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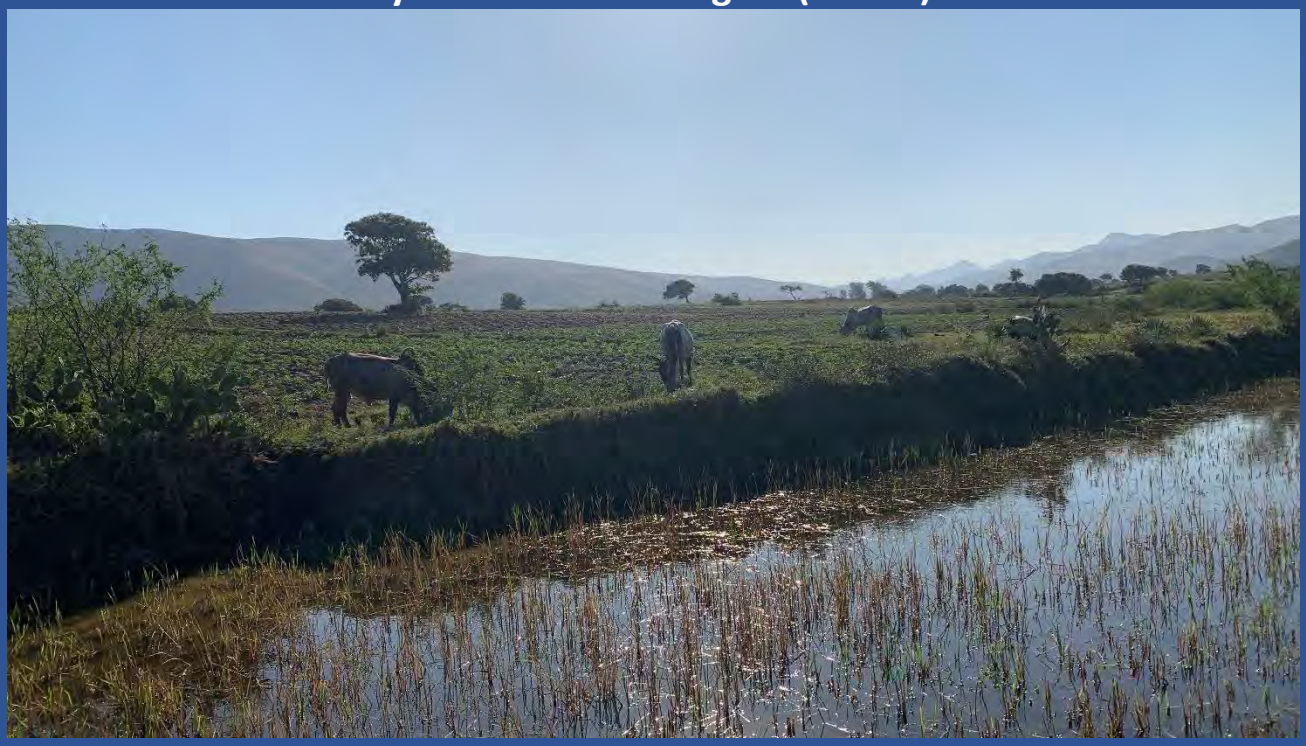

Madagascar Desk Review and Market Study

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ABOUT THE PROJECT/DELIVERABLE

This report presents the results of the Desk Review and Market Study (DRMS) completed under the USAID/Bureau for Humanitarian Assistance (BHA)/TPQ/SPADe Madagascar Resilience Food Security Activity (RFSA) Activity Design project. The research undertaken in this engagement will inform the design of the FY24 RFSA in Madagascar, which will serve the needs of rural Malagasy communities affected by chronic nutrition and food insecurity. This project is supported through a buy-in from USAID/BHA/TPQ/SPADe into the Long-term Assistance and Services for Research (LASER) project currently in place between USAID/DDI/ITR/R and a consortium led by Purdue University under cooperative agreement #7200AA18C00009. This project has been executed by Abt Associates under a subcontract with Purdue University.

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ABOUT LASER PULSE

LASER (Long-term Assistance and SErvices for Research) PULSE (Partners for University-Led Solutions Engine) is a $70M program funded through USAID's Innovation, Technology, and Research Hub that delivers research-driven solutions to locally sourced development challenges in USAID partner countries. A consortium led by Purdue University, with core partners Catholic Relief Services, Indiana University, Makerere University, and the University of Notre Dame, implements the LASER PULSE program through a growing network of 3,500+ researchers and development practitioners in 86 countries. LASER PULSE collaborates with USAID missions, bureaus, and independent offices, and other local stakeholders to identify research needs for critical development challenges, and funds and strengthens the capacity of researcher-practitioner teams to co-design solutions that translate into policy and practice.

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EXECUTIVE SUMMARY

Introduction

Madagascar has experienced multiple shocks and stresses over the last five years, leading to significant humanitarian caseloads, particularly in the South (known as the Grand South) and Southeast of the country, where the population suffers acute poverty and food insecurity. These areas are isolated due to poor road infrastructure; high poverty rates (78.8 percent); limited financial inclusion; and significant exposure to droughts, cyclones, and other climate change-driven events (OECD, 2021). In addition, the Anosy region suffers from conflict related to the theft of cattle and banditry. In the Grand South and Southeast, 40-84 percent of the population relies on subsistence farming and other agricultural activities (DHS 2021), yet access to arable land and agricultural productivity is low. The Government of Madagascar considers the development of this region among their main priorities.

This Desk Review and Market Study (DRMS), as well as the accompanying Secondary Data Analysis (SDA) and Political Economy Analysis (PEA), is intended to inform the program design for the next round of multi-year Resilience Food Security Activity (RFSA) programming in Madagascar. The RFSA programming will serve the needs of rural Malagasy communities affected by chronic nutrition and food insecurity. In particular, the DRMS aims to:

- Provide BHA and potential implementing partners with deep contextual understanding of the resilience and food and nutrition security context and key activity design issues for consideration in the Grand South and Southeast Madagascar.
- Inform the Bellmon determination and selection of food assistance modalities for the targeted geographic areas.

This study looked at nine market systems across four regions of Madagascar: Atsimo Andrefana, Androy, Anosy, (comprising the Grand South) and Atsimo Atsinanana (Southeast) regions. It focuses on rice, maize, sorghum, beans, groundnuts, vegetable oil, chickens, goats, and zebu (cattle) in selected districts of those regions.

About the Assessment

The study team followed a four-step process (detailed in Annex A), including a literature review of approximately 150 documents; development of qualitative data collection tools and training of assessment staff; collection of data in the relevant districts (July and August 2023), resulting in a total of 28 focus group discussions (FGD) and 220 key informant interviews (KII) and coding, thematic analysis, and triangulation of results. As part of the assessment, the team developed market maps to illustrate the relationships between market actors and how norms, policies, and infrastructure impact market functioning. The team also used the Market Systems Resilience Framework (Downing et al. 2018) to evaluate the resilience of the selected market systems and how it affects households' use of markets. These analyses can be found in the individual market system reports in Annexes B-J.

Food Security Overview in Study Area

Access

Access describes how households use resources to produce or obtain food (through purchase or barter). Rice is the main staple of the Grand South and Southeast, but it is frequently substituted with cassava, maize, or sweet potato. Around 85% of household expenses are estimated to be spent on food, with

staple foods making up the highest proportion of food expenditures (see Section 5.1 for detail). Prices for food, including rice, are volatile seasonally, despite government rice imports of 600,000 MT per year (Fayed, 2023) and policies designed to keep rice prices stable (imported rice has been VAT-exempt since 2005) (FEWS NET, 2018). Given the poor state of roads, there is complexity regarding which foods are most easily accessed at different times of year in different locations. More detail on this can be found by commodity in Annexes B-J, with detail on how various market actors play a role in access.

Poor crop production levels are typical and lead to numerous negative consequences. Due to low production levels, households are frequently both producers and purchasers of rice, maize, beans, and other commodities. Price volatility affects producers negatively both at the time of sale and later in the year when they purchase commodities. Low production levels and low profits reduce funds available to purchase inputs such as seed. In the 2023/24 planting season, this limited the amount of land that was planted (SeedSystems, 2023), resulting in reduced demand for agricultural labor, an important source of income for the poor and landless households (FEWS NET, 2023). Landless households also engage in petty trade, brickmaking, and charcoal production. Some poor households also use temporary migration to increase household income, but this has decreased as transport costs have increased. Migration as an income stream and coping mechanism is discussed in Section 4.6.

Financial inclusion is relatively low at 26.3 percent across the country (World Bank, n.d), but this study found that savings groups have been set up in the Grand South and Southeast and are well received by local communities because of their ability to address household financial constraints. There has also been promising growth in the use of mobile money.

Availability

Availability means that sufficient quantities of appropriate food (from production, imports or aid) are consistently found within reasonable proximity to households. In the Grand South and Southeast, a good variety of foods are produced (typically 8-11 types of food within a household), but vulnerability to droughts in the Grand South and tropical storms in the Southeast reduce availability through lower production and damaged roads. Poor production practices and lack of access to inputs also reduce the quantities produced. Section 3 and Annexes B-J provide details on production quantities and related issues. Poor households typically access markets on foot or by bicycle—transport by oxcart or vehicle is relatively expensive—this also limits the availability of food in more remote areas.

Poor roads and limited storage facilities reduce the quantity of food physically available in markets due to losses during transport and failure of traders to bring food from other areas. Investments in storage and processing, which could improve local availability, are deterred by insecure property rights, poor contract enforcement, and the predatory behavior of some market actors. In a few areas, conflict related to cattle theft also reduced food availability. According to FEWS NET, imports of rice and other key staple items such as sugar, oil, and wheat through May 2024 are expected to be similar to 2022. The government expects to cover 25 percent of the estimated national gap with grain imports until April 2024 (FEWS NET, 2023). Total cereal imports into Madagascar were valued at $335 million in 2021 (OEC, 2023), primarily from India, Pakistan, and Russia.

Anticipated Food Needs

United Nations Office for the Coordination of Humanitarian Affairs (OCHA estimates that 1.6 million people in the Grand South and Southeast need food and livelihood assistance (OCHA, 2023). In the Southeast, areas with better access to markets and higher cash crop production are expected to

maintain their current position (IPC Phase 2 "Stressed") of being able to meet minimum food needs but experiencing difficulty in meeting non-food needs. Across the Grand South, households without access to aid are expected to experience "Crisis" (IPC Phase 3). During the lean season (December to March) households will continue purchasing most of their food at markets. (Food inflation is at 10.2 percent as of October 2023 (WFP, 2023)). From March to May 2024, food prices will begin declining, but this is also the peak of cyclone and flood seasons, when anticipatory cash assistance may be appropriate to reduce the impact of natural disasters. Aid preferences (cash compared to in-kind) depend on gender, age, and location (rural locations showing stronger preferences for in-kind due to transport challenges); Section 7.2 provides more detail on regional preferences for the modality of aid.

Markets and Livelihoods Overview

Livelihoods and Gender

Crop sales and agricultural labor are among the most common income sources for poor and very poor households in the Grand South and Southeast—83 percent of households rely on agricultural livelihoods (DHS, 2021). Households most often raise a mix of crops and livestock on smallholder farms of less than 2 hectares (ha). Poor households may also generate additional income through petty trading, selling charcoal or firewood, doing domestic labor, migrating for mining work, and fishing in coastal areas. Despite a good harvest in 2023, households are struggling to recover because their savings and other resources have been depleted as they coped and rebuilt from disasters. The 2023 production season was strong, but household resilience levels are precarious, and the risks posed by climate change mean that new approaches are needed to address the shocks and stresses of the future. Low levels of education, low use of agricultural inputs (including improved inputs), and lack of resources drive the poor production performance across market systems, although there is a notable level of commitment to education and savings that households described during the focus group discussions—which could point to significant opportunities for change. Sections 2.1 and 4.0 provide more detail on livelihoods considerations in the study area.

Another difference between wealth groups is livestock ownership. While 50-60 percent of all wealth groups own livestock, better off households have large herds of cattle, goats, and sheep, whereas middle households and poor households have smaller herds, and 13-30 percent of the poorest households own no livestock or land (DHS, 2021). A significant proportion of households' own poultry—47 percent of poor households and 41 percent of the poorest households. In Anosy and Atsimo Andrefana, even the very poorest households own one zebu. Annexes H, I, J (poultry, goats, and cattle, respectively) provide more detail on livestock market systems and livelihoods.

Women manage household finances, including making decisions around nutrition and market purchases or sales. Focus groups consistently reported that production decisions were made jointly, although the male head of household makes any final decisions. This joint decision making provides a foundation for improving productivity and addressing unhelpful taboos that exist in some locations. Sections 2.3 and 4.3 provide more detail on gendered social practices and market opportunities

Seasonality and Prices

Price variations are generally seasonal, with prices lowest in the harvest season when a commodity is locally abundant, and highest during the lean season. Price fluctuations are driven at least in part by producer behavior and weak market linkages: producers sell nearly all their crops immediately (creating an excess in the market at harvest time), but at other times of year traders rarely seek additional

supplies from other locations because of the high cost of transport. When a product becomes locally unavailable during the lean period, a few larger traders may pull food from local stocks (largely at the secondary market level) but typically traders do not transport food from other production areas (for example from the north, where production timing and volumes are different). This means it is unavailable in the market, or only available at very high prices. Household expenditures also follow seasonal patterns, with food purchases highest during the lean period.

Inflation has been decreasing during 2023, although from a very high level (INSTAT 2023). As of October 2023, overall inflation stood at 8.2 percent in Madagascar, coming down from a high of 12.43 percent in March 2023. However, food inflation normally trends higher than overall inflation, and stood at 10.8 percent in October 2023 (down from 15.5 percent in March 2023) (WFP, 2023). The Food and Agriculture Organization (FAO) Cereal Price Index was up slightly in September, due to a 7 percent increase in maize and sorghum prices, although wheat prices fell slightly (FAO 2023). FAO's 2023 Rice Price Index also shows that the price of rice remains 27.8 percent higher than this time last year (a 15-year high), a result of the uncertainty around India's ban on white rice exports (India is the world's largest rice exporter). Rice prices have indeed increased as the season progresses (see Figure 4) (FEWS NET 2023a). The FAO's Vegetable Oil Price Index shows prices slightly down from August, driven by lower world prices for palm, sunflower, soy, and rapeseed oils worldwide. For cassava, a common replacement for rice among poorer households, prices are higher than last year and the five-year trend. Because of a poor bean harvest, the price of beans has also risen by 20 percent since the main harvest was completed in June (FAO 2023). The market system reports (Annexes B-J) provide local price information for each of the selected commodities.

Market System Resilience/Market Functionality

Market systems resilience (MSR) is a lens that looks at the ability of markets to innovate, mitigate, and adapt, to solve problems in the face of shocks and stresses, and therefore better serve targeted households. This framing is used in the market systems reports (Annexes B-J) to look at both structural (diversity, connectivity, rule of law, and power) and behavioral (competition, cooperation, business strategy, and decision-making) issues within a market system to determine how well the system can adapt and support household resilience (Vikara Institute, 2022).

The analysis of market systems resilience found that nearly all market systems explored across both the Grand South and Southeast had low connectivity (variety of relationships and business connections), low diversity (variation in sales channels, business models, products), and a focus on profit capture rather than growth. In general, markets are reactive to shocks and stresses, not proactive in identifying opportunities or preparing for future shocks. Producers in rural markets are not well connected to market actors in other locations, as evidenced by products being sold out or having very high prices at certain times of year. Lack of diversity in markets also limits the potential for employment creation in off-farm businesses, such as food processing or petty trading of agricultural goods. Section 2.2 provides a discussion of issues common to all markets and Annexes B–J provide further discussion on the resilience of each market system.

The Market Functionality assessment by the Madagascar Cash Working Group (CWG) found that three-quarters of markets can support cash and voucher assistance (CVA) across the Grand South and Southeast (WFP, 2022). While there is price volatility, especially for basic cereal products, the CWG analysis indicates that it is manageable. Nevertheless, very isolated communities are unlikely to be suitable candidates for CVA due to limited financial infrastructure to support CVA and reduced access to markets. The CWG also found sufficient availability of essential food and non-food products in the study

area, but our market systems analysis shows market structure weaknesses, such as over-reliance on a single supplier, have a negative impact on market functionality, particularly when shocks or stresses affect the area.

Infrastructure

Ports and Roads

Three main ports--Taolagnaro (Fort Dauphin), Tuléar, and Toamasina--serve the Grand South and Southeast. Facilities at all three ports can receive international vessels and permit commercial loading and unloading at the dock, but limited port infrastructure and lengthy berthing procedures are challenges at Toamasina and Tuléar.

Insecurity is an issue on a few roads in the Grand South, particularly the RN 13. Road conditions deteriorate rapidly during the rainy season (November–March), and only 10 percent of roads are considered to be in "good condition" and passable throughout the year (Logistics Cluster 2022a). This leads to high transport costs throughout the Grand South and Southeast. High fuel costs and in-transit commodity losses were cited as common challenges related to infrastructure. More detail on infrastructure is available in Section 2.4.

Storage Facilities

Warehousing is not developed as a service, and therefore most factories have their own warehouses, generally in major towns. Outside of big cities, warehousing facilities are old and poorly maintained. Many warehouses previously belonged to parastatals and have since been neglected. The few new storage facilities that exist are used for cash crops or humanitarian aid. However, due largely to the investments of aid agencies, warehousing capacity is growing. Section 2.4.3 and Table 5 provide detail on the location and size of warehouses in the study area.

Financial Infrastructure

Commercial banks, microfinance institutions (MFI), and mobile money operators are present in the larger towns of the Grand South and Southeast. Regarding mobile money, the Cash Working Group found that 6 out of 10 traders in the Grand South and Southeast do not have mobile network problems; the greatest network access challenges were found in Vangaindrano district (Atsimo Atsinanana) (CWG, 2022). Obstacles to better financial inclusion for both households and market actors include high bank fees, lack of physical access to banks, and lack of literacy. Mobile phone ownership is low, but many households gain access to mobile money (for example, receiving remittances) through friends and neighbors. Additional information on financial services can be found in Section 2.4.8.

Key Findings Table

The table below provides a summary of key findings and signposts to locations in the report where more detail is found regarding these findings.

Key Findings	Additional detail found in sections:
The findings indicate that in-kind (Title II) assistance (in the form of rice, maize, sorghum, beans, and vegetable oil) and cash and vouchers assistance are feasible. The most appropriate modality will depend on the target group, livelihood, and specific geographic location.	Rice: 3.1.5 Maize: 3.2.5 Sorghum: 3.3.4 Beans: 3.4.5 Vegetable Oil: 3.6.4 Modalities: 5.3

Key Findings	Additional detail found in sections:
Graduation Programs that incorporate training, access to finance, and market-aligned livelihoods activities appear to be appropriate and feasible. Aligning graduation activities with ongoing market systems development activities (under other complimentary funding) is likely to improve graduation outcomes. Evidence shows that systems approaches can contribute positively to household-level resilience; systems approaches implemented by other actors should be integrated with household-level programming.	Modalities: 5.3 Lessons Learned: 5.4 Considerations for Program Design: Section 7 Graduation Approach: 7.1
Producers have poor agricultural knowledge; this includes information on improved production practices, climate adaptation practices, and market information. The ability to do budget planning was noted as a specific barrier in FGDs.	Producers' sections found in Annexes B-J Lessons Learned: 5.4 Region-specific considerations: 7.2
Due to lack of information and market relationships, producers have little agency when negotiating with other market actors. At harvest time, producers have limited options and feel they must take the selling price offered, with no negotiation.	Producers' sections found in Annexes B-J
This study did not find strong household preferences for cash, voucher, or in-kind assistance. The desired modality varied according to household circumstances and knowledge.	Region-specific considerations: 7.2
Conflict related to cattle theft in Betroka district and cultural norms around funerals and social obligations complicate investment efforts in the zebu (cattle) value chain.	Conflict Dynamics: Section 2.3.2 Cattle/Zebu: Section 3.7 Cattle/Zebu Market Systems Assessment: Annex J
Households show a strong saving culture and a willingness to invest in education, which a RFSA could harness, particularly through the financial inclusion component of the graduation approach.	Financial Services: Section 2.4.8 Coping mechanisms/Use of disposable income: Section 4.1.2 Financial Inclusion: Section 7.1.4 Region-specific considerations: 7.2
Financial inclusion is very low overall, although savings groups are well received by communities where they exist. There may be an opportunity for incorporating mobile money as a transfer modality in some areas, particularly if the RFSA provided SIM cards and/or mobile phones directly to participants as part of program activities.	Coping mechanisms/Use of disposable income: Section 4.1.2 Financial Inclusion: Section 7.1.4
Climate change is expected to increase rainfall in the Southeast, but it will be less consistent. The Grand South is expected to be drier. Livelihood activities will need to be cognizant of, and plan for, the anticipated effects of climate change on communities and households.	Climate change vulnerabilities: Section 4.2

Key Findings	Additional detail found in sections:
In some market systems, aid is negatively affecting the behavior of market actors. This can be seen with seed systems and in the rice, beans, and vegetable oil market systems to some extent.	How shocks and stresses affect…: Section 2.2.3 Maize - Access and Availability Issues: Section 3.2.4 Beans - Barriers/Opportunities: Section 3.4.3
A significant number of markets can support cash and voucher assistance (CVA). Mobile phone access appears reasonable (shared access), but opportunities to use it as a development tool are not being utilized.	Market Context and Market Resilience: Section 2.2 Formal & informal social protection mechanisms: 2.3.3 Financial Services: 2.4.8 Financial Inclusion: Section 7.1.4
Market systems are not consistently resilient to shocks and stresses, further undermining household capacities. Poor infrastructure (particularly roads) and lack of crop storage exacerbate the issues created by market structure and market behavior.	Market Context and Market Resilience: Section 2.2 Market Connectivity: 2.2.4 Market Systems Resilience analysis found in Annexes B-J
Significant potential local value is lost because of poor input systems (agricultural and veterinary) and lack of processing. This affects not just income but also nutrition and dietary diversity.	Input and Processing sections found in Annexes B-J
There is potential to increase household incomes and improve resilience through the rice, maize, sorghum, beans, groundnuts, chickens, and goats market systems.	Rice: 3.1.5 Maize: 3.2.5 Sorghum: 3.3.4 Beans: 3.4.5 Groundnuts: 3.5.4 Chickens: 3.9.4 Goats: 3.8.4 Graduation Approach: 7.1

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ACRONYMS

ACSA	*Agent Communautaires de Santé Animale*
ACSQDA	*Agence de Contrôle de la Sécurité Sanitaire et de la Qualité des Denrées Alimentaires*
AfDB	African Development Bank
ADRA	Adventist Development Relief Agency
APPSA	Agent de Proximité de Production et de Santé Animale
BHA	Bureau for Humanitarian Assistance
BNGRC	*Bureau National de Gestion des Risques et des Catastrophes*
BoViMa	*Bonne Viande de Madagascar* (Madagascar Good Meat)
CCT	Conditional Cash Transfer
CDD	*Conseil de Développement Diocésain*
CECAM	*Caisses d'Epargne et de Crédit Agricole Mutuels*
CIP	International Potato Center
CRS	Catholic Relief Services
CSA	Centre de Service Agricole
CREAM	Centre De Recherches, D'études Et D'appui à L'analyse Economique À Madagascar
CTAS	*Centre Technique Agro-écologique du Sud* (Technical Agroecological Center of the South)
CVA	Cash and Voucher Assistance
CWG	Madagascar Cash Working Group
DHS	Demographic and Health Surveys
DRMS	Desk Review and Market Study
EDFI	European Development Finance Institutions
EMMA	Emergency Market Mapping and Analysis
EU	European Union
FAO	Food and Agriculture Organization
FGD	Focus Group Discussion
FFS	Farmer Field Schools
FIB	Fiche Individuel Bovine
FID	*Fonds d'Intervention pour le Développement* (Development Intervention Fund)
FOFIFA	National Center for Applied Research on Rural Development
FRED	Federal Reserve Economic Database
GBV	Gender-Based Violence
GIZ	*Deutsche Gesellschaft für Internazionale Zusammenarbeit*
GMO	Genetically Modified Organism
GRET	Groupe de Recherche et d'Etudes Techniques
HEA	Household Economy Analysis
HITA	*Huilerie Industrielle de Tamatave*
IDEAL	Implementer-Led Design, Evidence, Analysis and Learning
IFAD	International Fund for Agricultural Development
IFC	International Finance Corporation
IFRC	International Federation of Red Cross and Red Crescent Societies
IRRI	International Rice Research Institute
IMF	International Monetary Fund

INSTAT	*Institut National de la Statistique* (National Statistics Institute)
IOM	International Organization for Migration
JICA	Japan International Cooperation Agency
KII	Key Informant Interview
LASER	Long-term Assistance and Services for Research
LFL	Livestock Feed Ltd.
MBP	Market Based Programming
MEB	Minimum Expenditure Basket
MFI	Market Functionality Index
MGA	Malagasy Ariary
MICI	*Ministère de l'Industrialisation, du Commerce et de la Consommation*
MINAE	*Ministère de l'Agriculture et de l'Elevage* (Ministry of Agriculture and Livestock)
MPPSPF	Ministry of Population, Social Protection and Promotion of Women
MSANP	Madagascar Ministry of Public Health
MSME	Micro, Small, and Medium-Sized Enterprise
MSR	Market Systems Resilience
MT	Metric Tons
MTM	Ministry of Transport and Meteorology
NGO	Nongovernmental Organization
ODOF	One District One Factory
OECD	Organisation for Economic Co-operation and Development
OPR	*Organisation Paysanne Régionale*
PARM	Platform for Agricultural Risk Management
PEA	Political Economy Analysis
PULSE	Partners for University-Led Solutions Engine
RFSA	Resilience Food Security Activity
RINDRA	Reinforcement of Institutions for the Development of Agricultural Resilience
SAF/FJKM	SAMPAN'ASA MOMBA NY FAMPANDROSOANA
SDA	Secondary Data Analysis
SEED	Sustainable Environment, Education & Development
SILC	Savings and Internal Lending Committee, generically called savings groups
SPADe	Strategic Planning and Activity Design
SQD	Quality Declared Seed
SSA	Seed Security Analysis
SSAS	Seed System Assessment
SWM	Sustainable Wildlife Management
TAZA	Androy Zone Transaction Company
TPQ	Technical and Program Quality
UN	United Nations
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
VAT	Value Added Taxes
VSLA	Village Savings and Loan Associations, generically called savings groups

WASH	Water, Sanitation, and Hygiene
WFP	World Food Programme
WHH	Welthungerhilfe

1. INTRODUCTION TO THE ASSESSMENT

Madagascar has experienced multiple shocks and stresses over the last five years leading to significant humanitarian caseloads, particularly in the Grand South and Southeast of the country, where the population suffers acute poverty and food insecurity conditions. USAID's Bureau for Humanitarian Assistance (BHA) seeks to build resilience among households and communities, to reduce the need for ongoing and future food and nutrition security humanitarian assistance in the region. This section reviews the purpose of the assessment, provides an overview of how the report is structured, and summarizes the overall methodology.

