. (Taolagnaro has been suggested as a site.)

3. In terms of non-governmental early general seed (EGS) production, CTAS has been taking a lead supporting the Agnarafaly multiplication center, producing 10-15 MT year when conditions are favorable. The private company Agrima has been selectively multiplying early breeding parental (175 kgs for three crops in 2022-23) and also delivering 75 MT of certified seed last season (and 88 MT local variety high quality seed). Additionally, CIP has been supporting FIFAMANOR to get basic quality sweetpotato vines and cuttings. While these are much needed contributions, they are currently punctual, not coordinated initiatives, and all could likely benefit by being scaled up.

4. Several organizations have been involved in decentralized seed multiplication, that which is more directly link to farmer end-users. CTAS works with 500 seed producers (PMS), CIP has 57 DVMS, FAO has 200 multipliers, CRS has both vine multipliers and seed producers, about 60-70 in total. The DEFIS project also cited a total 640 PMS in the South, although it is likely the some of the figures above overlap. While it is difficult to sense of the exact total, tallies suggest that between 300- 350 MT/year is being multiplied directly geared for the South (not including commercial company importations). Very roughly estimating, this total amount of seed may be less than 1/5 or might be needed. We say 'roughly' as effective demand cannot yet be estimated due unknown around issues such as variety appreciation, costs of production, farmer willingness to pay, etc.

5. Beyond seed production *per se*, there are as important challenges in seed delivery and marketing. Much of the seed produced is geared to institutional clients such as rural development projects and NGOs involved in emergency and recovery. High quality seed is subsequently given to farmers free: no farm-level high quality seed markets are being stimulated. In select cases where seed marketing is geared to smallholder farmers directly, the seed cost is routinely heavily subsidized, by 50% and more. Development and humanitarian practitioners in the South complain that smallholders won't buy higher quality seed (mainly due to cost but also as they can source more cheaply from local markets). Experience elsewhere suggests that "Good seed PAYS, not costs." If southern farmers see only cost – and not benefit – then seed production and marketing strategies may best be very closely reviewed. Weaning from subsidy will also have to be programmed as an explicit process.

In sum, at all levels of seed production and marketing there have been key constraints identified, some of which are being addressed (e.g., opening up a FOFIFA research station in the South and rehabilitating government seed production). Non-government actors, especially CTAS, but also select NGOs, CGIAR centers and private sector companies, have been key for shoring up seed supply, even starting at the EGS level but especially working on

downstream multiplication. In moving forward, there needs to be expansion and coordination in seed production- with many more actors engaged (and incentives may have to be weighed). Equally, critical however there will have to be shifts in seed production and marketing. Smallholder farmers must be engaged as direct buyers, paying for seed at real costs. Institutional buyers alone must not drive seed production and marketing across the South.

Informal Seed Sector

1. The informal system is quantitatively the most important one across crops in delivering over 98% of the seed southern farmers sow. The informal seed system consists of several components- seed saved from own harvest; seed obtained through social networks (friends, neighbors, relatives); and seed purchased in local markets.
2. In the Great South, the local market system is currently the key to farmers' seed security, providing 74% of the seed smallholders sow (this figure is the highest % ever reported for local market use within an SSA, anywhere). Local market use confirms that southern farmers are already engaged commercially in buying seed, local seed. Local markets are also an important source for farmers' accessing new varieties.
3. Traders sell a large range of crops, largely procuring seed stocks from local sources: their own production, seed sourced directly from other farmers, and seed bought via collectors.
4. Many traders aim to tap into a lucrative local seed market, as prices often prove higher than those linked to food grain alone. To respond to the demand for seed to plant, traders in the region have adopted some six select practices for managing potential local seed. For instance, they sort out bad grains and waste (like dust and pebbles), keep freshly harvested stocks apart, and pay extra attention to storage conditions. Unusual is that some traders in the Great South grade stocks and a select few employ methods for germination tests.
5. Traders also engage in unique seed security roles in the Great South: moving stocks from one region to another (for use in emergency); seeking out special new varieties; and serving farmers in hard-to-reach last mile areas.

In sum, given that the informal sector is an important force in the South, and especially the informal markets and traders, it might make sense to explore more explicit linkages to formal and intermediary sectors. There may also be opportunities for strengthening and professionalizing this informal sector further (raising quality, knowledge of modern varieties, storage etc). The challenge is how to leverage its current strengths and address its current weaknesses in a more strategic way.

Cross-sectors: Meeting seed security for the Great South

Many of those interviewed with the SSA expressed an urgent need to move seed security planning and operation forward in explicit ways and quickly. Many also called for more coordinated actions so as to create an Integrated Seed Sector, uniting strengths of formal, intermediary, and informal seed sectors. For this reason, the SSA recommends the convening of **a Regional Seed Security Workshop for the Great South as a priority.**

VI. RECOMMENDATIONS: ACROSS THE GREAT SOUTH

The seed security assessment conducted in May-June 2023 encompassed three regions: Atsimo-Andrefana, Anosy and Androy. Coverage was sufficiently comprehensive to allow for overall recommendations – those that can potentially spur seed security across the Great South. Important is that the SSA looked at both the supply and demand side (demand here equated with community and farmer views). Both are key for identifying seed security action points.

The seed security constraints identified within the SSA were diverse and widespread. They included problems involving all the major seed security features (availability, access, seed health and variety quality), with constraints identified particularly in the medium and longer-term. The constraints identified were chronic and systematic, not acute issues.

Note that the SSA did not find an 'emergency' situation requiring urgent humanitarian actions: for instance, there was no identified need for a widespread direct distribution of seed aid. In fact, the seasons being evaluated proved to be to relatively good ones, especially when compared with the two previous (2020-21; 2021-22). While very vulnerable households may still require safety net-type assistance linked to their deeply-rooted poverty, for much of the population there is an immediate need to act quickly and to think more longer term so as to build ongoing and resilient seed systems. Hence, while the SSA did not identify a humanitarian emergency, it did show the need for urgent short-term actions – but urgent <u>developmental,</u> more forward-thinking ones.

Overall, the seed security of smallholder farmers in the South is very compromised. A detailed and priority agenda for action might be developed soon to jumpstart seed security in the South. Recommendation theme #XII – the last one – calls for the convening of an inclusive stakeholder meeting to rethink impact-oriented strategies for ensuring seed security across the South. The meeting might focus on boosting and integrating all seed systems farmers use. The vision would be for an Integrated Seed Sector, working for Resilience. (Annex 3 suggests elements of a program.)

Below, we put forward a set of first order recommendations. These are priority areas for action. We stress <u>priority</u> as not all constraints can be addressed at once: there needs to be prioritizing and sequencing of actions. Together, as a set, the recommendations, if implemented, should provide a base for boosting seed security in the Great South in 1 to 5 seasons. Specific targets will have to be set.

