SEED SYSTEM SECURITY ASSESSMENT

EAST AND SOUTH MADAGASCAR

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The insights of many people shaped this work: men and women farmers, seed and plant breeding agencies, crop and livelihood specialists, local seed producers, seed companies, agro-dealers, traders, agro-enterprise specialists, humanitarian relief personnel, and others. Thanks to all for helping to sharpen the results.

Finally, we do aim for this assessment to lead to practical action in the short and medium-term. The positive opportunities for seed system, marketing and livelihood support in East and South Madagascar need to be seized upon soon and with vigor.

Acronymns

ADRA	Adventist Development and Relief Agency
AMPROSEM	Association Malgache des Producteurs de Semences
AR	Ariary (Malagasy Ariary: 2183= $US1)
AROPA	Appui au Renforcement des Organisations Professionnels et aux services Agricoles
CMS	Centre Multiplicateur de Semences
CIAT	International Center for Tropical Agriculture
CARE	Cooperating Agency for Relief Everywhere
CBSP	Community-based seed production
CIRAD	Centre International de Recherche Agronomique pour le Développement
CRS	Catholic Relief Services
DiNER	Diversity and Nutrition for Environmental Resilience
DRDR	Regional Directorate for Rural Development
DSD	Direct Seed Distribution
FoFIFA	Foibe Fikarohana momba ny Fampandrosoana ny eny Ambanivohitra
FIFAMANOR	Fiompiana sy Fambolena Malagasy sy Norvegiana
FAO	Food and Agriculture Organization (also UN-FAO)
G	grams
GDSM	Groupement Semis Direct de Madagascar
GRET	Groupe de Recherche et d'Etudes Techniques
HH	Household
IFAD	International Fund for Agricultural Development
IARC	International Agricultural Research Center
ISS	Integrated Seed Sector
Kg	Kilogram
MT	Metric Tons
NARS	National Agricultural Research System
NGO	Non-governmental organization
ODDER	Organisme Diocésain de Développement Rural Diocèse Tolagnaro
QDS	Quality Declared Seed
SOC	Service Opération Contrôle
SSSA/ESSS	Seed System Security Assessment… Evaluation du Système de Securite Semenciere
SDMad	Semis Direct de Madagascar
SMV	Service de Multiplication de matériel Végétal, (currently known as : Station de Collection Active)
SVF	Seed Vouchers and Fairs
UEA	University of East Anglia
USAID/OFDA	United States Agency for International Development: Office of Foreign Disaster Assistance
VALYPRODSEM	VALY Producteur de Semence
VSL	Village Savings and Loan

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Comments and updates are welcome by the SSSA team. Please contact the assessment coordinators at Felicien.Randriamanantenasoa@crs.org and l.sperling@cgiar.org

EXECUTIVE SUMMARY

A Seed System Security Assessment (SSSA) was carried out in east and south Madagascar in May 2013. It reviewed the functioning of the seed systems farmers use, both formal and informal, and assessed whether farmers could access seed of adequate quantity and quality in the short and medium term. The work covered two Districts, Vavatenina and Ambovombe that were chosen as they represent highly contrasting ecologies (lush versus poorly endowed) and as both are key areas where partners have ongoing implementation programs.

The rationale for conducting the SSSA in these areas of Madagascar was fourfold:

- Madagascar 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-related responses could help boost production system resilience, food security and overall nutritional profiles.

- There have been repeated seed aid programs particularly in south Madagascar fairly regularly since 2005. These practices, and the assumptions guiding them, were deemed in need of review.

- Determinations of the seed security situation in Madagascar have, implicitly or explicitly, been based largely on food security assessments, or the linking of a production drop (harvest failure) with an implied seed shortfall. Such food-focused tools do not contain a seed security component and most often conclude that a food deficit implies a seed deficit. Targeted, more comprehensive methods now exist to determine the short- and medium-term seed security situation.

- Finally, the work took place to build assessment capacity. Seed security assessment tools are linked to food security assessments, but are also quiet distinct. The *Seed System Security Assessment* (SSSA) in east and south Madagascar was designed to give honed technical insight and to train professionals in fast-evolving seed security assessment and intervention design methods. The training lasted two weeks and involved skill building in analysis of community seed security assessments, seed markets and use of an automated data program to quantify individual household constraints and opportunities.

For a better understanding of the dynamics of seed security in Madagascar, CRS hosted the fieldwork for the SSSA with direct partners including CARE, Caritas, and Tranoben'ny Tantsaha Nasionaly (National Agricultural Chamber). The results are being used to guide immediate action and to prepare future proposals (especially to address chronic stress in the southern Region).

Key findings are summarized below. For a full report, with across-site findings, as well as separate site-by site reports (with tailored action plans), please contact the CRS Head of Programming at Felicien.Randriamanantenasoa@crs.org

FINDINGS

Summary: Acute Seed Security Findings: 2012-2013

Multiple and diverse indicators suggest the seed security of east and south Madagascar farmers in the short-term is quite stable.

From the farmer point of view, 2010-2012

1. For the 2012-13 main growing season, farmers sowed 14-35% more seed than the 'normal' amounts in terms of overall quantities sown. Crop yields in the east were overall quite promising: rated as good or average in 80% and 14.5% of crop cases respectively. The south did experience some stress. While yields were rate as good or average in 33 and 23% of cases, respectively, farmers judged 44% of crop case results to be 'poor', with particular problems with maize and cowpea (drought).

2. Farmers relied on local channels (home saved, local markets, seed from friends or kin) to access 99% of their seed during the 2012-13 season. 'Friends, kin, neighbors' (social networks) as a source were important primarily for the vegetatively-propagated crops (cassava and sweet potato), which has key implications for how these cuttings might move more widely and quickly. Social cohesion was especially marked in the east, where sourcing seed from social networks was more important than market sources.

3. The reported plans of farmers for the 2013 off season (contre saison) show more a positive trend in seed use with overall expansion of 7-30% (Vavatenina and Ambovombe, respectively).

4. From the farmer point of view, the rationale for using less seed (a general proxy for decreasing area) is key. In the East, negative reasons driving low seed use were linked especially to insufficient land, labor and ill health. (Interesting, lack of funds to buy seed was only a secondary reason). In the South, too little money and poor weather (drought) were dominant, with ill health being an important cause for not managing the normal plot area. The major positive reason for sowing less was tied to SRI which has had an important impact especially in the eastern, Vavatenina site. Only 5% of the sample who planted less at both sites indicated their constraints to be linked to seed availability —and much of this revolved around scarcity of cassava planting material. Giving free seed would not have alleviated their constraints.

5. Farmers' rational for planting more (a general proxy for increasing land area) is also key for understanding opportunities to spur production. Households planted more for diverse reasons, especially getting access to more land, good weather, to intensify food production and change crop profiles (i.e. shift from one crop to another). Interestingly, in neither site were gearing production to the market or better marketing opportunities important as reasons for expansion. Simply, such agro-enterprise opportunities are few and far between.

6. Money, either having more or less was not cited as a factor for decreasing or expanding seed use (which is unusual in seed security assessments). This may be as only modest amounts are spent on seed for the two seasons with calculations in the east, ranging from 8918- 15300 AR ($US 4-7), (the increase due to emphasis on irrigated rice second season) and for south, the

price range of 6868-6200 AR ($US 2.85-3.15). These sums are within reach of the majority of farmers.

On the supply side, 2012-13

On the seed supply side for 2012-13 seasons, several findings are to be remarked

7. The few agro-dealers in place indicated no shortage of their normal supplies--- all focused on horticultural crops, with dealers having a good range, e.g. 22 types, on hand. Note that 0.1% of the sample used an agro-dealer, mainly to purchase seed of leafy vegetables.

8. For seed supply from formal agro-dealers, other constraints emerged:

- Geographic access Only two agro-dealers were located near the eastern site—and in a town center. In the south, a single dealer- focused mainly on veterinary supplies and was located again in the major town center.

- Crops focus: legume and cereal seed cannot be regularly accessed through agro-dealers. Horticultural crops only.

9. The seed available on the local market was plentiful. Generally, it was assessed by farmers and traders to be normal to good quality. A diversity of legumes was especially found in the open market. Occasionally, seed of recognized high quality also sold: certified vegetable seed in packet and, in the south, quality declared seed of a range of crops by GRET, a specialized NGO.

Community assessment 2012-13

10. In the short term, for their three major crops, communities at both sites assessed their members as 100% seed secure. However, in the south, some farmers are moving away from maize due the high rate of crop failure—and toward cassava.

Overall, in the short term, the seed security situation at both sites is a stable one.

Summary: Chronic Seed Security Findings and Emerging Opportunities

The review of medium-term trends in seed security in east and south Madagascar showed a few qualified moves forward but mostly static or stressed systems across the majority of seed security issues reviewed. We cite some of the major constraints encountered, below.

1. There was some new variety use within the SSSA sites, with over half of farmers (51%) having accessed at least one new variety in the period 2008−2013. However: 1) varieties of few crops were received (mainly irrigated rice in the east; sorghum and maize in the south); Few new legume varieties were on offer. 2) varieties were not always appreciated, with, sorghum types especially being rejected; and 3) variety delivery was basically free, through unsustainable channels (NGO/FAO).

2. Input use (non-seed) was generally low, with the exception of manure/compost in the east (81-91% of farmers, by season) and foliar sprays in the east (27-45% farmers, by season). The relatively low use of manure in the south (20-22% farmers) is surprising given the abundance of livestock and is a challenge that needs to be addressed.

3. For input use (non-seed), it is key to signal out the very low use of chemical storage treatments as farmers reported storage losses of 20-50% (especially for maize, rice, cowpea and the occasional groundnut stored).

4. Some important decentralized seed multiplication was noted during the SSSA, especially linked to the NGO GRET in the south. However, across all multiplication initiatives, two trends were noted: a) institutions – NGOs- remain the main clients and b) seed prices are heavily subsidized, even upwards of 100% over normal seed rates. Real markets and realistic strategies for marketing seed have yet to be identified.

5. Seed system channels which farmers use have generally remained static over the least five years.

6. There is virtually no agricultural processing in rural communities (with transforming of cloves in the east being an important exception). This means that farmers have been unable to reap the benefits of value addition to raw agricultural products. In the rural sites, the SSSA located only rice de-hullers (in the east).

7. Cassava diseases (whether Cassava Mosaic Disease or Cassava Brown Streak) are infecting 40% of plants in the south (farmers' estimates). In the south, there is no regional strategy for managing the disease or for helping farmers' access clean material.

8. Female-headed households and those headed by an older generation (grandparents) are sowing relatively less than those headed my male adults (parents). These initial signals merit further investigation. No significant seed security-related issues were found among households cultivating different land areas.

All sum, the major stresses encountered which affect seed security are chronic ones and the lack of sustainable innovations across the broad is to be remarked.

RECOMMENDATIONS

The opportunity to conduct assessments in distinct (contrasting) sites provided the field teams a useful perspective on seed security in select regions of Madagascar.

Below, we put forward a set of recommendations that are applicable across sites. As the seed security constraints identified are so widespread, we have decided to focus on the 'top ten', recommendations, that is, those for which investments and action plans might be given first priority. All recommendations could be effected in the short to medium term: 1-5 seasons.

(For tailored site-specific recommendations, see Annex I and site-specific reports available through CRS/Madagascar (Felicien.Randriamanantenasoa@crs.org).

Of special note is that the SSSA teams identified no problems in the assessed zones of action that might be labeled as 'emergency ones'. All constraints will require actions that are more developmental ones.

Seed security: areas for priority action

1. **Decentralized variety testing network.** There is a strong need to identify adapted varieties for a range of crops (e.g. beyond rice, maize) that can meet farmer needs. Research institutions alone cannot handle the volume or agro-ecological range of testing. A decentralized variety testing network might be catalyzed under the guidance of FoFIFA and engaging a range of partners. (For example, potential partners in Androy might include, *inter alia,* GRET, RCS, AROP, FAO, Ampela Mitraka.) Key is that members: a) agree to use the same protocole; b) test varieties under real farmer conditions; and c) ensure systematic farmer feedback. In terms of the last, widespread training in participatory varietal selection (PVS) methods might be programmed

2. **Decentralized seed multiplication.** Decentralized seed production must become a more strategic and effective force in serving farmers. Simply, the formal seed sector in itself will never be able to handle: a) the range of crops needed for stress zones; nor b) the range of varieties. At this point, the decentralized seed multiplication initiatives are having only modest impacts (viz. laudable efforts of GRET in the south/Ambovombe). As a general recommendation, sustainable seed production models might be confirmed and scaled-up, especially for the legumes and vegetatively-propagated crops.

   Tied to #2

   2.1 Decentralized seed multiplication groups need to assess the cost-effectiveness of their production and delivery strategy. (This should be a fundamental requirement.) Subsidized seed production and purchase should be discouraged. Groups should be encouraged to produce only if a) viable markets/delivery mechanisms are identified; and b) their own agro-enterprise and marketing skills have been enhanced ; and c) they have a realistic business plan.

   2.2 Links need to be specifically catalyzed to tie decentralized seed producers with continuing and new sources of germplasm.

   2.3 Seed multiplication and delivery has to be geared toward a smallholder farmer client based. Institutional buyers (e.g. FAO, WFP, SOS) cannot drive the seed business ---if it is to be sustainable.

3. **Variety delivery mechanisms.** Delivery mechanisms to give all farmers regular access to new varieties should be intensified (e.g. for legumes, cereals…). Sale through agro-dealers provides only one venue but should be encouraged, especially in small pack sizes (100, 200, 500 g). Sale in local groceries, open markets, via village committees, Tranoben'ny Tantasaha or Leader Farmers should also be tested (see Box 9). In addition, agro-enterprise groups and seed loan groups (with clear marketing plans) might be formed around seed (point 9 below). 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 across Madagascar.

4. **Seed systems for vegetatively propagated crops:** Special attention needs to be given to multiplying planting material for vegetatively propagated crops (especially cassava and sweet potato, including the orange-fleshed varieties). Decentralized cooperative and farmer- based "seed" production systems may be among the more effective, but varied models of production should be tested. Producer groups should also be well trained in how to maintain disease-free populations and be closely linked to reliable sources of new varieties and disease-free parent material (probably both at research institutions, FoFifa and FIFAMANOR).

5. **Strategy for Cassava disease control**. Associated with #4 but meriting a special note, there is a need to develop a strategy for the control of varied cassava diseases (mosaic, Brown Streak). This need is especially urgent in the South, where: losses have been estimated at 40%; where there is complete absence of any regional management plan; and where access to clean planting material is absent (non-existent?).

6. **Androy regional workshop on seed sector and Integrated seed security strategy.** Across the South, there are few ongoing means to introduce, multiply or market new varieties and higher quality seed (whether certified, QDS, or truthfully labeled). Policy makers and field workers alike stressed that seed related actions have to become more strategic and coordinated so as to create an Integrated Seed Sector (uniting strengths of the formal and informal seed sectors). The need for this regional workshop in Androy was seen as a top priority.

7. **Seed Storage options.** Storage losses on farm (estimated at 20-50% of stocks) must to be combatted in multiple ways particularly to deal with storage constraints of maize, rice and the legumes. Use of storage chemicals (organic and inorganic), triple bagging, or small seed silos are all possible options, to be tested for their technical and social suitability.

8. **Diversity and Nutrition Fairs (DiNERs).** Given the specific constraints found especially in the South (high malnutrition), short-term fairs might be hosted, but with a specific slant to help bolster diversity and nutrition in a region with is 'livestock-rich', but poor in most other agricultural innovations. Labeled as DiNER vouchers and fairs (DiNER= Diversity and Nutrition for Enhancing Resilience), such assistance aims to increase farmer access to agricultural elements that may be in short supply or with which farmers are not familiar. These may include, but are not limited to:

    i. New varieties, especially of legumes (e.g. beans)
    ii. Horticultural crops (especially leafy vegetables)
    iii. Fruit trees and other types of trees
    iv. Small livestock: chicken, guinea fowl, turkeys,

The potential for increasing both nutrition and agricultural resilience can be pushed forward through such fairs. Payment by direct cash, as well as vouchers should be considered.

Ultimately, non-seed issues will drive the seed security sector. Food and livelihood security generally, are linked to the financial capacity of farmers. The last two recommendations focus on needs for: a) generating cash, through Village Savings and Loans Programs; and b) developing agro-enterprise market chains.

9. **Village Saving and Loan Programs (VSL)**: VSL programs are 'accumulating savings and credit' programs. In a relatively short time (12 – 24 months), the VSL funds are often large enough to allow members to borrow enough money to access key agricultural inputs such as seed or storage chemicals. So as to secure access to seed and other important inputs in the future, VSL should be promoted systematically.

10. **Rural agro-enterprises** are mechanisms of potential impact that are currently severely underdeveloped across many regions. Farmers are selling their agricultural produce mainly in raw form or only slightly modified as may be the case for flours. As a start in promoting agro-enterprise development, profitable business models that work for smallholder farmers need to be tested and then scaled-up *(and see Annex III for a list of value chain subject matter which is already being explored*). Linking smallholder farmers effectively to markets is a solid solution to increase incomes and seed and food security, and also to create the demand that will support crop breeding and seed production of good quality seed and/or planting materials of improved crop varieties.

Overall, this SSSA recommends a move away from short-term, gap-filling interventions and towards strategic investment in smallholder–driven variety development, seed production, and agricultural marketing systems. Simultaneously, it suggests a sharpened focus on food security that particularly emphasizes crop diversification and nutritional enhancement.

I. INTRODUCTION

Rationale for Report

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(May 23, 2013) Washington DC (July 19, 2013) as well as in the regional towns of Vavatenina and Ambovombe (in early June, 2013).

Aims and Structure of Report

The report presents the results of the SSSA in east and south Madagascar during May 2013. It presents the findings on seed security across the two districts, of Vavatenina and Ambovombe. While this overview report focuses on the cross-site more global findings, Comprehensive site by site reports are available from the CRS/Madagascar central office. (Felicien.Randriamanantenasoa@crs.org).

In terms of report structure, Chapter II introduces the SSSA methodology and reviews the actual methods used in the May 2013 assessment, including the rationale for the choice of sites. Chapter III provides a brief background to Madagascar's formal input sector (plant breeding, and seed production) and also informal seed sector, including insights on how local seed markets function.

Chapter IV presents the main field findings, divided by seed security issues in the acute phase, 2013 season, and then homing in on medium and longer-term, chronic stresses and emerging opportunities.

Chapter V presents the recommendations across sites, followed by references.

Appendices post site-by site action plans and give a glimpse into the type of tailored strategies needed in diverse types of stress zones.

Appendices also post data tables, site by site, in the original French versions.

II. BACKGROUND TO SEED SYSTEM SECURITY ASSESSMENT

This chapter presents the necessary background to interpret this SSSA. It introduces the concept of seed security and the different types of seed aid approaches that might be matched to diverse seed security problems (and opportunities) encountered on the ground.[1] Methods used in the September 2011 assessment are then presented.

The Concept of Seed Security

Farm families are seed secure when they have access to seed (and other planting material) of adequate quantity, acceptable quality, and in time for planting. Seed security is best framed within the broader context of food and livelihood security. Helping farmers to obtain the planting materials they need enables them to produce for their own 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 between food security and seed security, determinations of seed security are normally based, implicitly or explicitly, on food security assessments. This results from a lack of appreciation and understanding of seed security issues.

The Dimensions of Seed Security: a Framework

The concept of seed security embodies several fundamental aspects. Differentiating among these is crucial for promoting those features that foster seed security as well as for anticipating the ways in which such security might be threatened. Table 2.1 outlines the fundamental elements of seed security: seed has to be available, farmers need to have the means to access it, and the seed quality must be sufficient to promote good production.

Table 2.1. Seed security framework, basic elements

Parameter	Seed Security
Availability	Sufficient quantity of seed of adapted crops is within reasonable proximity and in time for critical sowing periods.
Access	People have adequate income or other resources to purchase or barter for appropriate seeds.
Quality	Seed is of acceptable quality: • 'healthy' (physical, physiological and sanitary quality) • adapted and farmer-acceptable varieties

Source: Remington *et al.* 2002.

[1] This section draws on Sperling *et al.*, 2008.

Availability is defined narrowly as whether a sufficient quantity of seed of target crops is present within reasonable proximity (spatial availability) and in time for critical sowing periods (temporal availability). It is essentially a geographically based parameter, and so is independent of the socioeconomic status of farmers.

Seed **access** is 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 seed.

Seed **quality** includes two broad aspects: seed quality *per se*, and variety quality. Seed quality consists of physical, physiological and sanitary attributes (such as germination rate and the absence or presence of disease, stones, sand, broken seed or weeds). *Variety quality* consists of genetic attributes, such as plant type, duration of growth cycle, seed color and shape, and palatability.

In situations of stress, it is rare to have constraints in all three seed security features at the same time. The challenge is to identify the real problem and then target actions to alleviate that problem.

Acute and Chronic Seed Insecurity

Analysis of seed security requires consideration of the duration of the stress: whether it is 'acute' or 'chronic' (recognizing that the divisions are not absolute).

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 failure to plant, loss of a harvest, or high pest infestation of seed in storage. While in normal times households may have various degrees of seed security, all may be affected by an acute event, such as a flood.

Chronic seed insecurity is independent of an acute stress or disaster, although it may be exacerbated by it. It 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.

Acute and chronic seed insecurity often exist together in emergency contexts. Indeed, in cases where emergencies recur − in drought-prone areas, for example − acute problems are nearly always superimposed on chronic problems rooted in poverty.