1.1 Purpose of Assessment

This report presents the results of the Desk Review and Market Study (DRMS) completed under the USAID/BHA/Office of Technical and Program Quality (TPQ)/Strategic Planning and Activity Design (SPADe) Madagascar RFSA Activity Design project. This DRMS, as well as the accompanying Secondary Data Analysis (SDA) and Political Economy Analysis (PEA), is intended to inform the program design for the next round of multi-year Resilience Food Security Activity (RFSA) programming in Madagascar. The RFSA programming will serve the needs of rural Malagasy communities affected by chronic nutrition and food insecurity. In particular, the DRMS aims to:

- Provide BHA and RFSA applicants with deep contextual understanding specific to Madagascar regarding the resilience and food and nutrition security context, stakeholders, and key activity design issues for consideration.
- Inform the Bellmon determination and selection of food assistance modalities for each of the targeted geographic areas based on local market conditions, appropriateness, and feasibility. This study is not intended to provide specific program design recommendations, but instead provide stakeholders with the information needed to make evidence-informed activity design decisions.

USAID identified a list of 94 research questions focused on the general themes of gender, age, social inclusion, youth engagement, food availability, food access, food utilization, nutrition, markets, livelihoods, and key stakeholders. The desk review also incorporated information related to poverty, in alignment with BHA's selection of the graduation approach for this RFSA.

The research activities for this DRMS examined specific locations, commodities, and populations. The analysis focuses primarily on specific districts within three regions of southern Madagascar that will be known as the "Grand South'' throughout this report (See Figure 1): Ampanihy Ouest district (Atsimo Andrefana region); Ambovombe-Androy, Bekily, Beloha, and Tsihombe districts (Androy region); Amboasary-Atsimo, Taolagnaro, and Betroka districts (Anosy region); and one area that we will refer to throughout this report as the Southeast region: Befotaka, Farafangana, Vangaindrano, and Vondrozo districts (Atsimo Atsinanana region). To refer to this entire area, including selected districts in both the Grand South and the Southeast, we will use the term "study area." Although data collection activities incorporated perspectives from a variety of stakeholders, the primary population of interest is potential RFSA target participants, which include the most vulnerable households and communities within these areas.

Figure 1. Depiction of the Study Area

1.2 Structure of the Report

Markets in Madagascar vary significantly across localities and commodities. This report will also have readers with a wide variety of information needs, including food security, livelihoods, and markets.

Section 1 provides an overview of the locations, methodology, and approach of the study. Further detail on study methodology can be found in Annex A. Section 2 describes contextual factors that are common to all regions of the study area, including: the livelihoods; social dynamics; market, policy, infrastructure issues; and a summary of food security issues. Section 3 provides summary findings on all nine commodities assessed as part of this study, including an overview of the market, description of key actors, and important barriers and opportunities. Readers interested in a deeper dive into a specific commodity—rice, maize, sorghum, beans, groundnuts, vegetable oil, chickens, goats, or cattle—can find individual market systems reports in Annexes B-J.

Additional livelihood concerns, particularly for women, youth, and people with disabilities, are addressed in Section 4. Section 5 describes current and recent past food security and humanitarian activities in the study area, including lessons learned from those experiences. Section 6 looks at trends over time for production, prices, nutrition, and future assistance. Considerations for program design, including those most relevant for the graduation approach, are provided in Section 7. In addition to the methodology annex (Annex A) and in-depth market systems reports (Annexes B-J) previously mentioned, there is also a final annex providing further contextual information on each region (Annex K: Region Profiles).

1.3 Selection of Market Systems[1] and Locations

The nine market systems selected by USAID provide a portfolio of opportunities to address resilience and food security issues across the diverse contexts of Madagascar's Grand South and Southeast regions. There are five commodities that are most relevant for Bellmon considerations: rice, maize, sorghum, beans, and vegetable oil. The other commodities in this study--groundnuts, cattle, goats, and chickens--also form an important part of livelihood activities in various districts throughout the study area but are less relevant to a Bellmon determination. These commodities include cash crops; products that are used primarily as coping mechanisms in times of crisis; crops that play an important nutritional role; and livestock, which are a form of "savings" and hold important cultural significance.

The DRMS primary data collection incorporated three primary markets, 13 secondary markets, and 10 village-level markets throughout the study area. In selecting the markets, the research team considered a variety of elements: location, rural vs. urban, market size, logistical feasibility and security of visiting, and types of market activity (such as whether it could be visited on a market day and whether the targeted commodities were likely to be found there). The study team attempted to balance these elements in the initial planning and was opportunistic in identifying market actors who could provide information on the targeted commodities. All the marketplaces visited were within the USAID RFSA target area, except for Tuléar, which was included because it is a key market and the main import/export port for the Grand South.

1.4 Methodology Brief

The study team followed a four-step process, summarized here, and detailed in Annex A. The first step was a literature review, which clarified which questions could be answered with existing evidence, and which needed to be explored during the in-country work. With this information, the study team developed interview guides for key informant interviews (KIIs) of market actors, local government officials, aid staff, and others, as well as guides for community focus group discussions (FGDs). Sampling was purposive (ensuring representation of all market functions in market system and region) and largely qualitative. The study team gathered data in the relevant districts in July and August 2023, resulting in 28 FGDs and 220 KIIs.

Upon completion of data collection, the data were loaded into NVivo software and coded to support analysis in line with the Project Description. The study team triangulated primary data with secondary data, including a literature review and secondary datasets such as the 2021 Demographic and Health Survey (DHS 2021) and data from the World Bank. At the same time, study team leaders developed market maps to illustrate the relationships between market actors and how norms, policies, and infrastructure impact market functioning. The team also used the Market Systems Resilience Framework for further analysis on the selected market systems (Downing et al. 2018). Further analysis was performed to evaluate the resilience of the selected market systems and how this affects household use of markets. These analyses can be found in the market system reports in Annexes B-J.

[1] A market system is the network of people, infrastructure, and rules (formal and informal) that support buying and selling of a product. It may include multiple value chains (such as feed, dairy products, and meat for cows) and generally is not limited to a specific geography.

2. CONTEXT

Section 2 aims to provide an overview of the local context, beginning with an overview of the livelihood zones in the study area in Section 2.1. Section 2.2 provides further details on the market context, including reference markets, the impact of shocks and stresses on food access and availability, and market connectivity, diversity, power dynamics, and rule of law. Next, Section 2.3 provides further detail on the social context in the study area, including conflict, social safety nets, social practices that influence food security, household-level decision-making, and the impact of shocks at the household level. In Section 2.4, we provide a thorough overview of infrastructure. This refers to both physical infrastructure such as ports, warehouses, roads, and water sources and other infrastructure that also supports market systems such as cold chains, agricultural inputs, veterinary services, and financial services. The final subsection, 2.5, summarizes government policies related to genetically modified organisms, meat exports, taxes, and licensing for market actors, among others, as well as challenges related to corruption and enforcement.

Madagascar's Grand South (known in French as the *Grand Sud*) is an arid zone comprising three regions: Androy, Anosy, and Atsimo Andrefana. For this study, we have also included in our analysis a fourth region in the Southeast: Atsimo Atsinanana. The population of the study area is 4,943,706 million, or 17.94 percent of the population of Madagascar (DHS 2021). The study area is characterized by its isolation because of poor road infrastructure; high poverty rates (78.8 percent); limited financial inclusion; and significant exposure to droughts, cyclones, and other climate change-driven events (Organisation for Economic Co-operation and Development [OECD] 2021). In addition, Anosy suffers from conflict related to the theft of cattle and banditry (see 2.3.1 Conflict dynamics). In the Grand South, drought is felt most severely in the Androy and Anosy regions, while the Southeast faces repeated tropical storms and cyclones. During the most recent drought in 2021/22—the worst drought the country has experienced since 1981—an estimated 2.8 million people were exposed to drought (Fayad 2023). Madagascar was ranked 12th out of 180 countries in the International Monetary Fund (IMF) Climate Risk Index for 2000–2019, indicating a high level of exposure and vulnerability to extreme events (IMF 2023).

The SDA (DHS 2021) found that in the study areas, 40-84 percent of the population relies on subsistence farming and other agricultural activities, yet access to arable land and agricultural productivity are low. The Government of Madagascar considers the development of the Grand South and Southeast among their key priorities. A reliance on traditional agricultural practices leads to low production, exacerbating food insecurity. While the most recent agricultural seasons have been relatively good, food inflation is on the rise–currently between 11-15 percent — creating challenges for household consumption (WFP 2023).

2.1 Livelihood Zones of the Study Area (Household Economy Analysis)

Livelihood zoning is a way of understanding which geographies share similar patterns of producing and accessing food. The HEA approach helps practitioners understand how households are likely to respond to shocks, based on the resources that are immediately available to them, and therefore which resilience activities are likely to be most effective (FEWS NET 2023c).

Figure 2: Livelihood Zones in the Target Area

The study area in this report includes six livelihood zones (see Figure 2) that encompass the Mahafaly Plateau, a semi-arid zone, and rice production areas, but not the coastal livelihood areas.[2] The study area is characterized by smallholder farms of less than 2 ha, with households producing staple crops such as cassava, sweet potato, and rice in the Grand South, along with raising livestock, particularly goats and cattle. Households mainly produce for their own consumption and sell any surplus almost immediately to meet household needs and to avoid storage, which often incurs high losses because of inappropriate storage methods. The study team found very little local processing, and traders report that poor post-harvest handling practices lead to waste and spoilage because transportation times to market are generally long. The north of Androy and most of Anosy are dominated by rice production, with a small pocket where groundnuts are grown alongside other staple crops. Maize is predominant in Amboasary-Atsimo (shown in medium blue in Figure 2). Livestock has the greatest importance in the Mahafaly Plain in Ampanihy Ouest (shown in black) and the Bara Plateau in Betroka and Befotaka (shown in light blue). In the livelihood zones of the Southeast cassava and cash crops (such as coffee, cloves, vanilla, litchi) provide the main livelihoods. Another source of income for poor households is paid agricultural labor, for which they often temporarily migrate. Poor households may also generate additional income by selling charcoal or firewood, doing domestic labor, practicing informal mining, and fishing in coastal areas (FEWS NET 2017).

2.2 Market Context and Market Resilience

Market systems and the marketplaces that comprise them lack beneficial market relationships, instead showing both structural and behavioral elements that limit opportunities for growth, innovation, and adaptation. This means strengthening of market systems is necessary to increase households' livelihoods opportunities and improve resilience. Specific examples by commodity are found in Annexes B-J. Nevertheless, Madagascar's Cash Working Group found that despite the systemic weaknesses, three-quarters of markets can support cash and voucher assistance (CVA) (Cash Working Group, 2022) and the research team's findings indicate that the figures may have increased since 2022.

[2] Note that across the coastal areas of the Grand South, fishing is an important livelihood, but - given that fish were not included in the list of selected market systems - these areas were not deliberately incorporated as part of the sampling plan (Refer to Annex A for further details on sampling).

2.2.1 Reference Market Profile Summary

Key or "primary" markets in the study area are cities or very large towns that are hubs for market system activities, where a wide range of market actors and value chains are represented regularly; there is often a port. The primary markets for this study are Tuléar, Taolagnaro (Fort Dauphin), and Farafangana, all of which are large urban areas with multiple marketplaces.

Secondary markets are linked with primary markets. This is where wholesalers obtain a large proportion of goods for resale in smaller markets, and where goods produced in rural areas can be aggregated for sale in larger markets. In the study area, a typical secondary market will have a marketplace where, one day a week, 300-400 individual market sellers sell their products from simple stalls or a sheet placed on the ground. A core set of shops and market sellers operate every day, but the number of sellers doubles or triples on the main market day. Secondary markets explored in this study include Ambovombe, Amboasary, Ampanihy, Andalatanosy, Befotaka, Bekily, Betioky, Betroka, Farafangana, Morombe, Tsihombe, Vangaindrano, Vondrozo.

2.2.2 How Households Access Markets

In general, in rural communities within the study area, people walk one to two hours to reach a secondary market, or sometimes use a cattle cart. Transport by vehicle is expensive and reserved for transporting goods or animals. Most roads are in such poor condition that they are more comfortably walked rather than driven. Bicycles may also be used, including for transport up to 70 kilograms (154 pounds). The long distances between markets, combined with poor road conditions, make accessing primary markets challenging. As also noted in Section 2.4.2, road conditions limit households' access to markets, further isolating communities and limiting their ability to sustain their livelihoods.

2.2.3 How shocks and stresses affect food access and availability within markets

As well as affecting households, shocks (such as a tropical storm) and stresses (such as poor-quality roads and infrastructure) impact market functionality, creating food access and availability issues (see Table 1 for further details).

Table 1: Summary of Access and Availability Issues

Access Issues	● Low income from previous poor production reduces the quantity of inputs purchased (such as seed), reducing the amount of land that can be planted (and therefore future production quantities) ● Droughts and reduced planting lowers the amount of agricultural labor required; an important income source for the poor and landless ● Lack of household storage reduces control over when harvest is sold; producers often receive a low farmgate price due to high volumes on the market and low negotiating power ● Households have reduced purchasing power in the lean season ● Price volatility is seasonal, but also linked to predatory behavior of some wholesalers and traders ● Some evidence of wholesalers with storage facilities manipulating the quantity and price of goods in relation to aid availability ● There is limited access to finance, which has the potential to provide anticipatory financing for adaptation or recovery from shocks ● Poor roads increase the cost of goods; journeys take longer, and transporters must repair their vehicles more frequently

Availability Issues	• Good diversity of agricultural products, but droughts, floods and tropical storms reduce production levels • Poor knowledge of improved production techniques and ways of adapting reduce production levels and increase climate vulnerability • Lack of access to improved inputs increases vulnerability to some shocks (e.g., pest infestation, drought) • Poor roads and storage mean that less food is physically available in markets due to losses during transport and failure of traders to bring food from other areas. This is problematic when tropical storms or flooding destroy roads. • Imports, including food aid, improve availability of food, but do not address underlying causes of food insecurity • In some areas, conflict related to cattle theft reduces food availability • Insecure property rights, poor contract enforcement, and the predatory behavior of some market actors deter investment

The Food Balance Sheet from the Food and Agriculture Organization (FAO) included in Table 2 provides further detail on supply and demand at the national level, particularly for wheat, rice, and coarse grains (which includes sorghum, millet, and corn/maize).

Table 2: Madagascar Food Balance Sheet 2023

CEREAL SUPPLY/DEMAND BALANCE FOR THE 2023 MARKETING YEAR (January/December)				
	Wheat	**Rice**	**Coarse grains**	**Total cereals**
2023 Domestic availability (000 tonnes)	**2**	**3 072**	**220**	**3 290**
2022 production	2	3 072	216	3 290
Expected stock drawdown	-	-	4	-
2023 Utilization (000 tonnes)	**263**	**3 873**	**240**	**4 372**
Food use	263	3 093	230	3 585
Non-food use	-	550	11	561
Exports	-	-	-	-
Expected stock buildup	-	230	-	226
2023 Import requirements (000 tonnes)	**261**	**801**	**20**	**1 082**
Per caput consumption (kg/year)	**9**	**104**	**8**	**121**
2023 Comparison with the previous year and the recent average				
Production (000 tonnes)				
Previous year's production	1	3 062	233	3 296
Previous five years' average production	3	2 557	236	2 796
2022 production compared to average (%)	**59**	**120**	**92**	**118**
Import requirements (000 tonnes)				
Previous year's imports	261	635	20	916
Previous five years' average imports	246	557	14	817
2023 Import requirements compared to average (%)	**106**	**144**	**139**	**132**

Source: FAO 2023

2.2.4 Market Connectivity

Market connectivity—defined as the way and degree to which actors and resources interact across geographic, ecological, and social landscapes—is a considerable challenge in Madagascar (Downing et al. 2018). In the context of market systems, connectivity includes not only the extent of connection but also the relationships between connected actors, whether they are farmers or businesses linked horizontally or vertically to one another in a system. Too many or too few connections can hamper the capacity to generate or sustain the growth of the market system.

For most of the commodities this study considered, producers in rural markets are not well connected to market actors in other locations, as evidenced by products being sold out or having very high prices at certain times of year. Market prices fluctuate significantly throughout the year (details by commodity are discussed in Annexes B-J). Price variations are often seasonal, with prices lowest in the harvest season when a commodity is locally abundant, and highest during the lean season. Price fluctuations are driven by producer behavior and weak market linkages. Producers sell nearly all of their crop immediately (creating a glut on the market) and traders do not seek additional supplies from other production locations because of the high cost of transport. This assessment heard multiple stories of prices for commodities, most often rice, being increased by traders and wholesalers to "make up for the loss of profit" immediately after direct food aid distributions. Consumer prices were described as artificially high and market behaviors were inconsistent with normal market behavior for the season. This appears to be a sign of predatory market behavior triggered by aid distributions.

FEWS NET reports that supplies for staple foods are expected to be normal in markets throughout the lean season, although in the Grand South, supply flows are likely to be "impeded, irregular, unpredictable, and below average" as road conditions seasonally deteriorate. Remote areas far from markets will face high transportation costs and receive lower volumes of goods at above-average prices that consumers will be less likely to afford (FEWS NET, 2023c). Consumer prices are expected to rise seasonally and remain above average. Producers reported being unaware of the farmgate prices in nearby markets, resulting in producers feeling they have little choice but to accept the (often low) prices that collectors offer. Low productivity (volumes) and poor roads mean that value chains are short; most production is consumed locally with minimal processing. While short value chains can be beneficial, in this case it is also a sign of weak market connectivity, traders are not bringing produce from other areas when supplies are low, or moving produce to different areas when there is a surplus pushing prices down. Direct humanitarian aid may also contribute to this as it reduces the incentive for wholesalers to find efficient ways to bring in commodities from other regions, by creating the perception of reduced demand overall. The lack of clear responses to market signals (which can often be seen through price changes) is likely to contribute to lower food availability. Groundnuts are an exception, as the bulk of the crop is sold to export wholesalers, who send groundnuts as a bulk commodity to China for further processing (see Annex F). Despite the lack of market linkages, rural markets (commune-level) depend on district markets for supplies of vegetable oil and rice, while district markets rely on rural markets for staple crops such as maize, beans, and livestock. Market access remains a major challenge. Connectivity for all the focus commodities is discussed in the relevant market system reports in Annexes B-J.

In terms of physical connectivity, all markets in the Grand South and Southeast of Madagascar face the challenge of poor roads. This lowers rates of return on investment because of high fuel costs, losses during transport, and repairs that must be made to vehicles. Improving roads and expanding local transport options would have a significant impact on market efficiency and likely on household incomes. The World Bank, European Union (EU), and African Development Bank (AfDB) are currently investing in the repair of primary roads, but rural feeder roads are still in poor condition and in need of repair.

2.2.5 Market Diversity

Market diversity relates to multiple dimensions, including the variety of food products, but also the diversity in sales channels, and different sizes of business (Downing et al. 2018). Market diversity is critical because it ensures that, for example, if one market actor or relationship can no longer function, there are others who can step in, or alternative food products that can become an acceptable substitute. The diversity of businesses is important because it makes adaptation easier in the face of shocks and stresses—both for households and the system overall.

The study team found limited variation in the products available in the market, sales channels, and types of businesses that exist. The limited variety of products is likely because there are few processing facilities in the study area, as well as due to transport challenges. The lack of agro-input providers means that increasing diversity of food products is more challenging, as there is no in-person outlet for producers to directly learn about, discuss, and purchase new products, such as improved seeds. According to respondents and a recent Seed Security Assessment, because aid agencies have stepped in to fill this gap, potential providers have less incentive to open businesses that would provide information and a sustainable distribution system for improved seeds, farm chemicals, and equipment that would improve diversity (SeedSystem, 2023). However, in other resilience contexts, market-based approaches have been very successful at increasing access for poor households (for example, private sector extension) (Gobin et al. 2023).

2.2.6 Power Dynamics and Rule of Law

Madagascar's agricultural policy is theoretically geared towards market-oriented production, and therefore it encourages the formalization of cooperatives and producers' umbrella organizations to meet both national and international demands. However, the lack of connectivity and transparent information in the existing market systems limits market actors' ability to negotiate prices—collectors and wholesalers most often hold the power to determine prices. The government has introduced laws and standards to regulate the market, for example, by limiting the profit margins that can be charged (to prevent inflation). This regulation has not yet translated into increased market power for producers, and there is some evidence that the required paperwork and fees are increasing opportunities for petty corruption (discussed in further detail in Section 2.5). Details on specific regulations and policies relevant to each market system can be found in the market systems reports, Annexes B-J.

Consumer protection laws are also in place to protect consumers from poor quality imports (rice, beans, vegetable oil) and to ensure that strict health controls are in place for meat production and sales. Most notably, Madagascar's President issued a decree in 2019 that banned the export of meat, which has undermined the International Finance Corporation's (IFC's) private sector investments in a feedlot and abattoir, designed to create jobs and income opportunities for poor herding households (see more detail in Annex J).

2.3 Social Context – Social Protection and Social Cohesion

2.3.1 How Shocks and Stresses Affect Households

Women, youth, and people with disabilities in rural areas face higher vulnerability to shocks (Kellum et al. 2020). Women's savings and assets, namely poultry, are used and sold first to help a household cope with shocks and economic hardship (Kellum et al. 2020; USAID 2021). In times of greater need, households may also resort to selling off zebu, which are important social and economic assets (Harivola

2021). Shocks, such as flooding, can limit access to clean water, sanitation, hygiene, and health services, increasing the risk of disease outbreaks (ACAPS 2022).