As an important observation, a good number of the priority areas for action were also identified during a 2013 SSA (which was much more limited in scope, and with diverse teams). There is not compelling evidence of significant seed security progress for the Great South in a full decade, from 2013-2023. There has been an expansion in promising projects and programs but not evidence that farmers' own seed security has been altered on a broad scale. *In fact, the levels of farmers' seed INsecurity stress may have increased (based on concrete signals).*

In devising recommendations, we have tried to be realistic, recognizing:

- conditions in the South: droughts, very poor roads, lack of services all around;
- the current formal breeding and formal seed sector capacities; and
- especially farmers' own circumstances- the high levels of malnutrition, low purchasing power

Any seed security program developed might best be innovative and explore ways to break the stagnation. There should be room for 'Out of the Box' and more integrated approaches.

Seed Security for the Great South. Priority Action Areas

I. VARIETY CONFIRMATION AND DEVELOPMENT

Varieties need to be confirmed that respond to the stress conditions of the South and that meet smallholder needs for both home consumption and market. There are a large number of varieties registered (see Annex 1), but it remains unclear which are really performing and if the levels of performance are sufficient. Remember that the SSA team found very few new varieties in farmers' actual fields, so performance evidence is scant. Several actions that might be given priority:

1.1 Confirm current set of recommended/released varieties (FOFIFA, CTAS and others).

Which varieties: Varieties released by FOFIFA/FIFAMANOR, CTAS, and others should be objectively screened in controlled conditions and employing farmer-realistic management regimes. Which releases perform well and which not? The results could lead to sharper characterization and recommendations for a first set of released varieties across a range of crops. Verification should be tailored for the different regions of the South.

Who? An agency with sufficient expertise, field sites, and well-characterized plots should take the lead. The comprehensive variety screening could be managed by a government research institution but, equally, might be spearheaded on-the-ground by a non-governmental or especially private sector seed actor. The actor taking the lead should be able to perform with speed, rigor and objectivity.

1.2 Collect/import best crops and variety bets from elsewhere (across Africa, international).

No matter what the results of #1.1, The South also needs injections of new, very high performing variety materials. It needs quick boosts. Promising varieties should be brought in from elsewhere, to be tested in controlled conditions – even next season.

Which varieties/sources: Madagascar is a member of SADC and other Africa national agricultural research programs may have very promising candidates. Equally, CIRAD, the CGIAR centers (CIP, IITA, ICRISAT already work in the South), or international and national private sector companies might have _promising germplasm candidates.

Who to organize?: Likely similar to 1.1

1.3 Screen/process the remaining 24 varieties in CTAS' QDS catalogue.

1.4 Revitalize FOFIFA's research capacity in the South (at Behara?). Consider adding select sites in Anosy and Androy.

1.5 Build on private sector breeding expertise for companies with strong orientation to the South.

At time of this report writing, one company, Agrima is in discussions with the MINAE, to spur five breeding sites: Sakay (Bongolava); Maintirano (Melaky region), Antsirabe, Ambomvome, Beloha (South).

II. DECENTRALIZED VARIETY TESTING NETWORK

Linked to Recommendation I, varieties need to be screened on farm, with farmer feedback in decentralized plots. A regionwide decentralized testing network needs to be catalyzed, across the varied regions of the South. Not one site, but many sites.

2.1 Set up decentralized testing of promising varieties that are screened under realistic agroecological conditions.

Plots could potentially be commune-managed, community plots, or individual farmers' fields, particularly with lead farmers. Coverage has to include all key landscapes of the South.

2.2 Ensure authentic farmer feedback of decentralized variety testing sites.

Evaluations have to take place at different points in the season, with feedback from varied farmer-clients (men/women, more subsistence and market-oriented, farmers with different asset levels).

Who: The formal research institutions, even if functioning with high levels of expertise and funds, probably cannot handle the range of sites needed. FOFIFA/FIFAMANOR might have the lead role in oversight, but the actual testing might practically be devolved to organizations already working with farming communities, in well-defined zones, and on an ongoing basis. The FAO, NGOs such as CTAS or CRS, and even CGIAR centers, all have a presence in the South—and the agricultural expertise. Private sector companies committed to the South and perhaps two current CMSs could also host decentralized sites. The broader vision is to have many decentralized organizations untied in a coordinated decentralized testing plan.

How: Key is that testing site members agree to use the same protocol; varieties should be tested under realistic farmer conditions; and there has to be rigorous and systematic farmer feedback. Widespread training in participatory varietal selection (PVS) methods might also be useful. Practical protocols, easy and streamlined, need to be negotiated.

III. SEED PRODUCTION: EARLIER GENERATION AND SOC AND GOVERNMENT MULTIPLIERS: BREEDER, FOUNDATION, AND INITIAL CERTIFIED

High quality early generation seed, of guaranteed quality, needs to be on offer. As this issue has been explored in recent reviews (i.e. Rabenasolo, I. 2019), we focus on key immediate actions.

3.1 Schedule a collaborative review of the Service Opération Contrôle (SOC).

Such a review needs to be open to a frank assessment of current functioning and to set standards for desired future functioning. Specific calculations might be put forward in terms of what is needed: equipment, training, field funds and the like.

3.2 Consider establishing branches of SOC service based in the South.

Taolognaro has been suggested as one site. Setting up several might be a preferred option so as to effectively offer decentralized services.

3.3 Revive the degraded CMS center of Behara.

Assess what is needed: e.g. tractors, sprayers, etc. Put in place a longer-term, not stop-gap, operational plan.

3.4 Review overall CMS/PMS modes of operating.

Why are they geared near-exclusively to institutional clients rather than to the public, i.e., smallholder farmers, in the South?

3.5 Engage explicitly private sector organizations who have the technical capacity to produce breeder and basic/foundation seed, as well as subsequent generations.

Anticipate what legal arrangements may need to be clarified.

IV. DECENTRALIZED SEED PRODUCTION GEARED TO SMALLHOLDERS

There is not sufficient quality seed, which organizations can use as a base for further multiplication – whether certified, QDS or simply very high-quality farmer-produced seed. Despite the heroic efforts of several implementers, overall volumes remain low, the quality is not always as expected, and seed sales are subsidized. Further, while the work of CTAS is impressive, one organization alone cannot serve as the seed security backbone of a region as large and agroecologically stressed as the Great South.

The challenges in identifying and promoting sustainable seed production models are not isolated to the South (or even to Madagascar!) but they are urgent and are hindering not only supply of good seed but also the spread of new varieties (Recommendation V). The recommendations put forward here directly parallel recommendations put forward in the 2013 SSA. Nothing has significantly progressed in the decentralized seed production domain, except for the increasing of subsidy. As a general recommendation, sustainable seed production models might be confirmed and scaled-up, especially for the legumes and vegetatively-propagated crops. Some specific actions are listed below.

4.1 Review decentralized seed production experience elsewhere.

Commission an internal review (to other regions of Madagascar) and external – other countries in Africa. The review could be a quick review (1 month?) but should focus on why promising seed production models have endured and in what operating context.