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 for in this Southern Malawi assessment. So, 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.) In contrast, a diagnosis of a problem of 'seed access' 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, an identification of access problems on a chronic basis should lead practitioners to look well beyond seed and seed security constraints. The inability to access certain necessary goods on a repeated basis is usually equated with problems of basic poverty. Initiatives to

help farmers generate income and strengthen their livelihoods 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 initiatives, depending on the specific constraint identified.

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

Parameter	Acute	Chronic
Unavailability of seed	Direct distribution of seed	(Happens rarely or never)
Farmers lack access to available seed	Vouchers and cash (sometimes with seed fairs)	Income generation activity Agroenterprise development
Poor seed quality ▪ poor varieties ▪ unhealthy seed	Limited introductions of new varieties	Introduce new varieties and give technical support Variety selection / breeding Development of seed enterprises linked to new varieties and other quality enhancements

Seed System Security Assessment

A SSSA reviews the functioning of the seed systems farmers use both formal and informal. It asks whether seed of adequate quality is available and whether farmers can access it. The SSSA also promotes strategic thinking about the relief, recovery or development vision needed. For instance, during a period of stress, should efforts aim to restore the seed system to its former state, or should they aim to strengthen it? Should efforts focus on crops for food, income or both? Should interventions be linked to crops tied with the most vulnerable (e .g., women)? (see link for description of the SSSA method (http://seedsystem.org/assessment-tools/when-disaster-strikes/) .

Methods Used

The themes and methods used in the east and south Madagascar SSSA are sketched out in Table 2.3. They include a range of qualitative and quantitative methods and draw on multiple stakeholder insights. Of special note is that the sample sizes were relatively big for a quick assessment: 145 individual farmer interviews, 4 focus group discussions often with 40 people or more, select agro-dealer visits, and 21 seed/grain trader interviews.

Table 2.3. Investigative thrusts and methods used in the Madagascar SSSA (2013).

Type of Investigation	Commentary
Background information collection	Commissioning of specific documents on: formal sector breeding + sector seed supply trends Decentralized seed production inventories
Database utilization	agricultural production figures vulnerability data
Key informant interviews	MaL /project personnel Agro-enterprise groups
Focus group discussions Community-based Women's groups	Separate community and women- only FGD agricultural and variety use and trends seed source strategies, by crop community seed security assessment women's crop/seed constraints/opportunities
Farmer interview s **(N=145)**	Agricultural trends seed source patterns/fertilizer use Effects of earthquake/ Livelihood/
Seed/grain market analysis (**N=21 traders)**	• crops and varieties supplies on market • pricing patterns/ sourcing areas • seed quality management procedures
Agro-dealer/formal sector analysis	• (esp in east)

Household sample

Part of the methodology used in the SSSA did involve conducting quantitative interviews at the household level. Households were chosen without bias by fanning out in diverse directions from a central location point. Every 3rd or 4th household was chosen, (depending on population density).

Of note is that 1/3 of households designated themselves as 'female-headed'. Also, ¾ of the sample cultivated 2 ha or less

Table 2.4. East and south Madagascar (HH) sample characteristics (N =145)

Feature	Description	% Sample
Type of HH	Adult headed Grandparent headed Child headed	91.7 8.3 0.0
Sex of HH head	Male Female	66.2 33.8
Area cultivated	< 0.5 ha 0.5-1 ha >1.0-2.0 >2.0- 3.0 ha > 3.0 ha	25.4 25.4 26.1 14.1 9.2

Site Choice

Sites were chosen so as to link the assessment to action, and hence closely followed partner priorities. Figure 2.1 indicates the general location of sites, with Table 2.5 presenting more detailed parameters.

Figure 2.1. Geographic location of SSSA zones, May 2013

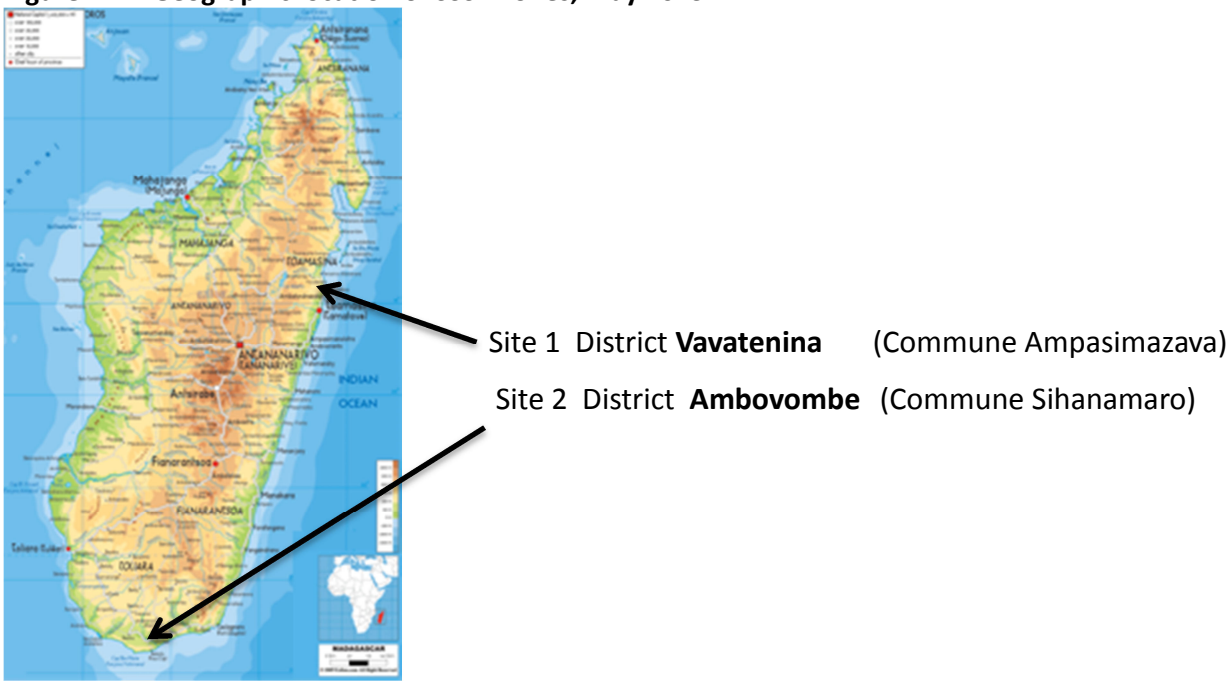


Table 2.5. Select descriptive parameters of sites chosen for assessment.

Site	**AMPAHIBE (commune** Ampasimazava**)**	**ANDRAMANERA (commune** Sihanamaro**)**
District	**Vavatenina (East)**	**Ambovombe (South)**
Agro-ecology	Tropical-humid; > 1200mm/yr, 2 seasons- but continual	Semi-arid; livestock/herding is more important ; 500-600mm/yr;2 distinct seasons
Irrigated /rainfed	Rainfed + irrigated (for rice)	Rainfed
Major crops	Rice, cloves, cassava, maize, litchis, coffee, fruit trees (eg. palm)	Cassava, maize, sweet potato, sorghum , millets, beans, bambara nuts, gnuts, cowpea, Niébé, Dolichos (lablab), melons, desert fruits (e.g. barbary figs)
Emerging crops	Yam, vanilla , horticultural crops (chinese cabbage, green beans, African eggplant)	Castor, sorghum, millets, horticultural crops (carrots ; Irish potato) , *Jatropha* (biofuel) ; Oranges, Papaya
Infrastructure - transport, roads - markets - telephone	Vavatenia – permanent market ; Road can be cut off by cyclones.	Road : worse than east (many dirt roads) ; Ambovombe – permanent market and rotating ones in rural areas More isolated than rest of country
Security risks ?	Calmer	More insecure
Environmental risks ?	Annual cyclones, erosion, slash and burn	Repeated drought; deforestation ; locusts ; wind erosion
Refugees ? Displaced ?	People seeking temporary work, itinerant workers	Some displaced- because of insecurity ; Youth seeking work ; Transhumance (herders)
Ethnic groups	Betsimisaraka	Antandroy
Other	Nationale Park– development + conservation program (Buffer Zone), Gold mining	Conservation activities : Mucuna, Cajanus Konoke (variety of de pea) Many NGO interventions

The sites are quite contrasting, in agro-ecology, rainfall, crop profile and infrastructure development. In fact, A UN-WFP survey in 2009 suggested that: 'By district, 78% of the households in the *Ambovombe* sample were asset poor compared to 1% in *Vavatenina*.' Hence, the SSSA sample seems to represent some of the country wealth extremes (UN-WFP, 2009. Additional insight on distinct land aspects of Vavatenina appears in Box 1.

Box 1: Land as a mobile resource

Land holdings in Vavatenina are generally quite small, a hectare or less. Key to successful agricultural production is not just having good fertile land, but especially having access to fields in the irrigated rice plains. Some families directly own such plots, some simply don't and manage to rent, while others, at the margins, work the irrigated area for others and split all harvests 50/50. Unusual is the degree to which land use is fluid. Even but weeks before the critical sowing period a family might still be negotiating--- maybe to double cultivated area or to figure out how to survive with fields 60% less than normal! In Vavatenina, land, not seed, is the driving constraint to agricultural production--- and a precariously moving one.

Seasonal Overview

Of specific note were the seasonal patterns of crop performance around the period of the seed system security assessment, (2010-2013 cropping seasons). Seasonal performance in the east was generally favorable across the three most recent seasons. The south, in contrast, experienced some drought stress in the season just prior to the SSSA, when drought in January resulted in re-sowing in February. Maize and cowpea were especially marked and by declines. Note that for maize, in particular, the community has long-term concerns and estimates harvest failures in 8 out of 10 seasons.

Table 2.6. Community assessment of crop performance over three past seasons

Good and bad seasons

EAST			
Major crops	2012- 2013	2011-2012	2010-2011
Rice	++	++	+
Cassava	+++	+++	+++
Chinese cabbage	+++	+	+++
SOUTH			
Major crops	2012- 2013	2011-2012	2010-2011
Cassava	++	+++	+++
Maize	+	+++	+++
Cowpea	+	+++	+++

+= poor; ++= average; +++= good. poor harvests are indicated in red

III. SEED SYSTEMS IN MADAGASCAR: BRIEF OVERVIEW

Smallholder farmers use multiple channels for procuring their seed. These channels fall within formal and informal seed systems (with the latter also labeled as the local, traditional or farmer systems).

The formal seed system involves a chain of activities leading to certified seed of named varieties. The chain usually starts with plant breeding, and promotes materials towards formal variety release. Formal regulations aim to maintain varietal identity and purity, as well as to guarantee physical, physiological and sanitary quality. Seed marketing takes place through officially recognized seed outlets, either commercially or by way of national agricultural research systems (Louwaars, 1994). Formal sector seed is also sometimes distributed by seed relief agencies.

The informal system embraces most of the ways farmers themselves produce, disseminate and procure seed: directly from their own harvest; through gifts and barter among friends, neighbors and relatives; and through local grain markets or traders. Farmers' seed is generally selected from the harvests or grain stocks, rather than produced separately and local technical knowledge, and social structures guide informal seed system performance (McGuire, 2001). In developing countries, somewhere between 80% and 90% of the seed sown comes from the informal seed system (DANAGRO, 1988; FAO, 1998), although this varies by crop and region. ***Results of this Madagascar SSSA show 99+% coming from local channels in the east and south regions*** (see Chapter IV, Table 4.1). It is only for select horticultural crops that agro-dealers are sometimes used and such formal seed sector sources are few and far between.

Figure 3.1 shows schematically the formal and informal seed systems (and their component channels) and how they may interact.

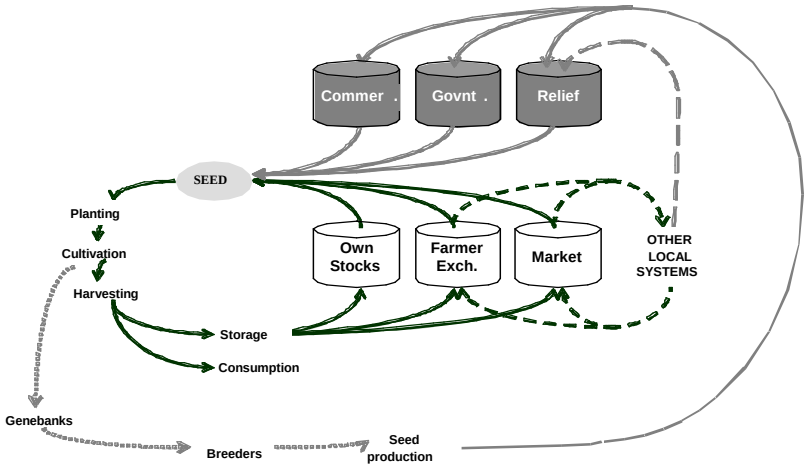


Figure 3.1. Channels through which Farmers Procure Seed. Own seed stocks, exchange with other farmers ,and purchase through local grain markets constitute 'informal' channels, while commercial seed stockists, government or research outlets , relief supplies constitute formal channels. The arrows indicate the flow of seed in 'informal' and 'formal' sectors respectively. Adapted from Almekinders and Louwaars (1999).

Table 3.1 also suggests how farmers in one community (south District Ambovombe- Androy) assess the advantages of accessing seed from each of the diverse channels.

Table 3.1. Community assessment of advantages and disadvantage of using diverse seed channels: Ambovombe District May 2013

Seed source	Advantages	Disadvantages
Own stocks	Known quality Immediately available Free (no money needed)	Seed lost—if poor season Risk of being eaten (*mahakana*) Traditional storage process has high pest attack
Local market	Always available Can find the varieties needed	Requires cash/ sometimes expensive Must wait for market days to be held
Social networks- Neighbors/friends	Nearby 'They can help you' 'No jealousy among friends' Free	Insufficient quantity Not available if neighbor is absent
NGO	Productive seed Free	Insufficient quantity

Note that formal sector sources do not even figure in this community list of potential sources as the nearest agro-dealer was located in Ambovombe, some 38 km away. Also, there were no itinerant traders in this community (i.e. those selling on bicycles) although such mobile merchants were found in the eastern site (Vavatenina District).

The next sections emphasize a few key points on varieties and seed system structures serving east and south Madagascar farmers. The formal breeding and seed sector are briefly reviewed, and then the focus shifts to the informal seed systems, including local markets.

Formal Breeding for East and South Madagascar

Variety development systems

Multiple 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 1974), and Fiompiana sy Fambolena Malagasy sy Norvegiana (FIFAMANOR) (established
1972 with Norwegian funding) carry out the bulk of breeding and selection activities. Their efforts are complemented or supported by :universities, some NGOs (e.g. Groupe de Recherche et d'Etudes Techniques- GRET) the private sector, and select international agricultural research institutes. Table 3.2 lists some of the main institutions supporting crop breeding and variety introductions.

Table 3.2 Indicative institutions involved in crop breeding and/or variety introductions in Madagascar

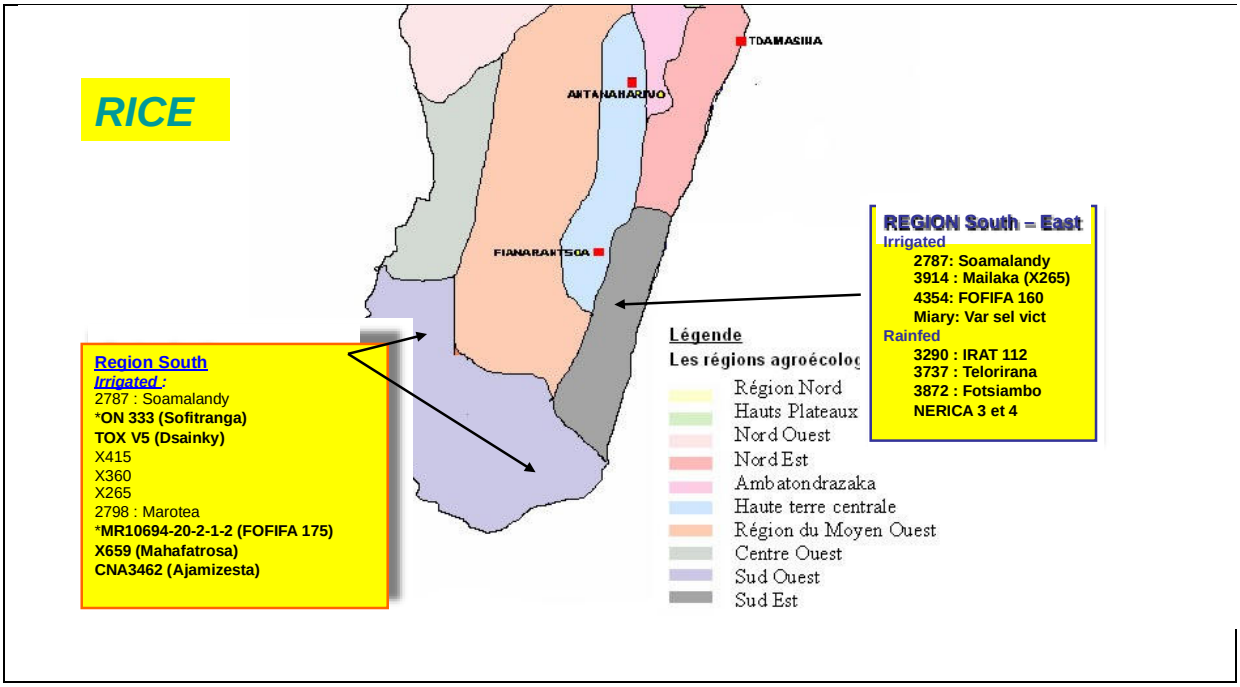
FOFIFA	FIFAMANOR	Universities	(select) NGOs- e.g. GRET	Private sector companies	Int'l Research Centers.
Wide-range of crops	Especially Wheat , Triticale, irish and sweet potato, mais and select legumes	Horticultural crops	Maize, sorghum, castor bean… + collection of local varieties	Horticultural crops Companies Laniera Nanisana Dom	+ IARCS + CIRAD …

Breeding can be an extended process and specialists suggest that varieties in Madagascar may take 6-8 years to develop, depending on the crop (S. Rakotomamonjy, personal communication, May 2013). A full list of released varieties can be found in the national catalogue issued in 2010 (by Minister of Agriculture, Decree N#2010-0958). At this point, the list is fairly restricted and especially focuses on rice.

Varieties geared for different regions of the country- including for the east and south.

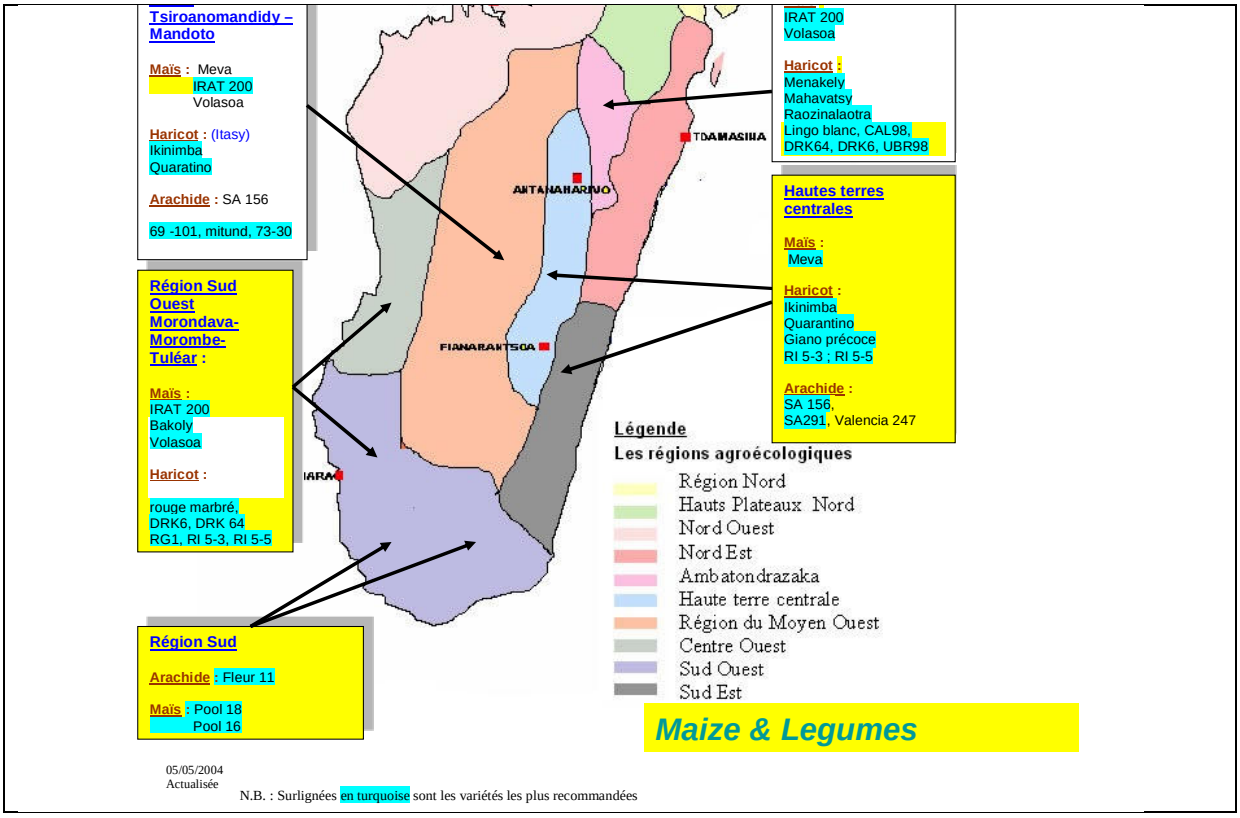
A series of Regional Research Centers also guide the development of varieties that are geared to be adapted to the diverse agro-ecological zones of Madagascar. The regional releases for several crops of special interest in the SSSA are mapped below (figures 3.2-3.4).