Recent shocks and stresses—whether droughts, flooding, or tropical storms—destroy crops, disrupt production cycles, and reduce productivity overall. Food access is also limited by the poor state of roads, both through reduced income and physical access when roads and bridges are washed out. Household coping mechanisms include reducing the amount of food consumed per meal, reducing the number of meals, collecting wild foods, selling household items and animals, and sending children to another household to eat. Wealthier households are more resilient to shocks, as they have more land and livestock assets, and can therefore subsist on their own crop, milk, and meat production. Poorer households with fewer assets are more likely to resort to foraging for wild foods, including red cactus leaves, roots, and wild fruits, to meet their food needs when crop production is insufficient (FEWSNET 2017; ACAPS 2022). Most households rely on multiple crops or income streams; therefore, while seasonality plays a role in food availability, particularly given the lack of household storage, it is not as large as the role of infrastructure and lack of resources. Low access to inputs and lack of income to purchase inputs also reduce the productivity of crops and livestock, which impacts food availability. Although households indicated during FGDs that they prioritize crop and animal inputs "in difficult times," the cost of inputs was also frequently given as a reason inputs (such as improved seeds) were not used more often.

Zebu theft (in Betroka and Amboasary-Atsimo districts) also reduces resilience and food security – as the number of livestock diminishes, this leaves households with fewer means of production. Some livestock traders believe that the cattle population is gradually declining because of the conflict. A large processor set up operations intending to improve the livestock sector and eventually exporting beef and goat meat, but producers in several districts worry this will increase the incentives for theft, leading to more households in distress.

2.3.2 Conflict Dynamics

Prolonged drought in the Grand South has exacerbated food insecurity and increased conflict incidence, including theft, cattle raiding, and gender-based violence (GBV) (de Berry 2023). Armed bandits, known as the *dahalo*, cause instability and conflict in communities through kidnappings, killings, and theft of livestock, money, and property (ACAPS 2022). Young men are driven to join these groups by drought-related hunger and poverty (de Berry 2023). There is also a cultural motivation for participating in banditry, as zebu theft is regarded as a rite of passage from boyhood to manhood (ACAPS 2022). Researchers found that households experience significant insecurity because of the *dahalo*, but the size and reach of the *dahalo* system makes it challenging, and potentially dangerous, for fellow community members to intervene in a *dahalo* attack. Government forces have historically been unable to protect households from *dahalo* conflict (ACAPS 2022). Women are at high risk of *dahalo*-related violence, with about 45 percent of women living in the Anosy and Atsimo Andrefana regions reporting experiences of violence at the hands of *dahalo* (Green 2020). Banditry has also led to the establishment of humanitarian no-go zones in the Anosy and Androy regions, which can limit access to humanitarian services (ACAPS 2022). The PEA report provides additional context on *dahalo* conflict in the study area.

2.3.3 Formal & Informal Social Protection Mechanisms

Since 2015, the *Fonds d'Intervention Pour le Développement* (FID, Development Intervention Fund) has implemented three national social safety net programs, in collaboration with the National Nutrition Office, the Ministry of National Education, and the Ministry of Population, Social Protection and the

Promotion of Women (MPPSPF) (see Table 3) (MPPSPF n.d.). These programs were financed by the World Bank and the Government of Madagascar. The Safety Nets and Resilience Program, a new World Bank initiative announced in 2023, will fund the government to expand the safety net to reach at least 3 million people, or 13% of extremely poor households across all 23 regions of the country (World Bank 2023). This program also includes funding to support a new social registry and improved targeting systems with additional funding from UNICEF and the WFP. In addition, several crisis-response cash transfer programs were piloted in the Grand South to respond to severe drought, food insecurity, and the COVID-19 pandemic.

Table 3: National Social Safety Net Programs

Program Name	Target Population	Target Area in Study Area	Aid Modality
Human Development Cash Transfers (TMDH) Program	All households with children under 5yrs; poor households with children aged 6-12yrs	Select districts in Atsimo Andrefana, Anosy, Androy, Atsimo Atsinanana	Monthly cash transfers to support nutrition, schooling, and living conditions, under the condition that families send their children to primary school.
Let Us Learn (LUL) Program	Children aged 11-18yrs	Select districts in Atsimo Andrefana	Monthly cash transfers to households that send their children to secondary school.
Cash for Productive Work (ACTP) Program	Poor/vulnerable households	Select districts in Atsimo Andrefana	Cash transfers in exchange for working to improve productive assets, protect the environment, and build economic infrastructure communities.

Participation in village savings and loan associations (VSLAs) provides informal social protection. VSLAs comprise 20-30 members who make regular financial contributions to a fund that provides credit for livelihood activities or in case of emergency (Konzack 2020). FGD respondents in Atsimo Andrefana, Androy, and Anosy shared that informal savings organizations, known as *voamamy*, help households meet basic needs and cope with financial emergencies and illnesses.

Community events also play an important role in fostering social cohesion. As discussed in the PEA, equality and reciprocity are the guiding values behind social events in the Grand South and Southeast Madagascar. Births, funerals, circumcisions, and marriage represent important moments for community members and relatives to come together, as well as share gifts of food and livestock. These social events reflect bonding within communities but can also place financial strain on households and lead to increased food insecurity.

2.3.4 Inclusion of Vulnerable Populations in Existing Social Protection Programs

National ministries and aid agencies operate social protection programs to support women and children, people with disabilities, and vulnerable households. Female-headed households are at a notably higher risk of poverty and food insecurity (Kellum et al. 2020). The Malagasy government faces funding, coordination, and coverage challenges in implementing its social protection programs. State financing is very limited, so programs are primarily donor funded. As of the publication of the 2023 National Social Protection Strategy, only 2.3 percent of overall households and 4.5 percent of households in extreme poverty were covered by a social transfer program (MPPSPF n.d.). The MPPSPF is responsible for providing mobility aids and other accessibility services to people with disabilities, but rarely has the resources to meet needs (MPPSPF n.d.). At the community level, it can also be challenging for vulnerable

groups to access social protection resources. Women may face barriers to participation in community associations, such as age or educational restrictions or residency requirements (Harivola 2021).

2.3.5 How Social Practices/Dynamics Affect Nutrition, Dietary Diversity, and WASH Outcomes

Women are responsible for household nutrition and water use, including food preparation, food consumption, and water, sanitation, and hygiene (WASH) (Veroniaina and Hobinasandratra 2021). Men traditionally eat first, and women are first to cut their food intake during lean periods (Kellum et al. 2020; de Berry 2023). As noted in the SDA, poor households are more likely to engage in open defecation (Harivola 2021).

Customs and taboos also influence households' agricultural practices and dietary diversity. As outlined in both the PEA and this report, households rarely prioritize spending on food storage during the harvest season. Instead, they choose to spend on social events or other investments, leaving them with limited food stores during leaner periods. Taboos in parts of Anosy and Androy prevent the drying of sweet potatoes, which can further limit food storage. In Atsimo Atsinanana, local customs forbid consumption of red beans.

2.3.6 Intra-Household Decision Making

Men and women divide decision-making responsibilities at the household level, often in line with the division of household labor. FGDs generally agreed that production decisions were made collaboratively, with the man making final decisions regarding land and livestock assets. Men contribute to nutrition decision making by deciding which crops to grow and controlling the production of milk and meat (USAID 2021; Veroniaina and Hobinasandratra 2021). FGD respondents shared that women may help their husbands determine the appropriate quantity of crops, such as rice, to store for household consumption. When women grow crops, these crops are delegated for household consumption (Veroniaina and Hobinasandratra 2021).

Women typically manage daily household finances and make decisions around household food consumption, household supplies, poultry, and purchases of market goods (USAID 2021). Women are responsible for procuring nutritious foods for their families and will plant or purchase vegetables and greens to help diversify their household's meals (Veroniaina and Hobinasandratra 2021). Women are typically the targets of nutrition-related educational programming, given their role in food preparation (Harivola 2021; Veroniaina and Hobinasandratra 2021).

2.4 Infrastructure

2.4.1 Ports

Of the 17 ports in Madagascar, three (Taolagnaro, Tuléar, and Toamasina) serve the Grand South and Southeast (Logistics Cluster 2022a; FEWS NET 2018). Facilities at all three ports can receive international vessels and permit commercial loading and unloading at the dock, and each reports the capacity to receive bulk grain. The smallest of the three, the Port of Taolagnaro, is a privately managed port in the Anosy district, near the town of Taolagnaro (Fort Dauphin). While there are reportedly three storage warehouses (Logistics Cluster 2022b), the study team found very limited infrastructure, with only a mobile crane for unloading.

Most goods intended for the Grand South pass through Taolagnaro or Tuléar, as internal transportation by road is expensive (FEWS NET 2018). The Port of Tuléar is a medium-sized, government-operated port

in the Atsimo-Andrefana region. It is the second largest port in the country and operates 24/7, with average waiting times ranging from 72-144 hours, depending on vessel type. It has 4500 MT of warehouse storage capacity and is connected by road to surrounding markets (Logistics Cluster 2022c). According to WFP Logistics, the Port of Tuléar can accommodate ships with a draft not exceeding 7.3m.

The largest port, the Port of Toamasina, is a key national port and processes goods intended for the Sud Est (FEWS NET 2018). The Port of Toamasina handles 75% of all national freight, including 194,169 MT of cargo per month and 1,000 MT of WFP cargo per month. It can accommodate ships with a draft up to 9.5m. It is connected to Antananarivo and regional markets by road (Logistics Cluster 2022a; Logistics Cluster 2022d). Tuléar and Toamasina are key ports for aid delivery, with commodities then trucked to warehouses.

2.4.2 Roads and Transport

Madagascar has one of the lowest densities of road per capita in the world, and this is acute in the Grand South and Southeast (World Bank 2022b). Feeder roads that would allow the transport of goods in rural areas to market centers are largely non-existent. In addition, across Madagascar, only 10 percent of roads are in good condition, 28 percent are in average condition, and 64 percent are in poor condition (Logistics Cluster 2022). Unpaved roads are common, and these are generally impassable in the rainy season. Natural disasters such as cyclones and floods are common, particularly in the Southeast, resulting in further deterioration of road infrastructure and heavy disruptions to transport. Poor roads increase the cost and time for delivery of goods; previous assessments found trucks often can move at just 5-10 km/h (FEWS NET 2018). Table 4 below illustrates these long travel times using several examples from the study area. This situation affects market linkages as it delays the delivery of goods, increases transport costs and reduces income from livelihoods. The main transport links in the Grand South and Southeast are the Route Nationale 7 (RN7) which connects Tulear with the capital Antananarivo, RN10 which runs east-west connecting Tulear with Androy and Anosy, RN12 which connects Taolagnaro with Antananarivo, and RN13 which connects Ambovombe with the rice-growing areas of Androy and Anosy to the north and ultimately with Antananarivo (via the RN7). These are the major commercial trucking routes. The research team heard anecdotal reports of monopolies in the transport sector (possibly Chinese families with multi-generational residency in Madagascar) that keep transport prices high and impact profits for producers. This dynamic, along with rising fuel prices and poor roads, makes roads and transport a significant constraint for market systems and potentially important for balancing power dynamics in market systems. Most households invest very little in transport. They typically move goods by cattle cart or bicycle (loaded with 60-70 kg); but this limits the volume of sales. Other market actors limit the movement of goods to keep costs down, which impacts food availability (discussed in Section 2.2.3).

Table 4: Transport Distance in the Grand South and Southeast

Route from South to Antananarivo (capital):	**Distance *(Google Maps estimates)***	**Estimated Time**
Ampanihy to capital RN10 to RN7 to Antananarivo	1113 km	more than 22.5 hours
Ambovombe to capital RN13 to RN7 to Antananarivo	1012 km	more than 21.5 hours
Farafangana to capital RN12 to RN7 to Antananarivo	817 km	More than 15 hours

2.4.3 Warehouses

Warehousing is not developed as a service, and therefore most factories have their own warehouses, generally in major towns. Outside of big cities, facilities are old and poorly maintained. Many warehouses previously belonged to parastatals and have since been neglected. Pests, heat, and humidity create additional challenges for warehouse storage (FEWS NET 2018). The few new storage facilities that exist are used for cash crops (e.g., vanilla, coffee, peanuts, cotton) and therefore are available only at certain times of the year. Storage warehouses dedicated to sorghum are maintained by NGOs.

Overall, humanitarian warehousing capacity is growing. WFP's 2023 assessment found 29,254 MT of warehouse space in the study area, 14,150 MT of which is humanitarian warehouse space. Many humanitarian agencies also rent private warehouses, and there is an additional estimated 15,104 MT of private warehouse space in the study area, although these facilities may not be available when the owner is using it for their own business activities. Table 5 summarizes warehouse storage capacity in the study area. Where figures have been provided in m^2 rather than MT, the estimate assumes 50kg bags stacked 5m high; approximately 2MT per square meter of available space. Actual space available may vary.

Table 5: Warehouse Capacity by District

Districts	Region	Available MT in Humanitarian Warehouses	Available MT in Private Warehouses
Ampanihy-Ouest	Atsimo-Andrefana	1,000	120
Tulear	Atsimo-Andrefana	4,500	13,084
Ambovombe-Androy	Androy	0	0
Bekily	Androy	250	200
Beloha	Androy	0	0
Tsihombe	Androy	800	0
Amboasary-Atsimo	Anosy	5,650	700
Betroka	Anosy	0	0
Taolagnaro (Fort Dauphin)	Anosy	1,350	200
Befotaka	Atsimo-Atsinanana	0	0
Farafangana	Atsimo-Atsinanana	600	500
Vangaindrano	Atsimo-Atsinanana	0	300
Vondrozo	Atsimo-Atsinanana	0	0
		14,150	15,104
TOTAL MT FOR STUDY AREA		29,254	

Source: WFP, 2023

2.4.4 Cold Chain

Cold chain infrastructure is quite limited across the Grand South and Southeast. The study teams found that households and market actors could not see their potential—and therefore were not interested in investing in the cold chain. For example, consumers have a strong preference for purchasing meat butchered the same day. Investment in a large refrigerator is not perceived as worthwhile because consumers do not want to purchase meat that is more than 12 hours old. In addition, running costs (electricity) are expensive, and electricity service is often unreliable, making cold chain investments even

less attractive. Given this bias, market actors are not particularly interested in exploring new technologies, such as solar refrigerators.

2.4.5 Agriculture Inputs

A significant challenge to the distribution and use of appropriate agriculture inputs is the lack of agro-dealers in the study area. Our primary data collection identified three agro-dealers in the Grand South and Southeast, and a recent Seed Security Analysis (SSA) found nine (SeedSystem 2023). Those that exist do not seem to have inventory shortages. They also face significant competition from aid actors that also distribute seed, despite the SSA finding no need for widespread direct seed distribution (SeedSystem 2023). Multiple examples of seed distributions were also mentioned in interviews for this assessment

Agro-dealers focus on horticulture crops, with a good range of types available, but limited quantities of certified seeds. Seeds available from local markets are considered by producers and wholesalers to be "good or average quality." Improved varieties are generally only available through one-off aid distributions, although CTAS (the Technical Agroecological Center of the South, a Malagasy nongovernmental organization [NGO]), Agrima, and Fiompiana sy Fambolena Malagasy sy Norvegiana (FIFAMANOR) are working to change this situation. However, seed production is geared towards aid agencies and therefore may be given to producers for free, or heavily subsidized, without thought to improving seed delivery and marketing channels for greater resilience in the long term.

Primary sources for seeds are own saved seed, informal markets, and exchange with family and friends. The SSA reports that current seed security trends mirror those identified 10 years ago, with a decline in the number and quality of supply channels. Producers are saving less volume of seed and purchasing more from informal markets, but aside from direct aid donations, there are no new sources for purchasing improved seeds. Only 8 percent of households report accessing new varieties (improved or local). New delivery channels and packaging sizes are needed to increase the use of climate-resilient seed. Notably, few agro-dealers provide credit to producers—important for cash-strapped producers and no agro-dealers accepted vouchers. Cash and mobile money are the major forms of payment. While there are large companies producing and supplying agro-inputs at the national level, they have given little attention to the needs of the Grand South, and they have made no investments in their distribution structures.

2.4.6 Water and Irrigation Infrastructure

Groundwater in the Grand South is highly vulnerable to droughts, and is often the only viable water source for communities. Chronic droughts alongside floods and tropical storms point to the need for improved water management in the study area. According to the IMF, the hydro-agricultural network in the South is inadequate and requires significant rehabilitation work (Fayad 2023). While the AfDB and the Japan International Cooperation (JICA) have made investments in agricultural infrastructure in the Grand South, it is important to consider the impacts of climate change on agricultural and livestock productivity (Beileh 2013). Climate change is leading to more intense rainfall events, which will increase flooding in some areas and change the availability of water for both household and productive uses in the future. Section 4.2 provides additional detail on the impact of climate change.

2.4.7 Veterinary Services

Despite the importance of zebu in Malagasy cultural life, there is limited herd management or investment made in animal husbandry, particularly regarding veterinary inputs. This is due to (1) the

perceived high cost of veterinary drugs and consultation; (2) the lack of access to vets: there is only one veterinarian per district, and producers must bring animals to the vet—it is only worth paying for the vet to visit *in situ* if the producer has a lot of animals; and possibly, (3) the focus on numbers of animals, for cultural reasons, rather than productivity of each animal. Yet, a significant proportion of producers (74 percent in Androy, where figures are available) indicate that animal illnesses (across all types of livestock) are a "very important constraint" for them (INSTAT 2021). It is also possible that because the goal of zebu producers is the number of animals (for cultural reasons), not productivity of those animals, there is perceived to be no return on investment for veterinary inputs.

Although chickens are the first asset of poor households to be sold when households need cash, and are important for women's income, they also do not receive any veterinary inputs such as vaccines that could reduce disease and increase income. Instead, to mitigate risk, many households keep only a very small flock at any time (3-5 chickens; more than 10 is considered a "large flock"), creating a negative reinforcing loop that limits the potential for nutrition and income benefits.

2.4.8 Financial Services

Madagascar has seen rapid growth in mobile money over the past ten years, and now has nearly 4 million mobile money accounts (FRED 2022), higher than the number of bank accounts (Monnier 2023). Airtel Money, Orange Money, and Telma MVola are the main mobile carriers and money operators with the greatest rural presence. All three operators have partnered with local banks: Telma with BFV-SG (part of the Société Générale banking group), Orange with BMOI (part of the BNP Paribas group), and Airtel with the Bank of Africa - Madagascar (Bair 2019). There is also some interoperability, with users of MVola and Orange Money able to receive money from abroad as well as from any of the three local operators. The CWG found about 6 out of 10 traders in the Grand South and Southeast do not have mobile network problems; the greatest network access challenges were found in Vangaindrano district (Atsimo Atsinanana) (CWG 2022). While the country adopted legislation around the use of e-money in 2016, the regulatory environment could still be further strengthened by expanding interoperability from bank accounts to e-wallets and improving client identification tools. While ID coverage is fairly strong in Madagascar, with 79% of the adult population having an ID, there is no automated Know Your Customer (KYC) verification, IDs are required even for minimum value accounts, and mobile money providers are required not only to verify the identity of their clients but their addresses as well, which can be complicated and time-consuming (GSMA 2021).

Mainstream banking and mobile money services still have limited penetration, however, reaching only 26.3 percent of Madagascar's population (The World Bank n.d.). Most households that borrow rely on friends and family or moneylenders who charge high interest rates, although the study found some reports of market wholesalers providing credit for those growing cash crops. Obstacles to better financial inclusion include high bank fees, lack of physical access to banks, and lack of literacy. The lack of collateral or credit history also complicates access to credit for buying agricultural inputs such as land or machinery. The IFC has recently invested in financial service providers hoping to increase financial inclusion and access to credit, as well as decreasing vulnerability to climate change through access to micro-insurance products (IFC 2023). The WFP is also partnering with the Malagasy government to provide vulnerability and weather index insurance for the eight districts most affected by drought and cyclones (WFP 2022).

According to 2021 Demographic and Health Surveys (DHS) data, across the Grand South and Southeast, mobile phone in all four regions is 29.6 percent (see Table 6), with female-headed households consistently having less access than male-headed households in all areas. Low mobile phone ownership contributes to lower usage of mobile money, but the study team found households had an interest in using mobile money for convenience and safety reasons.

Table 6: Mobile Phone Ownership in the Study Area

Region/District	Mobile Phone Ownership	Households in lowest wealth quintile	Households in second lowest quintile
Androy	27.10%	12.04%	31.60%
Anosy	28.40%	10.73%	31.29%
Atsimo Andrefana	42.30%	15.38%	40.12%
Atsimo Atsinanana	22.80%	9.96%	40.00%
All four regions	29.60%	12.39%	25.11%

Source: DHS 2021

VSLAs (locally *voamamy*) have been set up by some aid actors in the Grand South and Southeast, and they have been proven to reduce poverty by as much as 14 percent in Madagascar (IMF 2023), as participation in these groups helps to smooth cash flow, overcome liquidity constraints, transfer or reduce risks, and provide greater autonomy and flexibility when managing assets. Expansion of these groups, and integration of mobile technology, could have a positive impact on household resilience.

2.5 Policy

The Malagasy government has export, tax, and investment policies in place to govern national markets. Madagascar has banned the use of genetically modified organisms (GMOs) for cultivation and has banned importation of GMO crops (Genetic Literacy Project n.d.). In addition to GMO import restrictions, the government restricts national exports of meat, as previously noted. Bonne Viande de Madagascar (BoViMa), funded by the IFC, provides technical assistance to breeders and aims to facilitate exports of goat and zebu meat to the Middle East, although these efforts have so far been partly blocked by government restrictions (Vyawahare 2020). There are several investment and tax laws in place to incentivize market investments; see the PEA report for details.

Despite these national policies and taxes, markets face several challenges. Overall inflation has risen from 4 percent in 2020 to 8.5 percent as of August 2023, causing the central bank to raise interest rates (IMF 2023). Rural producers often lack collateral, credit histories, and identification documents and have limited financial literacy, making it even more challenging to engage with financial resources (IMF 2023; WFP n.d.). Consumer protection and regulation of digital finance is lacking in Madagascar (IMF 2023). Corruption is also a widespread issue. Powerful firms can often skirt and manipulate market policies, making it challenging for firms without connections to political elites to enter the market (World Bank 2020). The national government is highly centralized, which limits the power of local authorities to regulate markets at the local level. Additionally, ongoing political instability makes it challenging to develop long-term economic policy (World Bank 2020).

At the local level, market activities are monitored by local and regional authorities. Researchers found that market actors must present authorizations or licenses to authorities, particularly when traveling to

larger markets, such as those in Tuléar. Retailers, collectors, or wholesalers who fail to present suitable documentation upon request by authorities or law enforcement can risk having their goods confiscated. These market actors are also required to pay taxes to local municipalities. Sellers face restrictions on their profits (approximately 20 percent margins are allowed). Respondents in the Atsimo-Atsinanana region reported that the Ministry of Commerce conducts regular market visits to monitor prices. Sellers with high profit margins are required to decrease their prices. There are additional local taxes and restrictions on the sale of poultry and zebu. For example, poultry sellers in Anosy must pay a daily municipal tax, plus rebates if they sell over 30 chickens. In the Atsimo Atsinanana region, sellers must pay a tax and obtain authorizations certifying the poultry's health prior to sale. Zebu butchers must slaughter zebu in a slaughterhouse to ensure that proper hygiene and paperwork requirements are met. They must obtain a license, a deed of sale, health certification, and an "animal passport" to slaughter and sell zebu. Butchers must also pay annual and daily taxes to market and slaughterhouse managers. These taxes pose financial burdens to market actors.

Knowledge gaps and corruption complicate adherence to local laws and regulations. Many individuals are unclear on local laws and regulations, but face intimidation from local authorities and law enforcement who demand payments to access markets. Some individuals bypass regulations by paying bribes. Transporters in the Atsimo Andrefana region, for example, can pass through road barriers by paying a bribe of $11 (Malagasy Ariary [MGA] 50,000). Corruption is widespread in the zebu market, given the extensive paperwork and veterinary requirements.