4.2 Set clear and transparent guidelines for decentralized seed production development.

Some features that have proved important elsewhere include:

f. Decentralized seed multiplication programs must assess the cost-effectiveness of their production. Subsidized seed production and purchase should be discouraged. Subsidized programs should have a phase-out strategy (like the use of graduated vouchers.)

g. Production groups should be required from the start to have a clear business strategy. They should be encourage to produce only if a) viable markets/delivery mechanisms are identified; b) their own agro-enterprise and marketing skills have been enhanced (training) ; and c) they have a realistic business plan.

h. Seed production programs need to multiply *the* most promising and appreciated varieties (not just what is easily available).

i. Decentralized producers should be actively linked to new sources of germplasm. This helps keep their business dynamic. Variety turnover stimulates demand.

j. Seed multiplication and delivery should also be geared toward a smallholder farmer client base. Institutional buyers (e.g. FAO, WFP, NGOs) should not be the only main driver/client of the seed business – if it is to be sustainable.

V. VARIETY DELIVERY TO ALL FARMERS AND LAST MILE AREAS

New varieties, whether modern or highly performing local, are not reaching farmers in the South. Only 8% of households reported received a new variety in the last 5 years, with most of these deliveries being received free from the NGOs/UN, that is, in a subsidized manner. The main non-subsidized venue was the local market, but the new variety accession rate was still very modest.

New varieties (really good ones, as emerging from Recommendations I+II) need to be put on offer in channels that are geographically-accessible and financially-accessible to farmers.

In all cases, enhanced delivery options need to be complemented by vigorous media campaigns helping farmers to make informed decisions about whether to use the new materials. This latter process could benefit from the rural radio programs already in place, texting/SMS, etc. (see Recommendation IX).

5.1 Expand channels where new varieties can be legally sold.

Promote sales in venues that farmers frequent; venues that sell seed, venues that sell food, places where they seek nutritional help (e.g. health centers), etc. Seed tracing services (codes on packs) might help shore-up accountability and authenticity.

5.2 Pack new varieties in 'affordable' units.

Encourage public, private, and intermediate sector to pack in small, well-sealed units (100g, 200g, 500g). Packs can be transported and, if handled well, maintain viability.

5.3 Engage new actors in the knowledge and sale of new varieties.

Market traders, for instance, are already selling new varieties. Actively provide them with the information needed to follow the variety pipelines and to be able to pass on information to their customers. Think beyond seed-specific sellers. Broaden the notion of 'seed security actor' (e.g., women's organizations?)

5.4 Avoid built-in subsidies for seed.

Good seed pays, not costs. If farmers are not buying new varieties (sometimes linked with better quality seed), it is because the varieties are not promising enough or the cost of the seed doesn't outweigh the benefits. Subsidies on the client side (e.g., vouchers) can distort farmers' assessment of the real value and create a false assessment of demand. If subsidies are practiced, they should be used on a limited time basis, and with a clear vision to phase them out.

VI. SORGHUM CONFIRMATION AND PROMOTION

Sorghum is clearly a crop that is adapted to the Great South and that could help bolster farming system resilience. At this point, farmers within the SSA did not include it among their priority crops and many seem to hold negative stereotypes, possibly linked to its use in seed aid. Sorghum's potential for the South needs to be further explored, confirmed, and actively programmed. Several thrusts might be pursued simultaneously.

6.1 Confirm high performing varieties for sorghum.

High performing varieities need to be identified and confirmed for both farmer and market acceptance (linked to Recommendations I and II).

6.2 Promote awareness-raising and behavioural change campaigns for sorghum.

Farmers may require more information on sorghum (including its management and processing for home use). There may also have to be active campaigns to battle stereotypes.

6.3 Identify value-added and/or novel market value chain possibilities for sorghum.

Identifying added value possibilities – including sorghum's use in commercial value chains – may be appropriate for select areas of the South and could possibly spur faster adoption

VII. SEED STORAGE (MINIMIZING LOSSES)

The SSA found that most farmers don't save seed at all: risks of loss are too high, families need all harvests for food, or stocks are immediately sold to generate cash. That said, those farmers who did manage to store experienced important losses, even up to 35%.

As a range of storage technologies for different types or crops have been initially tested and confirmed in select regions of the South, there some clear recommendations forward. Important in all cases is that options be reviewed for their social as well as technical suitability. Also, clarifying the supply side (how the innovations will be manufactured and marketed) will be as important as enhancing farmers' own product access and awareness.

7.1 Review post-harvest practices and farmer storage needs further.

The SSA identified the problem of storage but did not review the causes, current methods, and possible preferences in depth. Any action plan should be preceded by a solid analyses of farmers' current management practices and the kinds of agricultural commodities to be stored.

7.2 Promote promising storage techniques for the cereals and legumes (if these are priority crops).

Farmers need to be equipped with the knowledge to preserve their seed (and grain) using airtight containers. A general Training of Trainers on hermetic storage (PICS, silos, jerrycans, etc.) might be a first step. If Purdue Improved Crop Storage bags (PICS) bags (a technology tested by CRS) are seen as a promising option, a local supply chain for bags might be established. (Note that Tanzania has a large manufacturer capacity). The cost of bags have to factored in as a constraint from the start.

7.3 Promote promising storage techniques for the tubers (especially sweetpotato, if this is a promising crop.)

In-depth work has already been done on the storage constraints and opportunities for sweetpotato. CIP has led the work on a triple sand technology that has been tested in several areas of the South. The technology should be promoted further.

VIII. FEMALE-HEADED HOUSEHOLDS + SEED SECURITY

Initial insights from women's only focus groups suggest that seed security constraints of female-headed households particularly merit more general attention and specific analysis. Many are short of funds at critical

sowing periods. Female-headed HH also may require, and need to hire, outside help for some of the heavy agricultural tasks.

There are many variations of female-headed households in the Great South: women with polygamous husbands (3,4,5 wives), unmarried mothers, and women 'abandoned by their husbands', among others. Also, female-headed households seem to represent a rather large portion of households in the South: 4 of the 8 women-only focus groups estimated that 50% of the households in their village were female-headed. Note that different types of female-headed households may have diverse needs. Suggested first actions forward:

8.1 Commission a specialized study on female-headed households and seed security challenges.

Ensure that seed security specialists and gender specialists work jointly.

8.2 Consider innovative financing possibilities for women, especially to coincide with the timing of critical sowing periods.

IX. INCOME GENERATION, MICROFINANCE FOR FARMERS, ETC.

While the SSA did not specifically look at financing options, farmers' money issues – or lack of money – loomed large as the key constraint shaping farmers' current seed insecurity problems. Even if seed is available (whether high quality or just local market seed), many farmers cannot afford to buy the amounts they need.

The future of farmers' seed security in the Great South will be as linked to raising farmers' buying power as it is linked to specific seed issues. There are several avenues to explore here that fall outside the terms of an SSA but which merit signaling:

9.2 Explore value-added products at the community level.

The SSA found very few value-added processing with rural communities. Those existing brought modest income, e.g., processing manioc flour. Additional processing opportunities could help farmers diversify their income sources.