Figure 3.2. Select FoFIFA rice releases



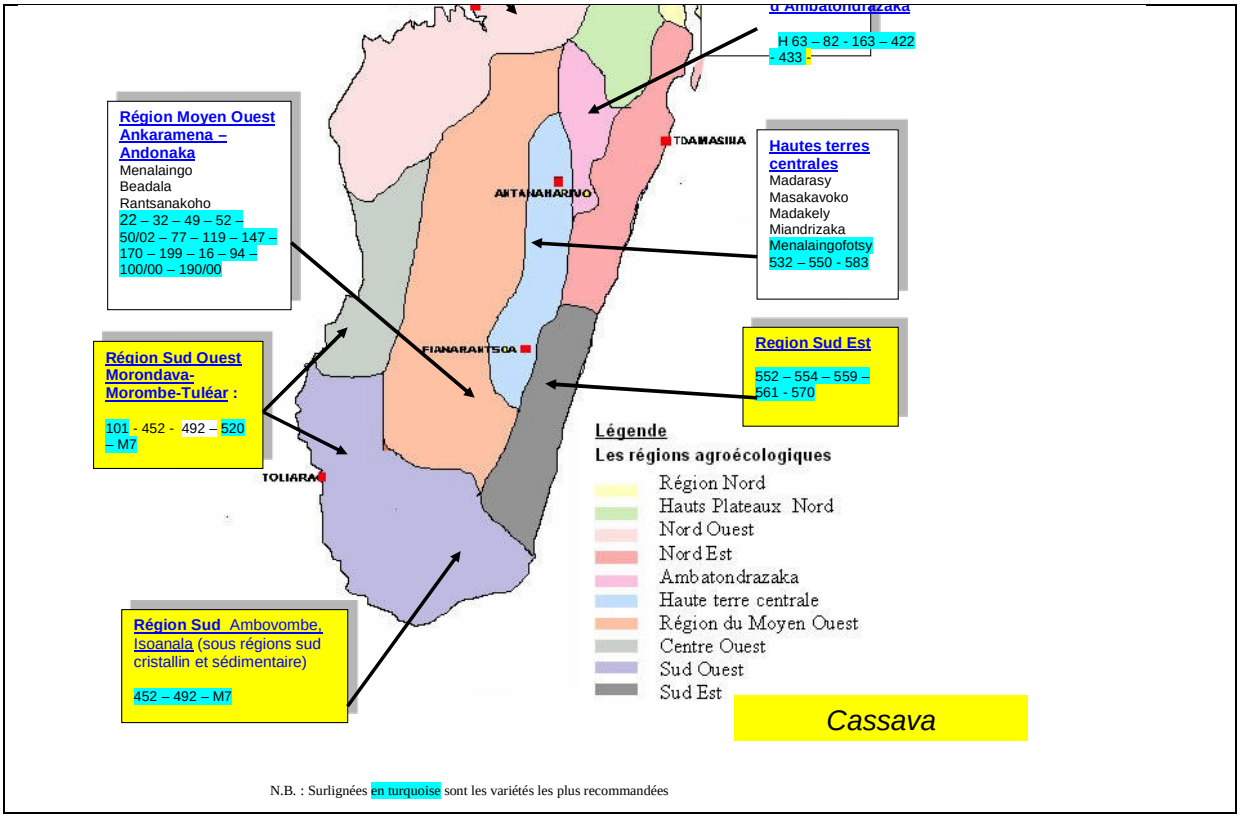
Source: Rakotomamonjy, and Rakotoarisoa, 2013

Figure 3.3. Select FoFIFA maize and legume releases



Source: Rakotomamonjy, and Rakotoarisoa, 2013

Figure 3.4. FoFIFA cassava releases



Source: Rakotomamonjy, and Rakotoarisoa, 2013

Select NGOs also occasionally help with variety adaptation trials and have been especially important in eliciting farmers feedback-- to ensure adaptation and acceptability by the rural population (see Box 2). Key in this discussion of seed security is that 1) the large majority of released varieties are of rice; that 2) the placement of decentralized screening sites overall is uneven and not representative of the full range of ecologies in which farmers sow crops. In many regions of the country (especially the more marginal ecologies) there is a strong need to catalyze the development of routine and ongoing decentralized variety screening network which can work under the guidance of FoFIFA to identify varieties that respond to smallholder farmer needs.

Box 2: GRET: how an NGO serves as a backbone of agricultural research and seed multiplication

GRET is a French NGO which has a central presence in agricultural activities in southern Madagascar, associated with the Project Soa. While based out of Ambovombe, it works in a swath of the southern region and provides some key important variety development and seed sector services--- to some extending filling in where formal institutions do not have reach.

Among the many important services of GRET, the project:

1) tests improved varieties for their performance and adaptation, across am impressive range of crops (maize, sorghum, groundnuts, beans, cowpea, lima bean, dolichos…). This includes work on farm with farmer leaders;
2) effects collections of local germplasm (maize, cowpea, dolichos, canjanus…);
3) supports the Agnarafaly seed production center (Androy);
4) organizes farmer groups to multiply seed and , in total, produces 50-80T/year;
5) has set up a network of boutiques (c.80) to sell seed in Ambovombe and in rural markets/areas;
6) is the first project in Madagascar (under SOA) to work with Quality Declared Seed (QDS) standards.

At present, GRET does subsidize the price of it's seed sales (see Box 12), both through cash and voucher transfer but reflects that such subsidies are used to catalyze farmer interest in 'higher quality seed' and will be greatly reduced in time.

NB: At the time of the SSSA, part of the Madagascar GRET was in the process of transforming itself into a local NGO: 'Centre technique agro-ecologie du Sud (CTAS).

Variety introduction and delivery

In principle, new varieties in Madagascar should be made accessible to farmers through multiple and ongoing channels. In practice, ¾ of farmers in the SSSA who had obtained new varieties in the last five years, received them from once off distributions of the UN-FAO or NGOs (Chapter IV, Figure 4.9/Table 4.9). Also, the new varieties distributed were mainly for a limited range of crops: irrigated rice in the east, and sorghum and maize in the south site.

GRET's selling of seed (Ambovombe area) was unusual in that the NGO boutiques may have potential to be ongoing.

Agro-dealer networks

Theoretically, there a range of agro-dealers that could potentially also serve farmers: namely ACM, AFAFI, AGRICO, AgriVet, ITA/ICS, SDC-Agri, VALYAGRI and SEPCM are the main ones that supply retailers (Randrianatsimbazafy, 2013). In practice, the average distance for a smallholder farmer to an agro-dealer is about 70 km (Ibid, page 4).

In terms of scale of operations of, we give the example of AgriVet. In May 2013, this network had more that 50 wholesalers and 300 retailers in the main agricultural areas of Madagascar—and especially the higher potential ones. Unfortunately none were located in the southern areas of Analanjirofo or Androy at the time of the assessment, but AGRIVET did have plans to install a sales point in the eastern area, in Fenerive East or Foulpointe. Such dealers largely focus on horticultural crops and other input supplies (insecticides, pesticides, herbicides and occasional storage chemicals), though AGRIVET started to seeds hybrid maize seeds in October 2011 in the areas of Vakinankaratra, Itasy and Sofia (Hery, Andriamazaoro, *personal communication May 2013*)

Key in terms of the SSSA field sites is that the only 2 agro-dealers were found in all of Fenerive Est (private sellers) and ½ in Ambovombe in the south. The term ½ is used as the store was basically geared to meeting veterinary needs: In the Ambovombe area, livestock raising is much more important than crop agriculture. Box 3 suggests the very restricted magnitude of sales.

Box 3: Agro-dealer shortcomings (from farmers' point of view)

Fenerive est= 2 Agro-dealers
13.000 packets/year

Ambovombe= ½ (veterinary)
100 packets/year

few, far between, only horticultural seed

In sum, presently Madagascar smallholder farmers have almost no continued access to new varieties of any crop, with the exception of vegetable seed for those who can reach an agrodealers. Additional efforts to develop and release new varieties – without enhancing systems to facilitate farmer access—seems like an expensive exercise without any significant impact on the actual national productivity.

Overview of Formal Seed Sector

The formal seed sector has been well described and reviewed in Madagascar (Randrianatsimbazafy, 2013). Here we make a few key points related to seed security of vulnerable populations. (We do not attempt an analysis of formal seed sector strengthening). It is important to remember that 99+% of the seed Malagasy farmers sow comes from the informal, not the formal sector.

Breeder, foundation and certified seed, May 2013

Figures on the production of breeder, foundation and certified seed were generously shared by formal sector multipliers during the SSSA , May 2013. As first observations, the figures give a sense of the relatively modest scales of multiplication as well as the crop profiles being promoted. Rice and maize have been staples for multiplication; Irish potatoes and beans may be gaining in importance. A good number of legumes have little high quality seed production at all.

Table 3.3. FoFiFA Breeder seed available for east and south zones, May 2013

Crop	Quantity, by variety	Responsible Institution	Multiplication site
Rice	1500 g	FOFIFA DRR	Antananarivo, CRR Alaotra
Maize	1000 g	FOFIFA DRA	CRR Alaotra
Legumes	1200 g	FOFIFA DRA	CRR Alaotra
Cassava	150 boutures	FOFIFA DRA	CRR Alaotra ; Paysans multiplicateurs d'Andonaka

Source : Rakotomamonjy, S.A. and J.Rakotoarisoa, 2013

Table 3.4. FIFAMANOR seed available, May 2013

Crop	Varieties/types	Quantity (kg)
Forage seed	Oats N#153, Oats OT 7030 Chloris, aygrass	19295
Wheat	Laza, Romy, Rotsaka, Avo Hary, Andry, Felana, Hery Romany, Salohy, Vonona, Vokatra	4233
Triticale	PACA, Ker Rye	57.5
Irrigated rice: basic seed +	Cham Rong Dhan FOFIFA 171, 172, 173, 161	590
Soybean	FT10, OC11	3304
Bean	Feno R 152 (red) UBR (marbled)	386
Maize	Meva	4713
Irish potato (pre-basic, basic, other-combined)	PDT Diamondra, H1 05 Diamandra II, H103 Diamondra I, H205 Diamondra II, H2 9 Maharevo, I 12 2 Maharevo, L2 05 Diamondra L4 Meva, M13, 018-1 Maneva, S0-05 Harena SP 05 Spunta, Spunta base	7674.5

Source: Vololoniaina Ramalanjaona, FIFIAMANOR, May 2013

Table 3.5. Seed production figures SOC: 2001-2012 (tons)

CROP	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Rice	1900			1300	1500	900	2045	1505	nd	601	547	1061
Maize	-	-	304	-		100	147	120	nd	146	146	162
Bean	-	-	-	-		-	37	16	nd	122	84	27
Groundnut	-	-	-	-		23	26	5	nd	0.7	0.7	4.5
Irish potato	-	-	-	-		-	48		nd	32		
Vegetable seed	3.5		3.5	3.5	3.5	3.5	3.5	3	nd	2.5	9.5	16.5
Lima bean	-	-	-	-		-	-	52	nd			
Cowpea									nd	25	25	
Sorghum									nd		32	
Bambara nut									nd			5

Source: Ketamalala Randriamilandy, Head of SOC, May 2013

More formal quality seed producers (although not all certified)

A group of higher quality (sometimes certified) seed enterprises also exists, and appears to be growing. We list below just those associated with the Groupement Semis Direct de Madagascar **(**GSDM). Note that their clients here tend to be institutional buyers rather than smallholder farmers, although GSDM seed might be used as a base for further decentralized production. The extent to which GSDM suppliers reach vulnerable farming populations (or how to make those links stronger) would need to be considered further.

Table 3.6. Groupement Semis Direct de Madagascar : list of members, 2013

GRET Project SOA, Ambovombe – July 2013	Groundnut, Dolichos, Bean, Konoke, Maize Cowpea, Sorghum
SDMad	Variety of rices (irrigated, rainfed) Maïze, Horticultural crops, Cajanus et Stylosanthès
Andri-ko, Ambatondrazaka – July 2013 – : Basic and certified seed	Maize, Rice, Mucuna …
Société ROSTAING, c/o BRL, NANISANA, Antananarivo – July 2013 –	*Stylosanthes guianensis* variété CIAT 184
CMS Sakay – August 2013 – :	Maize, Rice, Voanjobory
FOFIFA Kianjasoa	Graminées: Bracchiaria, Eleusine, Légumineuses: Mucuna, Niebe, Vigna umbellata, Stylosanthes

Source http://gsdm-mg.org/stock-de-semences-disponibles/

Seed quality: national laws and QDS newly emerging

National seed laws were recently formalized in Madagascar (see Randrianatsimbazafy for detailed insight). Here we note only an unusual development related to seed quality, which has potential to help scale up quality seed production. The GRET project in the south, working under the Soa project, is embarking on a program of producing Quality Declared Seed (QDS). To our knowledge, such programs in Africa have only been implemented in Tanzania and Zambia. Basically, QDS programs aim to scale up quality seed production and make it cheaper, without exposing farmers to substantial risk.

Ultimately, seed production will only be scaled up if many more partners are involved. Scaling implies not increasing not only brute quantity, but also expanding the range of crops and varieties bulked up. As one scaling strategy, much better links with producer and farmer organizations could be considered (Box 4).

Box 4: Farmers organizations: how to link them systematically-- Réseau interCSA

Decentralized seed multiplication, including multiplying of different qualities of seed (certified, QDS, truthfully labeled) would especially benefit from linking to ongoing, local associations. In this vein, a new initiative (January 2013) funded by IFAD within the project AROPA is of special interest.

The "Réseau interCSA" , supported by Tranoben'ny Tantsaha, aims to catalyze a professional farmer networking service. In terms of partners, it is working on an impressive scale: with 107 CSAs (Centre de Service Agricole) and the 22 GTDR (Groupement de Travail pour le Développement.
Geographically also, they are organizing widely: they have started with the regions of AROPA: Androy, Anosy, Amoron'i Mania, Haute-Matsiatra, Ihorombe--- but hope to spread across 22 regions country wide. Key to this network is the bringing together of information to: a) help create an informed body of farmer users; and b) to stimulate links producer groups themselves.

The system is still being tested (as of May 2013) but includes information on:

- market prices;
- news at the producer level;
- Supply and demand of agricultural products (sales, seed).

Also as a potentially very valuable resource, for seed system and agro-enterprise other development, it is also compiling an *extensive database on farmers' organizations*. Here one finds: organizational contact details, details on specializations (e.g. seed producers, input suppliers, marketing skills) ; and well as a description of services provided to members.

Seed security strategy meeting- Androy

Finally, in reference to both the formal sector—and its links to the informal sectors sector-- we note a general concern at both sites. Simply, seed chain actors are relatively de-linked one from another. Across the south in particular, policy makers, government offices and NGOs, alike, sense that there are few ongoing means to introduce, multiply or market new varieties and higher quality of seed (whether certified, QDS, or truthfully labeled). Many of those concerned with seed security expressed the urgent need for more strategic and coordinated actions so as to create an Integrated Seed Sector (uniting strengths of formal and informal seed sector). The need for this regional workshop in Androy to discuss regional seed security strategy was seen as a top priority.

Creation of an integrated seed sector will demand knowledge of all the systems farmers use. We now move to a brief discussion of the informal seed sector.

Informal Seed Systems in East and South Madagascar

The informal system is the major seed procurement system across crops in and south Madagascar, providing upwards of 99% of the seed sown. The informal sector includes all the ways farmers themselves produce and disseminate seed: through own stocks, via barter/gifts and through local markets. The there were common elements in the operation of the informal sector at the two SSSA sites examined, there were also unusual differences. While 'own stocks' was the primary seed source for most in 2012-13, social networks were the second source in the east (providing 24% of the seed sown—see Box 5), with local markets proving key in the south (34% of the seed sown). operated.

Box 5: The force of social cohesion as a means to access seed: Vavatenina

Like farmers everywhere, those in Vavatenina sometimes do not have enough seed stored in their own stocks. Yet, unlike many other contexts where SSSAs have been effected, Vavatenina seems to be a region of unusual social cohesion when it comes to seed. Friends, relatives, neighbors provided a surprising 47.4% of the seed sown for the main season 2012! Local markets, in contrast, usually a solid source, provided but negligible amounts (3.7%)

What in particular is sourced from social networks?

- Young plants of chinese cabbage (pets' ai)
- Cassava and sweet potato planting material
- Rainfed rice

Note that not all is free, but most is considered of good quality. Neighbors—unlike markets-- are trusted seed sources in this eastern Madagascar region.

Seed/grain markets

'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 (Sperling and McGuire, 2010). 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

Both farmers (buyers) and traders (sellers) use a range of strategies to access 'good' seed from the markets. For the buyer, he/she wants to maximize the possibility that the product bought will actually grow on his/her own farm. Hence, a series of questions are often asked when a farmer is buying seed (see Box 6).

Box 6: How a trader knows that a farmer is buying/wants seed (versus grain)

Customer- farmer:

- directly asks for seed, particularly during a sowing period (e.g. June)
- buys a small amount, such as a few small tins (less than 1 kg) of maize; or a large amount (>10 kg) of beans.
- requires that the batches be 'pure' of a single variety;
- demands a specific variety, by name, known for performance;
- asks about the provenance of the varieties, whether they are locally adapted and whether they have been directly procured from farmers
- asks about germination; bites and smells the seed to look at freshness and moisture content;

For the seller, trader, he/she wants to tap into a lucrative seed market, whose prices prove higher than those obtained from routine food grain alone. Unusually, the practice of selling seed on local markets is particularly restricted in the eastern SSSA site at Vavatenina as the area has a high- and distinct ethic of seed sharing. Even so, traders in this region have adopted select practices for managing potential seed—especially focusing on variety adaptability to local sowing conditions (table 3.7 below).

Table 3.7. Trader practices in managing potential seed, SSSA sample in Vavatenina , May 2013

	% of answers 'yes'										
N= 11	*Get grain from spec 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*
	64	**26**	**17**	**4**	**27**	**9**	**4**	**17**	**30**	**9**	**9**

Distinguishing among traders : general structure of seed/grain markets

One trader is not like another, and in trying to chart how seed markets function, it is important to understand key differences. For instance, traders who have large, reliable trucks and storage facilities define their supply territory differently from local sellers who may produce their own seed and travel to market by bicycle or donkey. The SSSA team spoke with many kinds of traders, at varying at all scales- those directly selling seed in local markets (above)-- and well as traders controlling the major potential seed flows in and out of a region.

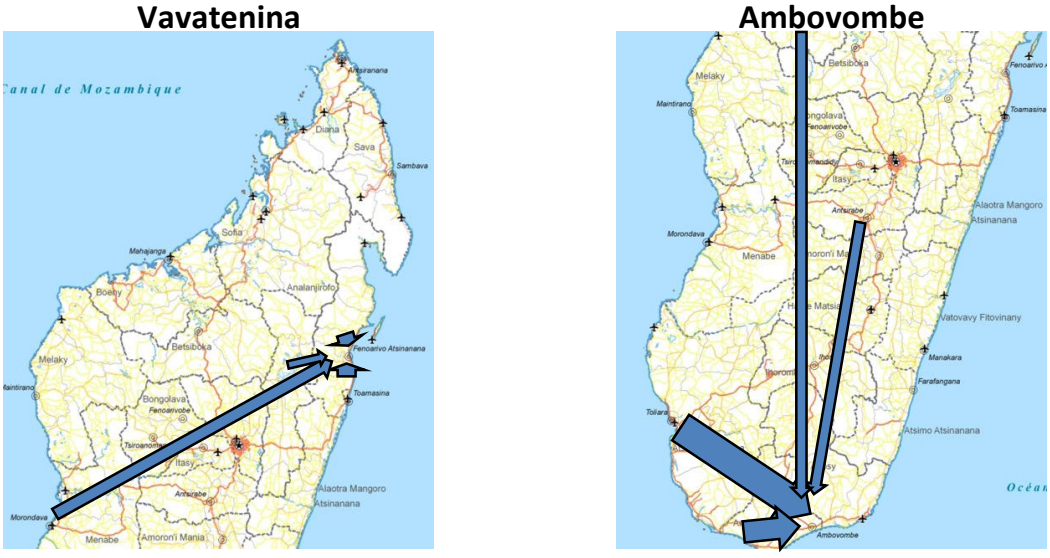
Seed flows: to assess supply and adaptation

To assess supply (is seed available!), one needs to have insight not only into the level of traders but also into the zones which can supply potential seed (that is, grain which is adapted and will grow in a specific local region). As 3.5 implies, seed/grain markets are not only 'local', but are also part of a much wider market system with links to other regions and even countries. Tracing of seed/grain flows proves to be important for understanding not only availability of supplies, but also price. It is key to understand flows for several concrete reasons:

- Seed flows mean that seed availability is rarely just a **local** phenomenon. Potential seed supplies of from other areas may alleviate local shortfalls; conversely, it may sometimes occur that market stocks mostly flow outwards, due to high prices in other markets, or to speculation.

- Prices are affected by national factors (e.g. urban demand, national supply restrictions), as well as local ones. For instance, merchants in Vavatenina say that prices in Tamatave affect local prices.