3. MARKET

This section of the report summarizes information gained about each of the nine commodities involved in this market system assessment: rice, maize, sorghum, beans, groundnuts, vegetable oil, zebu, goats, and chickens. Each section begins with an overview of the market system, followed by a description of key actors, and then a summary of key barriers and opportunities within this market. We have also provided further details on access and availability issues for key Title II commodities. Readers looking for further detail should refer to Annexes B-J, which provide a more thorough analysis of each market system.

This report and the Seed System Assessment (SSAS) found that households typically grow diverse crops, producing eight or more on-farm products, good news for both dietary diversity and income smoothing. Most crops grown in the study area contribute to food security, whether sold or consumed. However, transformation (primary processing) levels are low to nonexistent in rural communities; most producers reportedly sell products without adding any additional value, which could bring in additional income. Most producers do not routinely store their harvest, either consuming their entire harvest (if in food deficit) or choosing to sell it quickly. Households that do store food from the previous season report experiencing losses as high as 35 percent, particularly for beans, maize, rice, and groundnuts, due to the infrequent use of chemical storage treatments (SeedSystem 2023).

Most producers (98 percent) obtain seeds through informal systems: their own saved seed, seed obtained through social networks, or seed sold in local markets. The SSAS found that fertilizer and other farm chemical use was low; pesticide use (45 percent) was the highest. Use of natural fertilizers (compost, manure) was also relatively low (38 percent), and this appears to be a knowledge gap (on the part of the producers), as well as a supply gap (on the part of the input providers).

Participation in the market and potential increased profitability are two important incentives for investing in production (such as purchasing inputs) or adapting (such as using improved varieties). The

Maharo program of the Catholic Relief Service (CRS) found that during recovery periods (from drought or tropical storms), subsistence production was dominant and profitability low. However, producers will invest or adapt when they believe they are moving into a phase of market growth, which indicates there is potential for market-based programming to increase impact.

3.1 Rice

3.1.1 Rice Market System Overview

Rice is the main staple food in Madagascar and plays an important role in the Malagasy social fabric, culture, politics, and economy. Rice is the most important staple crop for households in the Grand South and Southeast, although a few communities (Antandroy, Mahafaly) consider rice a luxury for special occasions. Poorer households consume cassava, sweet potato, and maize as a substitute. Within the target area, rice cultivation is most important in Anosy and a few districts of northern Androy and eastern Atsimo Andrefana that border Anosy. Despite rice's importance, producers do not reach their potential yields, and households frequently must purchase imported rice when their own production has run out. Producers also have little negotiation power at the time of sale—according to the World Bank (2020), they capture only 36 percent of profits available in the market chain, while comparable rice producers in other countries make 47-71 percent of available profits.

Most producers have small or medium-sized plots of land (around 2 ha) but are not always working their own fields. For example, around a third of households in the Southeast do not own the rice fields they work in (Food and Agriculture Organization/World Food Programme [FAO/WFP] 2021). Two types of production systems are used in the study area: dam-based irrigation and rain-fed irrigation, depending on the area. Rice harvest can occur two to three times a year, with producer households typically harvesting 2.8 tons per hectare (FAO 2020). They consume about 40 percent of their harvest, save about 10 percent for the next year's seed, and sell about 50 percent.

Regional demand is high and is increasing in urban areas; however, domestic production does not meet the population's needs, and therefore approximately 16-24 percent[3] of rice is imported (Adewole 2023, FAO 2022b). Wealthier urban populations typically prefer local "red rice" because of its fattier and sweeter taste or imported rice, and rural communities often prefer medium grade imported rice. Imported rice typically comes from India, Pakistan, or China and enters through the port cities of Tuléar, Taolagnaro, and Toamasina. As of July 2023, India has banned rice exports, which will influence the prices and supply of imported rice in the future. Prices are typically lowest in May and June during the main harvest and are highest during December and January, which is also when rice is often distributed as in-kind food assistance by humanitarian agencies.

According to respondents, the rice distributed for humanitarian assistance is usually imported, and about a quarter of it is "broken rice," which is preferred for its faster cooking times. Many producers struggle to find affordable, high-quality rice seeds in the market (as well as other relevant agricultural inputs). In the past, FAO and WFP have provided direct seed aid, including improved varieties, but this has reduced incentives for agro-input dealers to provide these services.

[3] Author's calculations using MINAE and FAO data

3.1.2 Description of Key Actors

Rice producers have low productivity and work primarily at a subsistence level. They rely on traditional agricultural practices when making cultivation decisions. A few producers use improved agricultural practices or improved varieties (see Annex B for detail). They also experience high post-harvest losses. Cooperatives exist but have limited capacity.

The recent SSAS found there were few input providers in the study area, and the ones that existed were largely concentrated in more urban areas—three in Tuléar and two in Taolagnaro (SeedSystem 2023). Producers typically sell their harvest to collectors or wholesalers; collectors handle several hundred tons of paddy rice, while wholesalers sell several thousand tons. Both collectors and wholesalers buy paddy rice directly from producers on community market days. The price is typically negotiated on the spot, with prices generally set by larger wholesalers. Producers widely see these prices as unfair but have limited power to negotiate for fairer terms. Most producers also do not have farm-level storage that would allow them to hold paddy rice for a better sale opportunity. Instead, they are forced to sell immediately at the lowest prices, to the wholesalers and collectors, which can store the grains for future sales. Producer households also face pressure to sell immediately to access cash to prepare for celebrations such as Independence Day (June 26). Rice processors transform paddy rice into white rice, and a few also process white rice into rice flour, which is used to make rice cakes (primarily produced by women). Processors have limited presence and low efficiency. At the moment, it is difficult for locally processed white rice to compete with the quality and prices of imported rice. Rice importers primarily operate in the port cities of Tuléar and Taolagnaro. They then supply their product to wholesalers, who sometimes sell the imported rice alongside locally produced rice.

3.1.3 Barriers/Opportunities (including investment potential)

There are several opportunities for investment in the rice market in the study area, primarily by increasing farm-level storage capacity, strengthening agro-dealers, and expanding access to information for producers. One of the most important opportunities lies in unlocking the potential of agro-dealers to provide services to farming households. This would help reduce post-harvest loss, improve production through better use of inputs, and potentially also provide access to credit for farming households. There is also the potential to create linkages between village-level agro-dealers and seed multiplier centers, seed control service, and the Ministry of Agriculture and Livestock (MINAE). All of these efforts would strengthen the market system rather than create further aid dependency, which respondents believe has been an unintentional consequence of activities such as seed distribution.

Increasing storage capacity for small-scale producers would also help them improve profit margins and manage periods of food insecurity throughout the year. There is also an opportunity to expand producers' access to market-related knowledge—including market prices, effective use of inputs, and other agricultural techniques—to provide the resources for more informed decision making at the household level. Strengthening rice cooperatives could also play a role; a well-functioning cooperative has the power to increase producers' bargaining power in the market, as well as provide them with collective resources such as storage and small-scale processing equipment. Other investment opportunities include enhancing and expanding primary processing facilities.

Given its importance, rice is also a major policy focus for the Government of Madagascar, which could present some opportunities for coordination. For example, customs duties and Value Added Taxes (VAT) for imported rice are waived, and locally grown rice is also not subject to VAT. This should result in domestic producers enjoying a strong comparative advantage over imported rice. However, the inefficiency of the market chain and the cost of local transport mean that imported and locally grown

rice directly compete on price at the retail level. While there could be some window for initiatives to improve the information flows through the system, previous efforts have faced challenges once donor funding ran out.

The primary barriers to overcome in the rice value chain include poor road conditions, access to land, and minimal use of best practices in agriculture. As with the other markets studied in this assessment, poor road conditions are a major barrier to market connectivity and contribute to high transport costs. Access to land can also be difficult, particularly for rice, given that land appropriate for rice cultivation is often already owned by large landowners, who then rent to small-scale rice producers. Finally, a reliance on traditional methods rather than modern agricultural practices limits the yield and therefore earning potential of farming households.

3.1.4 Access and Availability Issues

Availability: Total white rice production in the study area has been estimated at 2,563,207 MT annually. Given typical per-capita consumption of 110 kg (FEWS NET, 2018), an additional 600,000 MT is required to meet national needs, which is filled by rice imports (author calculations based on MINAE data). However, the government hopes to reach self-sufficiency in rice production by 2024, and gradually begin exporting rice by 2026 (African Development Bank Group 2023). MINAE anticipates production of 4,081,000 MT in the 2023-24 season to meet a consumption need of 3,389,000 MT (Adewole 2023). Producers typically consume some of their harvest (40 percent), save a portion for next season's seed (10 percent), and sell about half (50 percent). Production levels in the study area, however, are generally not sufficient to meet the region's rice needs, in part because rice consumption is on the rise in urban areas. Cassava, sweet potato, and maize are typical substitutes for rice in lean times, especially for poorer households.

Access and Price Volatility: Rice prices, whether for local or imported varieties, are at their lowest during the harvest (May and June), when producers sell most of their production to buy gifts and food for the national holiday (June 26); and highest during the lean period, which generally corresponds to the depletion of food stocks and the implementation of agricultural activities (particularly December and January). Because producers generally sell their crop immediately, the price advantage goes to the collectors or wholesalers who buy paddy rice at low prices and sell white rice later at premium prices. (World Bank 2020). Small producers do not have adequate storage and therefore cannot sell later to gain a better price later in the year. Consumers also suffer from this situation, as there is less competition and therefore prices remain high in the lean season because weak market linkages limit the movement of commodities between regions. Humanitarian agencies deliver rice to vulnerable households in December-January (the peak of the lean period). Additional information on price structures in the rice market can be found in Annex B.

3.1.5 Other Implications for USAID (notable for Bellmon Analysis, other policies)

The rice sector plays an important role in household diets, and therefore activities to strengthen this sector are a strong candidate for livelihoods programming under graduation models, particularly if layered with other market-based programming designed to strengthen the market system overall. Well-targeted food aid in the form of rice is less likely to distort the market system if distribution mechanisms go through market actors and strong accountability and monitoring structures are put in place to encourage transparency of both targeting and pricing. Local government involvement may help in some areas, but this will not be universal. Improving household production and storage is also likely to have

the greatest impact on both price volatility and household food security over the medium and long term. Aid modalities that strengthen and work through existing market structures are recommended.

3.2 Maize

3.2.1 Maize Market System Overview

Maize is Madagascar's second most important cereal crop after rice, grown by around 40 percent of producers in the study area (FAO 2022a). Maize plays an important role in household food security, as it is used for both human consumption and animal feed. Maize is sold mainly as dried and ground kernels *(katsaka voadisa/voatoto*) and as flour (for the Anosy and Southeast regions, mainly for animal feed). MINAE has defined maize as one of the priority agricultural sectors in its action plan. The coastal zones are important maize-growing areas because of the microclimate. In the study area, riverine areas of Ampanihy Ouest (Atsimo Andrefana), Tsihombe and Ambovombe in Androy, all of Anosy, and Befotaka in the Southeast are considered producers of maize. Outside these areas, few people grow maize, and what is consumed or found in the markets is generally brought in from other regions of the Grand South or Southeast. In Atsimo Atsinanana, maize is not typically part of household diets and is instead used almost exclusively for animal feed.

Production quality and volume depend on consistent distribution of rainfall throughout the crop cycle. In the 2018 to 2021 growing seasons, producers experienced recurring drought, as well as infestation by the fall armyworm (*Spodoptera frugiperda),* which drastically reduced yields (see Annex C for further details). Production levels had not returned to normal in the districts visited by the study team, and harvests did not meet the needs of the local population. At the national level, Madagascar is a net importer of maize.

3.2.2 Description of Key Actors

Producers access seeds through local channels (saved seed, local markets), but can only access improved seeds through donations from aid agencies. A number of crop varieties are in circulation, and consumer preferences vary by location. Producers do not tend to alter their crop profiles from one main season to the next (SeedSystem 2023). The division of labor within producer households is that the men do the tilling; the women take care of sowing, weeding, and harvesting. No chemical fertilizers are used, while organic fertilizers (manure) are used by some producers. Producers sometimes work together to form associations and cooperative groups.

Collectors buy maize from producer groups in the surrounding communes and sell it to processors or wholesalers. In general, it is the collectors and wholesalers who set prices, which are often not advantageous for producers. Collectors must have a "Collector's Card," for which they must pay a fee and complete some administrative formalities. Wholesalers work in close collaboration with the transporters and dockworkers to get the products to their points of sale. (Corruption exists throughout the transport chain.) Wholesalers sell maize to retailers (urban and rural) and processors and during times of stress, wholesalers increase their investment in maize, as maize sales are much more profitable during this period. Processors for maize are mostly feed mills and small-scale informal processors that create flour, which is then transformed into products such as doughnuts. In the Grand South, there are very few local processors, so the corn flour sold on local markets comes from Tuléar.

3.2.3 Barriers/Opportunities

Demand for maize is high, for both household consumption and animal feed, indicating there are opportunities for investment and expansion. If maize producers had a stronger knowledge of modern irrigation, pest control methods, and on-farm storage techniques, plus improved access to the resources necessary to implement these techniques, local production would be expected to increase, reducing dependence on imports. There is opportunity particularly in the coastal areas where the climate is more favorable for maize production.

However, there are also notable barriers, including changing weather patterns because of climate change, poor transportation infrastructure, and lack of pest control. Maize relies on consistent rains, so climate change has already impacted yields due to irregular weather patterns. Delays in the start of the rainy season have also caused disruptions in the traditional crop calendar. The inadequacy or obsolescence of structural investments such as water points and boreholes limit crop irrigation capacity. This lack of infrastructure (including appropriate storage), together with producers' lack of knowledge, results in low maize yields and high post-harvest losses in the study area. In addition, the cost of transport, particularly during the rainy season, increases considerably, impacting household purchasing power.

3.2.4 Access and Availability Issues

Availability:

Maize production in 2023 is projected to reach 260,494 MT in the whole of Madagascar, a 20 percent increase over 2022 (MINAE, 2023). However, in the study area specifically, small production increases are expected only in Atsimo Atsinanana and Atsimo Andrefana, while Androy and Anosy show slightly lower production levels. Although annual maize consumption nationally averages 223,000 MT (USDA, 2023), local maize harvests remain insufficient to meet the needs of the local population for consumption and income. Below average maize production is expected for 2023/24 due to El Nino effects (FEWS NET, 2023). Typically, 30-50 percent of production is consumed, 10 percent is saved as seed and the remainder is sold. However, armyworm infestations have reduced yields in the last three growing seasons. On average, the population in much of the Grand South and Southeast consumes approximately 21 kg per person per year (FEWS NET, 2018). Typical substitutions are cassava, sweet potato, and cowpeas. 318.7 MT of maize was imported in 2021, but more recent figures are not available.

Price Volatility and Access:

Prices are expected to remain significantly higher than the two-year average, despite similar production levels to last year. Local supply determines maize prices, which are at their lowest immediately after the harvest (April to June, depending on variety and location). Limited storage options in rural areas mean wholesalers control the release of commodities on the market. Often during lean periods wholesalers will increase the supply of maize on the market, but they will often also increase their prices. Humanitarian agencies deliver maize and rice to vulnerable households in December-January (the peak of the lean period). This assessment heard cases of traders in Befotaka closing their shops during periods when aid was delivered to communities, only to raise prices—to make up lost income—upon reopening three weeks later.

3.2.5 Other Implications for USAID (notable for Bellmon Analysis, other policies)

As Madagascar's second most important cereal crop, the maize sector plays a significant role in food security and livestock market systems, and therefore activities to strengthen this sector are a candidate for livelihoods programming under graduation models, particularly if layered with market-based programming designed to strengthen the market system overall. A local NGO representative in Ambovombe suggested that bulk maize could be provided in a way that promotes local processing and creates jobs. This approach may be worth consideration for Title II aid and graduation households that do not own land or livestock. Aid modalities that strengthen and work through existing market structures, such as cash programming, are also recommended.

3.3 Sorghum

3.3.1 Sorghum Market System Overview

Sorghum is better adapted than many other crops to the difficult conditions in the Grand South; it has a shorter growing cycle (three months) and is more resistant to the dry conditions in the area. It also has greater nutritional value than the other cereals (rice and maize) most widely consumed in Madagascar. Sorghum is a staple food of the Antandroy ethnic group in Androy and is also used for animal feed. In the Androy region, sorghum is mainly grown in the districts of Beloha, Tsihombe, Ambovombe, and Amboasary. Sorghum is mostly grown by subsistence producers for their own household consumption, while some producers sell their crops to aid agencies for distribution as humanitarian aid, imported sorghum still accounts for the bulk of the crops distributed as in-kind assistance. At present, the absence of household milling to process sorghum into flour for cooking limits consumption, as manual processing can be time-consuming. Small retailers, particularly women, or direct producers, are the primary sellers of sorghum in urban markets or on communal market days.

Production has declined in recent decades as maize has replaced sorghum as a preferred crop (Kansas State University 2023). However, the government is increasingly supporting sorghum cultivation under the direction of MINAE, with substantial support from international donors including USAID, the EU, and the World Bank (see further details in Annex D).

3.3.2 Description of Key Actors

NGOs play an important role in the sorghum market system in the Grand South, which has led both to advancements and challenges. In the study area, producers rarely consider sorghum a priority crop, and demand is often limited. Those who grow sorghum cultivate the crop for household consumption and income, but their primary motivation seems to stem from NGO support rather than market-based incentives. NGOs provide producers with agricultural inputs, equipment, and capacity-strengthening support through Farmer Field Schools (FFS). They also sometimes support the formation of producers' associations. Their activities mainly focus on increasing sorghum production at the local level and could not connect producers with formal markets because of constraints such as low production, quality control, lack of infrastructure, and poor road networks. The SSAS found producers obtained over 85 percent of sorghum seed through humanitarian or development programming from FAO or NGOs (SeedSystem 2023).

New varieties of sorghum are being introduced to Madagascar. Rasta is most preferred by producers because it has a short cycle and higher yield, while MINAE is promoting a variety called macia. However, even with these new varieties, many producers still struggle to access products such as chemical

pesticides at the necessary dosage and frequency, and yields remain low. Post-harvest loss is also an issue due to producers' lack of knowledge about newer storage technologies and techniques, although NGOs have provided plastic silos and training on reducing post-harvest loss to some producer associations.

Due to the limited demand for sorghum outside its production areas, few collectors or wholesalers are interested in sorghum. There is, however, interest and demand from larger-scale processors and private sector firms. The country's two major commercial farms, Tozzi Green and AGRIMA, have expressed an interest in supplying more sorghum to their animal feed customers. Two major food product companies, Basan Group and NutriFoods, are also interested in sorghum as an ingredient. Unfortunately, there is very little sorghum processing capacity in the study areas. Most food and feed companies are in the central part of the country and, even if producers could produce a surplus for sale, the road network is a major obstacle to connecting with those potential customers. At the local level, most sorghum retailers are women who sell in urban markets or on communal market days. Currently, the profit margin for sorghum cultivation is lower than for other crops (corn, peanuts, cowpeas) given the level of yield obtained and the purchase price on the markets.

3.3.3 Barriers/Opportunities (including investment potential)

There are opportunities in the sorghum value chain due to sorghum's climate resilience, nutritional benefits, and potential as an ingredient in processed foods and animal feed. This is especially true in the Androy region, where demand is higher because sorghum is commonly consumed. Once milled, sorghum does not require a large amount of cooking (as compared to rice and corn), so it does not consume as much fuel, a major benefit for vulnerable households. The increased interest among commercial farms and private sector actors is also a promising development that aligns with government priorities. The potential of sorghum could be further expanded if producers gained the skills and inputs needed to reach their full production potential, and if local small-scale milling and processing became more widespread throughout the study area.

Limitations for the sorghum market include pests and a low understanding of market potential. The main pests that damage sorghum crops are birds, stem borers, and armyworms, which are also a major problem in maize cultivation. Some respondents reported losses of up to 30 percent from the fall armyworm. Demand for sorghum in local markets is low (especially outside of the Antandroy community), and weak relationships between producers and larger companies disadvantages producers, limiting their participation in the market. Negative taboos around sorghum might also be a contributing factor in some areas. For example, producers in Fotadrevo in Atsimo Andrefana reported a belief that growing sorghum would lead to a reduced rice harvest (ADRA 2021).

3.3.4 Other Implications for USAID (notable for Bellmon Analysis, other policies)

Sorghum currently plays a limited scope in household diets because it is eaten regularly in only a few of the targeted districts. However, it has good potential as a drought-resistant crop. Therefore, activities to strengthen this sector are a strong candidate for livelihoods programming under graduation models, particularly if layered with market-based programming designed to strengthen the market system and increase consumer familiarity and demand. Because production and demand levels are low, aid activities, such as Title II donations, linked to this sector are unlikely to interfere with domestic production or marketing at this time. However, aid modalities that strengthen and work through existing market structures to build access, availability and utilization of sorghum would be expected to have a greater impact on medium-term food security, particularly in drought-prone areas of the Grand South.

3.4 Beans

3.4.1 Beans Market System Overview

Over 30 varieties of beans and pulses are grown in Madagascar. They are produced in all parts of the study area, but the area between Amboasary-Atsimo district and Taolagnaro in Anosy is best known for its bean production, due to its favorable microclimate. Production capacity for beans is around 76,000MT in the Grand South, but production levels overall are low as yields suffer from poor agricultural practices and post-harvest handling, meaning that high losses are incurred. To address local demand, beans must be transported from other parts of the country. Despite increased rains, bean production sharply decreased in the Grand South in late 2023, due to many households consuming their seed stocks during the drought and new seeds being unaffordable. Production is down 59 percent in Atsimo Andrefana and 94 percent in Anosy (FEWS NET, 2023c). To address local demand, beans must be transported from other parts of the country to the study area. As a result, the beans market system is across the study area. For example, seed multiplication efforts for locally adapted beans are limited, and there is no processing taking place. As a result, most beans grown by households are consumed at home. When producers do sell, it is generally to collectors or in their own local markets. Wholesalers buy from collectors and sell to urban retailers; however, a significant part of wholesalers' business is done with aid agencies, which purchase beans locally and distribute them as humanitarian aid.

Local prices, whether for local or imported beans, are at their lowest during the harvest (August) and highest during lean periods (around December-January) (see further details in Annex E). Because producers generally sell their crop immediately, the price advantage goes to the collectors or wholesalers who buy beans at low prices and sell them later at premium prices. Most producers do not have adequate storage and therefore cannot align their sales with higher prices later in the year. Consumers also suffer from this situation, as there is less competition, and therefore prices remain high. At the time of high prices, vulnerable households receive humanitarian aid—aid agencies reported they get beans for distribution from wholesalers (local purchase). This may also contribute to high prices if individual wholesalers do not have the capacity to source and manage additional stocks beyond aid volumes. In this case, low volumes in the market contribute to prices staying artificially high.

3.4.2 Description of Key Actors

Producers (who are mostly women) rely on traditional methods, using animal draft power for plowing (when available), then sowing, weeding, and harvesting by hand. Some inputs (organic fertilizer, traditional pesticides) are used in a limited way. Depending on the variety, bean yields range from 7 to 12 kilograms per hectare (kg/ha) across the country; but according to respondents in this study, yields in the Grand South and Southeast are often lower, averaging about 5 kg/ha. There are no private input providers in rural areas, making the market system reliant on aid actors. Unlike some other value chains, there are no producer associations or cooperatives in the study area for beans. Most producers buy unimproved seeds, although improved seeds, alongside training, are sometimes available through NGOs. Red kidney beans are popular with many households because they are believed to have more flavor and do not require sauce or meat when served with meals. However, in certain parts of Atsimo Atsinanana, consumption of red kidney beans is taboo (red is the devil's color). In these areas, production and sales of white beans is considerably higher. White beans are the most consumed across Madagascar, and preferred by restaurants that cater to tourists.