9.2 Expand Village Savings and Loans Programs.

VSL programs are 'accumulating savings and credit programs' that allow farmers to generate funds In a relatively short time (12 – 24 months). The VSL funds are also often large enough to allow members to borrow enough money to access key agricultural inputs such as seed or storage chemicals. This type of farmer group-managed assistance needs to be expanded. (These programs have various labels. CRS uses the term *Savings and Internal Lending Committees – SILCs* – for their own work).

9.3 Review whether Fonds de Developpment Agricole (FDA) can integrate the financing of seed acquisition in their financing plan.

For example, consider beneficiary contribution, IMF credit, or FDA subsidy. Clearly, there are many other options, for example, expanding larger-scale agroenterprises in the South. With expanding sorghum markets (tied to poultry feed, being a current example), this area of increasing finance and income generation for stressed farmers opens up many areas for reflection.

X. INFORMATIONAL CHANNELS GEARED TO SMALLHOLDERS

Simply, across the board in the South, farmers need access to more technical and marketing information. Farmers have insufficient information on: new varieties, where to find quality seed, how to use select inputs, advice on options for combatting climate stress, etc. SMS, radio programs, posters, and online videos are all options for better ensuring that farmers have information to make informed choices (see Annex 2 for several examples linked to improved storage).

This recommendation is put forward only to remind us that any product (including seed) is only as good as the information clients have to access and manage it. If investing in seed systems, also invest in accompanying information systems.

10.1. Invest in information systems related to variety, seed, and seed management that smallholders need to make informed choices.

XI. MARKET-ORIENTED EMERGENCY/RECOVERY APPROACHES

Only a small portion of the households interviewed within the SSA had received emergency aid over the last 5 years, but this type of humanitarian assistance had been well established in the South, at least since 2005 with its incidence is growing. Currently, the dominant form of aid in the South is Direct Seed Distribution (DSD), with other, more market-based options rarely implemented.

Recent globally-published technical guidelines for emergency aid recommend moves towards market-based assistance and away from direct distributions.

> *Market-based assistance should be given priority if the approach can also address the seed security constraint identified. Market-based assistance has the potential to deliver immediate assistance to farmers while encouraging longer term functioning of regularly used markets.* ***Humanitarian assistance should support, not undermine, critical market functions.*** *(Sperling et al., 2022)*

Note that market-based emergency responses can be applied on the supply as well as demand sides.

11.1 Make available, disseminate, recent guidelines for 'best seed aid practice.'

Found within the Seed Emergency Response Tool (SERT), best practice guidance should be shared with NGOs, donors and other seed stakeholders intervening in the Great South. A common set of 10 Principles for Good Seed Aid Practice has been published and disseminated, which can provide a joint vision for seed aid response.

11.2 Avoid routine use of any response options (including repeat use of vouchers).

Avoid creating unnecessary and unproductive farmer dependencies. When the same response option is used repeatedly, it signals that the system is not responding to the intervention. This SSA provides detailed information as to the seed security problems, potential solutions, and response options. Anyone looking to intervene in the seed system in the Great South should carefully consider their response modality.

11.3 (As USAID recommends), If seed-related aid is given three seasons in a row in the area with the same response, governments and donors should require a field review of the seed security situation and the responses implemented.

For more information on the USAID guidelines, visit https://www.usaid.gov/document/bha-emergency-application-guidelines-annex-technical-information-and-sector-requirements.

XII. GREAT SOUTH SEED SECURITY STRATEGY- REGIONAL WORKSHOP: INTEGRATING SEED SECTORS FOR RESILIENCE

Across the Great South, the seed security of smallholder farmers is severely compromised—for all key seed security parameters-- availability, access, seed health and variety quality. There are well-defined problems on the supply side, and an equally extensive set of challenges from the community and farming households' point of view (linked to the demand side).

More practically, there are few ongoing means to introduce, multiply, access or market new varieties and higher quality seed (whether certified, QDS, or just good farmer seed). Also concerning, is that the level of seed security among southern farmers is not just static – it seems to be in the decline.

It might be time for a major reflection of seed security strategy for the Great South and the holding of a regionwide workshop might be one important key step. Initial ideas for a draft workshop program are sketched in Annex 3. These are suggestions meant to stimulate concrete discussion.

Some of the guiding principles for such a workshop, might be the following:

5. The solutions have to practical and realistic, taking account of the unusual challenges in the South;
6. The vision should be for resilient systems. (not just any commercial system);
7. Both the seed supply side and demand side (communities, farming households) should be considered with equal rigor;
8. Strategies developed might best leverage all the seed systems farmers' use: formal, informal, and intermediary. Catalyzing an Integrated Seed Sector and identifying specific points of integration might be among the goals;

Actors who might to be invited include: government, plant breeder, formal seed sector and Intermediary sector specialists, NGOs, private sector, local seed and grain traders, climate and nutritional specialists, gender specialists, and more. It will be important to go beyond seed actors and include those with more holistic, resilience thinking.

In brief, these 12 thrusts form the core of the SSA recommendations. All recommendations have emerged from data-driven field insights. Recommendations should be implementable in 1-5 years. Briefly, below, we map these 12 thrusts as a boost in the seed security of smallholder farmers in the Great South. Is something missing as a key action? Is the overall emphasis on track?

Recommendations: Holistic Reviews

Below, we map the recommendations organized by two types of clusters: a) how they chart with Seed Security Framework Elements (Table 2.1) and b) how they chart with Seed System Resilience Features (Box 1). With these diverse mappings, we hope to stimulate holistic thinking.

Recommendations ordered by Seed Security Constraint

Here is the first table, where recommendations are sorted by seed security constraint (availability, access, seed health/quality, and crop/variety suitability). The placing of actions in specific seed security categories was challenging as an activity such as 1.4 – revitalize FOFIFAs research capacity in South – might we linked to variety suitability or to availability. We have tried to fair in designating categories (and activities can always be re-sorted, if needed). At a first glance, what the clustering shows is that:

a) there is a need to address activities across a range of seed security elements;

b) access-linked activities seem to be as important as availability-linked ones; and

c) improving and scaling up seed quality production – often the emphasis of seed specialists – won't get us very far on the full road to seed security.

There were a few recommendations that do not fit neatly into the prescribed seed security framework elements: a) the call for a regional meeting (Thrust XII) and b) the advice to move to market-oriented approaches in emergency (Thrust XI: 11.1, 11.2 and 11.3). Both are key as overarching visions, even if they transcend the seed security boxes.