The SSSA showed that flows vary by crop. For Vavatenina, the eastern SSSA site, much of the potential maize seed comes from the same region, primarily from the surrounding Districts of Fenerive Est and Vavatenina, as well as Tamatave. Coastal maize production is enough to supply the markets here – and consequently the potential maize seed is largely sourced locally. Beans, in contrast, can flow longer distances via markets to Vavatenina. While the neighboring district of Ambatondrazaka supplies markets in Vavatenina for beans (and groundnuts), even more important sources for beans are the major production zones on the western side of the country: Miandrivazo and Morondava. Quality drives such long-distance flows, as grain size tends to be larger from these districts. Vendors attest they source from the other side of the country for this reason, and that these large-grained beans from the west are good quality for sowing – and adapted for sowing in Vavatenina as seed. In the southern site, the beans and cowpeas sold on the market come from the area surrounding Ambovombe, as well as from Tuléar to the west. For maize, Tuléar is also the main source of potential maize seed sold in Ambovombe. However, there are seasons when the whole southern region is stressed, including Tuléar. In those crisis times, long-distance flows through markets fill shortfalls in maize and sometimes cowpeas, flowing into Ambovombe from production areas far to the north: Antsirabe and Majunga. Examples such as this highlight how markets are not only local, but manage flows of potential seed across national scales in times of crisis. Of note: even large-scale traders who regularly traded >150 t long distances were very aware of the need for local adaptation of potential seed, and that some farmers buy their wares to plant as seed.



Maïze – Fenerive Est, Vavatenina

Beans – Miandrivazo, Morondava, Ambatodrazaka

Cowpea, Beans - Ambovombe, Tuléar

Maïze – Tuléar,
(In crisis: Antsirabe, Majunga)

Figure 3.5: seed flows of select crop in normal and crisis periods

Potential seed and price

Finally, 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, two trends can be 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 (i.e. those which could be used as potential seed). In areas of high stress, where few varieties may perform at all, prices between desired and non-desired varieties can differ by as much as 25-50%. Second, around planting time, traders may distinguish among batches of the same variety which are 'well sorted and stocked' from batches 'less well sorted and stocked', adding a price premium (≈ 5%) for the cleaner materials which presumably demand less labor to prepare for sowing. So sometimes prices reflect the differences between seed and grain in terms of 'varietal quality', and sometimes reflect the differences in terms of 'seed quality'. Farmers who pay these price premiums are undoubtedly buying seed *per se*.

Figure 3.6 conceptually suggests these price trends. The pattern below is sketched mainly for didactic reasons: grain price trends, in particular, may be highly variable by environment and time period. [2]

Table 3.8 then shows actual prices from the traders' survey in the southern market near Ambovombe of Ambanisarika. Even though it was a small market, traders there were selling at least 7 crops—for seed: greengram, cowpea, Bambara nut, bean, lablab, maize and mucuna. One of the sellers was also signaled as a 'seed specialist. Not that the difference of price from seed to grain can amount to even a 100% increase.

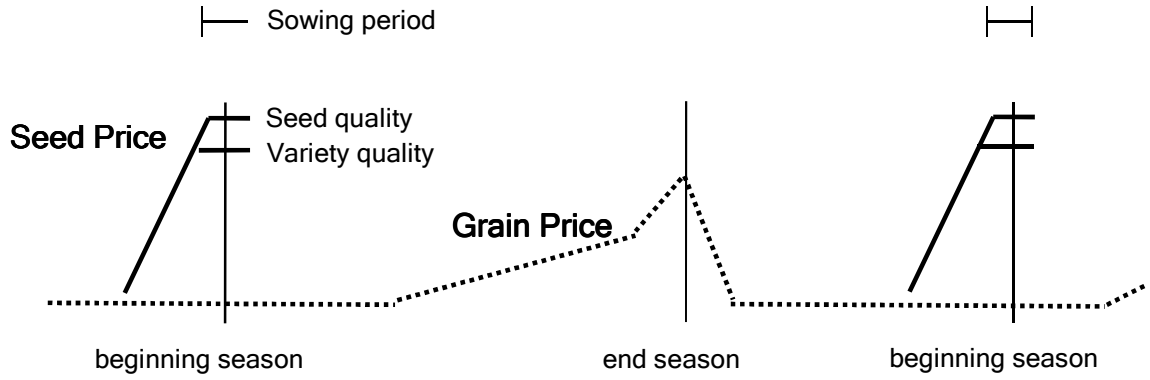


Figure 3.6 Trends in crop and seed prices in local seed/grain markets through the season, showing seed price peaks at sowing time and grain price peaks before harvest. Seed price differential takes into account variety quality (for the most sought-after varieties), plus sometimes seed quality features (i.e. a price premium for well-sorted stocks).

[2] This section on price draws from Sperling and McGuire, 2010

Table 3.8. Price of seed and grain (non sowing) for select crops at Ambaniskarika market, Ambovombe, 2013 (in Ariary)

Crop	Non-sowing period	Sowing period
Cowpea	250	300
Bambara nut	200	400
Lablab	250	400

Actual field findings on market functioning appear in the next Chapter IV. These also include findings on how the local seed markets functioned 2012-13. As a glimpse, seed supplies were available and the quality, overall 'normal' or 'good'. Prices also were also within the reach of most smallholder farmers.

Salient points : Formal and informal seed systems in east and south Madagascar.

Plant Breeding and Variety introduction/delivery

- A new variety catalogue was issued in 2010. It is fairly restricted and rice varieties dominate.
- The principal research stations for food crops, FoFIFA and FIFAMANOR, continue important variety development and testing work. However, the extent of their regional testing system is limited. Current testing networks cannot cover the range of agro-ecologies in which farmers sow.
- In terms of new varieties, farmers in the SSSA sites, were able to access only a small set of crops: mainly irrigated rice it the east and sorghum and maize in the south. (see also Chapter IV).
- There are few ongoing delivery channels by which farmers can access new varieties. Three-fourths of farmers receiving new varieties in the last five years did so through once-off distributions of the UN-FAO and NGOs.
- Agro-dealers do carry an important range of horticultural crops and one (AgriVet) started to see maize as of October 2011. However, farmers, on average (i.e. countrywide), have to travel 70km to such a dealer

Formal Seed Sector.

- Production of Breeder, Foundation and certified seed is a key mandate of several institutions: FoFIFA, FIFAMANOR and SOC. Rice and maize have been the staples for multiplication; Irish potatoes and beans may be gaining in importance. A good number of legumes have little high quality seed production at all.
- A set of complementary seed enterprises also exists (e.g. Groupement Semis Direct de Madagascar members**),** although not all produce certified seed. Current enterprise clients

tend to be institutional buyers rather than smallholder farmers, although GSDM seed might be used as a base for further decentralized production.

- An important seed quality development is the launch of a Quality Declared Seed (Program) being operated by GREAT under the Soa projects. Such QDS programs are rare in Africa, but do exist in Tanzania and Zambia. Basically, QDS programs aim to scale up quality seed production and make it cheaper, without exposing farmers to substantial risk.

- Ultimately, seed production will only be scaled up if many more partners are involved. As one scaling strategy, much better links with producer and farmer organizations could be considered. A novel project "Réseau interCSA" ,(supported by Tranoben'ny Tantsaha) aims to map and characterize producer organizations and could provide one source of information for engaging decentralized actors in a coordinated seed production network.

Informal Seed Sector

- The informal system is the important one across crops in Madagascar, except for the highly commercial crops horticultural vegetables and the emerging market for hybrid maize It provides 99+% of the seed sown.
- Local markets serve as one backbone of seed provision , especially after seasons of stress. Due to poor harvests, farmers are forced to access a larger portion of their seed off farm and in local markets. For example, in the main season 2012-13, farmers in the south (near Ambovombe) accessed upwards of 34% of their seed for major crops from local markets.
- Traders sometimes strategically manage their stocks of 'potential seed', that is, grain which can usefully be planted. Trader management of potential seed was more comprehensive within the southern area—as there market purchase of seed is more common practice.
- Given that the informal sector is an important force, opportunities for strengthening and professionalizing it further should be pursued. This might include explicit actions: to introduce new varieties, raise seed quality and promote even more specialized seed trade.

Cross-Sectors

- In reference to both the formal and informal sectors, there is a concern that seed chain actors are relatively de-linked one from another. In the South, in particular, experts expressed the urgent need for more strategic and coordinated actions so as to create an Integrated Seed Sector- ISS- (uniting strengths of formal and informal seed sectors). To quickly move toward specific planning and integration, there was an immediate call for a Regional Seed Security Workshop to be held for Androy.

IV. FIELD FINDINGS: ACROSS SITES

The fieldwork for the SSSA took place in May 2013 as farmers were finishing one season and assessing their stocks and planning for the second imminent planting period.

The assessment considered two major themes. It analyzed the short-term, acute seed security situation in both sites, focusing on the October 2012-May 2013 main season and the second, 'off season' (*contre saison*) whereby planting and harvesting vary during from March to November 2013. Seed procurement strategies, quantities sown, and crop profiles were all analyzed. As the second thrust, the SSSA considered medium-term trends, including possible chronic seed security problems and emerging opportunities. Issues considered included crop diversification, agricultural product transformation, access to modern varieties, use of other inputs and seed aid received.

This section presents field findings on seed security across the two assessment sites.[3] Comprehensive site reports for Vavatenina and Ambovombe Districts, are available from CRS Madagascar (Felicien.Randriamanantenasoa@crs.org). The tailored action plans, site by site, have been appended in Annex I.

This chapter is organized first to present findings on acute seed security (October 2012- May 2013 and March 2012-November 2013 agricultural seasons) and then analyses trends over multiple seasons to consider chronic problems as well as emerging opportunities.

Acute Seed Security Findings

Issues of seed security were first scrutinized for the short term: how and where did farmers obtain seed for the main 2012-13 season? Did they plant a 'normal' quantity of planting material? What do they assess as their seed security strategy and prospects for the 2013 off season. Note that seed system stability and resilience are best assessed by looking at multiple seasons in a row.

Seed sources and quantities planted, 2013 main season

Table 4.1 and 4.1/4.2 show the sources and quantities of seed actually planted by farmers for the main 2012-13 season. Information is given in both table and graph form so as 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 99% of the seed farmers sowed came from local channels, including from farmers' own stocks, through social networks of neighbours, friends and relatives and from local markets. This suggests the importance of informal seed systems as the core seed sources. Community based seed producers and seed received from NGOs/UN-FAO were sources of negligible importance in these sites during the seasons in question. Agro-dealers were also of overall negligible importance for seed, but did provide seed of horticultural crops for a select few, especially a variety of leafy greens, including the chinese cabbage ('Petsai' or Bok Choy), occasional tomatoes and carrots).

A closer look reveals that there were important differences between the two sites. While in both, seed for 'own stocks' was main source for seed, (providing 45% and 48% of the total seed sown, respectively) in the East, Vavatenina, seed derived was social networks (friends, neighbors and kin)

[3] 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.

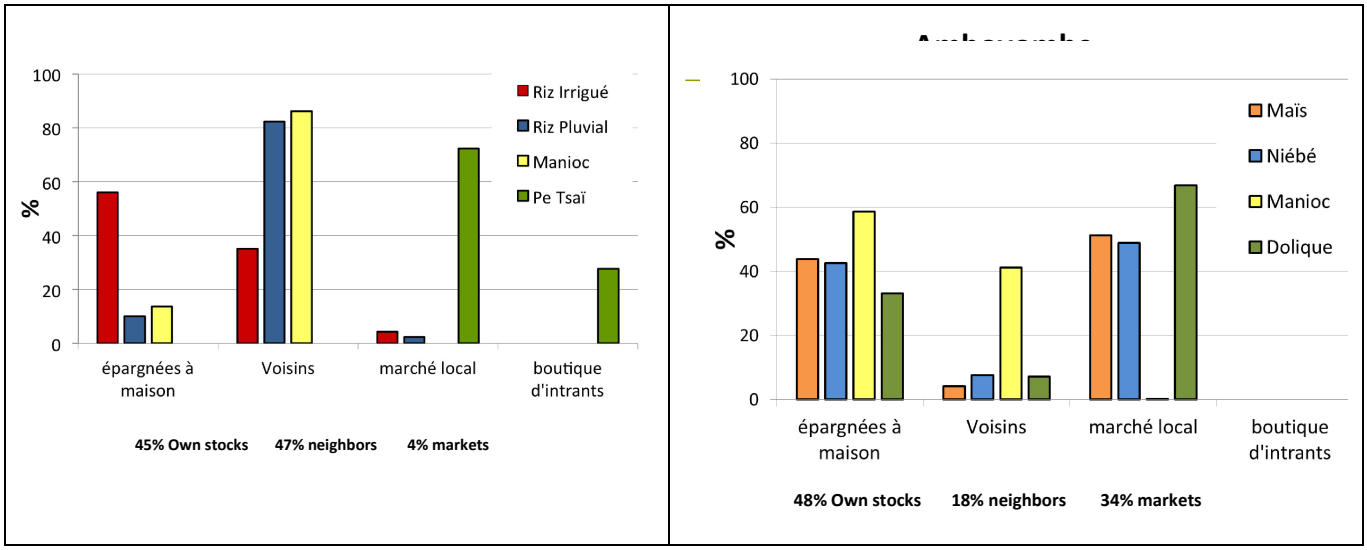
was of equal importance. Even though vegetatively-propagated material (Cassava, sweet potato) is often passed neighbour to neighbour in many sites in Africa, this overall degree of social cohesion in seed/planting material sharing is rare and has not been noted in other Africa-based SSSAs (see: http://seedsystem.org/field-assessments-action-plans/). (See also Box 5, Chapter III on social cohesion.) For the South, Ambovombe, local markets were the second primary source for seed, with a range of legumes sourced from open-air vendors. Also of note was the use of agro-dealers by site. While they were scarce in both (see section Agro-dealers, Chapter III), their use was virtually non-existent in the South.

Table 4.1. Seed (%) planted and sources farmers used, 2012-13 across both sites

Crop	kg total plantée	% of total						
		Home-saved	Friends, neighbors, family	Local market	Agro-dealers	Community-based producers	Gov't	NGO/FAO
Maïs	443.2	**43.4**	4.5	**51.1**	0.3	0.1	0.0	0.7
Sorgho	2.5	0.0	0.0	0.0	0.0	0.0	0.0	**100.0**
Dolique	35.4	**33.2**	7.1	**66.8**	0.0	0.0	0.0	0.0
Ambatry	1.3	0.0	0.0	**100.0**	0.0	0.0	0.0	0.0
Manioc *	736.1	**36.6**	**63.2**	0.1	0.0	0.1	0.0	0.0
Patates douces	2.18	**47.7**	**52.3**	0.0	0.0	0.0	0.0	0.0
Pasteque	2.2	**90.9**	0.0	9.1	0.0	0.0	0.0	0.0
Niebe	225.3	**42.5**	7.6	**48.8**	0.0	0.0	0.0	1.1
Courge	7.70	**64.9**	0.0	**35.1**	0.0	0.0	0.0	0.0
Pe tsai	0.10	0.0	0.0	**72.9**	27.1	0.0	0.0	0.0
Brede chaud	0.28	**90.9**	0.0	9.1	0.0	0.0	0.0	0.0
Bamabara	15.5	0.0	**32.3**	**67.7**	0.0	0.0	0.0	0.0
Daboara	0.160	**62.5**	**37.5**	0.0	0.0	0.0	0.0	0.0
TOTAL	1471.8	**39.3**	**34.7**	25.5	0.1	0.1	0.0	0.5

Figures 4.1/4.2. Farmers' seed sources in two sites, 2012-2013, *major crops per site*

Are farmers seed-stressed 2012-13?



(Are the amounts of seed sown in this main season more or the same as usual? what about the yields?)

To understand better any possible vulnerability, the SSSA team asked farmers to compare the 2012-2013 quantities of seed they sowed, by crop, with what they would normally sow at the same time each year. Basically, the question was this: Were the 2012- 13 patterns 'normal' or 'different' from what farmers usually do, as gauged by the farmers themselves?

Farmers reported that they, overall, had increased the quantities sown, across crops, with both showing dynamism: Vavatenina increases of 14.4% and Ambovombe increases of over 1/3 , 34.8%. In the East, maize and irrigated rice areas were especially being increased, with the South putting greater emphasis on cassava and cowpea.

Table 4.2. Farmers' sowing amounts for 2012-13 - more, less, or same?

Crop	N	% HH More	% HH Same	% HH Less	Mean % change %
Maïze	10	10	50	40	**14.5**
Rainfed rice	20	10	25	65	***-24.1***
Cassava	58	38	33	29	**7.0**
Sweet Potatoes	9	33	44	22	**3.6**
Irrigated rice	76	32	33	36	**15.9**
Chinese cabbage	8	13	75	13	***-1.7***
ALL	**188**	**30**	**36**	**35**	**14.4**

Vavatenina : + 14.4 %

Crop	N	% HH More	% HH Same	% HH Less	Mean % change %
Maïze	57	19	26	54	**2.9**
Dolique (lablab)	13	31	23	38	***-2.8***
Cassava	52	21	46	33	**58.1**
Cowpea	54	30	37	33	**20.7**
All	**188**	**28**	**37**	**42**	**34.8**

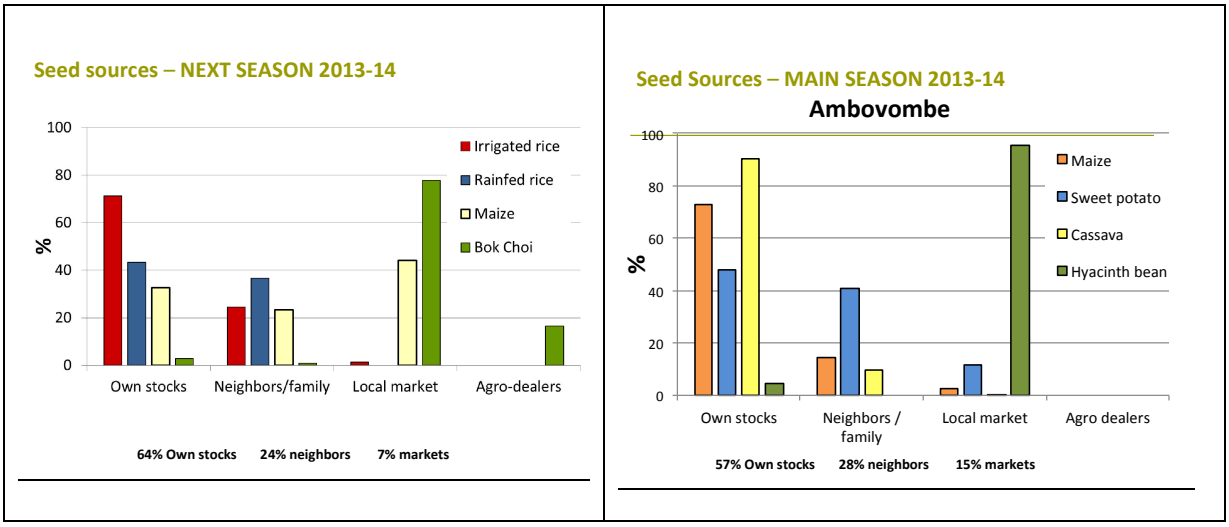
Ambovombe: + 34.8 %

Important to note is that farmers also judged the seed quality to be quite good and will resow the same type of seed in 80-95% of cases (for the east and south, respectively. Further, generally, farmers rated the resulting production as quite satisfactory—with some important exception. The east had a very good season: overall crop performance was good (80% of cases) or average (14.5% cases) with a small fraction, 5.5% indicating that the season had been poor for a select crop. The south experienced drought at the beginning of the season and many re-sowed in February/March. Hence in terms of results, farmers rate specific crop performance as good or average in 33 and 23% of cases respectively. The poor performance rating, for 44% of cases, was mainly linked to problems with maize, and to some extent with cowpea. In fact, for maize, 69% of farmers indicated that their harvest had been a poor one. A shift away from maize could bring more production stability and, indeed, some farmers indicated moves toward cassava.

Seed sources and quantities to be planted 2013 off season—and possible stress

Farmers in the two sites were asked the same questions on actual seed sources and quantities to be planted for the next season, which was but a few weeks away at the time of the SSSA. While 'planned seed sources' are not proven 'hard' data, they are a good indicator of whether farmers expect seed stress or other related troubles. Further, as many of the interviews were conducted by former aid providers, farmers answering this question could have also shown bias by trying to elicit seed aid help. The results below show a strong trend toward even greater self-sufficiency – and away from asking for seed-related aid. In general, anticipated use of seed sources for the next season, the 'off season, followed the same basic trends, but with a high rise in the use of own stocks (Figures 4.3 and 4.4). Also analysis of quantities planted, as compared to 'normal' suggested sowing amounts in the off season were projected to increase by 6.6% and 29.7% in Vavatenina and Ambovombe, respectively. Given that this is the short season, often in better-watered lowland areas, the crop emphasis is different from the previous, with Vavatenina farms especially expanding seed use (area planted for Chinese cabbage and beans, and those in Ambovombe putting greater emphasis of sweet potato and, similarly, bean cultivation. Hence, in both seasons monitored in the SSSA, farmers were expanding beyond their normal seed sowing quantities, with increases especially marked in the South.

Figures 4.3/4.4 Farmers' seed sources in two sites, 2013 off season, *major crops per site*



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. Malnutrition remains a concern in Madagascar, and 'stable/increasing' planting may not be good enough. A third of the population consumes less than the minimum level of dietary energy, while half of all children are stunted. (UN-FAO, 2011). Obviously, important development challenges remain for agricultural systems: higher yields, more nutritional quality, yields that bring in more income.

Focusing on potential problem areas + reasons spurring production

Potential problem areas

The relatively 'normal' and even promising picture for 2012-13 should not obscure that there may be vulnerable populations -- or other key reasons -- why some farmers are planting less and which are important for helping to design critical support assistance. For the main and off-seasons of 2012-13, significant portions of the population, between 20 and 40% were planting less (see table 4.2 for main season results).