Collectors and wholesalers determine the purchase price of beans, with little negotiating power on the part of the producers. During the off-season, collectors import beans from producing areas. Collectors

and wholesalers must contend with transport over bad roads, the high cost of fuel, and the administrative requirements of trade. The transport fee is $4.44-$6.67 (MGA 20,000-30,000) per 50-kg bag, depending on distance and season. Collectors store goods in their warehouse, and when an appropriate tonnage is reached, they deliver the goods to wholesalers. Wholesalers obtain beans from collectors or buy them from producers in larger markets such as Amboasary. They store the beans in their warehouses until the desired tonnage is reached, at which point they are delivered. There is collaboration between wholesalers and aid organizations to supply the latter with beans as needed through local procurement. Retailers that sell beans also sell a variety of products, such as rice, maize, beans, vegetable oil, and groundnuts—a strategy that enables them to diversify their customer base. Most retailers are women and sell to a variety of end consumers, including producers who use the product as seed, households for their own consumption, and restaurants for commercial purposes.

3.4.3 Barriers/Opportunities (including investment potential)

There are several windows of opportunity in the beans market. From a nutritional perspective, beans are a vital source of protein for many households in the region. Beans are also produced for consumption in all parts of the study area, ranking fourth after rice, maize, and cassava. This means that many households are already familiar with their cultivation. There is also an opportunity to capitalize on recent innovations in the bean sector, such as FAO's introduction of drought-resistant varieties. As with other value chains, support for financial inclusion, expansion of input suppliers, and introducing producer cooperatives could set the foundation for a stronger market system.

There are, however, noteworthy challenges in expanding this market. Despite the new drought-resistant varieties, there is a common perception that beans are not climate resilient. Producers prioritize drought-resistant crops and only cultivate beans when they believe there is sufficient rainfall. In the rainy season, the crop requires regular, well-distributed rainfall. As a result, the quality of production is partly correlated with the quality of the water supply. Despite introducing new varieties, almost all producers in the Grand South and Southeast still use local purchasing channels to access seeds and do not have ready access to these new varieties. Furthermore, improved seeds require newer cultivation techniques, while producers currently rely on traditional methods. Most importantly, the lack of appropriate storage facilities and lack of funds to purchase chemicals to protect the beans during storage (particularly important for beans) means high losses, further reducing producer interest. Beans are also perceived as a women's crop, which may contribute to the lower prioritization for production. Local governments do not always prioritize beans, despite their contribution to dietary diversity and improved nutritional outcomes. Donations from aid agencies further reduce the incentive to prioritize bean production, as there are unclear market signals regarding the level of profit that can be made. Producers in focus groups indicated beans are a low priority crop, one that is often provided by aid rather than their own production.

3.4.4 Access and Availability Issues

Availability: As noted above, production and post-harvest volumes of beans are generally low in the Grand South and Southeast. Estimates put the production potential at around 76,000MT for the Grand South. (This assessment could not find production figures for the Southeast.) Annual consumption figures for beans average 1.3kg per capita (Helgi Library 2023). Some producers reported yields as low as 5 kg/h, indicating a strong reliance on markets for access to beans. Madagascar exports beans to France, UAE, and many other countries, indicating that even when there are local production shortages, there should be sufficient in-country production to provide in the range of 6000 MT from national sources (AgriExchange 2020).

Access and Price Volatility: Prices are lowest during harvest and highest (sometimes doubling) during the lean season. Retailers align their prices so that all prices are the same, regardless of the type of bean (see Annex E - Retailers for more detail). Based on conversations with collectors, the poor roads, limited warehouse capacity, and the high cost of transport all contribute to high prices for beans in the lean season.

3.4.5 Other Implications for USAID (notable for Bellmon Analysis, other policies)

The bean market system is underdeveloped in the study area, despite its role in household diets and the potential to increase supply in the Grand South and Southeast through better connectivity with market systems in the areas of Madagascar that export beans. Therefore, activities to strengthen this sector are a strong candidate for livelihoods programming under graduation models, notably asset transfers related to storage. These should be layered with market-based programming designed to strengthen the market system overall. Because production levels in the study area are very low, and particularly after the 2023/24 production season, aid activities linked to this sector are unlikely to interfere with domestic production or marketing at this time. However, aid modalities that strengthen market connectivity and increase production are most likely to address medium-term food security issues.

3.5 Groundnuts

3.5.1 Groundnut Market System Overview

Groundnuts are the leading oilseed crop grown in Madagascar. Production occupies around 5 percent of cultivated land, well behind rice (50 percent), cassava (25 percent) and maize (10 percent) (FAO 2022a). Groundnuts are most critical in four districts of the study area: Ampanihy-Ouest district in Atsimo Andrefana; Bekily and Ambovombe districts in Androy; Amboasary-Atsimo in Anosy region; Befotaka district in Atsimo Atsinanana. Groundnut production in the study area is estimated at thousands of tons each year. Aid agencies play a major role in seed distribution and sometimes input supply. Household production is divided into three uses: seed for the next crop, household consumption (15 percent), and the bulk for sale. The portion intended for sale can sometimes represent up to 95 percent of household groundnut production. As noted in Annex F, groundnut is consumed roasted as a snack on its own, as a cake, or added to sweets and savory dishes. Very little is processed into oil.

Compared to other value chains, groundnut producers seem more likely to work together in cooperatives, likely because of the influence of NGOs. Producers and cooperatives primarily sell to collectors, who either sell the products directly for export or sell to wholesalers. Exports from Madagascar have grown significantly and since 2019 have exceeded 30,000 tons. Groundnut production in Madagascar was estimated at 65,000 MT in 2021, with about half of production exported (PARM/MINAE 2023). China is the world's largest importer of groundnuts and is currently the primary destination for groundnut production in the Grand South of Madagascar. From local wholesalers, groundnuts are typically then sold to either retailers or processors. Commonly found processed products include roasted seeds, butter, flour, sauces, oil, and oil cake. MINAE sets the rules for buying and selling, and processors set quality standards related to aflatoxins (see further details in Annex F).

3.5.2 Description of Key Actors

Local and international NGOs are the main provider of seeds in this market system. The most important players include CTAS and the National Center for Applied Research on Rural Development (FOFIFA).

Most producers grow groundnuts on plots of 0.5 to 1.25 ha and plant from October to December, with peak volume in the local market in May and June. Two varieties are grown in the Grand South: pink groundnuts (Fleur 11 variety, locally certified), resulting from FOFIFA research and red groundnuts (*cannette* variety). The Fleur 11 variety is popular both for local consumption and for export, because of its taste and because it produces more oil; it is well adapted to dry and semi-arid conditions. Red groundnut is blander and less drought resistant. Yields are between 800 and 1,200 kg/ha and the use of fertilizer and chemical pesticides is uncommon. Groundnut producers' associations are formed at the village level, often with the support of NGOs. In some cases, producers working collectively have had a stronger ability to challenge the typical power dynamics of the system and establish prices that are more favorable to producers. Association members represent around 30 percent of groundnut producers. Women play an active role throughout the value chain.

Collectors bring the groundnuts from the producer to a storage warehouse for sale to wholesalers. During the collection season (May-June), almost 2 MT of groundnuts are collected per day. Chinese export wholesalers play a dominant role in the market system. Because of the large quantities they buy, they can obtain much cheaper prices than other wholesalers that sell to small retailers or processors. Processors add value to the groundnut value chain by meeting local needs and creating jobs. However, they face risks, including price volatility that cuts profits, insufficient supply of nuts because of competition from exporters, and low yield. In the Grand South, groundnuts are processed most commonly as roasted seeds (peanuts) and groundnut sweets (Koba Ravina pastries in particular). These products are produced at home and sold mainly by women and children. Small peanut oil mills operate in Ambovombe, Ampataka, and Vangaindrano (cooperative). Nutrisud is a processing company in the Grand South that produces fortified food for malnourished children. However, it cannot obtain the quality it needs in appropriate volumes (particularly due to standards regarding aflatoxins) and must instead import groundnuts from India via Antananarivo. The Androy Zone Transaction Company (TAZA) also processes groundnuts into butter and defatted flour. It has problems finding outlets for the butter because of the poor road conditions and the difficulties of foreign markets.

3.5.3 Barriers/Opportunities (including investment potential)

Overall, the groundnuts market is promising, with demand steadily increasing in local, national, and international markets. Groundnuts are more drought-resistant than other crops.[4] This, combined with their status as both a food and cash crop, makes groundnuts a preferred crop from a resilience perspective. The Malagasy government has made this crop a clear priority, particularly through its collaboration with donors and NGOs to improve access to seeds, organize producers into collectives, and improve market linkages. While the support from donors and NGOs is currently constructive, in the long run an NGO-supported market system is not sustainable. More focus must be placed on strengthening private sector actors such as agro-input suppliers to become long-term players in a self-sustaining system. There are also opportunities to expand these suppliers to offer more fertilizer and pesticides, as well as related training and advice. Another opportunity in this value chain lies in the presence of groundnut producer cooperatives. These collectives have showed strong potential in improving connectivity and knowledge-sharing, as well as increasing the power of smallholder producers in the agricultural system. Cooperatives are also a helpful body for engaging producers in training and education; for example, in storage methods that reduce aflatoxins. Other areas of potential investment

[4] Note that while groundnuts are considered drought-resistant, they still need a minimum amount of rain at key points in the growth cycle to be fully productive. If farmers plant at the wrong time, they might still face poor yields.

include strengthening small-scale processors and related enterprises (e.g., oil cakes, sweets) and leveraging women's involvement.

Even with this potential, there are some notable barriers to take into consideration. Testing for aflatoxins is very challenging, and there are no testing labs for seed production or phyto-sanitary tests available in the study area. These tests must be performed at central labs in Antananarivo, which is an expensive extra step that most actors tend to forgo. Similar to other market systems, actors in the groundnuts market system struggle with transport issues and limited access to finance. Producers also are entrenched in traditional cultivation methods. There is no clear regulation on quality standards for groundnuts, and without an affordable, regional solution to this issue, plus the related training and education components, Madagascar will struggle to fully realize both the export and processing potential for this value chain. Respondents also cited risks including inconsistent (excessive or inadequate) rain, pests (which can reduce yield by 60-90 percent), and low sales prices.

3.5.4 Other Implications for USAID (notable for Bellmon Analysis, other policies)

The groundnut sector has good commercial viability, and therefore activities to strengthen this sector are a strong candidate for livelihoods programming under graduation models, particularly if layered with other market-based programming designed to strengthen the market system overall. Because of the commercial viability, direct food aid may interfere with domestic production incentives. However, other aid activities linked to this sector (such as cash distributions) are unlikely to interfere with domestic production or marketing and seem likely to support the goals of graduation models.

3.6 Vegetable Oil

3.6.1 Vegetable Oil Market System Overview

Vegetable oil is one of the most widely consumed household goods across all study areas, but consumption quantities are low at just 3.5kg per year, compared to international standards of 21kg (FEWS NET, 2018). There is little or no production in the study area (some artisanal production of groundnut oil), and therefore this commodity was reviewed as a distribution market rather than a production market.

Vegetable oil is used in cooking and provides a source of vitamins, trace elements, and flavor enhancers. Consumption varies, as oil is generally considered a luxury good for poor households, but demand is increasing. The vegetable oils on the market are refined and packaged at a factory based in Tamatave (in eastern Madagascar), or they are imported directly through ports in the Grand South and Southeast. From there, they are distributed throughout the study area. Vulnerable households either purchase oil at the market in small containers or receive larger quantities from aid agencies, including the WFP, CRS, and the Adventist Development Relief Agency (ADRA) during emergency/shock periods.

There is considerable price variability, as prices are impacted by weather conditions in the countries of origin and the cost of sea freight, combined with economic and geopolitical factors and the cost of local transport (see further details in Annex G). These factors can lead to price inflation over relatively short periods of time. Vegetable oil use is highest during the cash-crop harvest season, but infrequent during leaner periods. The Malagasy government, through the Ministry of Public Health's Food Safety and Quality Control Agency, is responsible for certifying the fitness for consumption of industrial vegetable

oils placed on the market. Wholesalers must declare their stock to local authorities from the Ministry of Industry, Trade, and Consumer Affairs to prevent price dumping and speculation.

3.6.2 Description of Key Actors

The majority of vegetable oil in local markets comes from importers. In the Grand South, unrefined oils are imported from countries including India and Egypt via the port of Tuléar, and crude vegetable oils are imported by the primary local processor. This oil processing plant is based in Eastern Madagascar in Toamasina and imports crude sunflower, palm, and soya oil from countries such as Brazil, Argentina, and Malaysia for refining, packaging, and marketing. Local oilseed processing capacity is limited in the Grand South and Southeast. Researchers identified several small, local processing plants in the Grand South that have closed due to the lack of input and infrastructure. As part of the One District One Factory project, the Ministry of Industry is planning to restructure the groundnut sector and set up a local processing plant for groundnut oil. From either importers or the Toamasina processing plant, the next step in the value chain is distribution, which relies on transporters. Transport costs vary, which contributes to the price instability of this good. The deterioration of the roads makes it challenging and expensive to transport goods safely by truck, particularly in the Southeast.

Wholesalers work with transporters and dockworkers to get products to their points of sale. During periods of shocks or shortages, wholesalers may show favoritism among customers or choose to sell only to loyal customers. The price of a 20-liter can of vegetable oil from a wholesaler typically costs $27.33-28.88 but can reach up to $40.00 depending on road conditions and other factors. Retailers—who are mostly women—handle direct sales to consumers, including households and merchants such as donut vendors. During the coffee and clove harvest season and during festival periods, vegetable oil sales increase, and retailers may take out loans from microfinance organizations to meet demand. During shocks and during the rainy season, fewer customers purchase vegetable oil, and the price increases, so retailers purchase less product. Vegetable oil is sold to consumers in various quantities, depending on availability and what consumers can afford. Consumers do not select vegetable oils based on brand, but rather based on price and habits. Unrefined oils are cheaper and more popular among producers, as they are considered more flavorful. Congealed/solid oil is also preferred, as the price is low, and the oil can last longer than other types.

3.6.3 Barriers/Opportunities (including investment potential)

Within the vegetable oil value chain, there is some opportunity to strengthen the role of female retailers. Investment in local processing, such as the groundnut oil plant being planned by the government, might be a long-term investment, although quality issues with locally produced groundnuts could be an initial barrier. Expanding local processing could help reduce reliance on imports, create additional jobs, and reduce some of the factors contributing to price instability.

There are also some significant barriers. The price instability of vegetable oil is a primary challenge impacting market players. Due to inflation on the international market, the price of vegetable oil can rise in the span of a few weeks, or even a few days. As a result of price instability and deteriorating roads, the cost of transporting goods has also increased. Shocks, such as cyclones, cause vegetable oil prices to increase. Local processing capacity is limited, and previous attempts at expansion have failed due to poor road quality and regional insecurity. Market players, particularly wholesalers, also need a substantial amount of working capital and therefore rely on credit to guarantee liquidity and replenish stocks. Food distribution by aid agencies decreases local consumption and can threaten profits for retailers, distributors, and importers.

3.6.4 Other Implications for USAID (notable for Bellmon Analysis, policies)

Vegetable oil is generally not produced in Madagascar, and for the poorest households it is considered a luxury item. Therefore, activities to strengthen this sector are not a good candidate for livelihoods programming under graduation models, except as one product (among many) that might be sold by micro, small, and medium-sized enterprises (MSMEs). That said, direct distribution of Title II commodities or other aid activities linked to this sector are very unlikely to interfere with domestic production or marketing.

3.7 Cattle/Zebu

3.7.1 Zebu Market System Overview

Zebu is a local breed of cattle that is adapted to the challenging climatic conditions of the Grand South and Southeast of Madagascar. Zebu have significant cultural significance; ownership is a form of wealth accumulation and a sign of power at the community level. Zebu play a key role in social events such as weddings, funerals, tomb-buildings, and sacrifices to settle community conflicts. Zebu ownership also supports labor-intensive agricultural activities, such as plowing and transporting crops to market. Producers generally sell zebu to meet larger financial needs, such as the construction of tombs, but owners also sell their animals for food in times of stress. Zebu breeding tends to use only traditional animal husbandry methods, with very limited inputs or veterinary care. Culturally, the emphasis is typically on the number of zebu a household owns rather than the quality, health, and productivity of the livestock.

Among those living in extreme poverty (bottom wealth quintile), 16 percent of households own zebu in Atsimo Andrefana, 25 percent in Atsimo Atsinanana, 23 percent in Anosy, and 18 percent in Androy; with the poorest households owning around one animal (DHS 2021). Ownership increases among higher wealth quintiles. While zebus are important throughout the study area, the most critical districts in the study area for zebu are Ampanihy Ouest, Ambovombe, Bekily, Amboasary-Atsimo, Betroka, and Vangaindrano (CREAM 2013 a-d). The largest zebu market in the region is in Betroka.

The zebu industry is strictly regulated, given the ongoing issue of zebu theft and banditry. Zebu theft has been going on for many years as a traditional cultural practice among young men, but has grown in scale, intensity, and violence (Healy 2017). Zebu theft is hampering the development of zebu breeding study zones, especially in Betroka, Amboasary and Befotaka South. According to the laws on zebu markets, the management of zebu trade involves multiple actors, including the head of the Fokontany, Commune staff, Gendarmerie officers, the health veterinarian, and the administrative delegate, each with specific roles to guarantee the legality of the sale and the health of the animals (see Annex J for further details). Respondents reported issues with corruption and skirting administrative requirements at various points along the value chain.

3.7.2 Description of Key Actors

For producers, zebu are among the most lucrative of the commodities studied in this report. During high season, calves sell for $88-176, young zebu animals sell for $331-353, adults for $551-662, and castrated zebu for about $883. During lean seasons or shocks, the prices might decrease by half or even a third, according to respondents. This value chain is dominated by men; starting from childhood, when boys are responsible for taking zebu out to pasture during the day. As with other livestock, veterinary care is limited, and diseases can be a challenge. Men dominate the zebu market system, making most of the

decisions related to their purchase or sale, although women may be responsible for care activities such as hand feeding when necessary.

Collectors may buy zebu from producers only on the main market day for that locality (this is to ensure the appropriate paperwork is in place). There are very few fattening operations, so butchers buy directly from collectors and wholesalers. Wholesalers may also bring a larger zebu herd to the main livestock market in Betroka. From there, zebu are transported out of the region to other primary markets, such as Ihosy in Ihorombe region. The zebu generally walk between large markets under the control of shepherds, who are paid by the head. At the Ihosy market, large collectors buy zebu for transport to Antananarivo. BoViMa, which was created through an IFC investment, is the largest processor of meat products (goat and cattle) in the study area. However, after a presidential decree banning meat exports, the company had to pivot to producing meat into flavoring products (for export). BoViMa works with producer organizations to provide technical assistance and aims to support improvements in the sector overall, but there has been some controversy surrounding the company's presence, with community members fearing that large-scale production will exacerbate zebu theft and insecurity.

Zebu milk is also sold, and women sometimes run small-scale enterprises processing zebu milk into haboob (curdled milk) and homemade yogurt, which is then sold at markets. Prices for dairy increase during the dry season, when milk production is reduced due to insufficient pastures.

3.7.3 Barriers/Opportunities (including investment potential)

While zebu play a vital role in Malagasy culture, and there is certainly interest from companies like BoViMa and slaughterhouses to expand and strengthen this market, there are many risks inherent in investment in the zebu market, especially when considering involvement from a "Do No Harm" perspective. Zebu play a central role in ongoing local conflicts, and the sector suffers from low production, disease, and limited pasture.

Ongoing issues with zebu theft, combined with a cultural emphasis on having as many zebu as possible (rather than making each animal as productive as possible), has led to little incentive for producers to invest in their animals. Furthermore, veterinary services are limited, and zebu face problems with diseases and parasites such as symptomatic anthrax, bacterial anthrax, and faciola (liver fluke). There are also taboos against vaccinations in some areas, besides the common complaints around the cost of care. Expansions in cultivation and recurring drought have affected the availability of land for pasture, which can be a major issue during the lean season.

3.7.4 Other Implications for USAID (notable for Bellmon Analysis, other policies)

Zebu plays a very important cultural role in Malagasy life. Yet, despite its role as a source of nutrition, form of savings, and a cultural obligation, the incentives at the household level to increase the productivity of cattle are low. Therefore, activities to strengthen this sector are not recommended for livelihoods programming under graduation models. While communities will welcome activities to strengthen this market sector, such activities are unlikely to contribute to improving poverty for households.

3.8 Goats

3.8.1 Goats Market System Overview

Goat breeding is well established in the Grand South of Madagascar, particularly among the Mahafaly and Antandroy ethnic groups. According to the 2021 DHS data, among the poorest quintile of households, 26.7 percent of households own goats in Androy, 12 percent in Atsimo Andrefana, 6 percent in Anosy, and 1 percent in Atsimo Atsinanana (DHS 2021). Goat farming is an important economic activity in the Grand South, as goats serve as a form of savings and economic risk reduction for agro-pastoralist households. On average, a goat-breeding household owns nine heads of goats. Goat breeding is limited in the Southeast because goats are poorly adapted to the rainy climate in this region. Goat meat purchases are highest on weekends and holidays, particularly in June and December, due to Independence Day and end-of-year celebrations. The goat industry is most profitable from March to August, which coincides with the harvest period. However, from September to March, prices drop considerably, as producers cannot feed large herds during the lean season. Goat prices in the high season range from $33 to $111 a head, and prices during the lean season range from $11 to $22 a head. There is notable involvement of aid agencies in this value chain, because of goats' adaptability to the dry and arid climate of the Grand South and potential as a livelihood opportunity. Producers typically travel long distances on foot to sell to collectors or wholesalers or directly to processors. Goat fleece is used for mohair rugs, and BoViMa processes meat powder (used as a flavoring), which is typically exported.

3.8.2 Description of Key Actors

Producers use traditional practice and limited inputs, particularly veterinary services and fodder. Goats face risk of bacterial disease, endoparasites, and hair loss, which can negatively impact producers' profits. Veterinarians typically cover a large geographic area, meaning that distance is often a barrier in addition to the cost of services. Goats and sheep that local producers own are usually pasture-fed and herds are allowed to wander freely, which can cause conflict within communities when livestock damage crops. Particularly during the dry season, it is difficult to obtain sufficient fodder for households' herds. Many producers in the Grand South are agro-pastoralists, and male, as herding work is not considered appropriate work for women. In the study area, approximately 95 percent of goats are a local breed. There are three to four popular goat breeds, but Angora is the only improved variety. Households prefer *soramena* goats for breeding and black goats for consumption. Goat breeders adhere strictly to traditional breeding practices, such as inbreeding and minimal goat fattening, which lead to smaller animals. Producers sometimes organize into associations or cooperatives, typically facilitated by NGOs. Unfortunately, according to respondents, once the program or support ends, these associations do not always endure.

There are several sales channels for goats and goat products, including local, regional, national, and export markets. Men are responsible for transporting livestock to the market on foot. These distances can be long (sometimes 15-55 km). Producers sell their goats to collectors, who transport the goats by truck to wholesalers in Antananarivo, Tuléar, or Taolagnaro. From there, the goats are often sold either to butchers or processors. Butchers supply meat to rural and urban consumers, although meat consumption is low (except during holiday season, and among certain populations such as Muslims and the Mahafaly). BoViMa purchases goats at the same price year-round from their supported producer organizations according to set standards on age, weight, health, and documentation. Although BoViMa was originally created to export meat, they have since pivoted to working with a slaughterhouse in Anosy to process meat powder for export to Dubai. Fleece from local black-haired goats and Angora

(white-haired goats) is used to produce mohair rugs. Tourists make up the primary market for mohair rugs, which can make the market inconsistent. Goat's milk is sometimes used to produce cheese, but production is limited by the goats' low milk supply.

3.8.3 Barriers/Opportunities (including investment potential)

As numerous NGOs have already determined, there is definite potential in the goat value chain, especially given goats' resilience to the climatic conditions in the Grand South and their dual value for households as a form of both savings and economic risk reduction. There are several ways to further strengthen this potential. First, there is a need to introduce improved breeds, and FAO has already begun programming along these lines. Producers would also benefit from training in modern animal husbandry practices. Improved breeds and training, combined with stronger systems for veterinary services, will help strengthen this market in the long run, beyond the time horizon of specific interventions. As with other value chains, there is also an opportunity to provide producers with training in negotiation and farm planning, and possibly to strengthen the sustainability of existing associations. To support producers through the lean season, it would also be beneficial to explore supporting fodder production as a livelihood activity and strengthen linkages between fodder producers and goat producers.