Table 6.1 Summary recommendation plan: mapped by seed security constraint

Seed Security Element	Rec #	Seed Security Action (linked to recommendations)
Availability	3.3	Revive the degraded CMS center of Behara
	3.4	Review overall CMS/PMS modes of operating
	3.5	Engage private sector more fully to produce breeding/foundation/certified seed
	4.1	Review decentralized seed production experience elsewhere
	4.2	Set clear and transparent guidelines for decentralized seed production
	7.1	Review post-harvest practices and farmer storage needs further
	7.2	Promote promising storage techniques: cereal and legumes
	7.3	Promote promising storage techniques: tubers/sweetpotatoes
Access	5.1	Expand channels where new varieties can be legally sold
	5.2	Pack new varieties in affordable units
	5.3	Engage new actors in the knowledge and sale of new varieties
	5.4	Avoid built-in subsidies for seed
	6.2	Promote awareness-raising and behavioral change campaigns- sorghum
	6.3	Identify value-added or novel market value chain possibilities - sorghum
	8.1	Commission specialized study on female-headed HH and seed security
	8.2	Consider innovative financing possibilities for women, esp, at sowing periods
	9.1	Explore value-added products at community level
	9.2	Expand village savings and loans programs
	9.3	Review FDA funding- financing of seed acquisition
	10.1	Invest in farmer-oriented information systems: variety, seed, storage.

Seed Security Element	Rec #	Seed Security Action (linked to recommendations)
Seed health/quality	3.1	Schedule a collaborative review of SOC
	3.2	Consider establishing branches SOC in South
Crop/variety suitability	1.1	Confirm current set of recommended/released varieties
	1.2	Collect/import best crop and variety bests
	1.3	Screen/process the remaining 24 varieties for CTAS QDS catalogue
	1.4	Revitalize FOFIFA's research capacity in South
	1.5	Build on private sector breeding expertise-South
	2.1	Set up decentralized variety testing network
	2.2	Ensure authentic farmer feedback in variety testing network
	6.1	Confirm high performing varieties- focus on sorghum

Notes: Not easily mapped in table: Thrust X (Market-oriented approaches in emergency); Thrust XI (Regional seed security strategy meeting).

Are the activities above, as a cluster, sufficient to boost seed security? Much will depend on how they are sequenced and the quantitative targets that are set. It is hard to say which are 'most important'. Certainly, identifying crops and varieties that are superbly adapted and appreciated is among the highest priorities (and then, of course, getting them in the hands of farmers!)

Recommendations ordered by Seed Systems Resilience Features

Moving to the Seed System Resilience Features (originally explored in Box 1), we do a similar exercise and map the proposed recommendations by feature (Table 6.2).

This mapping was even more challenging than the first (Table 6.1) as the features for seed system resilience are still being debated and refined—and likely should be defined further in any regional seed security meeting for the Great South. The table shows, again, that activities across the range of resilience features are needed. Looking at the full cluster, one wonders if information systems (those that also help create demand) might be given more emphasis.

Overall, resilience thinking and specific resilience programming are relatively new so it would be premature to even guess if the cluster as a whole can achieve moves forward in seed security. Something to add in the framework might be an analysis of "resilience to what kinds of specific stresses?" This could be an important theme for the proposed regional seed security meeting. Acitivities might have to be tailored to the specific stress.

Again, two of the recommendations did not fit neatly in the seed system resilience table. Market-oriented approaches in emergency (Thrust XI) and the regional seed security meeting (Thrust XII).

Table 6.2 Summary recommendation plan: mapped by seed system resilience features

Seed System Resilience Feature	Rec #	Seed Security Action (linked to recommendations)
1. Stress tolerant crops and stress-tolerant varieties are identified as performing, adapted, and accepted.	1.1	Confirm current set of recommended/released varieties
	1.2	Collect/import best crop and variety bests
	1.3	Screen/process the remaining 24 varieties for CTAS QDS catalogue
	1.4	Revitalize FOFIFA's research capacity in South
	2.1	Set up decentralized variety testing network
	2.2	Ensure authentic farmer feedback in variety testing network
	6.1	Confirm high performing varieties- focus on sorghum
2. A wide portfolio of crops and varieties (linked to #1) are identified so that farmers can alter their planting profiles according to fluctuating conditions.	1.1	Confirm current set of recommended/released varieties
	1.2	Collect/import best bet crops and varieties
	1.5	Build on private sector expertise-South
3. Seed of stress-tolerant crops and varieties is multiplied with seed production significantly scaled up. Seed is available.	3.1	Schedule a collaborative review of SOC
	3.2	Consider establishing SOC branches in South
	3.3	Revive the degraded CMS center of Behara
	3.4	Review overall CMS/PMS modes of operating
	3.5	Engage private sector more fully to produce breeding/foundation/certified seed
	4.1	Review decentralized seed production experience elsewhere
	4.2	Set clear and transparent guidelines for decentralized seed production
	7.1	Review post-harvest practices and farmer storage needs further
	7.2	Promote promising storage technologies: cereals and legumes
	7.3	Promote promising storage technologies: tubers/sweetpotatoes
4. Delivery mechanisms are spurred to give farmers access to needed crops/varieties: at last mile, stress zones	5.1	Expand channels where new varieties can be legally sold
	5.3	Engage new actors in the knowledge and sale of new varieties
5. Delivery formats (prices, pack sizes) are developed that enable even poorer farmers to obtain seed they need.	5.2	Pack new varieties in affordable units
	5.4	Avoid built-in subsidies for seed
	6.3	Identify value-added and or novel market value chains: sorghum
	8.1	Commission specialized study on female-headed HH and seed security
	8.2	Consider innovative financing possibilities for women, esp at sowing periods
	9.1	Explore value-added products at community level
	9.2	Expand village savings and loans programs
	9.3	Review FDA funding- financing of seed acquisition
6. Information systems are fostered tot strengthen farmers' ability to strategize and deal with fluctuating conditions.	6.2	Promote awareness-raising and behavioral change campaigns- sorghum
	10.1	Invest in farmer-oriented information systems: variety, seed, storage

Concluding remarks

In concluding and closing the recommendations section, we choose to repeat some reflections proffered when opening this Chapter VI.

In devising recommendations, we have tried to be realistic, recognizing:

- conditions in the South: droughts, very poor roads, lack of services all around;
- the current formal breeding and formal seed sector capacities; and
- especially farmers' own circumstances – the high levels of malnutrition, low purchasing power

Any seed security program developed might best be innovative and explore ways to break the stagnation. There should be room for 'Out of the Box' and more integrated approaches.