To understand more clearly the nature of this decline, farmers were asked to explain why they were planting less of a given crop for each of the seasons. Diverse reasons were given. These sometimes reflected Important stresses: " I had no money to buy more seed' or 'my husband left to pick cloves work and I just don't have the labor'. However, there were also important positive reasons for 'planting less' "I am able to sow less now, because I used the System of Rice Intensification (SRI) so fewer kilos are needed for much better harvest", or the land I now have is more fertile so seed can be saved ".

While these comments suggest some variability, overall, across both seasons and sites, there is a small cluster of reasons why farmers' sow less. In the East, negative reasons driving low seed use were linked especially to insufficient land, labor and ill health. (Interesting, lack of funds to buy seed was only a secondary reason). In the South, too little money and poor weather (drought) were dominant, with ill health being an important cause for not managing the normal plot area. The major positive reason for sowing less was tied to SRI that has had an important impact especially in the eastern, Vavatenina site. Important to note is that only 5% of the sample who planted less at both sites indicated that their constraints to be linked to seed availability —and much of this revolved around scarcity of cassava planting material. Giving free seed would not have alleviated their constraints. Table 4.3 shows the frequency of reasons cited, with Box 7 giving more qualitative insight on 'why farmers might sow less.

Table 4.3. Reasons (% responses) farmers cited for planting less of certain crops, 2012-13

Reasons for planting LESS than normal: 2012-13	Vava %	Ambo %
SEED- RELATED		
Seed availability		
No seed available in market	0	1.3
No seed/cuttings available from neighbors	1.5	3.8
Seed access		
No money to buy seed/poor finances or seed too high	9.2	**21.5**
Seed quality		
Seed available is not good quality or the variety is not liked	1.5	1.3
Sub-total: Seed-related	**12.3**	**27.8**
NON-SEED FACTORS OF PRODUCTION (Limits)		
No/insufficient labor	16.9	**3.8**
Illness/health problems	13.8	**19.0**
No/insufficient land or land not appropriate/sufficiently fertile	20.0	7.6
Lack of tools/tractor/ other machinery to farm	0	3.8
Plant pests/diseases make production not possible	0	0
Animals/predator make production not possible	0	0
Lack of other inputs: controlled water supply/irrigation or fertilizer	0	0
Poor weather/rainfall	6.2	34.2
Insecurity	0	0.5%
Sub-total: factors of production-related	**56.9**	**68.4**
OTHER PRIORITIES/STRATEGIES		
Markets for crop or crop products not well-developed	0	0.0%
Other priorities than agriculture (e.g. have shop)	1.5	0.0%
Changed crop profiles or priorities	6.2	1.3
New agronomic technique	15.4	1.3
Other	7.7	1.3
TOTAL	**84.6**	**98.7%**

Box 7: Why some farmers planted less in 2012-13, insights from Vavatenina

In Vavatenina, a minority of farmer planted less than normal. However, sowing reductions were almost never linked to a 'lack of seed', but were more often tied to other constraints – and sometimes to opportunities. Land is very mobile in Vavatenina, especially the prime irrigated land in the Azafo Plain, a 3000 hectare expanse which abuts many communities in this district and is key for irrigated rice. Many households may change they area they farm from one year to the next, by hiring in (or out) additional plots; sowing rates thus change as well. For others, reduced sowing reflects ill health, or the inability to pay for labor to work more land. While these are signals of household vulnerability, they do not specifically relate to seed - and poverty does not constrain seed access as much as it does other factors, as so little seed is purchased. Seed-related assistance will not address the root concerns of the poorest households, but rather smart, targeted support with livelihoods or credit.

Reduced sowing also reflected opportunities. Some farmers reduced sowing to one crop as they shifted attention to another crop, which they were increasing. Others are starting to adopt SRI, the System of Rice Intensification, which involves careful management of rice seedlings, and involves a much lower sowing rate. This dynamism shows that reduced sowing is not always a sign of stress.

Here is a sample of reasons farmers in Vavatenina gave for planting less in the main season of 2012-13:

- I use SRI now
- The land I have is more fertile, so I need to sow less
- I just moved here from somewhere else, (and don't have that much land)
- I am separated from my husband, (and lack labor/land)
- My husband left to pick cloves, so I do not have labor
- I stopped renting land, so only sow my own plots this season
- I dropped cassava, as want to focus on rice
- Seed I received is better quality, so I sow less
- I got a new variety from CARE and wanted to test it first
- I planted between another crop this season, so needed less seed than when I sole-cropped it.

Spurring production

To complete this analysis of the rationale for farmers' planting decisions, we end on a positive note: why those who planted more did so. Households plant more for diverse reasons, especially getting access to more land, good weather, to intensify food production and change crop profiles (i.e. shift from one crop to another. Interestingly, in neither site were gearing production to the market or better marketing opportunities important as reasons for expansion. In both sites, agro-enterprise opportunities proved very limited. (see section Agro-enterprise, this chapter). Table 4.4 shows the frequency of reasons cited with Box 8 giving more qualitative insight on 'why farmers might sow more. Of note is that money (in this case, having more money,) did not figure as a driving force.

Table 4.4. Reasons (% responses) farmers cited for planting more of a given crop 2012- 13

Reasons for planting MORE than normal 2012-13:	Vava. %	Ambo. %
SEED RELATED		
Seed availability		
More seed available due to good harvest	7.1	9.4
More seed available due to free seed	1.8	0
Seed access		
More money to buy seed or seed price low	3.6	0.
Seed quality	0	0.
Have especially good seed or good variety		
Sub-total: SEED RELATED	**12.5**	**17.0**
NON-SEED FACTORS OF PRODUCTION (opportunities)		
Good/increased labor	7.1	43.8
Feeling strong/healthy	10.7	1.9
Have more land/more fertile land	32.1	18..9
Have tools/tractor, other machinery to help farm	0	0.0%
Have access to irrigation, fertilizer or other inputs (e.g., stakes)	0	0
Good weather/rainfall	1.8	32.1
Good security (peace has arrived)	0	0
Sub-total: factors of production-related	**51.8**	**19.8%**
OTHER PRIORITIES/STRATEGIES		
Well-developed /new markets for crop or crop products	3.6	3.8
Have decided to give more priority to agriculture	16.1	1.9
Changed crop profiles or priorities	8.9	18.9
Other	**7.1**	**1.9**
TOTAL	**100**	**100**

Box 8*:* Why some farmers planted more in 2012-13, insights from Vavatenina

Again, increased sowing rates often reflect more available land or labor. However, increases do not always mean all is well, as some are sowing more to make up for illness or poor production the previous season. A selection of reasons given, below:

- I have more land (hired, gained via family)
- I am sowing higher rates to suppress weeds
- I am sowing rice more densely to try to get higher production
- Increasing Pets'aï (Chinese cabbage) for better nutrition

Can the markets deliver seed 2011-2012?

The role of the markets in ensuring seed security also needs to be addressed although, in this SSSA, markets were really only important for seed in the South. Key questions revolve around several issues: "Can the markets deliver enough seed? Will seed be put on offer, with the quality that farmers want? and Do prices make purchases accessible for smallholder farmers?

Chapter III looked at general agro-dealer and seed/grain market functioning. Here we summarize the salient issues to determine if there are supply and access problems for the seasons in question---or not.

Agro-dealer and formal seed supply 201213

The SSSA team interviewed agro-dealers and formal seed sector companies in every site of the assessment. As noted in Chapter III (see Box 3) formal outlets were few in the east and virtually non-existent in the southern site (where the single agro-dealer focused on livestock needs.) In the east, if farmers use agro-dealers, their rationale is primarily to obtain horticultural seed (figure 4.5). One Varika dealer visited in the east carried some 22 vegetable types, all produced within Madagascar (Laniera) and certified by SOC (see figure 4.5 to get sense of seed range on offer). Prices also were in the realm of accessible: 800- 1000 Ar for a packet, with one packet (0.35-0.45$US) of Chinese cabbage having perhaps 2000-3000 seeds. She cited her supplies as normal and stated that demand had stayed constant: as 'normal' she had sold about 3000 packets during the season and 5000 total year round (as had been the case for several years running). Farmers particularly sought, and were able to obtain: bredes, Pets'ai and cucumbers (first place in demand); tomatoes, green beans, cabbage and squash (second set in demand) then the occasional onions and carrots. As a dealer, she did not aim to expand seed quantities on offer—as she felt her client-base was static. She also sensed that expanding the scale of business and setting up an itinerant sale mechanism would not be profitable. If she were to upgrade supply, it would rather be in terms of diversity and, in this vein, she lamented she did not have adequate supply of cauliflower, peppers, artichokes and spices. Note that the dealer also carried non-seed inputs such as insecticides, herbicides and pesticides as well as the seed stockage product 'Prochidrine'.

Important for seed security issues is that this dealer, as well as the few other dealers established in the region, did not carry non-horticultural crops—so no legumes and maize.

In short, the agro-dealer supply and demand- for the seasons in question were normal and functioned at a very modest level, as usual. Dealer focus was on horticultural crops, with a complete absence of the legumes, maize and rice.

Figure 4.5. Agrodealer shop inventory : examples from the east and from the south

a) in Fenerive Est: large range horticultural crops

b) in Ambovombe: focus on veterinary supplies

Local seed/grain market-supply 2012-13

Local market functioning for the 2012-12 seasons was also evaluated, as local markets are important especially to obtain Chinese cabbage in the East (Pet'sai) and maize, legumes and lablab in the South. Of note is that use of local markets for seed declined from the first to second season as the harvest were generally good and more seed of 'own stocks' retained for sowing.

Market seed availability and quality

Market traders, among the largest seed suppliers in each zone stated no problems obtaining supplies main season 2012-13 and anticipated none for the off season. (Remember that the amounts sourced by farmers from the markets are modest). Visits to the Ambovombe market in the south showed seven different legumes on offer (e.g. beans, lima bean, cowpea, lentils…)—so the diversity and well as amounts available were impressive. Stocks generally looked well sorted, and, selectively even certified and QDS seed was available on open markets; Chinese cabbage in Vavatenina , and several legumes being sold by GRET in a rural market outside of Ambovombe in Ambanisarika. No formal seed quality tests were effected during the SSSA but trader management practices for potential seed were reviewed (Chapter III. Table 3.7).

Figure 4.6. Open local markets

Diversity of legumes in market, in South

Vegetable seed packs even in open market

Market seed access/price—and costs to farmer

Finally, the issue of seed price was reviewed – and specifically the total price for seed which farmers had purchased 2012-13 and aspired to purchase for the off-season 2013.

Tables 4.5/4.6 show the total cost calculations in each site and across both seasons. For the east, if moves from 8918-15300 AR ($US 4-7)—with the increase due to the second season emphasis on irrigated rice. For the south, the prices are relatively stable across seasons, 6868-6200 AR ($US 2.85-3.15). These sums are within reach of the majority of farmers, although as Table 4.3 confirms st sums as

Expenses for the Main Season, 2012-13

Crop	Nb qui cultivent	Average Expenses (Ar) marché local	voisins	négociant d' intrants	Total par culture	% de total
riz irrigué	76	821	2784	0	**3605**	40.4%
riz pluvial	20	375	3875	0	**4250**	47.7%
Pe Tsaï	8	688	0	375	**1063**	11.9%
total (des 3)		**1884**	**6659**	**375**	**8918**	100.0%

Vavatenina

Off-season:
15 300 Ar.

Crop	Nb qui cultivent	Average Expenses (Ar) marché local	voisins	négociant d' intrants	Total par culture	% de total
maïs	57	3855	0	0	**3855**	56.1%
manioc	54	12	463	0	**475**	6.9%
Niébé	52	2538	0	0	**2538**	37.0%
total (des 3)		**6405**	**463**	**0**	**6868**	100.0%

Ambovombe

Off season:
6 200 Ar.

Community assessment of seed security

Finally, as a cross-check to the above quantitative data, the communities themselves were asked to assess the seed security of their members. Seed Security was defined as either having the seed already in hand, or being able to access the seed with some certainty (though purchase, barter, gift, or other). Community meetings at all sites involved upwards of 40 people, men and women, and the discussions were intense and interactive. Table 4.7 presents the communities own assessment of those in their area who they deemed seed secure for the upcoming season, 2013. Seed security was assessed for the three most important crops as prioritized by the community group. In both sites, for their three major crops, the community debated and agreed that their members would be seed secure.

Table 4.7. Community assessment of the % of its members who are seed secure for 2013

Crop	% Seed secure
Vavatenina	
Rice	100
Cassava	100
Cucumber	100
Ambovombe	
Cassava	100
Cowpea	100
Maize	100

Summary: Acute Seed Security Findings: 2012-2013

Multiple and diverse indicators suggest the seed security of east and south Madagascar farmers in the short-term is quite stable.

From the farmer point of view, 2010-2012

1. For the 2012-13 main growing season, farmers sowed 14-35% more seed than the 'normal' amounts in terms of overall quantities sown. Crop yields in the east were overall quite promising: rated as good or average in 80% and 14.5% of crop cases respectively. The south did experience some stress. While yields were rate as good or average in 33 and 23% of cases, respectively, farmers judged 44% of crop case results to be 'poor', with particular problems with maize and cowpea (drought).

2. Farmers relied on local channels (home saved, local markets, seed from friends or kin) to access 99% of their seed during the 2012-13 season. 'Friends, kin, neighbors' (social networks) as a source were important primarily for the vegetatively-propagated crops (cassava and sweet potato), which has key implications for how these cuttings might move more widely and quickly. Social cohesion was especially marked in the east, where sourcing seed from social networks was more important than market sources.

3. The reported plans of farmers for the 2013 off season (contre saison) show more a positive trend in seed use with overall expansion of 7-30% (Vavatenina and Ambovombe, respectively).

4. From the farmer point of view, the rationale for using less seed (a general proxy for decreasing area) is key. In the East, negative reasons driving low seed use were linked especially to insufficient land, labor and ill health. (Interesting, lack of funds to buy seed was only a secondary reason). In the South, too little money and poor weather (drought) were dominant, with ill health being an important cause for not managing the normal plot area. The major positive reason for sowing less was tied to SRI which has had an important impact especially in the eastern, Vavatenina site. Only 5% of the sample who planted less at both sites indicated their constraints to be linked to seed availability —and much of this revolved around scarcity of cassava planting material. Giving free seed would not have alleviated their constraints.

5. Farmers' rational for planting more (a general proxy for increasing land area) is also key for understanding opportunities to spur production. Households planted more for diverse reasons, especially getting access to more land, good weather, to intensify food production and change crop profiles (i.e. shift from one crop to another). Interestingly, in neither site were gearing production to the market or better marketing opportunities important as reasons for expansion. Simply, such agro-enterprise opportunities are few and far between.

6. Money, either having more or less was not cited as a factor for decreasing or expanding seed use (which is unusual in seed security assessments). This may be as only modest amounts are spent on seed for the two seasons with calculations in the east, ranging from 8918- 15300 AR ($US 4-7), (the increase due to emphasis on irrigated rice second season) and for south, the p 6868-6200 AR ($US 2.85-3.15). These sums are within reach of the majority of farmers.

On the supply side, 2012-13

On the seed supply side for 2012-13 seasons, several findings are to be remarked

7. The few agro-dealers in place indicated no shortage of their normal supplies--- all focused on horticultural crops, with dealers having a good range, e.g. 22 types, on hand. Note that 0.1% of the sample used an agro-dealer, mainly to purchase seed of leafy vegetables.

8. For seed supply from formal agro-dealers, other constraints emerged:

    - Geographic access Only two agro-dealers were located near the eastern site—and in a town center. In the south, a single dealer- focused mainly on veterinary supplies and was located again in the major town center.

    - Crops focus: legume and cereal seed cannot be regularly accessed through agro-dealers. Horticultural crops only.

9. The seed available on the local market was plentiful. Generally, it was assessed by farmers and traders to be normal to good quality. A diversity of legumes was found in the open market. Occasionally, seed of recognized high quality also sold: certified vegetable seed in packet and, in the south, quality declared seed of a range of crops by GRET, a specialized NGO.

Community assessment 2012-13

10. In the short term, for their three major crops, communities at both sites assessed their members as 100% seed secure. However, in the south, some farmers are moving away from maize due the high rate of crop failure—and toward cassava.

Overall, in the short term, the seed security situation at both sites is a stable one.

Chronic seed system concerns+ emerging opportunities

We now move to examining more systemic trends in east and south Madagascar agricultural and seed security. Community-level assessments were done in both sites and involved a range of methods: community meetings, special focus group discussions with women, key informant interviews (with government leaders , business men, NGOs staff and others), and market analyses. The varied methods allowed for cross-verification and opened possibilities to assess medium-term trends. The following topics are highlighted below: dynamism in use of seed sources, crop diversification decentralized seed production, processing and agro-enterprise, seed aid, access to new varieties and use of inorganic and organic fertilizers.

Seed system sourcing-- dynamic trends

Community mapping of seed sources served to trace general trends in seed source strategy. Groups mapped sources for a particular crop and compared those used currently with those used five years previous. In both sites, mapping indicated little dynamism in sources used across crops: main sources are own stocks, special projects, and social networks. The lack of dynamism is especially lamentable for crops such as cassava, where major disease threats demand that novel sources of planting material enter agricultural systems quickly (see Box 13). Examples of seed sourcing for irrigated rice, cassava and maize appear below.

Figure 4.7 Vavatenina: irrigated rice seed sources

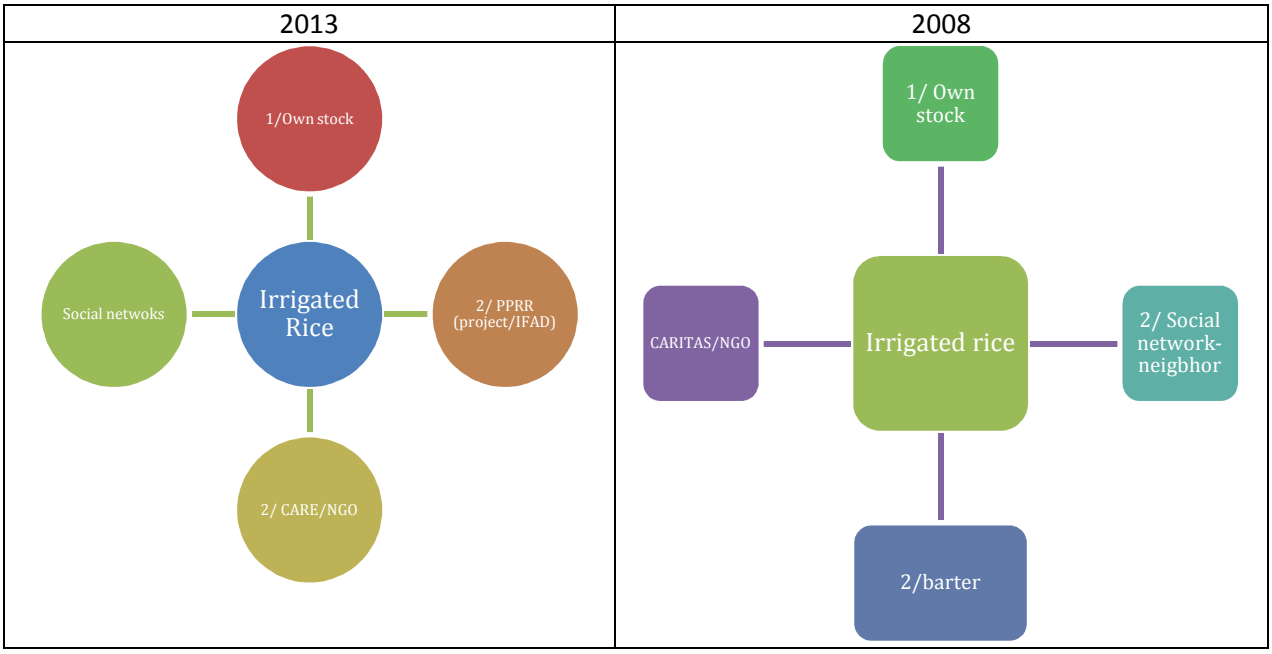


Figure 4.8 Vavatenina: Cassava planting material sources

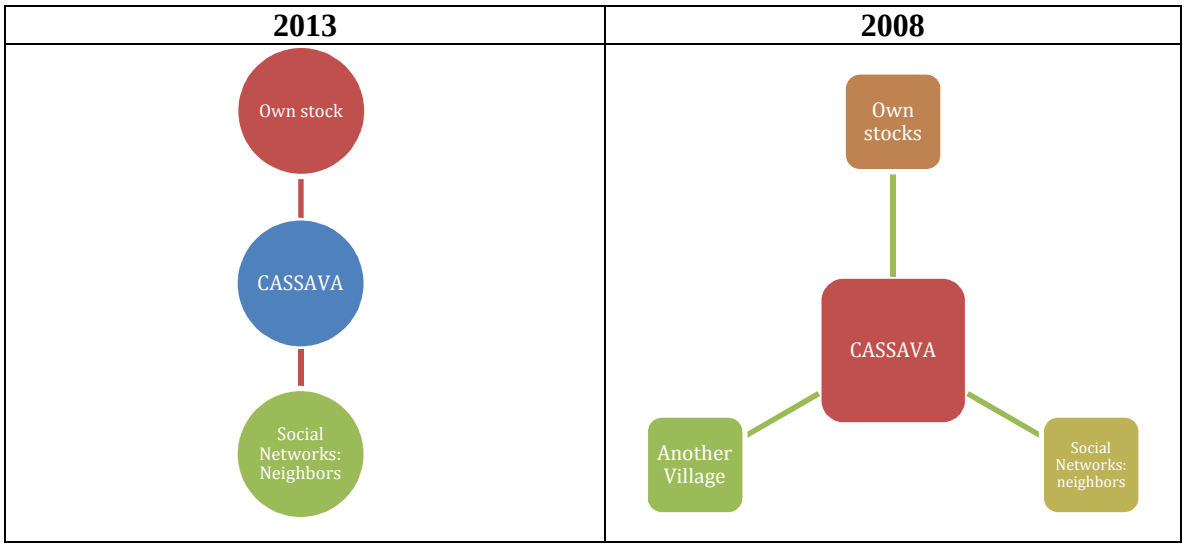
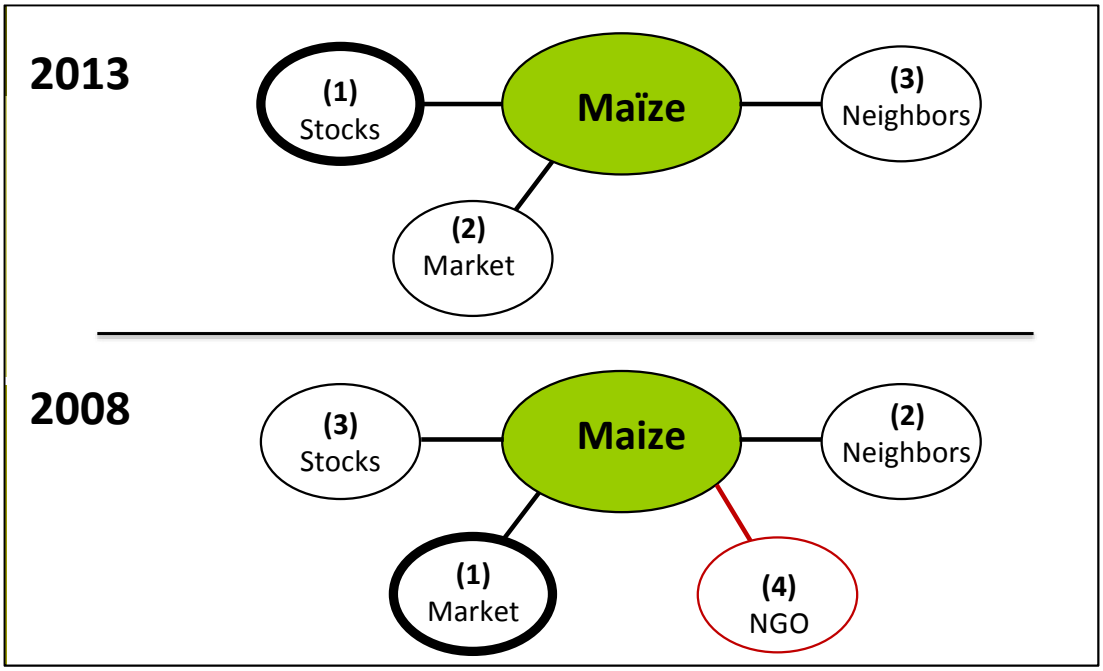