As with zebu, there are important cultural norms related to the goat value chain. These can act as both barriers and opportunities for activities, and it is crucial for donors and implementing organizations to understand these factors. Cultural taboos mean goats are not universally appropriate, either for asset transfer or livelihood activity, in all communities in the target area. This livelihood is in fact considered taboo among the Antesaka and Antefasy ethnic groups in the Southeast and the Bara tribe in Betroka, among other areas. There are also important norms around gender. As this is a value chain dominated by men and boys, it could be challenging to integrate women and female-headed households without concerted efforts to change social norms. For instance, in Atsimo Andrefana, it is taboo for women to build, maintain, or even enter goat enclosures, particularly while menstruating (IMPEL 2022). As with zebu breeding, there is also an emphasis on quantity over quality of animals, as owning many goats is a sign of wealth in many communities. In the absence of zebu, goats are also sometimes used for social events and funerals (*havoria*).

During the rainy season, goats are vulnerable to diseases such as anterothexemia and internal parasites, and access to preventive services and treatment is limited. During the dry season (June to October), water scarcity causes poor pasture quality and results in insufficient fodder to sustain herds.

The purchase of goats for other resilience programs has contributed to an overall increase in the price of livestock. This risk would need to be carefully managed. There can also be a lack of transparency around policies and taxes set by the Ministry of Agriculture and Livestock and local authorities, which can negatively impact market actors at lower levels, especially producers. The presidential decree prohibiting meat exports is respected but is very likely dampening economic opportunity in the Grand South.

3.8.4 Other Implications for USAID (notable for Bellmon Analysis, policies)

In Androy and Atsimo Andrefana, goats are an important asset for poor households. Activities to strengthen this sector are a good candidate for livelihoods programming under graduation models in those regions, particularly if layered with other market-based programming designed to strengthen producer knowledge and the system for veterinary inputs. Aid activities linked to this sector are unlikely to interfere with domestic production or marketing, but care should be taken not to 'flood the market'

given the activities of other agencies. Aid modalities that strengthen and work through existing market structures, such as cash programming, are recommended.

3.9 Chickens

3.9.1 Chickens Market System Overview

Chickens are an important commodity in the study area, particularly for those living in poverty. Chicken rearing is common across the entire study area, as it is the most common livestock among those in the poorest quintile across all four regions (DHS 2021). According to the 2021 DHS dataset, the percentage of households living in poverty who own at least one chicken is 43 percent for Androy, 30 percent in Anosy, 32 percent in Atsimo Andrefana, and 60 percent in Atsimo Atsinanana. In general, producers do not use improved methods of rearing, such as providing feed, building coops, and vaccinating. These are regarded as unnecessary and expensive, rather than as an investment in improved production. A minimal amount of chicken is consumed by households; most goes directly from producers to collectors and wholesalers, and local cafes. Egg consumption is also low, with national per capita consumption at just 11.5 eggs (HelgiLibrary 2021). Large-scale industrial breeding does not exist in the study districts, and 90 percent of national production is at the smallholder level (Kansas State University 2023). Outside of the study area, there are some large-scale producers that sell to urban retail shops and food processors. The main challenge facing the chicken sector is the high mortality rates among flocks due to *barika* (Newcastle disease) and poultry influenza. Vaccination coverage is very low. The harsh climatic conditions are believed to make chickens more prone to the disease, and because of this, larger-scale poultry farming is considered a risky business. Most producers—especially those living in poverty—only own one or two chickens at a time, although producers in the Southeast tend to have closer to four or five chickens on average (DHS 2021). FAO has also recently been distributing improved breeds, which could address some of the producers' concerns.

3.9.2 Description of Key Actors

Small-scale producers purchase three-day-old chicks from the nearest market. The *akoho gasy* breed is widespread in markets because it is more resilient to climatic conditions and does not require special feeding. Other breeds on the market include Bengal cocks for cockfighting and *Pil coqs,* a mixed variety. FAO recently distributed KC3 hens, a laying breed from Kenya valued for the size of its eggs. There is also an improved breed called *kurokee*; a mixed breed used for both meat and eggs. The distribution of the latter is part of the MIONJO project, which the *Centre de Service Agricole* (Agricultural Service Center) is implementing. There are two types of feed available from animal feed suppliers, starter and feed. NGOs are active in the chicken market, and aid projects are the primary providers of inputs for producers. Phytosanitary and animal health products are imported, packaged, and marketed by the country's main suppliers.

There are few commercial producers of chickens and eggs in the Grand South and Southeast. Small-scale producers (two to five chickens) sell their chickens on market day or by going door-to-door to local restaurants during the week. Larger producers (around 60 animals) hire labor to take the chickens to larger markets to store and sell there (USAID 2022). Chickens are usually transported using a bicycle, on foot, or by *taxi-brousse* (bush taxi). The chickens are grouped into large *garaba* baskets containing 10 to 25 animals and then transported as luggage on the bush taxis. The main customers for wholesalers are the small and medium-sized restaurants in the towns. Particularly during lean periods, wholesalers may enter into an agreement with collectors, paying in advance to symbolize their commitment. Retailers

supply small cafes in large towns and local consumer households. They sell chickens either live or dead, depending on household preference, and prices differ for the two types of meat. Retailers' profit margins are limited. Processing is extremely limited in this value chain, with the main forms of processing being selling chickens dead instead of alive and street vendors selling snacks such as fried chicken.

3.9.3 Barriers/Opportunities (including investment potential)

Chickens are a promising value chain for organizations aiming to improve lives among the most vulnerable communities in the study area. Chickens are common throughout the entire study area, and they act as a source of nutrition, a livelihood activity, and a savings mechanism when emergency cash is required. They are also a promising activity for engaging women: unlike for zebu and cows, women are generally responsible for chicken rearing and typically make most of the decisions regarding their husbandry and sales.

The major barriers to this market include risk aversion among producers, disease, and theft. As mentioned previously, due to limited veterinary services, diseases are common among poultry, leading to producers' tendency to keep flocks small and avoid major investments in their production. Periodic droughts impact the productivity of cereal crops, which therefore impacts feed availability for chicken producers. Financial difficulties in rural areas are driving up theft of assets such as chickens that can easily be converted to cash. Producers report that poultry is the sector that has suffered the most, and the market barriers are deterring some producers from rearing chickens entirely.

3.9.4 Other Implications for USAID (notable for Bellmon Analysis, other policies)

The chicken sector plays an important role in household finances and is the only livestock asset consistently owned by women. Activities to strengthen this sector are a very strong candidate for livelihoods programming under graduation models, particularly if layered with programming designed to increase producer knowledge and understanding of return on investment for inputs. Within the market system, there are also livelihood opportunities for those who do not own land or chickens, for example grinding mills could be provided as part of a graduation program asset transfer, and could create an MSME for youth or urban households. This type of aid activity is unlikely to interfere with domestic production or marketing.

4. LIVELIHOOD CONSIDERATIONS

Section 4 provides further details on livelihoods within the study area. Section 4.1 begins with a summary of income profiles in the relevant areas. Section 4.2 discusses the impact of climate change on livelihoods. The next three sections discuss opportunities and challenges for women (4.3), youth (4.4), and people with disabilities (4.5). We also discuss the role of migration and remittances for local livelihoods (4.6) and provide a detailed overview of relevant programming related to livelihoods and markets (4.7) Note that efforts related to food assistance are discussed in Section 5.2.

4.1 Income profiles

4.1.1 Income sources

Households generally show significant diversification in their income-generating activities, participating in as many as 13 activities that contribute to livelihoods. This diversity provides opportunities for income smoothing and some protection from shocks and stresses (droughts, tropical storms), although the extent depends on many factors. Income from agriculture, livestock, and trade plays the largest role in disposable income for households, with agricultural labor playing an important role for poor and very poor households (Fayad 2023, FEWSNET 2021). Agriculture labor and casual labor opportunities are more regular in the Southeast, contributing up to 30 to 50 percent of annual cash income there, versus 15 to 30 percent in the Grand South. Landless households also engage in petty trade, brickmaking, and charcoal production. Other common livelihoods for poorer households include gathering wild foods, fishing, selling firewood/charcoal, making handicrafts, and engaging in petty trading. Migration also plays a role in income diversification, particularly for households in Anosy. This is discussed more in Section 4.6, including how migration serves as a source of resilience. More detail on household profiles by region can be found in Annex K.

4.1.2 Coping Mechanisms/Use of Disposable Income

The research team carefully examined how households' income profiles changed during difficult times when they must turn to additional sources of income. During times of stress, households reported coping mechanisms including collecting firewood for sale, gathering wild foods[5] for sale and consumption, feeding cactus to livestock (instead of feed), selling livestock (chickens and goats first), selling other household assets, sending an individual to look for work in urban areas, and relying on humanitarian assistance. If these adaptation strategies are not sufficient, households begin reducing the size of their zebu herd or may migrate more permanently (see Section 4.6 for more discussion on migration).

In addition to income sources, this study gathered relevant data on households' spending patterns using participatory exercises in FGDs. Participants were asked to think about how they spend their money in "normal times," and were given 10 tokens to "spend" on different expense categories (e.g., food, health, agriculture inputs, livestock inputs, education, social obligations, savings, or debt repayment). After food, the highest priorities during normal times were inputs for both crops and animals, savings, and education, respectively. These priorities remained consistent across all regions in the study area, with education having a slightly higher priority in Atsimo Atsinanana, and social obligations (such as gifts to other households in times of need or for life celebrations) having a slightly higher priority in Anosy.

FGD participants were then given just seven tokens and asked to "spend" their money as though it was a "difficult time" (for example, a drought or after a big storm). Unsurprisingly, food remained the highest priority, but interestingly, education became the next highest priority, indicating a strong commitment to educating children. Inputs for crops and livestock remained high on the list of priorities during difficult times, but healthcare rose to be one of the top five priorities, particularly from the perspective of adult women. Payments for social obligations dropped significantly in most regions, but remained important

[5] Common wild foods include cactus fruits, wild mangoes, tamarind, breadfruit, jackfruit, and – in extreme cases – *vihy*, an aquatic plant with an edible fruit that can cause digestive issues if not prepared correctly. FEWS NET found that, because of cumulative years of drought, wild food availability throughout southern Madagascar remains below average (FEWS NET 2022).

in Anosy, despite the reduced capacity to "spend." Savings also "decreased" but only slightly. The category that saw the biggest drop across the board was shelter.

4.2 Climate Change Vulnerabilities

Madagascar has been hit by a tropical storm every 0.9 years on average, while droughts and floods take place every 2.7 and 3 years, respectively (Fayad 2023). Sandstorms (known locally as *tiomena* or red wind) have also increased in frequency and length since 2019, creating dunes on farmlands, drying out soils, eroding, and damaging crops—affecting both planting and harvest seasons (Mongabay 2021). The IMF expects climate change to decrease agricultural production through three channels: (1) the loss of cultivable land due to erosion, more intense rainfall, cyclones, and floods; (2) a decline in land productivity because of more severe drought and drought-induced pests; and (3) the loss of labor productivity caused by extreme heat—which, according to the World Bank, has already fallen by $95 per worker over the past 20 years (Fayad 2023).

The Paris Agreement thresholds of 1.5°C and 2°C were set to avoid the most damaging effects of climate change. However, around a third of the days in 2023 breached the 1.5°C level (McGrath et al. 2023). What this means specifically for Madagascar's Grand South is that producers in Ampanihy Ouest (Atsimo Andrefana) and parts of Androy should expect a rise in temperatures and an increase in rainfall (Barimalala et al. 2021). At a 2°C threshold, this will extend to include all Androy and parts of Anosy. The delayed onset of rain and shortening of the rainy season will likely result in drier conditions throughout Atsimo Atsinanana. Over 2°C, an increase in total rainfall is expected, but more extreme rainfall events are expected throughout Madagascar, especially January through April (Barimalala et al. 2021).

4.3 Opportunities for Women

4.3.1 Property rights, contract enforcement

Legally, men and women in Madagascar have equal rights to property; however, in practice, local customs limit female land ownership. Traditionally, men may inherit and own cattle and land (USAID 2021), while women can obtain land and livestock by purchasing it, inheriting it, or acquiring it through marriage, but typically access land through their fathers or husbands (Kellum et al. 2020; Harivola 2021). Despite legal protections granting women equal rights to land in civil marriages, women typically lose land rights when they are divorced or separated (Kellum et al. 2020). In traditional marriages, a woman's right to land is not protected, and men often receive two-thirds of the property following divorce. Similarly, inheritance customs in Amboasary Atsimo favor men, and dictate that property passes on to sons (Harivola 2021). Even when a woman owns zebu in her own right, there is social pressure to slaughter hers, alongside her husband's, at the time of his death. This makes the accumulation of assets very difficult for women.

4.3.2 Production Decisions

The study team found women make meaningful contributions to production decisions. In FGDs and KIIs, the team heard that production decisions were made jointly between the husband and wife, although the husband often has the final say. In Atsimo Andrefana and Androy the norms about "women's crops" and "men's crops" are stronger than in Anosy and Atsimo Andrefana. Crops and livestock perceived as "women's" are groundnuts, beans, sorghum, and chickens; while products perceived as "men's" are rice, maize, goats, and zebu. Women manage household finances and making decisions around nutrition

and which products to sell or purchase at the market. Building on these norms, there may be opportunities for women to take a greater role in the local targeting of humanitarian assistance; for example, by using community-led approaches and discussions with established women's groups (such as savings groups) to establish targeting priorities in specific communities. Annexes B-J provide detail on women's roles in each specific market system.

4.4 Opportunities for Youth

4.4.1 Aspirations

"Young people are thirsty for knowledge..."
Young Man Befotaka South

Youth in the Grand South and Southeast hold an array of livelihood aspirations—from agriculture to animal husbandry, teaching, and coaching. In FGDs, young people shared a thirst for knowledge and a strong desire to make their families proud through education. Educated youth are perceived as having greater livelihood opportunities, as they have access to employment in the private sector or can employ and manage their own agricultural workers. However, the young people interviewed, particularly girls, rarely had the opportunity to continue their schooling because of household financial difficulties and household responsibilities.

Money and access to equipment ('tools of the trade') were respondents' primary barriers to pursuing their livelihood of choice, as the plows, seeders, pesticides, and other tools required to cultivate land are expensive. Many young people were interested in following in their parents' paths and pursuing livelihoods in agriculture and animal husbandry, or in related jobs such as traders and collectors of maize, cowpeas, goats, or poultry. Young women in the focus groups shared that, when possible, they borrowed money from their parents to pursue small business initiatives, such as working in small eateries and selling agricultural products in the market.

Outside of agriculture, youth expressed interest in professions such as teachers, midwives, athletic coaches, and drivers. Youth may also migrate to bigger cities to work as guards and rickshaw drivers or to Ilakaka for mining jobs, but economic migration was more commonly discussed in Anosy than in other regions. In the Atsimo Atsinanana region, young people who were not employed in agriculture or animal husbandry took on jobs as porters or charcoal makers. A few young men aspired to become local leaders, to enact change in their districts, or district chiefs, doctors, and policemen. Many indicated they aspire to own zebu, as zebu are an important economic asset in the Grand South and Southeast.

4.4.2 Role in Household Responsibilities

From an early age, girls and boys take on distinct roles in production and household labor. Boys are typically responsible for agricultural tasks and household tasks that require strength, such as herding and grazing zebu, collecting firewood, and collecting water. Girls are responsible for domestic chores, such as childcare, dishwashing, cleaning, and cooking, and contribute to firewood and water collection (Harivola 2021). Traditional gender norms (stronger in the Southeast) dictate household roles and discourage boys from contributing to domestic labor. Agricultural tasks for young men and women, however, are similar, including weeding, planting, sowing, and harvesting crops.

4.4.3 How Education Affects Livelihoods

Education is a critical resource for youth to achieve their livelihood aspirations, giving young men and women access to stable employment and allowing them to better navigate their finances and legal rights. However, poverty, geographic barriers, and early marriage limit educational access for youth in the study area. There is also a lack of vocational training available in the Grand South and Southeast, which also limits diversified livelihood opportunities. Young men from poor households are often forced to drop out of school to support agricultural production. Youth who drop out of school may also seek other sources of income, such as transactional sex by young women, and *dahalo* participation by young men (Harivola 2021).

> "Young people need to study so they can help their parents when they are successful in life. They **must strive to be the pride of the family…**"
>
> Young Woman Befotaka FGD

Parents in the FGDs showed a high commitment to education for their children, yet many struggle to afford school fees, books, and supplies. Often, secondary schools are only available in the commune's main town, leading to notably lower rates of attendance for children living in rural areas (Harivola 2021; WFP 2022). The SDA found that households headed by individuals with incomplete or no primary education experience higher rates of poverty than households headed by individuals who have completed primary education or higher. Therefore, supporting youth in staying in school is important for breaking the cycle of poverty.

4.4.4 Additional Contextual Factors

Madagascar ranks in the top 13 of countries with the highest rates of child marriage and early pregnancy. Early marriage and early pregnancy act as barriers to education for young women and often require them to leave the labor market to care for their families. Young men also marry early to establish their status in society, but early marriage and parenthood do not limit their employment opportunities in the same way, as childcare responsibilities fall to their wives. Atsimo Atsinanana and Atsimo Andrefana have some of the highest rates of early marriage in the country, at 60 percent and 66 percent, respectively (Kellum et al. 2020).

> "People who have studied stand out from others because **they know how to manage their money**"
>
> Youth FGD Ejeda

Young women who participate in the labor market are typically employed in agriculture or work as cleaners and housekeepers in urban areas (Kellum et al. 2020). Unmarried girls may resort to transactional sex to provide for themselves without burdening their families (Kellum et al. 2020). Young men have greater access to productive assets, due to gendered land inheritance rights, and therefore have greater opportunity for agricultural livelihoods.

4.5 Opportunities for People with Disabilities

Although legally protected, people living with disabilities in the Grand South and Southeast are socially and culturally isolated and under-resourced, making it challenging for these individuals to contribute to their communities. Disability rights fall under Madagascar's National Act of 97/044, which protects the rights to health, employment, and education for people with disabilities. In practice, social and cultural

norms isolate people with disabilities and restrict these groups from fully participating in their communities (USAID 2021). The lack of accessible infrastructure also limits access to economic opportunities and support services for adults with disabilities and makes it challenging for youth with disabilities to attend school (USAID 2021; Kellum et al. 2020). Families often view family members with disabilities as "burdens," as they are perceived as unable to work and contribute financially to their families. This perception also impacts decision making and the personal autonomy of people with disabilities, as they may be restricted from deciding about production activities, health, and nutrition (Veroniaina 2021). While aid agencies consider people with disabilities to be a population of focus for assistance, there is limited programming in the study area geared specifically towards the needs of individuals with disabilities.

4.6 Role of Migration and Remittances in Household Resilience

There are around 90,000 IDPs/internal migrants[6] in the Grand South (International Organization for Migration [IOM] 2022). Cyclical droughts in the Grand South substantially impact patterns of internal migration. The pressure from environmental factors is intertwined with the need for increased economic opportunity; making it difficult to determine when migration is voluntary rather than 'forced' by weather incidents. Nevertheless, migration during the most recent drought from 2019 to 2022 follows a similar pattern to previous droughts (2013/14 and 2016/17). Urban areas of Tulear, Ilakaka, Majunga, Morondava, and Nosy Be, and northern and north-northeastern regions of the country were common migration destinations. Informal, low-skilled, low-paying jobs, such as rickshaw pullers, security guards, port labor, and domestic workers were common employment options (IOM 2022). Close to half of those who migrate (40-46 percent) are likely to make it a permanent relocation, rather than cyclical or seasonal migration (IOM 2017). Those who move still report maintaining assets (zebu, land) in their place of origin. The remainder migrate for four to five months during the lean season—the main period of migratory labor—returning when the next production season begins. This is also the time when livestock herds migrate.

Androy has historically been a "source region" for internal migration and rural-to-urban migration within the study area, because of the drought and lack of employment opportunities. Past IOM studies have noted that the people of Androy have always considered migration an economic opportunity; yet many indicate they would stay if appropriate irrigation infrastructure existed, or rain patterns were more reliable (IOM 2017). This is consistent with data from FGDs in which communities reported mixed perspectives on whether migration is good or bad—it simply depends on the reasons behind the migration.

Families are more likely to move due to the drought, and often identify social networks in advance that could support their relocation (IOM 2017). According to FGDs, men make this decision, even though it affects the whole family. When individuals migrate, it is most often young men who move to urban or mining areas in search of work. This can lead to women and elderly household members taking on

[6] "A ***migrant*** is defined as any person who is moving or has moved away from his/her habitual place of residence (across an international border or within a state), regardless of (1) the person's legal status; (2) whether the movement is voluntary or involuntary; (3) what the causes for the movement are; or (4) what the intended length of the stay is. (IOM 2019). Refugees and Internally displaced persons (IDPs) are often considered to be forcibly displaced. A distinguishing feature of forced displacement is that individuals may not have sufficient time and choice to determine when and how to leave and where to go. In addition, climate change may be considered a factor in forcing displacement. (World Bank, 2019)" (Byrne 2022).

additional responsibilities, and something of a reversal of traditional gender roles, as the remaining adult must make all decisions on subsistence, household feeding/meal preparation, and production activities rather than the man who has migrated (Veroniaina 2021).

The frequency of remittances sent back home seems to depend on the nature and length of the migration. Poor migrants seeking temporary work more often send money to families left behind during the lean season. Permanent internal migration results initially in fairly infrequent remittance—just once or twice a year, while migrants who had been living away from their place of origin for longer (10+ years) reported sending money more frequently, particularly for important events such as funerals. Overseas remittances, from the diaspora living outside of Madagascar, have increased significantly since 2005, reaching 4.8 percent of GDP in 2022 (IOM 2022).

4.7 Selected Resilience Efforts Related to Markets and Livelihoods

Table 7 reflects key programs actively working to strengthen resilience in the Grand South and Southeast. The Government of Madagascar and aid agencies are working to build resilience particularly through investments in infrastructure, livelihoods, governance, and social programs.