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ANNEXES

Annex 1: Official Variety Lists for the Great South

- Lists A +B

Annex 2: Information Examples Geared To Smallholder Farmers

- *The Triple S System: Storage in Sand and Sprouting*
- *Purdue Improved Crop Storage Poster*

Annex 3: Great South Seed Security Workshop

- Draft program ideas

Annex 1. Registre des Espèces et Variétés exploitées dans le « Système des Semences de Qualité Déclarée » dans le Sud de Madagascar

Annex 1: List A (from SOC website: https://soc-semences.mg/registre-des-especes-et-varietes/)

Rice

Dénomination / Fiche variétale	Synonyme	Nature génétique	Origine	Obtenteur	Mainteneur	N° Collection	Cycle semis-maturité	Rendement potentiel(t/ha)	Intérêts
Vesainky	TOX 3233-31-6-2-1-2A	LIS	Nigéria	FOFIFA	FOFIFA	7196	145-162j	4	Résistance à RYMV
AjàMizesta	CNA 3462-(9)	LIS	Brésil	FOFIFA-CNA	FOFIFA	3985	125j	4	Résistance à la pyriculariose
Soafintsanga	ON333	LHL	Vietnam	FOFIFA	FOFIFA	6937	125-140j	4	Résistance à RYMV
Mahafatrosa	IR 510009-62-3-3-3	LIS	IRRI-Philippines	FOFIFA-IRRI	FOFIFA	4156	90-95j	4	Résistance à la pyriculariose
FOFIFA 175	MR 10694-20-2-1-2	LLS	Madagascar	FOFIFA	FOFIFA	7186	115-125j	3	Résistance à RYMV
X265	IR 15579-24-2	Lignéeiroduite	IRRI-Philippines	IRRI-FOFIFA	FOFIFA	3914	155-160j	4-5	Facile à égrener

Groundnut

Dénomination	Synonyme	Origine	Obtenteur	Mainteneur	N°Collection	Couleur des grains	Rendement Potentiel (t/ha)	Intérêts
Fleur 11	ISRA (1993)	Sénégal	CNRA	FOFIFA	360	Rose clair	2	Bonne productivité

Sorghum

Dénomination / Fiche variétale	Synonyme	Nature génétique	Origine	Obtenteur	Mainteneur	N°collection	Cycle semis-maturité	Couleur des grains	Rendement Potentiel (t/ha)	Intérêts
IRAT 204	80-25		Sénégal	ICRISAT-FOFIFA	FOFIFA	852	90-95j	blanc	2-3	Tolérance à la sécheresse et au vent
MACIA	FF6		Mali	ICRISAT-FOFIFA	FOFIFA	006	110j	blanc	4,7	Tolérance à la sécheresse

Common Bean

Dénomination / Fiche variétale	Synonyme	Origine	Obtenteur	Mainteneur	N°Collection	Couleur des grains	Rendement Potentiel (t/ha)	Intérêts
Ranjonomby	RJ1	Madagascar	FOFIFA	FOFIFA	192	Blanche	1-1,2	Exportation
DRK64	CIAT-DRK	Tanzanie	CIAT	FOFIFA-CIAT	246	Rouge foncé	1,4 -1,6	Exportation
RI-5-2	RJ1 x Ikinimba	Madagascar	FOFIFA	FOFIFA	312	Jaune clair	1,2 -1,5	Exportation
CAL98	CALI-CIAT /FOFIFA/98	Colombie	CIAT	FOFIFA	248	Rouge foncé tacheté de blanc	1,6-2	Exportation – Productivité

Maize

Dénomination / Fiche variétale	Synonyme	Nature génétique	Origine	Obtenteur	Mainteneur	N°Collection	Cycle semis-maturité	Couleur des grains	Rendement potentiel (t/ha)	Intérêts
IRAT 200	Ferké 7928 IDSA 38	COM	Côte d'Ivoire	CIRAD-FOFIFA	FOFIFA	450	105-120j	Jaune à orange	5,4-6,6	Tolérance à la sécheresse
VOLASOA	Los banos (1) 8227	COM	Mexico	CIRAD-FOFIFA	FOFIFA	452	105-120j	Jaune orange à orange	4,7-6	Régularité de rendement
BAKOLY	Suwan(1) 8131	COM	Thailand	CIRAD-FOFIFA	FOFIFA	444	95-100j	Jaune orange à orange	4,3-6	Précocité
Pool 16	SR S1 Pool 16	COM	Mexico	FOFIFA-CIMMYT	FOFIFA	8725	90-95j	blanc	3,5	Tolérance à la sécheresse
Pool 18	SR S1 Pool 18	COM	Mexico	FOFIFA-CIMMYT	FOFIFA	8727	90j	blanc	3,5	Tolérance à la sécheresse
Mailaka	IRAT 412 (2)		Population	IRAT	IRAT-SD MAD	SD MAD	110-130j	Jaune brillant	4	Précocité

Brachiaria

Dénomination / Fiche variétale	Synonyme	Nature génétique	Origine	Obtenteur	Mainteneur	N°Collection	Cycle de longévité	Intérêts
Brachiaria ruziziensis	Urochloa ruziziensis	Population	Afrique centrale (Burundi, Rwanda, Congo)	FIFAMANOR	FIFAMANOR		Environ 5 ans	Résistance à la sècheresse Productivité en matière sèche élevée
Brachiaria brizantha	Urochloa brizantha	Population	Afrique (Côte d'Ivoire, Ethiopie, Afrique du Sud)	FIFAMANOR	FIFAMANOR		Environ 5 ans	Résistance à la sècheresse
Brachiaria brizantha cv		Population	Afrique	FIFAMANOR	FIFAMANOR		Environ 5 ans	Productivité en matière sèche élevée

Sweetpotato

Dénomination / Fiche variétale	Synonyme	Nature génétique	Origine	Obtenteur	Mainteneur	N°Collection	Cycle semis-maturité (jours)	Rendement Potentiel (t/ha)	Intérêts
Mahafaly	440 063/TIS2544	Clone	Kenya	CIP	CIP/FIFAMANOR	PP11	130-140	20 – 23	Bonne productivité
Mendrika	199 004.2	Clone	Kenya	CIP	CIP/FIFAMANOR	PP119	120-130	21-24	Riche en beta carotène

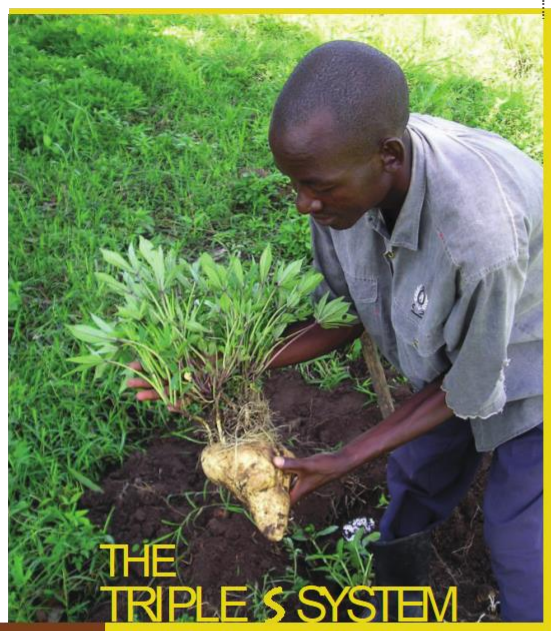
Manioc

Dénomination	Synonyme	Nature génétique	Origine	Obtenteur	Mainteneur	N°Collection	Cycle semis-maturité (mois)	Rendement Potentiel (t/ha)	Intérêts
81/00110	M7	Clone	Ibadan	IITA-FOFIFA	FOFIFA	532	10 à 12	42-60	Usages multiples
TME 14,	IITA-TME 14,	Clone	Ibadan	IITA-FOFIFA	FOFIFA	635			Résistance à la mosaïque
I 96 / 0191,	IITA-I 96 / 0191,	Clone	Ibadan	IITA-FOFIFA	FOFIFA	640			Résistance à la mosaïque
I 91 / 0427	IITA-I 91 / 0427	Clone	Ibadan	IITA-FOFIFA	FOFIFA	641			Résistance à la mosaïque
MM 96/5725	IITA-MM 96/5725	Clone	Ibadan	IITA-FOFIFA	FOFIFA	637	18-24	43-50	Usages multiples, Précocité