Figure 4.9 Ambovombe : maize seed sources:



Crop diversification and (few) value added products

Communities also 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 geared to increasing revenue margins. Results are presented below for Ambovombe, which is the higher stress region. Interestingly, an impressive diversity of crops is grown. However, transformation levels overall seem non-existent, a reported by the community.

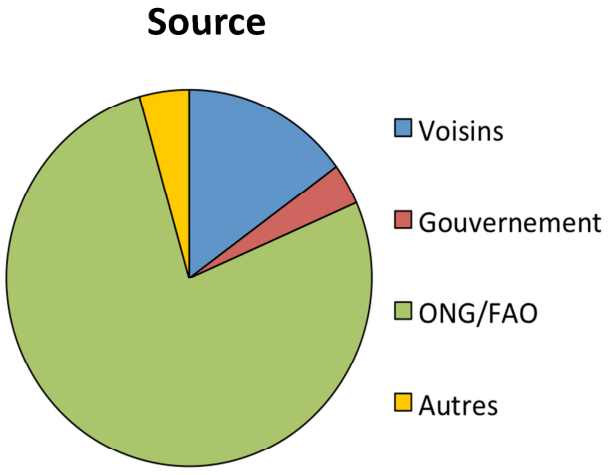
Table 4.8. Ambovombe . Diversity of crops, but little transformation

Crop	Importance for food	Importance for income	Transformation
Cassava	+++	++	-----
Lablab	++	+	-----
Sweet potato	+++	++	-----
Cowpea	+++	++	-----
Maize	+++	+++	-----
Groundnut	++	+++	-----
Bambara	++	+++	-----
Squash	+++	++	-----
Melons	++		-----
Water Melon	+++	+	-----
Horticulturals		++	-----

+++ indicates the highest importance. (others rated medium or low)

New varieties

Continuing to search for innovation, we move to the issue of new varieties. Within the context of assessing seed security, variety introductions can be an economical way to increase production quickly. 4.9 and Table 4.9 show the extent of variety introductions 'during the last five years' (approximately the period 2008-13) within the sampled sites. Slightly over half of farmers reported that they had recently accessed new varieties (although whether these are 'modern varieties' or new local varieties cannot be determined). The varieties have been accessed mainly NGO/FAO.



Crop	New variety (#)	
	Vavatenina	Ambovombe
Maïze	4	**14 (25%)**
Sorghum	0	**17 (31%)**
Irrigated rice	**41 (79%)**	0
Cassava	0	5
Cajanus	0	7
Sweet potato	1	3
Cowpea	1	3
Other	5	6

51% obtained a new variety

Figure 4.9/Table 4.9. Madagascar Farmers' sources and types of new varieties, 2008-2013

Note that the new varieties delivered consisted overwhelming of rice in Vavatenina. In the south, maize and sorghum were especially being promoted although farmer interest in sorghum seemed

variable. Of the 17 within the sample who had received a sorghum variety, 16 (94%) had already rejected it by the time of the SSSA. Some reported bird problems, but poor germination was also cited as a main reason for abandoning the crop. In both sites, there was only a single new legume introduced—cowpea—and this happened only in small quantity.

Review of the channels for accessing new varieties shows that such channels are largely unsustainable as well as subsidized. On going conduits, which sell seed of new varieties might best be catalyzed in the near future (Box 9). Focus also might always be on giving farmers multiple options (Box 10).

Box 9: Innovative channels for getting new varieties out

Groundnuts, beans, lentils, cowpea, lablab….

Madagascar farmers need better access to new varieties—and especially to the legumes. No sustainable conduit currently gives them easy seed access—except to vegetable seed

Why not build ***multiple channels*** to render seed accessible to ALL:

- Leader Farmers (de GRET)
- Traders on open markets
- Farmer organizations
- Women's groups
- Local shops/groceries
- Churches
- Village committees
- Tranoben'ny Tantsaha…

There are wonderful possibilities for enhancing farmers' access to new varieties ---quickly.

Box 10: Why multiple varieties, rather than one super variety, is the preferred farmer strategy— even for the major staple

While plant breeders and extensionists may be inclined to promote a 'one super variety', farmers, in contrast, often seek diversity, even for the same growing season. Rice in Vavatenina is a case in point. The improved variety X265 gives a good yield in favorable times but the local type, Gony, seems more tolerant under variable hydraulic conditions. Even better are both together: X265 matures in four months and Gony in six, so the two planted together allow for staggered food production.

Decentralized Seed Multiplication

Getting access to new varieties will also be contingent on their being multiplied. Decentralized seed producers will be particularly important for the crops not taken up by the private sector, namely all of the legumes and most of the cereals (with the exception of hybrid maize. While still relatively limited in number, decentralized seed production in both sites is being supported by the Church (e.g. Fivondronan'ny Tantsaha Manatsara Velontena- Producer Association Improving Rural Life) as well as by select NGOs (e.g. GRET CARE/AROPA) in the south. The Government Central Agricultural Services (CSA) also sometimes sells seed directly to farmer clients.

However fledgling they may be, it is important to be positive about advances in decentralized seed production as they will need to be scaled up if farmers are to have access to new varieties on an ongoing basis. Equally important, in terms of sustainability, is to put forward a word of caution. ALL decentralized multiplication programs reviewed during the SSSA either: gave seed free, gave farmers vouchers to 'buy' seed or sold seed at a substantially subsidized price. The case of KOVI producing rice seed once off (Box 11) proved to be among the higher rates of subsidy, but prices at GRET (Box 12) also suggest that subsidies are being built in even for programs which aim to be ongoing ones. Decentralized seed production remains a viable enterprise only when a) it can wean itself from institutional clients; and b) it sells seed at real cost.

Box 11: The subsidized seed production trend- how to break the model

Farmer cooperative groups, community based groups as well as more formal small-scale companies, should be important and sustainable sources of modern crop varieties and of good-quality seed for farmers. Such entities should be able to change quickly their profile of crops and varieties on offer, to respond to small-farmer needs and to tailor selling strategies to their local clientele.

Unfortunately, the history of small seed-producing groups in Madagascar reveals an industry that tends to look up to its donors and organizational buyers rather than forward to its clients. One case shared by the Koperativa Voromangan' Iazafo (KOVI) in the plain of Lazafo (near Fenerive Est) reveals how strong the need is for a rethinking central seed business strategy.

In anticipation of the damage done by the 2007 cyclone Yan, KOVI received a government contract to produce 30T of rice (X265) to be used as seed. While the normal going rate is 460 AR/Kapoka, the government promised and paid a price more than double: 1000/AR/Kapoka.

It is no wonder that KOVI is now interested in orders of seed only if institutional buyers step forward. The cooperative senses that the real demand from farmers for new rice varieties is just too thin, with transaction costs too high and profit margins too low.

Cooperatives are supposed to be especially farmer-oriented. Yet, it will take major shifts in thinking (and perhaps marketing) for groups such as KOVI to move away from large institutional clients and to cultivate actively a *farmer-client seed buying base.*

Box 12: Prices of QDS (GRET) seed versus market seed how to sell and NOT subsidize?

May 2013 prices of GRET seed- sold In Ambovombe boutique. The better quality seed (presumably QDS) is priced only slightly higher than that found in open market stalls

CROP	SEED PRICE : GRET	PRICE IN LOCAL MARKET
Local maize	**180 Ar / kpk**	**160 Ar / kpk**
Exotic maize	**170**	
Sorghum (IRAT 204)	**200**	
Cowpea	**280**	**200**
Dolichos	**300**	**250**
Cajanus	**230**	
Konoke	**250**	
Mucuna	**250**	**150**
Bajiry (pearl millet)	**250**	
Bean (red)	**700**	**600**
Bean (white)	n/a	**900-1000**
Groundnut	n/a	**400**
Bambara nut	n/a	**300**
Lima bean	n/a	**800**
Lentils	n/a	**800**

(data: courtesy of GRET);

n/a= price data not collected

Special need cassava planting material

As a sub-category of decentralized seed multiplication, there is a need to highlight the special concerns of vegetatively-propagated crop (VPC) planting material: cassava and sweet potato.. Cassava is especially important in the south as a crop that delivers even in drought periods. However, threat of diverse cassava diseases (see Box 13) means that clean material needs to be available on an ongoing basis. Simply, varieties bred to be resistant (to either Cassava Mosaic Disease or Cassava Brown Streak) have been known to routinely break down in east and southern Africa within 5-10 years. Unfortunately, clean planting materials are mainly available only from research stations and special projects: cassava from FoFifa and Orange fleshed sweet potato (OFSP) from FIFAMANOR and quantities are very small. Unfortunately, there is also no sustainable strategy in place to bring decentralized multipliers of VPCs together.

Box 13: Cassava: how to scale up 'clean planting material multiplication

Cassava is a critical crop—particularly in areas of stress. When the maize season is bad—farmers turn to cassava (although they may flip back to maize—when rains are promising!)

However, cassava has compelling seed security challenges.

- Planting material is mainly available through social networks of kin, friends and neighbors. Near nil cutting or stems are found on the open market and NGO programs for multiplication are few, far, and donor dependent. Access to improved varieties is very low.

- Challenges are also acute in terms of disease. In the southern SSSA site, Farmers estimate 40% losses of the cassava crop in farmers' fields [variously infected with cassava mosaic disease (CMD) and East African mosaic virus]. While some CMD-resistant varieties have been released (e.g. 81/00110, 84/00045), farmers in the SSSA reported no access to the varieties) and the Regional Directorate for Rural Development (DRDR) confirmed that there is no government program in place anywhere in the south to combat the disease and spread clean planting material.

What do cassava specialists suggest as the way forward?

Short-term	Medium term
Government specialists provide advice to NGOs/PVOs on how to buy /procure clean disease resistant planting material. More sensitization with farmers on selecting clean planting material. Thermotherapy treatment	Scale up and train decentralized seed producers—to multiply clean disease resistant material. Engage more NGOs to reach needed scale. Sell cuttings (not give them free!)

Agro-enterprise

Virtually no agro-enterprise was located in the zones of action as tied to agricultural products, with the exception of businesses in Fenerive Est which provided services on rice de-hulling. In contrast, the need to add value to agricultural products across Madagascar has been recognized as a key priority so as to boost rural incomes and a series of background agro-enterprise analyses has been effected (posted in Annex III).

Beyond agricultural trade, a very lively commerce in turkeys was identified in the south in Ambanisarika (So there is local rural innovation). Turkeys are bought locally and then sold in the towns of Ambovombe, Fort Dauphin and Tuléar. Traders described how a turkey bought at 20,000 AR might be sold at 35,000, with no additional fattening. Profits from the turkey business have apparently helped households: buy goats, construct parts of houses, and even have led to the purchase of a zebu.

While not an agro-enterprise investment per se, the SSSA team also noted cases where access to new seed types led to innovations in other areas- including nutritional and environmental improvements (Box 14).

Box 14: Seed as a catalyst to wider innovation. The case of Saint Gabriel

Growing and selling of horticultural crops is widespread within the Fenerive Est region. Local markets are full of leafy vegetables, cucumbers, eggplant, tomatoes, carrots, onions. Formal seed outlets (agro-dealer shops) also sell at least 22 types of garden crop seed, some quite local and others verging on exotic, like red peppers. Yet good availability does not mean that all farmers have access to such high value seed. Nor might farmers know how to maximize its use for nutritional and other gains.

Brother Edwin of the St Gabriel project has introduced horticultural vegetables to some of 800 vulnerable town people (peri-urban farmers), spurred by a free seed aid donation from the Caring Response Madagascar Foundation. Rather than just hand out the packets—and leave—The St. Gabriel team has been using the seed as a stimulus to encourage kitchen gardens, environment cleaning, and even human sanitation management.

As step #1, the St Gabriel team has been promoting a concept known as the keyhole garden (www.bakerinstitute.org) whereby fenced in circular plots, two meters in diameter, are continually enriched by a central compost basket. Even very small areas, <0.3 ha, can be tended to produce healthy supplies of beets and peppers and sprawling melons. In step #2, these circular gardens are being tied to well-designed waste recycling systems. Kitchen scraps and field debris are collected and deposited in the central basket, and pipe conduits link human waste to garden plots so as to enhance soil nutrients on a continuing basis. (Brother Edwin calls this: CLTS- Community –led Total Sanitation).

So Brother Edwin's group started with a high value horticultural seed, and tied this gift to programs which immediately enhance family nutrition, soil and garden fertility, and human waste management. Vegetable seed can be a catalyst for multiple types of innovation.

Manure/Compost, Fertilizer, Pesticide + Storage Chemical Use

Select input use was also examined during the Madagascar SSSA as a complement to the seed security analysis. This included examining farmers' use of a) organic fertilizer: manure and compost; b) inorganic fertilizer ; c) pesticides and d) storage chemicals. Table 4.10 summarizes the % of farmers at each site using or intending to use these inputs for 2012-13 main season and the 2013 off- season. Discussion of the pattern of use for each input follows.

Table 4.10. Percent (%) of Farmers in Vavatenina site (east) and Ambovombe site (south) using a select input during the season cited (SSSA sample)

Input	East		South	
	Main season 2012-13	***Off season 2013***	***Main season 2012-13***	***Off season 2013***
Manure/compost	81.1	90.5	22.1	20.0
Mineral fertilizer	9.5	29.7	0	0
Pesticides: foliar sprays	27.4	44.9	n/a	n/a
Storage chemicals	2.6	24.7	13.0	11.1

Manure/Compost Use

Manure/compost were the inputs applied most at both sites, with use in the east markedly higher that the south, 80-90% of farmers per season, versus 20-22%, respectively. The lower use in the south is surprising given that Ambovombe is primarily a livestock rearing area.

In the east, farmers used basically kitchen refuse as compost- and applied it to irrigated rice and Chinese cabbage as priority, both seasons.

In the south, farmers used both kitchen refuse and livestock manure, giving priority to maize, cassava, Chinese cabbage or sweet potato, depending on the season. Certainly, there are opportunities to significantly expand manure use in the south.

Mineral Fertilizer use

Mineral fertilizer was only used in the eastern site, and by a minority: 10-29% of those interviewed (varying by season). Eastern farmers again gave priority application to irrigated rice and Chinese cabbage, both seasons.

Pesticide use

Pesticide use was only monitored in the eastern site—as it is virtually unknown in the south. Application in the east is, again, concentrated only on irrigated rice and chinese cabbage. Use is much higher during the off-season.

Storage Chemical Use – 2010-2011 and 2011-2012 seasons

The SSSA team also reviewed storage chemical use. *Farmers assessed storage losses as 'substantial, at 20-50%, for the crops of maize, rice, cowpea and (occasionally) groundnut.* In contrast to the high magnitude of the problem, relatively few farmers used chemical control measures on their stocks.

Across the inputs, the main reasons for not using them across seasons were similar: farmers considered them 'too expensive; as not available, or they simply did not know about them (especially for the storage chemicals).

In all of the above, one can say very little about efficiency of use, a topic that merits a great deal more analysis.

Seed Aid

As the last 'input' we look at seed aid, which has been a form of assistance in the south and east Madagascar since about 2005. Here we include both emergency assistance and developmental aid, as farmers themselves often cannot make the distinction.

The SSSA results show that about half of the total population (51.4%) have received seed aid between 2008-2013. In this period, they have received it a mean of 1.4 times, so one in four main seasons, with some farmers having received aid up to 4 times, or nearly every year (Table 4.11). Delivery has been via direct seed distribution (97% of cases) or seed loans (3% of cases).

Table 4.11. Madagascar. Seed aid: 2008-2013

# households (responding)	Received seed aid in last 5 years?			# HH that did receive	# times aid received			
	Yes	No	Total		Mean	Std. dev.	Min	Max
144	51.4%	48.6%	100.0%	74	**1.4**	0.64	1	4

The use of vouchers or direct cash transfers for emergency seed assistance was unknown in either of the sample site areas. The NGO, GRET, does use vouchers for developmental assistance so as to diffuse new varieties.

Box 15: Diversity and Nutrition fairs—DINERs

Given the specific constraints found in southern Madagascar, a novel fair approach might be promoted which has a specific slant to help bolster diversity and nutrition in a region which is 'livestock-rich', but poor in most other agricultural innovations. Newly labeled as DiNER vouchers and fairs (DiNER= Diversity and Nutrition for Enhancing Resilience), these fairs aim to facilitate farmer access to agricultural elements which are not sufficiently used in the southern region, including, but not limited to:

a. New varieties, especially of legumes (e.g. beans)
b. Horticultural crops (especially leafy vegetables)
c. Fruit trees and other types of trees
d. Small livestock: chicken, guinea fowl, turkeys

Farmers could have the option to buy from these fairs but provision of vouchers (or partial vouchers might also be used to catalyse interest in what may be agricultural novelties).

Comparing possible differences in seed security-related issues:

- ***Male and female-headed Households***
- ***Farmers accessing different land areas***

As a final thrust, The SSSA teams also examined possible differences within populations, for all issues above, for example, seed sources used, quantities planted, use of new varieties, manure/compost, storage chemicals, access to seed aid. Analyses were done by two major variables: sex of household head (male or female-headed households) and area under cultivation (below 1/2 acre, ½ -1 acre, 1-2 acres, over 2 acres).

- In terms of M/F headed households, two statistically significant differences were noted. Female-headed households had a greater tendency to decrease sowing rates (versus those male-headed. Similarly, households headed by grandparents had a greater tendency for decrease (versus those headed by the generation of parents). Both are signs of stress.

- In terms of households with diverse land areas available for cultivation, there were no significant differences among the seed-security-related issues considered.

Table 4.12: Differences in select seed security issues between M/F headed households and those with diverse cultivated areas

Issue	Differences? (t-tests)
Household headed by different genders	
sowing amounts 2012-2013	*yes- female-headed sowing less ;* *male headed more dynamic* *yes—grandparent -headed households sowing less*
use compost/manure	*no*
use of mineral fertilizer	*no*
use new varieties?	*no*
times received seed aid?	*no*
field sizes	*no*
Households cultivating different size land areas	
sowing amounts 2010-2011	*no*
sowing amounts 2011-2012	*no*
use of compost/manure	*no*
use of mineral fertilizer	*no*
use of new varieties	*no*
times received seed aid	*no*

Summary: Chronic Seed Security Findings and Emerging Opportunities

The review of medium-term trends in seed security in east and south Madagascar showed a few qualified moves forward but mostly static or stressed systems across the majority of seed security issues reviewed. We cite some of the major constraints encountered, below.

1. There was some new variety use within the SSSA sites, with over half of farmers (51%) having accessed at least one new variety in the period 2008−2013. However: 1) varieties of few crops were received (mainly irrigated rice in the east; sorghum and maize in the south); Few new legume varieties were on offer. 2) varieties were not always appreciated, with, sorghum types especially being rejected; and 3) variety delivery was basically free, through unsustainable channels (NGO/FAO).