Table 7: Key Livelihood Programs in Madagascar's Grand South and Southeast

Government of Madagascar		
Who	**What**	**Where**
Ministry of Public Works, Road Agency of Madagascar, *World Bank, EU, AfDB, European Investment Bank*	The Connectivity for Rural Livelihood Improvement Project (2020-2025, $140M) aims to improve transport connectivity in rural areas to enhance access to social and economic opportunities. Improvements to physical and digital connectivity will enhance the resilience of these rural communities.	13 regions including Atsimo Atsinanana, Anosy, Atsimo Andrefana
Fonds d'Intervention Pour le Développement (FID)	A Productive Social Net project aims to improve local productivity and support vulnerable families through monetary transfers in return for work. The work includes capacity building projects on agricultural production and increasing awareness.	Fitovinany, Anosy, Atsimo Atsinanana
Road Agency, *World Bank*	Connecting Madagascar for Inclusive Growth (2022-2028, $400 M) aims to improve resilience, connectivity, and management of key roads in rural areas for increased access to social and economic opportunities.	Atsimo Andrefana, Androy, Anody, Atsinanana, Sofia
Ministry of Environment and Sustainable Development, MINAE, FAO	Forest and Landscape Restoration Mechanism (2022-2027, $50M) aims to increase investments and create an enabling environment for biodiversity, conservation, and sustainable diversification of livelihoods.	Atsimo Andrefana
Ministry of Interior and Decentralization, World Bank	Support for resilience livelihoods, MIONJO (2020-2025, $200M) aims to improve basic infrastructure, local governance, and resilience.	Androy, Anosy, Amboasary Atsimo Andrefana
Ministry of Population, Social Protection, and Promotion of Women (MPPSPF), FID, *Multiple Donors*	National Social Safety Nets oversees two programs: conditional cash transfers to improve primary schools, attendance, and student transitions, Cash for Productive Work Safety Net to provide income support	20 districts in seven regions
Aid Agencies		
Who	**What**	**Where**
UN, *Multiple Donors*	FAGNAVOTSE (2019-2023, $4M) aims to increase financial access and support the development of value chains. Project includes social protection measures like cash transfers, health insurance, GBV services, and livelihood opportunities.	Amboasary

Welthungerhilfe (WHH), Start Network, *Multiple Donors*	Forecast Based Action project aims to address increasing drought risk in Madagascar. The project enables the allocation of assistance in advance of disaster based on risk analysis and warning systems.	Atsimo Atsinanana, Boeny, Alaotra-Mangoro
World Food Programme (WFP)	R4 Rural Resilience Initiative aims to strengthen community resilience, livelihoods and wellbeing amidst increasing climate crisis and vulnerabilities. By improving natural resource management, agricultural practices, increased investment, diversification, and financial assistance, communities can build resilience to upcoming shocks.	Madagascar
UNICEF, *Multiple Donors*	UNICEF aims to provide ($41M) multisectoral integrated (health, education, WASH, social assistance (cash/in kind) nutrition) responses to address community needs by reinforcing resilience of local communities and systems. Key targets include children with severe wasting, victims of GBV, and people without water access. UNICEF also funds ZARA MIRA (2022-2025), which is implemented by the *Fonds d'Intervention Pour le Développement* (FID), and aims to support households and children by promoting women's empowerment and gender equality through monetary transfers.	Madagascar
International Federation of Red Cross and Red Crescent Societies (IFRC), Camp Coordination and Camp Management, MPPSPF, BNGRC, *Multiple Donors*	Collaborated to help 35,418 households through the distributions of nonfood items, cash for shelter and home repairs, technical support, shelter kits, cash and voucher transfers, construction, and rehabilitation of shelters.	11 regions
Fonds de Développement Agricole, Multiple Donors	Reinforcement of Institutions for the Development of Agricultural Resilience (RINDRA) (EUR 40M) aims to strengthen governance, improve government capacity, and education and civic engagement to promote responsiveness and resilience. In agriculture, RINDRA has worked with corresponding ministries to support resource management and implement policy to encourage agricultural development.	Madagascar
Sustainable Environment, Education & Development (SEED) Madagascar	SEED works with communities to address health, education, livelihood, and sustainable resources management needs. SEED works to improve livelihood opportunities through embroidery, beekeeping, fishing, and weaving and protect the environment through conservation, capacity building, and research.	Anosy

Source: Madagascar Food Security Cluster 2023, World Bank 2023b.

5. FOOD SECURITY AND HUMANITARIAN ASSISTANCE

The following section provides further details on the food security situation and humanitarian context of Madagascar's Grand South and Southeast. We begin in Section 5.1 by providing further detail on the food security context, including the food basket profile (5.1.1), a description of the impact of ongoing conflict on local food security (5.1.2), and a brief note on unmet food needs (5.1.3). Section 5.2 provides a detailed matrix summarizing ongoing food security activities. Next, Section 5.3 goes more in-depth on the key food assistance modalities critical for the Bellmon determination. We also include a summary of lessons learned from previous programs in Section 5.4.

5.1 Food Security Context

5.1.1 Food Basket Profile

Poor households must rely on markets for food, even for types of food that they grow, as their own production is often insufficient and there is no household-level storage. In the south of Madagascar,

grains make up most households' food consumption followed by leafy vegetables, fruits and vegetables, meat, poultry, fish, pulses (beans, lentils, peas), eggs, dairy, and nuts (IMPEL 2021). Annex K provides regional profiles on the products households grow and buy, and how these relate to their livelihoods.

Food price inflation increased through most of 2023, reaching a peak of 15.5 percent in March before dropping to 10.8 percent in August (WFP 2023). Since 2019, crises such as COVID-19 and natural disasters, have raised the cost of the average food basket by 19 percent. Therefore, the CWB recommended an update to the Minimum Expenditure Basket (MEB)[7] in 2022. The intention is to deliver 2,133 calories per capita; therefore, the MEB has been set at $610 (MGA 2,805,785 per household. About 85 percent of this is expected to be spent on food. This aligns with the IMF findings that the standard food basket at markets in this region costs $0.45 (MGA 2,013 per person per day (Fayad 2023). The cost of a food basket is important to understanding poverty estimates in Madagascar, as the food poverty line is based on the cost of the MEB. INSTAT completed a 2022 household survey, and the poverty estimate may be further updated in the future (World Bank 2023).

The proportion of household expenditures spent is highest for staple foods like cassava, sweet potato, and maize and rice. Availability of goods in local markets reflects the seasonal crop calendar, altering households' consumption patterns with the seasons (FEWS NET 2017). During the lean season, when prices are highest and income opportunities are low, households rely on lower-quality imported rice and cassava (WFP 2022). Throughout the year, wild food gathering provides another source of food; cactus fruit, tamarind, and wild tubers are consumed more by poor households especially during the lean season (FEWS NET 2017). Information on crop calendars and varieties grown in the study area can be found in the market system report relevant to that commodity (Annexes B-J).

5.1.2 How Conflict Affects Food Security

The primary form of conflict in the study area relates to cattle theft, which represents 50 percent of animal losses (from any cause) in Bekily and 32 percent of animal losses in Ambovombe. About 31 percent of all livestock owners in Androy consider animal theft an "important or very important" issue (INSTAT 2021). As a form of household saving, livestock are vital to households' financial assets. Losing these assets negatively impacts households' ability to purchase what they need, particularly during lean seasons.

External conflict, like the ongoing war in Ukraine, can also increase prices of household staples such as rice and oil, as well as of inputs such as improved seeds, fertilizer, and veterinary medicines. Although their effects are indirect, international conflicts can put these livelihood resources beyond the grasp of poor producers (World Bank 2022a).

5.1.3 Unmet Needs: Percent of Food Requirements Not Met by Local Production

Poor production techniques, unavailability and/or inaccessibility of agriculture inputs (for both livestock and crops), and inconsistent rain patterns mean that households are unable to produce sufficient volumes to meet their food requirements. As of June 2023, FAO anticipated 1,082,000 MT of cereals would be needed in the 2022/23 marketing year, with 801,000 MT of this being rice (FAO 2023). More

[7] The purpose of the MEB is to understand the consumption and spending habits of households so that aid can align with and adapt to identified needs. The MEB provides an overview of household needs and therefore allows for planning and alignment of emergency response (e.g., to drought, cyclones) based on differences in consumption levels.

detail on the proportion of production that is sold rather than kept in the household can be found in the relevant market system reports (Annexes B-J).

5.2 Overview of Food Security Activities

Humanitarian agencies such as WFP import and distribute rice, maize, sorghum, oil, and pulses. The research team found that food aid distribution occurs either biweekly or monthly. Biweekly food baskets contain an estimated daily intake of 2,300 calories per person for a five-person household, on average, and include a total of 30 kg of rice or 30 kg of sorghum, 3 liters of vegetable or palm oil, and 4.5 kg of pulses. While this aid is intended to last one month, respondents noted that donation quantity does not differ by household size, so larger households may finish this food within one week. Humanitarian organizations also supply peanuts, sorghum, and millet seeds to increase agricultural production and distribute goats and hens to boost livelihoods. Distribution of materials and livestock is supplemented by cash distributions to help ensure that beneficiaries do not need to sell this aid.

Table 8 reflects key food assistance programs actively working in the Grand South and Southeast of Madagascar. The Government of Madagascar and aid agencies are working to reduce food insecurity, improve nutrition, and enhance agriculture productivity throughout the study area.

Table 8: Key Food Security Activities in Southern Madagascar

Government of Madagascar		
Who	**What**	**Where**
National Community Nutrition Unit	Implements programs to reduce chronic malnutrition in children.	Vulnerable communes in 111 districts
Ministry of Health	Established and supported community nutrition sites.	Madagascar
National and Regional Nutrition Offices, Ministry of Agriculture and Fishing, Ministry of Public Health, Ministry of Water and Sanitation, *GIZ*	Food Security, Nutrition, and Resilience Strengthening Project (ProSAR, EUR 5.5M, 2019-2023) aims to improve food access, dietary diversity, nutrition, and water access through a multisectoral approach. Additionally, the project works to develop health centers, build resilience, and strengthen multi-sector coordination.	Atsimo Atsinanana
Ministry of Agriculture, Livestock, and Fishing, *AfDB*	The Agro-Industrial Processing Zone Development Project in the Southwest Region of Madagascar (2020-2024, 20M U.A) aims to improve the processing of agricultural products and improve agricultural value chains through improvements to the regulatory framework, basic infrastructure, agricultural production, marketing, and storage.	Androy, Anosy, Atsimo Andrefana, Menabe
Ministry of Agriculture, *World Bank*	The Madagascar Agriculture Rural Growth and Land Management Project (2016-2024, $105M) aims to improve rural land tenure security and enhance access to markets for farming households.	Madagascar
Ministry of Agriculture, *IFAD, and Other Donors*	The Professional Training and Agricultural Productivity Improvement Program (FORMAPROD) (2013-2023, $86M) aims to improve agricultural productivity by ensuring a national and rural training system, improving financial access, and providing technical support and knowledge sharing in agricultural development.	Madagascar
International Organizations/ NGOs		
Who	**What**	**Where**
ADRA, *USAID*	FIOVANA (2019-2024, $40M) aims to improve the health and nutrition of women and children, increase household income and production, and strengthen community disaster risk management	Androy, Atsimo Andrefana

CRS, *USAID*	MAHARO (2019-2024, $45M) aims to reduce acute food insecurity among the most vulnerable people, households, and communities. Emergency food projects (20M USD) provide food and nutrition counseling and monitoring.	Atsimo Andrefana, Grand South
CIP, *USAID*	The Sweet Recovery Project (2022-2024) aims to improve food security and combat malnutrition through a sweet potato vine distribution initiative.	Atsimo Andrefana, Anosy, Androy
Ocean Farmers, *USAID*	NOSY MANGA (2022-2027): Restorative aquaculture for nature and community initiatives will support the development of sustainable commercial seaweed and sea cucumber farming.	Menabe, Atsimo Andrefana, Anosy
Global Communities, *USDA*	McGovern-Dole International Food for Education and Child Nutrition (2021-2026, $25M) is a school feeding program that will provide commodities like rice, beans, and vegetable oil to ensure daily school meals.	Androy
GRET, *EU*	Supporting Agroecology in the South and Southeast of Madagascar (2020-2024, 3.2 M EU) aims to sustainably improve the food and nutritional security of rural households.	Androy, Anosy
International Fund for Agricultural Development	Inclusive Agricultural Value Chains Development Program (DEFIS) (2017-2028, $250M) aims to strengthen production capabilities for household farms along with production and marketing support services.	8 regions including Androy, Anosy, Atsimo Andrefana, Atsimo Atsinanana
WFP, *Multiple Donors*	Food assistance and cash-based transfers. Malnutrition programs and treatment centers targeting children under 5. WFP is the largest school meals provider. WFP improves access to resources including seed donations, water, and financial services. For the Miaro national stunting prevention program, WFP provides specialized nutritious foods, nutrition-sensitive assets, and educational programming to nine communes in the study area.	Grand South, Southeast
FAO, *Multiple Donors*	FAO provides agricultural inputs (seeds, tools, fertilizer) for the agricultural season, increases capacity for cash crops and agroforestry activities through technical support, diversifies livelihood sources through storage and processing of agricultural products, supports development of fishing with equipment and technical support, supports restocking and animal health of small livestock, improves monitoring of vulnerable situations and warning systems, and improves coordination of activities at national and regional levels.	Grand South, Southeast
WHH, *EU*	Fighting Hunger in Madagascar aims to improve nutrition through planting fast growing fruit trees, providing agricultural inputs (high quality seeds), diversifying livelihoods, and establishing new water sources. Infrastructure for Small Scale Farming (2020-2024; $4M) aims to improve natural resource management, increase market access, and improve infrastructure for small-scale producers. Stopping the Downward Spiral (2020-2024, 3M USD) aims to introduce sustainable and efficient cultivation methods and more resilient crops to increase resilience and support food security.	Atsimo Andrefana
Rise Against Hunger	The School Feeding Initiative (2017-Present) aims to improve student nutrition, reduce absenteeism rates, and improve access to WASH.	Vatovavy Fitovinany
Red Cross Madagascar	Emergency food and support through monetary transfers.	Anosy
Action contre la Faim	Deployed mobile teams for health and nutrition services for children; provided monetary assistance for food, water, seed, and tool distribution.	Ambovombe, Tuléar
SAMPAN'ASA MOMBA NY FAMPANDROSOANA (SAF/FJKM)	FAGNAJA (2023-2024) aims to improve food security and nutrition by promoting sustainable practices (sustainable agriculture, market gardening, awareness raising) at the community and household level. VINA (2023-2024) will provide food during this lean season.	Anosy, Androy

Source: Madagascar Food Security Cluster 2023, World Bank 2023b.

5.3 Modalities

The majority of the aid provided in the Grand South and Southeast of Madagascar since 2005 has taken the form of direct delivery of food aid or cash. Findings from this assessment indicate that several

different modalities are likely to be feasible in the Grand South and Southeastern Madagascar. The most appropriate modality will depend on the specific populations targeted, their physical access to markets, the connectivity and trustworthiness of vendors, access to mobile phones (including shared access), and the preferences of households.

Cash programming has been largely successful to date. Given the relatively good season in 2023, aid modalities can now begin pivoting towards systems-based responses that address multiple elements of resilience at the household and market level. Evidence from other USAID resilience activities indicates that sequencing, layering, and integrating humanitarian and development approaches results in greater resilience impacts (Gobin et al. 2023). Table 9 briefly reviews the opportunities and risks of modality options relevant to the Bellmon Analysis.

Table 9: Opportunities and Risks of Modality Options for Bellmon Analysis

Modality (*example*)	Opportunities & Advantages	Risks & Disadvantages	Relevance to Feasibility, Appropriateness and Objective
U.S. In-kind Food Assistance *(USAID Drought & Cyclone response 2023)*	● Some HHs/locations prefer this modality due to convenience ● Women have stronger preference for direct food than men in some locations	● High transport and logistics costs ● Potential to distort food markets ● Higher carbon footprint ● Limited warehouse capacity ● Aid sold in some markets (Ampanihy) ● Transport of commodities to HHs is likely necessary	● Most relevant to rice, maize, sorghum, beans, and vegetable oil ● Appropriate if carefully targeted ● Market-integrated approaches (working through market actors) should be explored ● Feasibility across target areas may depend on warehousing and road network
Food Vouchers *(USAID Drought & Cyclone response 2023)*	● Can be used to build relationship with private sector actors ● Supports local food systems and market systems ● Ensures the purchase of specific items, such as encouraging the consumption of (drought-resistant) sorghum	● HHs find this modality inconvenient for food ● More administration than cash modalities ● Can be difficult to find reliable vendors ● Transport of large quantities difficult for households	● Appropriate in locations with reasonable access to multiple trustworthy market vendors ● Feasible, but not preferred by households ● Option of mobile vouchers likely to be limited by phone ownership ● Cash transfers likely to more effectively meet programming objectives
Cash Transfers for Food (and multi-purpose cash programming) *(USAID Drought & Cyclone response 2023, WFP Cash Programming)*	● Some HHs prefer this because they can purchase preferred foods ● Effectiveness of cash is enhanced when complementary	● Cereal prices were unstable in some markets during previous crises, creating a risk of inflation (likely manageable according to CWG analysis)	● Appropriate for any food or non-food commodity ● Supply of some commodities is inconsistent, but substitutes commonly available

Modality (*example*)	Opportunities & Advantages	Risks & Disadvantages	Relevance to Feasibility, Appropriateness and Objective
	support provided (McLean et al. 2020) ● Supports local food systems and market systems ● Cash Working Group indicated three-quarters of markets could support cash and voucher assistance (CVA) (CWG, 2022)	● Most vulnerable HHs often do not own a mobile phone (often have shared use)	● Program objectives more likely to be met if combined with market system strengthening activities ● Cash is feasible in more than ¾ of markets ● Mobile cash most secure, but feasibility will depend on mobile access for HHs
Local and Regional Procurement *(Homegrown school feeding initiative, WFP/FAO)*	● Supports local production and local SMEs ● Decreased cost of transport	● Inconsistent supply/delivery of local food products ● Smaller wholesalers may struggle to meet administrative demands of bidding/procurement	● Appropriate for rice, sorghum, and beans (if sourced from north of country ● Feasible, is already being used successfully, with some challenges ● Supports both food security and market system development objectives ● Could be easily aligned with other market strengthening approaches ● Approach can possibly be used across all areas, but supplies will depend on production levels of desired commodity

Legend: HH = household.

Because resilience touches so many aspects of a household's life, appropriate coordination across USAID activities will be critical for maximizing resilience and food security outcomes. Evidence shows that good resilience programming combines urgent actions (which may have long or short-term outcomes) with consistent 'slow-burn' activities (activities with long lead times) that have medium- and longer-term resilience impacts.

5.4 Past Experience/Lessons Learned

Given that one goal of this report is to provide a thorough review of contextual resources related to resilience, it is worthwhile to examine experiences and lessons learned from other USAID resilience activities. USAID/Ethiopia's Resilience Evidence Gap Analysis used contribution analysis to understand causal pathways for resilience (Gobin et al. 2023). The gap analysis found the following to be important factors in graduation: access to agriculture and livestock inputs; access to credit; climate adaptation activities; strong social capital; and good access to markets.

An existing example of using Title II commodities to catalyze market actors and private sector investment is USAID's *Ayiti Pi Djanm* project in Haiti. The project uses market systems approaches to catalyze private sector investments to develop locally produced foods and create new agricultural livelihood opportunities. It includes several elements that can be linked with graduation programs, including Farmer Learning Communities focused on building local leadership, mobilizing savings groups, and providing cash and voucher assistance to support basic household needs and youth entrepreneurs.

An examination of previous efforts to incorporate the graduation approach in RFSA programming noted the importance of transparency and clear communication with participants and partners regarding targeting criteria and the amount, duration, and timing of the consumption support (Bernagros et al 2022). Researchers also recommended that future programs carefully consider how participants will be supported, after graduation, through intentional linkages with the private sector, government services, and social safety nets. This report also highlighted the importance of ensuring that training and the financial inclusion component must be carefully tailored to the context and the unique needs and capacities of the target population and bolstered by sufficiently comprehensive coaching support.

Given the low education rates in the study area, it is also important to note that WFP found that holding budgeting workshops prior to cash transfers had a significant positive impact on how the cash was used. These workshops provided guidance on productive ways to use cash support, how to develop a household budget and track spending, and how to make informed financial decisions. WFP also found that photo-story displays showing how the cash was used worked well to support positive behavior change, given the low level of literacy. Stories that illustrated how cash had been used and the change it made in people's life reinforced positive norms in the community. This type of workshop was also found useful by the World Bank Human Development Cash Transfer program, where they were called "nudge sessions."

6. TRENDS ANALYSIS

Section 6 provides a summary of key trends over time in terms of nutrition (6.1), market and prices (6.2), production (6.3), and anticipated future assistance (6.4). Most of this information comes from secondary data sources.

6.1 Nutrition Trends

Access, availability, and utilization each have their challenges in the Grand South and Southeast of Madagascar, and these challenges drive nutrition trends for households (see Figure 3). As discussed in other sections, household capacities such as lack of storage and poor post-harvest handling also have a significant impact on food consumption levels because of how they contribute to the proportion of food that must be purchased. WFP and FEWS NET show negative trends regarding nutrition: the number of people using IPC "Crisis level" or above food-based coping mechanisms is rising despite a good harvest, likely because many have not recovered from previous drought and tropical storms (WFP n.d.; FEWS NET 2023b). Also, the number of people with insufficient food consumption continues to rise in all regions of the study area. Ambovombe (Androy), Amboasary (Anosy), and Befotaka (Atsimo Atsinanana) are currently the districts most affected by acute malnutrition. A slight improvement is expected in December 2023 with the off-season rice harvest. However, beyond December, the situation is likely to worsen as households move into the lean season.

Figure 3: Nutritional Trends by Region

Source: WFP (2023)

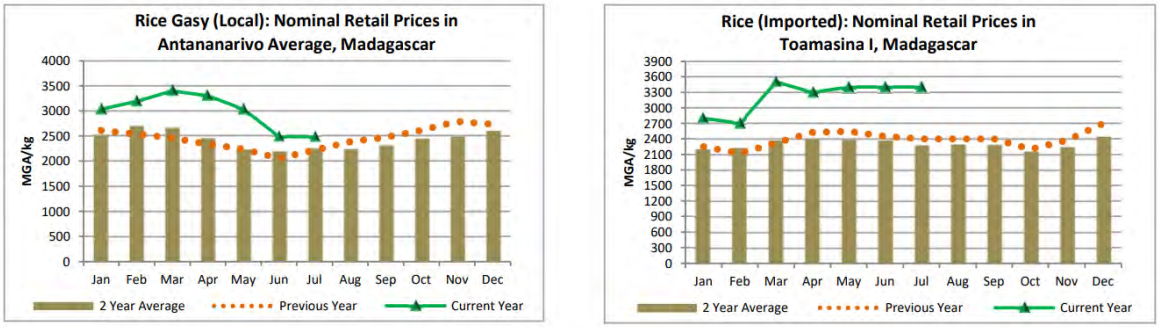
6.2 Market and Price Trends

Inflation has been decreasing over the last few months, although from a very high level. As of September 2023, overall inflation stood at 8.2 percent in Madagascar, coming down from a high of 12.43 percent in March. However, food inflation normally trends higher than overall inflation, and stood at 10.8 percent in September 2023, down from 15.5 percent in March (INSTAT 2023). The market system reports (Annexes B-J) provide local price information for each of the selected commodities.

Approximately $351M in cereals are imported to Madagascar each year (Trading Economics 2021). FAO's Cereal Price Index was up slightly in September, due to a 7 percent increase in maize and sorghum prices, although wheat prices fell slightly (FAO 2023). FAO's (2023) Rice Price Index also shows that the price of rice remains 27.8 percent higher than this time last year (a 15-year high), because of the uncertainty around India's ban on white rice exports (India is the world's largest rice exporter). Rice prices have indeed increased as the season progresses (see Figure 4) (FEWS NET 2023a). The FAO's Vegetable Oil Price Index shows prices slightly down from August, driven by lower world prices for palm,

sunflower, soy, and rapeseed oils worldwide. For cassava, a common replacement for rice among poorer households, prices are higher than last year and the five-year trend. Because of a poor bean harvest, the price of beans has also risen by 20 percent since the main harvest was completed in June (FAO 2023).

Figure 4: Local and Imported Rice Price Trends



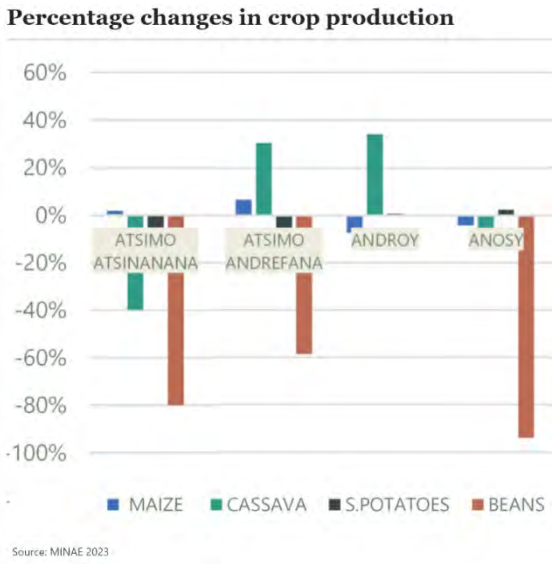
Source: FEWS NET

6.3 Production Trends

For 2023, the U.S. Department of Agriculture (USDA 2023) anticipates rice yields to be the same as the previous two seasons, despite local reports of "a better season" anticipated. This appears to be due to low financial capacity to purchase seed for planting. FEWS NET (2023b) reports also show lower production levels (compared to last year) for beans and maize across the study area (see Figure 5). USDA reports for Madagascar confirm a significant drop in maize yields for growing season 2023/24 (USDA 2023).

Demand for agricultural labor is below average across the study area, because of the limited capacity of better-off households to hire labor and due to smaller planting areas. High transport costs are also limiting poor households' capacity to migrate to groundnut- and sugarcane-producing areas, resulting in pockets with an oversupply of local labor. This is pushing wages below normal to 3000-5000 MGA (0.65 - 1.09 USD) per day, depending on the type of labor.