Annex 1: List B. LISTE DES VARIETES DE SEMENCES PRODUITES PAR CTAS

Espèces et variétés produites par CTAS
arachide kanety
Arachide boha
Cajanus androy
Dolique manja
Dolique lohapitse
Dolique vorompotsy
Dolique Ondragne
haricot mandronono
haricot menangoe
konoke mafiry
konoke mamy
konoke matsaotsaoke
Konoke soamaso
Konoke atolinkibp
mais amaninagnombe
mil besomotse
Mil Saretsako
Mil bevaoke
mucuna garadake
niébé baboke
niébé farimaso
pois de cap tsimeda
Pois du cap Soramena
Riz Mihary
Riz sebota
Siratro
Sorgho miaretse
Sorgho botra
sorgho rasta
Tsiasisa malaindrafe
antsoroko moramasake

Annex 2A: Information example: The Triple S System: Storage in Sand and Sprouting (sweetpotatoes)



THE TRIPLE S SYSTEM

[Storage in Sand and Sprouting]
provides planting material from storage roots in areas with a long dry season

In such areas, farmers often obtain sweetpotato planting material from roots which have been overlooked during harvest and sprout when it rains. However:

1. The roots sprout only when it rains and planting material only becomes available some weeks afterwards
2. The roots may sprout in distant fields, unprotected from grazing animals and thieves.

To solve these problems, researchers and farmers have developed a system of conserving planting material whereby storage roots are stored in sand and then planted out and watered before the arrival of the rains. This way, they have sprouted and produced large amounts of planting material in time for the arrival of the rains.

THE TRIPLE S SYSTEM
STORAGE IN SAND AND SPROUTING

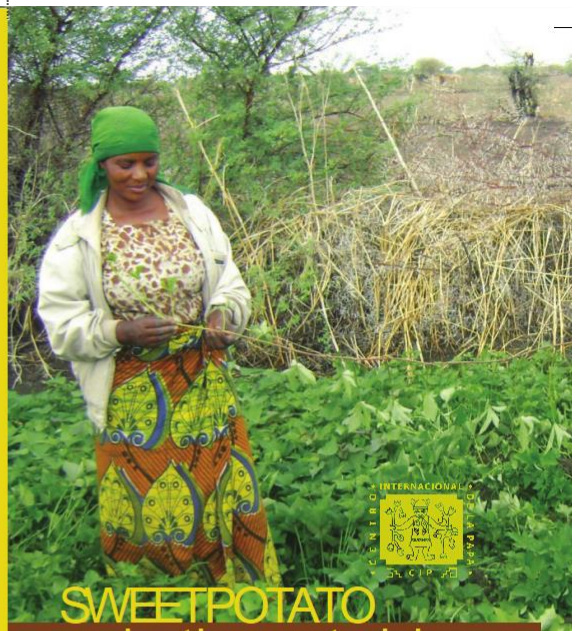
CENTRO INTERNACIONAL DE LA PAPA
CIP

Natural Resources Institute

University of Greenwich, Central Avenue, Chatham Maritime, Kent, ME4 4TB, UK

International Potato Center (CIP) – UGANDA, P.O. Box 22274, Kampala, Uganda

CIP Sub Saharan Regional Office, c/o ILRI, P.O. Box 25171, Nairobi 00603, Kenya



SWEETPOTATO
planting material

THE TRIPLE S SYSTEM

Storage
Sand
Sprouting

The sand covers the roots [by about 5cms].

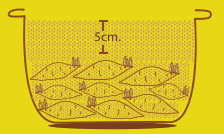
1

At the end of the rainy season, farmers get small to medium-sized sweetpotato storage roots, **carefully selecting roots that are from healthy plants and are undamaged**, particularly free from weevil damage.

2

The roots are kept in dry sand [swept from around the house or a road] in a container until 6 – 8 wks from the expected start of the rains.

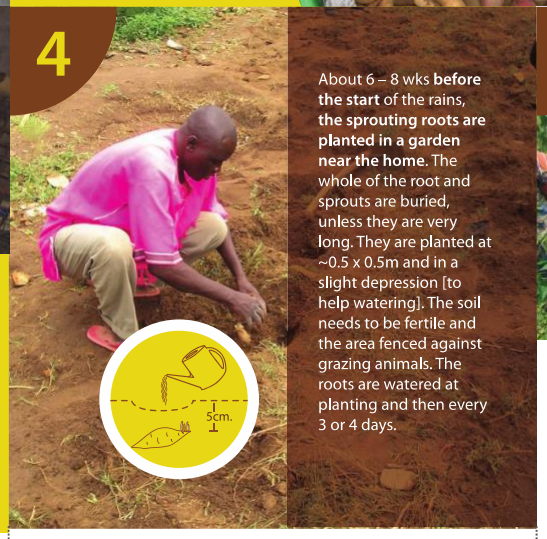
Take care that the sand is cool [not hot from having been in the sun]. Maybe two or more layers of roots can be kept in the same container.



3

The container of sand and roots is **kept in a cool dry, place**, until about 6 – 8 wks before the start of the rains, perhaps in the house or in a roofed hut, but safe from the children or chickens that may like to nest in it.

The roots sprout but generally the sprouts remain quite short. [If the dry season is very long, it may be necessary to remove the sprouts midway during the dry season and allow them to re-grow].