2. Input use (non-seed) was generally low, with the exception of manure/compost in the east (81-91% of farmers, by season) and foliar sprays in the east (27-45% farmers, by season). The relatively low use of manure in the south (20-22% farmers) is surprising given the abundance of livestock and is a challenge that needs to be addressed.

3. For input use (non-seed), it is key to signal out the very low use of chemical storage treatments as farmers reported storage losses of 20-50% (especially for maize, rice, cowpea and the occasional groundnut stored).

4. Some important decentralized seed multiplication was noted during the SSSA, especially linked to the NGO GRET in the south. However, across all multiplication initiatives, two trends were noted: a) institutions – NGOs- remain the main clients and b) seed prices are heavily subsidized, even upwards of 100% over normal seed rates. Real markets and realistic strategies for marketing seed have yet to be identified.

5. Seed system channels which farmers use have generally remained static over the least five years.

6. There is virtually no agricultural processing in rural communities (with transforming of cloves in the east being an important exception). This means that farmers have been unable to reap the benefits of value addition to raw agricultural products. In the rural sites, the SSSA located only rice de-hullers (in the east).

7. Cassava diseases (whether Cassava Mosaic Disease or Cassava Brown Streak) are infecting 40% of plants in the south (farmers' estimates). In the south, there is no regional strategy for managing the disease or for helping farmers' access clean material.

8. Female-headed households and those headed by an older generation (grandparents) are sowing relatively less than those headed my male adults (parents). These initial signals merit further investigation. No significant seed security-related issues were found among households cultivating different land areas.

All sum, the major stresses encountered which affect seed security are chronic ones and the lack of sustainable innovations across the broad is to be remarked.

V. OVERALL RECOMMENDATIONS: ACROSS SITES

The opportunity to conduct assessments in distinct (contrasting) sites provided the field teams a useful perspective on seed security in select regions of Madagascar.

Below, we put forward a set of recommendations that are applicable across sites. As the seed security constraints identified are so widespread, we have decided to focus on the 'top ten', recommendations, that is, those for which investments and action plans might be given first priority. All recommendations could be effected in the short to medium term: 1-5 seasons.

Tailored site-specific recommendations have been included in each site report with initial actions plans already developed (see Annex I). Site-specific reports are available through CRS/Madagascar (Felicien.Randriamanantenasoa@crs.org).

Of special note is that the SSSA teams identified no problems in the assessed zones of action that might be labeled as 'emergency ones'. All constraints will require actions that are more developmental ones.

Seed security: specific responses needed

Here, we suggest a first set of 'major areas for priority action'.

1. **Decentralized variety testing network.** There is a strong need to identify adapted varieties for a range of crops (e.g. beyond rice, maize) that can meet farmer needs. Research institutions alone cannot handle the volume or agro-ecological range of testing. A decentralized variety testing network might be catalyzed under the guidance of FoFIFA and engaging a range of partners. (For example, potential partners in Androy might include, *inter alia,* GRET, RCS, AROP, FAO, Ampela Mitraka.) Key is that members: a) agree to use the same protocole; b) test varieties under real farmer conditions; and c) ensure systematic farmer feedback. In terms of the last, widespread training in participatory varietal selection (PVS) methods might be programmed

2. **Decentralized seed multiplication.** Decentralized seed production must become a more strategic and effective force in serving farmers. Simply, the formal seed sector in itself will never be able to handle: a) the range of crops needed for stress zones; nor b) the range of varieties. At this point, the decentralized seed multiplication initiatives are having only modest impacts (viz. laudable efforts of GRET in the south/Ambovombe). As a general recommendation, sustainable seed production models might be confirmed and scaled-up, especially for the legumes and vegetatively-propagated crops.

   Tied to #2

   2.1 Decentralized seed multiplication groups need to assess the cost-effectiveness of their production and delivery strategy. (This should be a fundamental requirement.) Subsidized seed production and purchase should be discouraged. Groups should be encouraged to produce only if a) viable markets/delivery mechanisms are identified; and b) their own agro-enterprise and marketing skills have been enhanced ; and c) they have a realistic business plan.

2.2 Links need to be specifically catalyzed to tie decentralized seed producers with continuing and new sources of germplasm.

2.3 Seed multiplication and delivery has to be geared toward a smallholder farmer client based. Institutional buyers (e.g. FAO, WFP, SOS) cannot drive the seed business ---if it is to be sustainable.

3. **Variety delivery mechanisms.** Delivery mechanisms to give all farmers regular access to new varieties should be intensified (e.g. for legumes, cereals…). Sale through agro-dealers provides only one venue but should be encouraged, especially in small pack sizes (100, 200, 500 g). Sale in local groceries, open markets, via village committees, Tranoben'ny Tantasaha or Leader Farmers should also be tested (see Box 9). In addition, agro-enterprise groups and seed loan groups (with clear marketing plans) might be formed around seed (point 9 below). 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 across Madagascar.

4. **Seed systems for vegetatively propagated crops:** Special attention needs to be given to multiplying planting material for vegetatively propagated crops (especially cassava and sweet potato, including the orange-fleshed varieties). Decentralized cooperative and farmer- based "seed" production systems may among the more effective, but varied models of production should be tested. Producer groups should also be well trained in how to maintain disease-free populations and be closely linked to reliable sources of new varieties and disease-free parent material (probably both at research institutions, FoFifa and FIFAMANOR).

5. **Strategy for Cassava disease control**. Associated with #4 but meriting a special note, there is a need to develop a strategy for the control of varied cassava diseases (mosaic, Brown Streak). This need is especially urgent in the South, where: losses have been estimated at 40%; where there is complete absence of any regional management plan; and where access to clean planting material is absent (non-existent?).

6. **Androy regional workshop on seed sector and Integrated seed security strategy.** Across the South, there are few ongoing means to introduce, multiply or market new varieties and higher quality seed (whether certified, QDS, or truthfully labeled). Policy makers and field workers alike stressed that seed related actions have to become more strategic and coordinated so as to create an Integrated Seed Sector (uniting strengths of the formal and informal seed sectors). The need for this regional workshop in Androy was seen as a top priority.

7. **Seed Storage options.** Storage losses on farm (estimated at 20-50% of stocks) must to be combatted in multiple ways particularly to deal with storage constraints of maize, rice and the legumes. Use of storage chemicals (organic and inorganic), triple bagging, or small seed silos are all possible options, to be tested for their technical and social suitability.

8. **Diversity and Nutrition Fairs (DiNERs).** Given the specific constraints found especially in the South (high malnutrition), short-term fairs might be hosted, but with a specific slant to help bolster diversity and nutrition in a region with is 'livestock-rich', but poor in most other agricultural innovations. Labeled as DiNER vouchers and fairs (DiNER= Diversity and Nutrition for Enhancing Resilience), such assistance aims to increase farmer access to agricultural elements that may be in short supply or with which farmers are not familiar. These may include, but are not limited to:

    i. New varieties, especially of legumes (e.g. beans)

ii. Horticultural crops (especially leafy vegetables)
iii. Fruit trees and other types of trees
iv. Small livestock: chicken, guinea fowl, turkeys,

The potential for increasing both nutrition and agricultural resilience can be pushed forward through such fairs. Payment by direct cash, as well as vouchers should be considered.

Ultimately, non-seed issues will drive the seed security sector. Food and livelihood security generally, are linked to the financial capacity of farmers. The last two recommendations focus on needs for: a) generating cash, through Village Savings and Loans Programs; and b) developing agro-enterprise market chains.

9. **Village Saving and Loan Programs (VSL)**: VSL programs are 'accumulating savings and credit' programs. In a relatively short time (12 – 24 months), the VSL funds are often large enough to allow members to borrow enough money to access key agricultural inputs such as seed or storage chemicals. So as to secure access to seed and other important inputs in the future, VSL should be promoted systematically.

10. **Rural agro-enterprises** are mechanisms of potential impact that are currently severely underdeveloped across many regions. Farmers are selling their agricultural produce mainly in raw form or only slightly modified as may be the case for flours. As a start in promoting agro-enterprise development, profitable business models that work for smallholder farmers need to be tested and then scaled-up *(and see Annex III for a list of value chain subject matter which is already being explored*). Linking smallholder farmers effectively to markets is a solid solution to increase incomes and seed and food security, and also to create the demand that will support crop breeding and seed production of good quality seed and/or planting materials of improved crop varieties.

Overall, this SSSA recommends a move away from short-term, gap-filling interventions and towards strategic investment in smallholder–driven variety development, seed production, and agricultural marketing systems. Simultaneously, it suggests a sharpened focus on food security that particularly emphasizes crop diversification and nutritional enhancement.

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ANNEXES

I. SEED SECURITY: SITE SPECIFIC ACTION PLANS (French)

- Action Plan: Vavatenina

- Action Plan: Ambovombe

II. SSSA DATA TABLES

A. Vavatenina

B. Ambovombe

III. Value chain studies (as of May 2013): List from CITE: Centre d'informations Technique et Economiques

ANNEX I. SITE BY SITE ACTION PLANS

ESSS VAVATENINA: PLAN D"ACTION			
	Problème lié directement à la sécurité semencière (tous les problèmes sont chroniques)	Réponses- court terme (1 à 2 saisons)	Réponse - moyen terme (au-delà de 2 saisons)
1	Perte en stockage- surtout pour le riz (mais ?), pas d'infrastructure de stockage + gestions de semences	+ lutte contre les rongeurs : campagne de dératisation + promotion de l'utilisation de produit de conservation + sensibilisation sur les luttes biologiques	+ Tester différents moyens de stocker : - Sacs triples - Petit Silo - Produits chimiques - Les traitements indigènes (locaux) : piment, eucalyptus, neem, voandelaka (préservation et éducation environnementale, mise en place de stratégie locale de maîtrise de problèmes de rats : identification de foyers de rats, identification des pratiques locales)
2	"Mauvaise qualité de manioc (tiges)- maladies (pour le manioc)	+ identifier les matériels Information-Education-Communication (IEC) / pédagogiques disponibles (FOFIFA/DRA Manioc) DRA : Département de Recherche Agronomique du FOFIFA + Valoriser les expériences de Projet Great Lake Cassava Initiative (GLCI-Rwanda, Congo, Burundi-Tanzania)	+ voir si les variétés résistantes existent (via FOFIFA) + tester les variétés et les processus/méthode en milieu paysan pour l'adaptation et l'acceptabilité + diffuser les résultats + former les paysans sur les productions des tiges indemnes (même avec les variétés locales) +Travailler avec les décideurs et avec FOFIFA pour la mise en place d'une stratégie régionale sur les maladies de manioc

3	Mauvaise qualité de semences de riz (mélange de variétés)	+ former les paysans à sélectionner sur le champ	+ identifier la gamme de coopératives qui produisent les semences (potentielles) de riz (e.g. Tano Soroka) + sensibiliser les coopératives de garder chaque variété à part –
4	Nouvelles variétés pas disponible: riz, manioc, mais	+ Créer un réseau de test/expérimentation pour les variétés (CARE, CARITAS, CRS, St Benoit, St Gabriel, FOFIFA…) CRS contactera FOFIFA	- Tester en milieu réel les variétés de FOFIFA avant de les multiplier (apprécié et adapté) - Promouvoir la production locale des variétés performantes -
5	Nouvelles variétés pas **accessibles** - prix élevé : riz pluvial - ~~transport : loin au marché~~ –pas de boutiques d'intrants de proximité au milieu rural		+ Promouvoir le VSL/SILC pour accéder au crédit + Travailler avec les SVD pour l'achat et la vente des nouvelles variétés + Collaborer avec les **marchands ambulants** et les négociants en intrants tout en formalisant les services offerts par ces marchands ambulants + Tester différents canaux à une échelle importante **i) canaux potentiels** (épicerie de village, petits commerçants des marchés, les organisations paysannes, groupe de femmes, église, lieu de rencontre communautaire, comités locaux, Tranoben'ny Tantsaha…), **ii) forme de présentation** (petits sachets) et **iii) types de collaboration** (dépôt-vente, support de risque…) pour fournir les semences
6	Les matériels végetaux ne sont pas disponibles pour certaines cultures à multiplication par voie végétative : igname, PDCO,	+ organiser des concours de multiplication de matériel végétal (igname, PDCO)	+ former les paysans sur les productions des tiges indemnes (même avec les variétés locales)
7	Peu de Renseignements sur les innovations pour les agriculteurs + variétés	+ Emission radio périodique + Visite-échange des producteurs	+ Diffusion des informations sur les nouvelles variétés et où elles sont disponibles + Émissions périodiques sur les innovations à la radio

	+ produits de stockage	+ Programme d'IEC sur les variétés nouvelles et produits de stockage	(en collaboration avec les vendeurs des intrants) + **Collaborer** avec les agents communautaires (de santé) et les agents vaccinateurs pour promouvoir les variétés et produits
8	Pas de système en place (décentralisé) de multiplication de semences et marketing	+ faire des liens avec les GPS de CARE (PPRR, PSDR, par exemple) afin de acheminer les variétés nouvelles	+ Atelier de réflexion sur la multiplication de semences, afin de • assurer une cadre légale (QDS, **et autres**) • identifier les grand défis sur le marketing aux petits fermiers. + collaborer avec CSA afin de….**i)** identifier les besoins des groupes de producteurs de semences pour apprendre comment commercialiser (i.e la marketing, gestion d'entreprise)
9	Problème de nutrition : notre stratégie semencière doit appuyer la nutrition		
10	Problème aléas climatiques : notre stratégie semencière doit appuyer la résilience environnementale		

ESSS AMBOVOMBE : PLAN D"ACTION pour SIHANAMARO - AMBOVOMBE			
	Problème lié directement à la sécurité semencière (tous les problèmes sont chroniques)	Réponses- court terme (1 à 2 saisons)	Réponse - moyen terme (au-delà de 2 saisons)
1	Perte en stockage- surtout pour niébé, mais, arachide pas d'infrastructure de stockage	+ promotion de connaissance de l'utilisation de produit de conservation (K-Otrine, Carbaryl…) + si nécessaire les rendre disponible au niveau des points de vente	+ Tester différents moyens de stocker : - Sacs triples - Petit Silo - Produits chimiques - Les traitements indigènes (locaux) : piment, eucalyptus, neem, voandelaka, cendre, pétrole + Où il y a déjà une cohésion sociale (+leadership), tester des stratégies villageoises
2	maladies pour le manioc	+ identifier les matériels Information-Education-Communication (IEC) / pédagogiques disponibles (FOFIFA/DRA Manioc) DRA : Département de Recherche Agronomique du FOFIFA + Valoriser les expériences de Projet Great Lake Cassava Initiative (GLCI-Rwanda, Congo, Burundi-Tanzania)	+ voir si les variétés résistantes existent + tester les variétés et les processus/méthode en milieu paysan pour l'adaptation et l'acceptabilité + diffuser les résultats + former les paysans sur les productions des tiges indemnes (même avec les variétés locales) +Travailler avec les décideurs pour la mise en place d'une stratégie régionale (Androy) sur les maladies de manioc
3	Nouvelles variétés pas disponible: manioc, cultures maraichères, arachide fleur 11, niébé, légumineuses.	+ Créer un réseau de test/expérimentation pour les variétés sous tutelle de FOFIFA +Acteurs potentiels pour Androy : GRET, CRS, AROPA,	- Tester en milieu réel les variétés de FOFIFA avant de les multiplier (apprécié et adapté) : - Même protocole - Assurance de feed back paysan - Formation sur le PVS/SVP (Sélection Variété

		FAO, ALT (Andrew Lees Trust), Ampela Mitraoka	Participative)
4	Nouvelles variétés pas **accessibles** - pas beaucoup de points de vente - pas de boutiques d'intrants de proximité au milieu rural - « jamais de production sans un plan de marketing »	Valoriser les agents/techniciens de proximité (Agents vaccinateurs): identification des besoins, acheminement des semences Identifier les commerçants… du village pour collaboration	- Tester différents canaux à une échelle importante **i) canaux potentiels** (épicerie de village, Leader Farmer (de GRET), petits commerçants des marchés, les organisations paysannes, groupe de femmes, église, lieu de rencontre communautaire, comités locaux, Tranoben'ny Tantsaha…), **ii) forme de présentation** (petits sachets) et **iii) types de collaboration** (dépôt-vente, support de risque…) pour fournir les semences - Promouvoir le VSL/SILC pour accéder au crédit
5	Peu de Renseignements sur les innovations pour les agriculteurs + variétés + produits de stockage	+ Visite-échange des producteurs + Programme d'IEC sur les variétés nouvelles et produits de stockage + Valoriser les journées intégrées, JNE, JNA, JNN (journée nationale d'environnent/ alimentation/ nutrition/ de l'eau)	+ Diffusion des informations sur les nouvelles variétés et où elles sont disponibles + Émissions périodiques sur les innovations à la radio +Organisation de foire régionale de semences + Encadrement et dotation en pamphlet des vaccinateurs, des paysans leaders (FFS) sur les innovations +Organisation de foires DINERS (« Diversity In Nutrition and Environmental Resilience »
6	Peu de Renseignements sur les innovations pour les agriculteurs + gestions de semences + fumiers	+ Visite-échange des producteurs + Programme d'IEC sur les variétés nouvelles et produits de stockage + Valoriser les journées intégrées, JNE, JNA, JNN + Renforcer le thème fumier dans les FFS	+ Tournées de démonstrations sur les gestions de semences et l'utilisation de fumiers

7	Peu de système en place (décentralisé) de multiplication de semences et marketing, +Manque d'analyse des goulots d'étranglement sur les filières semencières: • l'introduction de nouvelles variétés, et • de la production des semences au tous les niveaux	+ Atelier de réflexion sur la stratégie régionale dans la région d'ANDROY sur les multiplications de semences (accessibilité, disponibilité, …)	+ Créer des liens entre le secteur formel et informel +identifier différents partenaires qui sont prêts à multiplier et faire le marketing de semences de bonne qualité (QDS/autre)
8	Moyens de préparation de sol limités : • équipements • main d'œuvre (FFW, ACT) • concurrence avec les funérailles	+ Joindre VSL/SILC avec acquisition d'équipement + Regarder l'expérience de l'ONG EFA (Ezaka ho Fampandrosoana any Ambanivohitra) sur la dotation des petits matériels et d'intrants	+ Organiser l'utilisation de la main d'œuvre FFA pour éviter les concurrences avec les activités de semis.
	Problèmes plus global	Réponses- court terme (1 à 2 saisons)	Réponse - moyen terme (au-delà de 2 saisons)
9	Insuffisance d'eau	+ développer les keyhole gardens pour faire des liens entre nutrition et la production dans une région sèche	Action de plaidoyer pour une solution de la problème de l'eau + promotion des système arrosage appropriés à moindre coûts
10	Pouvoir d'achat très bas	–	Développer une stratégie pour appuyer les institutions appropriées et plutôt locales de crédit : VSL - augmenter IMF - sensibiliser que les VSL ne sont pas leurs concurrents (lier VSL et IMF) FRDA - en développement
11	Ménages dirigés par femmes + « grandparents » semblent d'être moins dynamiques et	+ utiliser CUMA comme point d'entrée pour nutrition ET	+ diffuse les 'keyhole gardens' avec CUMA ET légumineuses, ciblés aux femmes et personnes âgées

	vulnérables	marketing	
12	Problème de nutrition : notre stratégie semencière doit appuyer la nutrition	+mieux comprendre pourquoi la promotion de sorgho n'a pas réussi au Sud…état (au passé), ALT, GRET : • qualité de variété(s) ? • dépendance à l'aide ?	+ « DINERS » à grande échelle, utilisant les semences pour informer sur l'importance de nutrition et catalyser • les changements de priorités • les méthodes de préparation NB – doit inclure variétés et méthodes de contrôle contre les nuisibles aux champs : e.g. chenilles sur patates douces ;
13	Problème aléas climatiques : notre stratégie semencière doit appuyer la résilience environnementale	+ diverse gamme des cultures + variétés résistantes + information utiles pour aider les paysans à stratégiser + pratiques culturales appropriées (e.g. CFCA) + meilleures techniques de stockage + encore réfléchir sur les types d'assurance des cultures qui peuvent être utiles ici	

ANNEX II. SSSA DATA TABLES (selected set)

Vavatenina Mai 2013

Sexe du chef de ménage

Chef de ménage	N	%
Male	51	67.1%
Femelle	25	32.9%
total	76	100.0%

Surface cultivée par le ménage

Surface cultivée	N	%
< 0.5 ha	26	36.6%
0.5 - 1.0 ha	21	29.6%
>1.0-2.0 ha	19	26.8%
> 2.0 -3.0 ha	5	7.0%
>3.0 ha	2	2.8%
total	71	100.0%

Taille de ménage

Chef de ménage	Nb	Moyen	Dév. Std.	Prob. Test t
Male	51	4.73	1.43	**0.0170**
Femelle	25	3.88	1.39	
Total	76	4.45	1.46	

Quantité semée la saison plus récente (actuelle) en comparaison avec la quantité semée habituellement (toutes les cultures)

Surface cultivée (ha)	Nb	Plus	Autant	Moins	Prob. Khi-carré
<0.5	62	23	28	11	**0.0039**
0.5-1.0	51	11	21	19	
>1.0-2.0	48	17	11	20	
>2.0*	20	5	3	12	
total	181	56	63	62	

Les proportions approvisionnées par chaque source pour une culture – GRANDE SAISON.

Culture	kg total plantée	épargnées à maison/ stocks propres	report- hybrides de maïs,	amis/ voisins / famille	marché local	négociant en intrants agricoles,	groupes de semences communautaires	Gouvernement	ONG/FAO	producteurs sous contrat	Autres	TOTAL %
Maïs	14.0	26.8	0.0	14.3	**46.4**	10.7	1.8	0.0	0.0	0.0	0.0	**100.0**
Riz pluvial	259.0	10.0	0.0	**82.2**	2.3	0.0	0.0	0.0	0.0	5.4	0.0	**100.0**
Manioc *	360.9	13.7	0.0	**86.1**	0.0	0.0	0.2	0.0	0.0	0.0	0.0	**100.0**
Patates douces	2.18	**47.7**	0.0	**52.3**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**100.0**
Tomates	0.025	0.0	0.0	0.0	0.0	**100.0**	0.0	0.0	0.0	0.0	0.0	**100.0**
Banane	0.25	0.0	0.0	**100.0**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**100.0**
Riz irrigué	1821.0	**56.0**	0.0	**35.1**	4.3	0.0	0.0	0.4	0.1	0.0	2.2	**98.1**
Petsai	0.09	0.0	0.0	0.0	**72.3**	27.7	0.0	0.0	0.0	0.0	0.0	**100.0**
Brede chaud	0.28	**90.9**	0.0	0.0	9.1	0.0	0.0	0.0	0.0	0.0	0.0	**100.0**
Canne a sure	2.0	**100.0**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**100.0**
Daboara	0.100	**100.0**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**100.0**
TOTAL - toutes	2459.8	**44.8**	0.0	**47.4**	3.7	0.1	0.0	0.3	0.1	0.6	1.6	98.6

Quantités de semences pour la saison la plus récente/actuelle : plus/autant/moins que normale

Culture	% de ménages				Changement pour tous qui sèment cette culture
	Nb de ménages	PLUS	AUTANT	MOINS	moyenne %
Maïs	10	10.0	50.0	40.0	14.48
Riz pluvial	20	10.0	25.0	65.0	-24.11
Manioc *	58	37.9	32.8	29.3	7.01
Patates douces	9	33.3	44.4	22.2	3.57
Riz irrigué	76	31.6	32.9	35.5	15.86
Petsai	8	12.5	75.0	12.5	-1.67
TOTAL - toutes	**188**	**29.8**	**35.6**	**34.6**	14.37

Les proportions approvisionnées par chaque source pour une culture – la contre saison.

Culture	kg total plantée	épargnées à maison/ stocks propres	amis/ voisins / famille	marché local	négociant en intrants agricoles,	groupes de semences commun- autaires	gouverne-ment	ONG/FAO	total
Maïs	21.5	**32.6**	23.3	**44.2**	0.0	0.0	0.0	0.0	**100.0**
Riz pluvial	54.9	**43.4**	**36.6**	0.0	0.0	0.0	0.0	16.4	**100.0**
Manioc *	1.0	0.0	**100.0**	0.0	0.0	0.0	0.0	0.0	**100.0**
Patates douces	1.1	1.9	**101.9**	0.0	0.0	0.0	0.0	0.0	**103.8**
Haricots	32.8	0.0	0.0	**84.7**	15.3	0.0	0.0	0.0	**100.0**
Riz irrigué	522.5	**71.3**	24.5	1.3	0.0	0.0	1.5	1.0	**99.6**
Petsai	0.9	2.9	0.9	**77.8**	16.6	0.6	0.0	1.2	**100.0**
Taro	0.4	0.0	**100.0**	0.0	0.0	0.0	0.0	0.0	**100.0**
Concombre	0.2	15.6	0.0	**43.8**	25.0	0.0	0.0	15.6	**100.0**
Brede chaud	0.4	**78.6**	0.0	21.4	0.0	0.0	0.0	0.0	**100.0**
TOTAL - toutes	635.7	**63.5**	24.5	7.1	0.8	0.0	1.3	2.2	**99.7**

Quantités de semences pour la prochaine saison : plus/autant/moins que normal

Culture		% de ménages			Changement pour tous qui sèment cette culture
	Nb de ménages	PLUS	AUTANT	MOINS	moyenne %
Maïs	9	22.2	33.3	44.4	***-25.42***
Riz pluvial	9	11.1	55.6	33.3	***-14.04***
Patates douces	9	0.0	66.7	22.2	***-11.88***
Haricots	8	50.0	37.5	12.5	**9.72**
Riz irrigué	54	20.4	53.7	24.1	**3.17**
Petsai	41	26.8	63.4	9.8	**13.56**
Cocombre	6	33.3	33.3	33.3	**0.56**
TOTAL - toutes	**148**	**24.3**	**54.1**	**20.3**	**6.63**

Ménages utilisant d'engrais minéral

La saison plus récente (actuelle)		La prochaine saison	
Oui	9.5%	Oui	29.7%
Non	90.5%	Non	70.3%
N total	74	**N total**	74

Ménages utilisant de pesticides

La saison plus récente (actuelle)		La prochaine saison	
Oui	27.4%	Oui	44.9%
Non	72.6%	Non	55.1%
Total N	73	**Total N**	69

Ménages utilisant de composts/fumiers

La saison plus récente (actuelle)		La prochaine saison	
Oui	81.1%	Oui	90.5%
Non	18.9%	Non	9.5%
Total N	74	**Total N**	74

Ménages utilisant des produits chimiques de stockages

La saison plus récente (actuelle)		La prochaine saison	
Oui	2.6%	Oui	24.7%
Non	97.4%	Non	75.3%
Total N	76	**Total N**	73

Ménages qui ont reçu de nouvelles variétés les 5 Dernières années ?

Nombre de ménages*	Reçu de nouvelles variétés ? (%)				Nb de variétés reçues les 5 Dernières années			
	Oui	Non	Total	Mén. Qui ont reçu	Moy-enne	Dév Std.	Min	Max
76	56.6%	43.4%	100.0%	43	**1.3**	0.65	1	4

* total qui ont répondu 'oui' ou 'non' a la question

Source de nouvelles variétés dans les 5 dernières années

Source	Nb	%
amis/ voisins / famille	12	21.8%
groupes de semences comm.	1	1.8%
gouvernement	1	1.8%
ONG/FAO	39	**70.9%**
producteurs sous contrat	0	0.0%
Autres	2	3.6%
Total	55	100.0%

Sommaire : la fréquence d'aide semencière

Nombre de ménages*	Reçu d'aide en semences ? (%)			Mén. qui ont reçu (Nb.)	Nombre de fois aide est reçue			
	Oui	Non	total		Moyenne	Dév Std.	Min	Max
75	48.0%	52.0%	100.0%	36	**1.4**	0.73	1	4

* total qui ont répondu 'oui' ou 'non' a la question

Aide en semences - par culture

Culture	Nb	%
Maïs	4	7.8%
Patates douces	1	2.0%
Carotte	1	2.0%
Haricots	1	2.0%
Niébé	1	2.0%
Tomates	1	2.0%
Riz irrigué	34	**66.7%**
Petsai	4	7.8%
Concombre	3	5.9%
Brede chaud	1	2.0%
TOTAL - toutes	51	**100.0%**

Surface cultivée (ha)	Nb	Plus	Autant	Moins	Prob. Khi-carré
<0.5	44	13	27	4	**0.0078**
0.5-1.0	43	14	22	7	
>1.0-2.0	38	7	21	10	
>2.0	14	2	4	8	
total	139	36	74	29	

Ambovombe Mai 2013

Sexe du chef de ménage

Chef de ménage	N	%
Male	45	65.2%
Femelle	24	34.8%
Total	69	100.0%

Type de ménages - est-ce que le chef une adulte ('normale'), enfant, ou grands-parents (avec des enfants dépendants)

Chef de ménage	N	%
Adulte	59	85.5%
Grand-parent	10	14.5%
Total	69	100.0%

Surface cultivée par le ménage

Surface cultivée	N	%
< 0.5 ha	10	14.5%
0.5 - 1.0 ha	15	21.7%
>1.0-2.0 ha	18	26.1%
> 2.0 -3.0 ha	15	21.7%
>3.0 ha	11	15.9%
Total	69	100.0%

Les proportions approvisionnées par chaque source pour une culture – GRANDE SAISON.

% de total									
Culture	**kg total plantée**	épargnées à maison/ stocks propres	amis/ voisins / famille	marché local	négociant en intrantsagricoles,	groupes de semencescommunautaires	gouverne-ment	ONG/FAO	TOTAL %
Maïs	429.2	**43.9**	4.2	**51.2**	0.0	0.0	0.0	0.7	**100.0**
Sorgho	2.5	0.0	0.0	0.0	0.0	0.0	0.0	**100.0**	**100.0**
Dolique	35.4	**33.2**	7.1	**66.8**	0.0	0.0	0.0	0.0	**107.1**
Ambatry	1.3	0.0	0.0	**100.0**	0.0	0.0	0.0	0.0	**100.0**
Manioc *	375.2	**58.7**	**41.2**	0.2	0.0	0.0	0.0	0.0	**100.0**
Pasteque	2.2	**90.9**	0.0	9.1	0.0	0.0	0.0	0.0	**100.0**
Niébé	225.3	**42.5**	7.6	**48.8**	0.0	0.0	0.0	1.1	**100.0**
Courge	7.70	**64.9**	0.0	**35.1**	0.0	0.0	0.0	0.0	**100.0**
Petsai	0.00	0.0	0.0	**100.0**	0.0	0.0	0.0	0.0	**100.0**
Bamabara	5.2	0.0	1.9	4.0	0.0	0.0	0.0	0.0	**6.0**
Daboara	0.060	0.0	**100.0**	0.0	0.0	0.0	0.0	0.0	**100.0**
TOTAL - toutes	1084.0	**48.3**	17.7	**33.1**	0.0	0.0	0.0	0.7	99.8

Quantités de semences pour la saison la plus récente/actuelle : plus/autant/moins que normale

Culture		% de ménages			Changement pour tous qui sèment cette culture
	Nb de ménages	PLUS	AUTANT	MOINS	moyenne %
Maïs	57	19.3	26.3	54.4	2.90
Sorgho	1	0.0	0.0	100.0	
Dolique	13	30.8	23.1	38.5	-2.81
Ambatry	1	0.0	100.0	0.0	
Manioc *	52	21.2	46.2	32.7	58.07
Pasteque	2	0.0	50.0	50.0	
Niébé	54	29.6	37.0	33.3	20.73
Courge	2	50.0	50.0	0.0	
Petsai	1	0.0	100.0	0.0	
Bamabara	4	75.0	25.0	0.0	
Daboara	1	0.0	100.0	0.0	
TOTAL - toutes	**188**	**28.2**	**36.7**	**42.0**	34.85

Les proportions approvisionnées par chaque source pour une culture – la contre saison.

Culture	kg total plantée	épargnées à maison/ stocks propres	amis/ voisins / famille	marché local	négociant en intrantsagricoles,	groupes de semences commun-autaires	gouverne-ment	ONG/FAO	total
Maïs	31.2	**72.9**	14.3	12.8	0.0	0.0	0.0	0.0	**100.0**
Dolique	22.3	4.5	0.0	**95.5**	0.0	0.0	0.0	0.0	**100.0**
Manioc *	137.5	**90.3**	9.5	0.1	0.0	0.0	0.0	0.0	**100.0**
Patatesdouces	355.6	**47.8**	**40.9**	11.4	0.0	0.0	0.0	0.0	**100.0**
Pasteque	2.0	**100.0**	0.0	0.0	0.0	0.0	0.0	0.0	**100.0**
Haricots	10.8	0.0	0.0	**95.3**	0.0	0.0	0.0	4.7	**100.0**
Niébé	13.7	27.0	0.0	**73.0**	0.0	0.0	0.0	0.0	**100.0**
Pois de Cap	0.5	0.0	0.0	**100.0**	0.0	0.0	0.0	0.0	**100.0**
Brede chaud	0.0	0.0	**100.0**	0.0	0.0	0.0	0.0	0.0	**100.0**
Daboara	2.4	**100.0**	0.0	0.0	0.0	0.0	0.0	0.0	**100.0**
TOTAL - toutes	575.9	**56.6**	28.3	15.0	0.0	0.0	0.0	0.1	**100.0**

Quantités de semences pour la prochaine saison:
plus/ autant/ moins que normale

Culture		% de ménages			Changement pour tous qui sèment cette culture
	Nb de ménages	PLUS	AUTANT	MOINS	moyenne %
Maïs	9	22.2	11.1	66.7	***-21.15***
Dolique	3	0.0	33.3	66.7	
Manioc *	17	17.6	58.8	23.5	**14.37**
Patates douces	61	27.9	31.1	41.0	**49.13**
Pastèque	4	50.0	25.0	25.0	
Haricots	6	83.3	0.0	16.7	**70.00**
Niébé	2	0.0	0.0	100.0	
Pois de Cap	1	100.0	0.0	0.0	
Brede chaud	1	0.0	100.0	0.0	
Daboara	2	0.0	100.0	0.0	
TOTAL - toutes	**106**	**28.3**	**33.0**	**38.7**	**29.71**

Ménages utilisant d'engrais minéral

La saison plus récente (actuelle)		La prochaine saison	
Oui	0.0%	Oui	0.0%
Non	100.0%	Non	100.0%
N total	67	**N total**	65

NB – question sur les pesticides n'était pas posée

Ménages utilisant de composts/fumiers

La saison plus récente (actuelle)		La prochaine saison	
Oui	22.1%	Oui	20.0%
Non	77.9%	Non	80.0%
Total N	68	**Total N**	65

Ménages utilisant des produits chimiques de stockages

La saison plus récente (actuelle)		La prochaine saison	
Oui	13.0%	Oui	11.1%
Non	87.0%	Non	88.9%
Total N	69	**Total N**	63

Ménages qui ont reçu de nouvelles variétés les 5 Dernières années ?

Nombre de ménages*	Reçu de nouvelles variétés ? (%)				Nb de variétés reçues les 5 Dernières années			
	Oui	Non	total	Mén. Qui ontreçu	Moy-enne	Dév Std.	Min	Max
69	44.9%	55.1%	100.0%	31	**2.1**	1.09	1	6
* total qui ont répondu 'oui' ou 'non' a la question								

Source de nouvelles variétés dans les 5 dernières années

Source	Nb	%
amis/ voisins / famille	5	8.5%
marché local	1	1.7%
négociant en intrants	0	0.0%
groupes de semences comm.	0	0.0%
gouvernement	3	5.1%
ONG/FAO	49	**83.1%**
Autres	1	1.7%
Total	59	100.0%

Semer encore l'introduction ?

Culture	introductions de variétés	Semer encore?
	Nb	%
Maïs	14	71.4%
Sorgho	17	**5.9%**
Ambatry	7	71.4%
Manioc *	5	60.0%
Patatesdouces	3	66.7%
Konoke	2	50.0%
Niébé	3	100.0%
Courge	1	**0.0%**
Petsai	1	**0.0%**
Mucuna	1	100.0%
Bamabara	1	100.0%
TOTAL - toutes	**55**	**56.4%**

Sommaire : la fréquence d'aide semencière

Nombre de ménages*	Reçu d'aide en semences ? (%)			Mén. qui ont reçu (Nb.)	Nombre de fois aide est reçue			
	Oui	Non	total		Moy-enne	Dév Std.	Min	Max
69	55.1%	44.9%	100.0%	38	**1.4**	0.55	1	3
* total qui ont répondu 'oui' ou 'non' a la question								

Aide en semences - par culture

Culture	Nb	%
Maïs	10	16.1%
Sorgho	21	**33.9%**
Ambatry	4	6.5%
Manioc *	8	12.9%
Patates douces	9	14.5%
Konoke	1	1.6%
Niébé	6	9.7%
Courge	1	1.6%
Petsai	1	1.6%
Bamabara	1	1.6%
TOTAL - toutes	62	**100.0%**

Quantité semée la saison plus récente (actuelle) en comparaison avec la quantité semée habituellement (toutes les cultures)

		Quantité semée la saison plus récente (actuelle)			
Chef de ménage	**Nb***	**Plus**	**Autant**	**Moins**	**Prob. Chi. Sq.**
Male	132	42	37	53	**0.0120**
Femelle	69	11	32	26	
Total	201	53	69	79	

Quantité à semer la prochaine saison en comparaison avec la quantité d'habitude (toutes les cultures)

		Quantité à semer la prochaine saison			
surface cultivée (ha)	**Nb**	**Plus**	**Autant**	**Moins**	**Prob. Chi. Sq.**
<0.5	16	4	5	7	**0.0219**
0.5-1.0	18	4	3	11	
>1.0-2.0	29	12	5	12	
>2.0	43	10	22	11	
total	106	30	35	41	

Quantité semée la saison plus récente (actuelle) en comparaison avec la quantité d'habitude (toutes les cultures)

		Quantité à semer la prochaine saison			
Chef de ménage	**Nb***	**Plus**	**Autant**	**Moins**	**Prob. Chi. Sq.**
Adulte	172	50	60	62	**0.0364**
autre*	29	3	9	17	
total	201	53	69	79	

- autre = « grand-parent » : maison avec de personnes âgés qui gardent les petits enfants

ANNEX III. Value chain studies (as of May 2013). List from : Centre d'informations Technique et Economiques

LISTE DES ETUDES FILIERES REALISEES PAR LE CITE
(Année 2006-2012)

Année 2012

- Etude sur la filière vanille dans la région SAVA (GIZ)
- Synthèse de résultats d'études filière et de données statistiques – domaine de l'artisanat (HELVETAS-inter coopération suisse)

Année 2011

- Etude de marché sur la commercialisation de Tilapia Nilotica et étude de groupes cibles du Projet dans la Région Atsinanana (ONG MIDEM – NORGES VE)
- «Métiers porteurs : Comment développer les métiers agroalimentaires en Afrique Subsaharienne dont Madagascar ? » (GRET)

Année 2010

- Diagnostic préliminaire de la filière broderie à Analamanga (Programme IFAC/UE)
- Diagnostic préliminaire de la filière transformation laitière à Antsirabe (Programme IFAC/UE)
- Diagnostic préliminaire de la filière transformation de ricin à Ambalavao (Programme IFAC/UE)
- Diagnostic préliminaire de la filière ébénisterie à Ambatolampy (Programme IFAC/UE)
- Diagnostic préliminaire de la filière Petits matériels Agricoles (PMA) à Arivonimamo (Programme IFAC/UE)
- Diagnostic préliminaire de la filière transformation halieutique à Ambovombe (Programme IFAC/UE)
- Diagnostic préliminaire de la filière transformation halieutique à Tuléar (Programme IFAC/UE)
- Etude de la filière transformation agroalimentaire à Diégo (Programme IFAC/UE)
- Etude de la filière vannerie à Analamanga (Programme IFAC/UE)
- Diagnostic préliminaire de la filière transformation de fruits/cas de la banane à Toamasina (Programme IFAC/UE)
- Etude de la filière soie à Vakinankaratra (Programme IFAC/UE)
- Etude de la filière Aluminium à Ambatolampy (Programme IFAC/UE)
- Information/sensibilisation des consommateurs – marketing et promotion des produits apicoles à Analamanga (SAHA Imerina – PROSPERER Analamanga)
- IDENTIFICATION DES FREINS ET LEVIERS DU COMMERCE EQUITABLE POUR LES ORGANISATIONS D'ARTISANS A MADAGASCAR – filière artisanat – (PFCE)

Année 2009

- La revue et finalisation d'étude diagnostic de la filière oignon dans la Région Sofia, et élaboration participative du plan de développement de la filière (Programme PROSEPRER SOFIA)
- Synthèse nationale sur la filière miel: Analamanga, Haute Matsiatra, Amoron'i Mania (programme SAHA nationale)

- Synthèse nationale sur la filière soie : Analamanga, Haute Matsiatra, Vakinankaratra, Amoron'i Mania (Programme SAHA nationale)
- Mise en place du label sur la soie d'ITASY (VMSL)

Année 2008

- Identification et collecte d'informations sur les opérateurs économiques autours des filières appuyées par SAHA dans la région Amoron'i Mania (Programme SAHA Betsileo) : filières haricots, poulet gasy, pomme de terre, soie, miel, pisciculture, fibres végétales
- Identification des opérateurs économiques sur la filière apiculture dans la région Analamanga – Zone Manjakandriana et Andramasina (Programme SAHA Imerina)
- Les implications structurelles de la libéralisation sur l'agriculture et le développement rural à Madagascar – Programme Rural Struc - phase II : filières riz, mais, lait, litchis, pomme de terre (Banque Mondiale - Coopération Française - FIDA)

Année 2007

- Etude des opportunités d'investissements et de marché dans les zones d'intervention de MCA-Madagascar (Millénium challenge Account) – sur une 30^{aine} de filières dans les 05 zones d'intervention de MCA.
- Les implications structurelles de la libéralisation sur l'agriculture et le développement rural à Madagascar (Programme Rural Struc)
- Etude de la filière soie dans la région d'Itasy (Programme SAHA)
- Etudes et élaboration de plan opérationnel filière piment intéressant principalement la zone du Haut Mandrare (PHBM/MAEP)
- Etudes et élaboration de plan opérationnel filière oignon intéressant principalement la zone du Haut Mandrare (PHBM/MAEP)
- Etude préalable à l'élaboration du plan directeur régional de la filière pêche maritime à petite échelle sur le littoral du Menabe – zones nord et Sud Morondava (CREPA-ZAC)
- Collecte d'information de la filière soie dans le cadre de l'appui à la gestion des informations économiques pour le Vondrona Mandrindra ny Seham-pihariana Landy (VMSL)

Année 2006

- Etude de la filière élevage à cycle court sans le District d'Ankazobe (Programme SAHA Coordination Régionale Imerina)