4

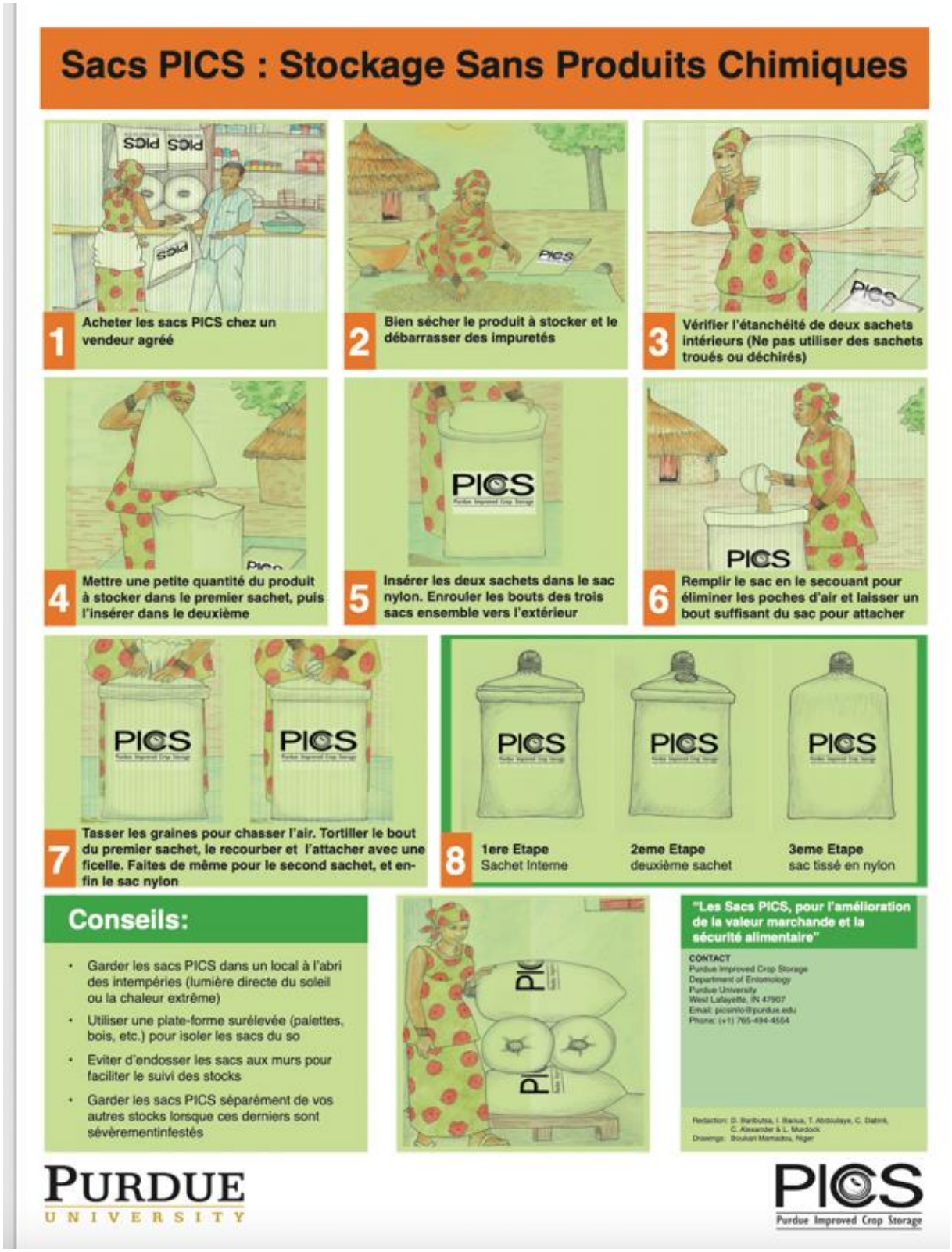
About 6 – 8 wks **before the start** of the rains, **the sprouting roots are planted in a garden near the home.** The whole of the root and sprouts are buried, unless they are very long. They are planted at ~0.5 x 0.5m and in a slight depression [to help watering]. The soil needs to be fertile and the area fenced against grazing animals. The roots are watered at planting and then every 3 or 4 days.

5

By the time the rains come, the roots will have sprouted vigorously and it is possible to cut large amounts of planting material.

Just 40 roots can generate about 1,500 cuttings.

Annex 2B: Information example: Purdue Improved Seed Storage



Annex 3: Great South Regional Seed Security Meeting *(Draft Agenda)*

Proposed themes to be discussed: draft 1

Preface. *Need targets: 1-3 seasons,*
Need targets: 3-6 seasons

See below some suggested themes and initial key questions (needs to be much further developed)

THE GREAT SOUTH (GRAND SUD): SEED SECURITY WORKSHOP	
# 1	**RESILIENT SEED SYSTEMS: VISION FOR THE GRAND SUD** *What are the features of resilient systems for the South?* *Given the features, what range of partners need to be engaged?* *What overall timetable for significant change?*
#2	**VARIETY CONFIRMATION AND DEVELOPMENT** *Which baskets of varieties should be confirmed already within country?* *Which 'other' sources might be the more promising, by crop?* *What might be quick strategies for locating 'best bets'?*
#3	**DECENTRALIZED VARIETY TESTING NETWORK** *Which organization should lead the governance and/or technical oversight?* *Which organizations might form to make a united practical screening network?*
#4	**SEED PRODUCTION: EARLY GENERATION MATERIAL: breeder, foundation +certified** *What range of organizations can be involved in EGS: what are the legal frameworks?* *What incentives might be needed to engage non-government + private sector actors (and with what responsibilities)?* *How might EGS production be better coordinated (including with transparent information systems)?*
#5	**DECENTRALIZED SEED PRODUCTION (QDS, COMMUNITY-BASED)** *What might be clear and transparent guidelines for best practice in decentralized seed production? Who can formulate these?* *What are the real costs of production for the varied models used in the South?* *What levels of subsidy (if any) could contribute to resilient seed systems?*
#6	**VARIETY DELIVERY—INCLUDING TO LAST MILE AREAS** *For each current delivery model (e.g. CTAS boutiques, PISP, DMM) what are the advantages and disadvantages? What needs to be improved?* *Mapping the current formal and intermediary outlets, which southern regions are being well-served? Which southern regions are being not served at all?* *Should more rotating (mobile) methods of delivery be spurred?*
#7	**POST-HARVEST SEED HANDLING ISSUES, INCLUDING SEED STORAGE** *What are the cost-benefits of varied current storage methods? (PICs, Triple S, local methods)* *Which groups might be supported with improved storage (farmers?, seed producers, PISPs, Traders?*
#8	**FINANCING FOR SMALLHOLDER FARMERS – Linked to agricultural inputs** *What are the range of options here linked to financial support especially at sowing periods?*

#9	**SPURRING INTEGRATED SEED CHANNELS AND ACTORS** *What might be features/signals of Integrated Seed Systems for the South?* *For what seed system functions might more integration be especially key?* *Should the informal sector (seed and grain traders) be considered a partner in the South's seed security strategy? First debates:* *If so, in what range of roles?* *If not, what are the risks?*
#10	**DIGITAL/KNOWLEDGE SHARING. INFORMATION CHANNELS** *What information conduits are best place to feed forward to farmers variety, seed, and climate-linked information across the South (for which groups of farmers)?* *What information conduits are best place to allow for farmer feedback? across diverse groups of farmers?*
#11	**SPECIAL CLIENT/VULNERABLE GROUPS: Women and others** *Is there any current work that can quickly inform on Female HH household and seed security?* *Would this group be a priority one for bolstering seed security in the South? Discuss pros and cons.*
#12	**EMERGENCY RESPONSES- MARKET-ORIENTED APPROACHES ONLY (guidelines?)** *In what forum should emergency response be discussed, so as to bolster also developmental seed system work? (emergency and developmental work are often best programmed as a continuum)*