Figure 5: Crop Production Trends by Region



Climate forecasts suggest an increasing likelihood of a strong El Niño by late 2023. This is typically correlated with below average rainfall in the Grand South of Madagascar. This is likely to compound the impacts of reduced agricultural productivity, loss of seeds, and the reduction of yields (Fayad 2023). In contrast, good rainfall led to improved pasture availability, resulting in improved livestock body conditions from fair to good. Herd sizes remain below average—households had sold off much of their livestock to address consumption gaps—but combined with increased seasonal demand, this means that livestock prices have increased, with cattle double the price of this time last year. Goat prices have also increased by 94 percent in primary markets, such as Tuléar.

6.4 Anticipated Future Assistance Trends

FEWS NET's (2023b) acute food insecurity index shows southern Madagascar is currently experiencing "Stressed" food conditions, and past December, the districts of Befotaka, Vangaindrano, Vondrozo, Ambovombe, Tsihombe, Beloha, Ampanihy Ouest, Amboasary, and Betroka are likely to have "Serious" levels of malnutrition. As of September 2023, about 25 percent of households were receiving 50 percent of their caloric needs from humanitarian assistance (food or cash). After several years of drought, households are expected to struggle to meet their non-food consumption needs, such as education, agricultural inputs, health expenses, and traditional obligations. Some of the worst-off households will likely use coping strategies such as consuming less preferred foods, reducing the number of meals, selling assets, or decreasing education spending.

Looking ahead to early 2024, FEWS NET predicts that areas of the study area will remain in Integrated Phase Classification Stressed (Phase 2) or Crisis (Phase 3) (FEWS NET 2023b). WFP's Hunger Map shows that as of October 2023, over 40 percent of households have insufficient food consumption (WFP 2023). Agricultural labor opportunities continue to be constrained, as producers report they did not have the funds to plant all their land. Although off-season rice will temporarily improve food access for some households in December, these stocks are not expected to last more than a month.

El Niño's effects are expected to mean a late onset to the rainy season and below-average rainfall. Irregular rainfall will also likely compound the impacts of reduced access to agricultural inputs on planted areas, affecting income-earning among poor households who rely on agricultural labor opportunities. This means significant humanitarian assistance in Ampanihy, Ambovombe, and Amboasary, Beloha, and Tsihombe is likely to be needed.

7. CONSIDERATIONS FOR PROGRAM DESIGN

Section 7 focuses on the key considerations for readers involved directly in program design. First, Section 7.1 offers relevant implications of this study's findings for the graduation approach, including targeting (7.1.1), consumption support (7.1.2), livelihoods promotion (7.1.3), and financial inclusion (7.1.4). Finally, we provide a summary of considerations that are specific to each region in Section 7.2.

7.1 Considerations for the Graduation Approach

7.1.1 Targeting

Feedback from FGDs points to the need for a strong element of community consultation during the targeting process. As noted earlier, women manage household finances and make decisions regarding nutrition and household purchases. One option is to build on these norms and give women a key role in targeting and selection. Established groups such as VSLAs and cooperatives could be used as the foundation for organizing these community-led approaches. These groups would have a solid understanding of the local appropriateness of livelihood activities and locally recognized poverty thresholds, as well as knowledge of needy individuals in their communities. Where there are no pre-existing groups, leadership from successful community groups might be temporarily hired to facilitate participatory processes in other locations. Combining community consultations with proxy indicators such as the number of livestock units owned (see Figure 6), productive assets owned, and quality of roofing material would be locally appropriate and consistent with the most commonly used targeting approaches for graduation programs (BRAC 2021).

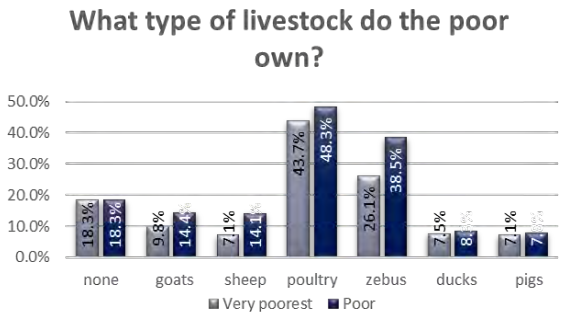
The Maharo project found that youth were typically more willing to receive and follow the advice of training and messaging (IMPEL 2022) than older farmers; therefore, it may make sense to target higher proportions of youth in activities designed to introduce new crops (such as sorghum) or new production techniques.

Food aid assistance activities in the Grand South and Southeast of Madagascar target the most vulnerable and food insecure populations, including very poor households, women, and children (USAID 2022), but there were consistent frustrations articulated by communities that the amount of aid received did not take into consideration family size. Using community-led approaches to targeting, such as engaging established women's groups in identifying the neediest households, would potentially address the concerns raised by communities regarding targeting.

7.1.2 Consumption Support

The study team found communities were evenly divided on whether cash or direct distribution was preferred, based on individual household preferences. Households that preferred cash valued its flexibility both in the products it could buy and the timing of when it was spent. Households that preferred direct food appreciated that it was not "diverted for other things." Vouchers were only a preference for items that were unique or not yet widely available (e.g., a new variety of seed). The MEB can be used as a guideline for the level of consumption support to be provided; however, it does not take education expenses into consideration. For households that have school-age children, it is worth considering whether expenses for schooling should be included in consumption support to keep children in school.

Figure 6: Livestock Breakdown for Poor Households



7.1.3 Livelihoods Promotion

As noted in Section 3, the rice, maize, sorghum, beans, groundnuts, chickens, and goats market systems all provide opportunities for livelihoods programming under the graduation model, including opportunities related to collecting and processing. In many cases, households may grow other crops as well as the ones addressed in this study. Activities such as FFS (livelihoods training) and household budgeting discussion (perhaps as part of the coaching component of a graduation program) can be designed to add value to those activities as well. When this is done jointly with both husbands and wives attending the same training sessions, it supports women's decision-making power in the household.

Agricultural labor is currently the most common income source for landless and land poor households. Development of MSMEs, particularly related to collecting, trading, and small processing, could also be explored for landless/land poor households. The opportunities for processing are discussed in each of the market systems reports, found in Annexes B-J.

It will be important to align selected livelihood activities and training with prioritized crops in each region. For example, crops perceived as "women's crops" are likely to be more appropriate when targeting female-headed households. Again, using community-led approaches, and bringing youth into these conversations, is important for aligning program design with community perceptions of income/food security opportunities and regional norms. Although zebu are highly prized in

communities, their purpose is less food security or income related, and more focused on long-term savings and cultural obligations. This may mean that investments in zebu are not an appropriate livelihood for USAID to support, even if they are prioritized by communities, because their use is not aligned with desired program outcomes.

Livelihood activities provide an opportunity to address the shortage of household storage discussed in this report, if resources for developing storage are provided as part of the livelihoods package and household budget management, negotiating skills, and using market data for decision making are included as part of the mentoring. Given the poor state of rural roads, another livelihood option is to link households to construction opportunities that improve rural feeder roads. This would add an off-farm income stream to the household, potentially increasing resilience. There is also an opportunity to utilize mobile technology to expand access to information on weather and agri-tech that could support household livelihoods.

7.1.4 Financial Inclusion

There is abundant evidence on the added value of savings groups (such as VSLAs) as part of graduation programs and as stand-alone activities and households indicated during FGDs their enthusiasm for these groups. Savings groups offer an important stepping-stone on the financial inclusion path, as well as providing a platform for building social cohesion and solving community-level challenges related to natural resource use, nutrition, conflict, and other issues (Gobin 2023). Savings groups also provide an opportunity to link households to new financial products such as microinsurance and mobile money. Although mobile ownership is not particularly high (FGDs indicated that shared access is common), many households use mobile phones to receive remittances. There is thus a level of familiarity that would support mobile money interventions and help overcome the physical access barriers to financial inclusion at microfinance and other formal financial institutions. It is notable that the SDA found a link between mobile phone ownership and poverty levels, showing that either directly providing mobile phones and SIM cards and phones as part of program activities (as was done in the Graduation to Resilience RFSA in Uganda) or creating purchasing plans for mobile phones (as have been done for solar products in other contexts) may be worth considering as part of graduation activities.

7.2 Region-specific Considerations

7.2.1 Ampanihy Ouest - Atsimo Andrefana

Atsimo Andrefana has the highest percentage of households in the study area that are both without livestock and without land (DHS 2021). This means that livelihood activities need to be designed to also address households without these assets; for example, activities to support petty trade, processing or food preservation, services such as transport, or models such as micro franchising may be better suited to these households. This region also has a lower percentage of men (40.5 percent) and women (31.2 percent) who work in agriculture, so off-farm livelihoods will also be important, although these may still be related to agriculture or livestock (e.g., processing activities, wholesale).

Atsimo Andrefana is the region with the highest mobile phone ownership in the study area (42.3 percent, although this figure includes districts outside of the study area). Mobile platforms that support other resilience activities—such as producer training, weather patterns, and planting cycles in agricultural areas and mobile money for households not involved in agriculture—may be more easily piloted in districts where mobile phone ownership is higher.

Differences between gender norms are more pronounced in this region, with production following traditional lines: men's crops being maize (riverine areas), goats, and zebu; women's crops being groundnuts and chickens. Sorghum is not often grown here. It could be introduced, although it would require building demand for a "new market" and could be linked to animal feed. There appear to be opportunities for household-level processing of maize and groundnuts, and improved production techniques for chickens.

During the FGDs spending exercise (see Section 4.1.2 for description), all household members specified food as the highest priority. After food, animal inputs (men and young men) and agri-inputs (women and young women) were highest; followed by shelter (men), education (women), savings (young women), and paying debts (young men). However, in difficult times, while men still prioritized animal inputs, women and young women prioritized health, and young men prioritized savings. Aid preferences were to receive food aid directly because, as one participant put it, "there is a lack of household budget management." For inputs, households preferred to receive cash and purchase the exact amounts they needed at the time they were needed.

7.2.2 Androy

Androy has the highest percentage of youth in the study area (65.4 percent of the region is 18 or younger). The percentage of heads of household who have not completed primary school is also high (61.1 percent). Only 16.4 percent of households own no livestock or land, while 60.5 percent of men and 62 percent of women work in agriculture. Gender roles in production are again clearly in place, with men responsible for rice (in the north), maize, goats, and zebu, and women responsible for beans, groundnuts, sorghum, and chickens. The bulk of the groundnut crop is sold to export wholesalers, and with global groundnut prices continuing to rise, there are considerable local and export opportunities for producers in this market system.

A much lower percentage (27.1 percent) of households own mobile phones, but it appears in many cases that friends and family may share access to the same mobile phone, allowing for transferring remittances. This is important because Androy is the region of the Grand South with the highest percentages of migration (Section 4.6 provides more detail). FGDs indicated that they often use mobile transfers to receive remittances.

During the FGDs spending exercise (see Section 4.1.2 for description), all household members specified food as the highest priority. After that, men, young men, and young women prioritized animal inputs, followed closely by agri-inputs; but adult women prioritized savings, followed closely by animal inputs. In "difficult times," a slight preference for agri-inputs emerged across all groups, with veterinary inputs a close third. Regarding preferences for receiving aid, youth, and adult men preferred cash, while adult women showed a preference for direct food aid. Young men and women indicated they preferred cash because it allows them to buy other things (in addition to food) that they may need, such as salt or non-food items. Adult men preferred cash "because it is easy to transport" and they preferred to make their own choices. Preferences for direct seed aid versus cash were split. Vouchers were specifically noted as "inconvenient," and quantities were not always honored. All groups complained the aid was not sufficient.

7.2.3 Anosy

On many demographic indicators—education levels, asset ownership, livelihood types—Anosy is like Androy. However, this region suffers most from conflict and economic loss related to cattle theft, particularly in Betroka district. This means that livelihood activities in these areas need to be

implemented with a conflict lens, and activities that use a Humanitarian-Development-Peace approach may be the most appropriate. Finding good economic opportunities for youth is important as an alternative to becoming a *dahalo* (bandit).

Gender norms are also more relaxed in this region than in Androy, although there are still perceptions of beans, groundnuts, sorghum, and chickens as "women's crops" and of rice, maize, and zebu as "men's crops." Sixty-three percent of men are involved in agriculture livelihoods, while 57 percent of women work in agriculture. Despite mobile phone ownership of just 28.4 percent, FGD participants in this area also specifically requested mobile money and savings group activities.

During the FGDs spending exercise (see Section 4.1.2 for description), in 'normal times' food was the top priority, with savings the next priority for men, women, and young women. Young men prioritized healthcare after food. Next in priority were social obligations/gifts for both men and young men; women prioritized inputs (both agricultural and veterinary), and young women prioritized shelter. In 'difficult times,' after food, adult men prioritized spending on education, while women and young men prioritized inputs, and young women continued to prioritize shelter.

Regarding preferences for receiving aid, there were minimal differences across groups. Comments on preferences seemed very individualized to household circumstances. Some individuals preferred direct aid; others felt cash gave them control and flexibility; and some thought vouchers best, especially for new 'technologies' like improved seeds.

7.2.4 Atsimo Atsinanana

Atsimo Atsinanana has the highest poverty rate of the study area, close to 70 percent, and the highest rate of men and women working in agricultural livelihoods (83.9 percent and 47.6 percent respectively). This is interesting, because a significant proportion of production in the region is cash crops (vanilla, cloves), and yet the benefits of these commodities do not appear to be coming to households. Like other regions, education levels are low, with 49.2 percent of household heads not completing primary school.

Within the study area, Atsimo Atsinanana has the lowest percentage of households with no livestock and no land (10.7 percent). This means that activities to improve the value obtained by households from their agricultural labors—such as strengthening producers' negotiating power, improving access to inputs, and continued work on savings groups—will be important. Although this area has fewer strict gender norms with regards to production, a considerable number of taboos impact which commodities are produced and how they are produced. Implementers in the region will benefit from an awareness of these taboos and work with communities to address them.

During the FGDs spending exercise (see Section 4.1.2 for description), Atsimo Andrefana was the only region where in "normal times" food was not universally the top priority; men and young men prioritized agricultural inputs over food in normal times. After that, education and animal inputs were the top priority for adult men, young men, and women, while young women prioritized shelter. Savings also scored high as a priority for young men and women. In "difficult times," education remained a top priority for adult men and women (after food), with healthcare coming a close third, while young women prioritized agro-inputs and young men prioritized veterinary inputs and savings.

Regarding preferences for receiving aid, young men and women preferred cash for both food and inputs, because "it allows us to distribute expenses among different needs, and we can put some in savings to overcome unseen difficulties." Adult women and men were both divided in their preferences between cash (which allows you to decide for yourself) and direct delivery ("so the men don't drink it"). For agro-inputs there was a similar story. Women wanted cash "so we can get the right seeds at the

right time," while men found it difficult to find the right kind of seeds and therefore showed some preference for direct distribution. Cash was preferred for veterinary inputs.

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Annex A: Methodology

The DRMS draws from several USAID resources: Emergency Market Mapping and Analysis (EMMA) toolkit, guidelines from the USAID/IDEAL Qualitative Toolkit, and USAID's Market Systems Resilience framework (Albu 2010; Fox et al. 2023; Downing et al. 2018). During the study design and data gathering, the research team drew on the EMMA toolkit and IDEAL Qualitative Toolkit to guide in-country data collection activities. The Market Systems Resilience framework provided a second lens for the analysis of data to examine the resilience of the market system overall, which is especially important in a context like Madagascar's Grand South and Southeast that experiences recurring shocks and stressors. Building resilience of the targeted households and communities in the study area – a primary goal of the upcoming RFSA – is highly dependent on the functionality of market systems used by targeted households. Finally, given the complex ethnic, political, and social dynamics, the research team also applied principles of conflict sensitivity throughout the research process.

The research methods included a desk review and in-person focus group discussions (FGDs) and key informant interviews (KIIs). The desk review included a variety of resources, including grey literature, program documents, evaluation, and academic literature, as well as less traditional sources such as blog posts and presentations. We also aimed to include diverse authors, including both Malagasy and international authors and papers written in both French and English. The literature review has been an iterative process, as the team has continuously incorporated additional sources, including those recommended by USAID, key informants, and other stakeholders. The secondary data include insights from the 2021 Demographic and Health survey, as well as data from sources such as the World Bank and the IMF.

In-person qualitative data collection was conducted between July and August of 2023. A team of qualitative researchers conducted 28 FGDs and 220 KIIs throughout the relevant districts. FGDs focused on target populations and were separated by both gender and age group (youth and non-youth). The KIIs were purposively selected according to type of market actor, commodity, and location. These interviews included three broad categories: 1) market actors such as collectors, wholesalers, processors, etc., 2) market infrastructure actors including those working in transport, warehouses, ports, etc., and 3) other knowledgeable individuals working in government, NGOs, or local civil society organizations. The research team also carefully sampled according to commodity and location to ensure that all nine commodities and all 12 districts were strongly represented in the data. In terms of sample size, the research team aimed to reach data saturation, or the point at which the data obtained is sufficient to answer the research questions and there is limited new information emerging from additional interviews. The table below summarizes the total number of interviews included for each commodity (note that in some cases one informant is knowledgeable about multiple commodities) (Table 10). All data collection team members were thoroughly trained in research ethics and data security procedures to safeguard participants' information, and all data was thoroughly reviewed and cross-checked during the data quality assurance process.

Table 10: Total Interviews Per Commodity

Total interviews conducted per commodity								
Zebu	**Goats**	**Rice**	**Veg. oil**	**Maize**	**Beans**	**Groundnut**	**Chicken**	**Sorghum**
95	83	94	71	77	72	78	65	55

After all data collection was complete, the research team began the process of thematic qualitative coding for both the local context data and the literature using NVivo software. This analysis assigned snippets of each document to various predetermined "nodes," for example: *sorghum, gender, climate, and livelihoods*. Then, during the writing process, the researchers were able to pull out all quotes relevant to specific nodes and review this data all together to draw out the most important themes. The market maps (found in the market system assessments, Annexes B-J) were another essential tool for analysis. These were created in an iterative process, initially drafted during data collection training, updated throughout data collection, and then finalized during the analysis stage.

Annex B: Rice Market System Report

Market System Overview

Rice is the number one staple food in Madagascar; and as the main crop, it plays an important economic, sociocultural, and political role. The livelihood zone that forms "the rice bowl of the South" includes most of Anosy and a few districts in northern Androy and eastern Atsimo Andrefana that border Anosy (FEWS NET 2017) (see Figure 2 in Section 2.1 for further reference). This area is largely savannah woodland with some natural pastures. Land along the rivers is more fertile and suitable to rice growing in rotation with groundnuts. Production in this area is substantial, although lower than in other parts of the country. In Anosy, typically the rainfall only allows for one harvest per year (FEWS NET 2017).

Production Issues

There are two rice-growing systems in this area of Madagascar: the irrigated rice system, in which all water is controlled through well-functioning dams; and the rainfed rice system, which depends exclusively on rainfall. The potential area suitable for irrigated and rainfed rice cultivation in Madagascar is over 4 million ha. Of this area, 1,974,000 ha are currently cultivated, and 81 percent is irrigated. Irrigated rice fields yield an average of 2.8 metric tons (MT)/ha, and rainfed rice fields yield an average of 1.2 MT/ha, resulting in total white rice production of 2,563,207 MT. Given the average per-capita consumption of 110 kg, an additional 600,000 MT is required to meet national needs, which is filled by rice imports. The government hopes to reach self-sufficiency in rice production by 2024, and gradually begin exporting rice by 2026 (African Development Bank Group 2023).

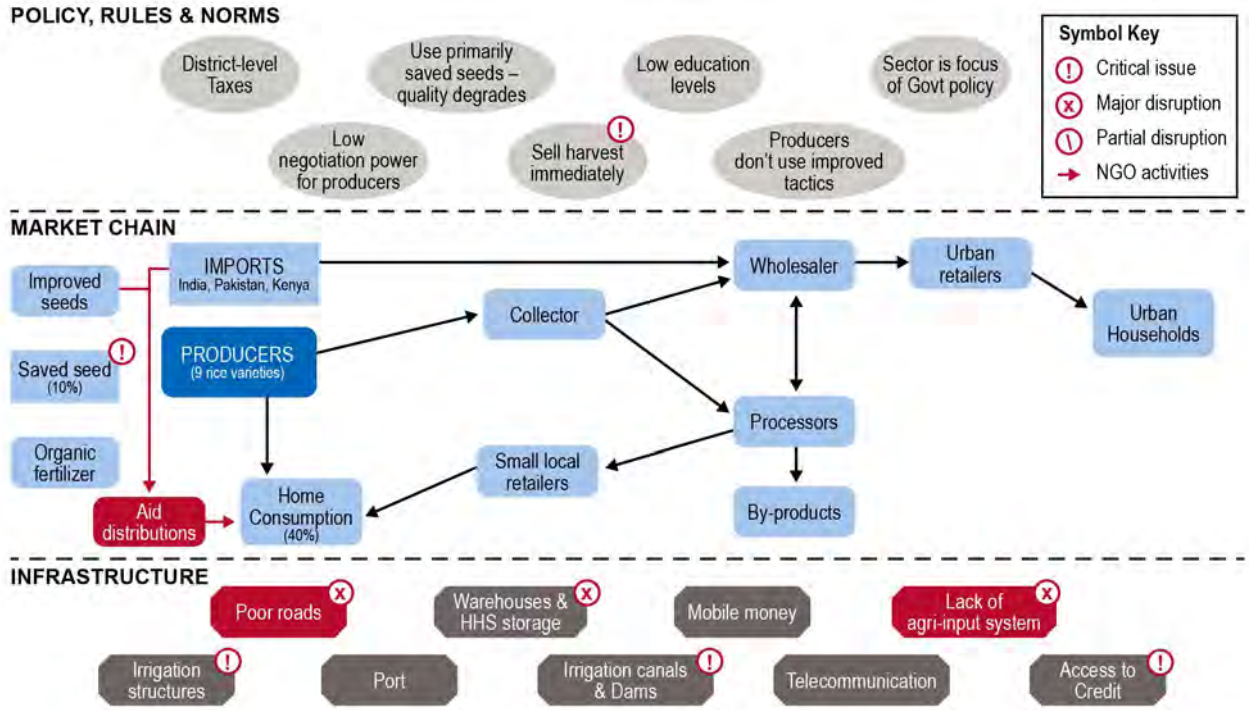
There are different types of irrigated rice fields collectively worked by producers: large, irrigated perimeters with a surface area of more than 10,000 ha; medium, irrigated perimeters with a surface area of 5-10,000 ha; small, irrigated perimeters with a surface area of 300-5,000 ha; and micro, irrigated perimeters with a surface area of less than 300 ha.

There are several rice varieties in use, generally originating from the National Center for Applied Research on Rural Development (FOFIFA), in collaboration with international centers such as the International Rice Research Institute (IRRI), CIRAD, and Africa Rice. Producers have their own vernacular for rice varieties in each region, which can make it challenging to match varieties to the original name catalogued by FOFIFA. In the Anosy region, the common varieties are *Tesé, Kenga, Tsipala mena, Mangatovo,* SEBOTA 281, and X265. In the Atsimo Andrefana region, the common varieties are *Masopiso, Philippine, Vary Lava, Bory,* and *Vary Lisa*; and in the Atsimo Atsinanana region, they are *Tsimahory, Tsipala, Vatomandry, Variosy, and Manangakombo*. Producers typically acquire new seeds through existing or ongoing projects in the regions, and then use them to self-produce seeds for subsequent harvests. This practice leads to a reduction in seed quality over time, resulting in lower productivity, which impacts overall rice production. Production cycles vary from 3 to 6 months. Producers plant several varieties in their rice fields to mitigate risks and avoid harvesting over the same

period. Yields in the South are generally lower than the national average, as producers do not use fertilizers to maintain soil fertility. Average yields in the three regions are around 2 MT/ha. Ranomafana in the Anosy region and Vangaindrano in the Atsimo Atsinanana region are key communes for rice production, as producers in these communes are able to grow rice three times per year.

Market System Map

Figure 7: Rice Market System Map



As shown in Figure 7, producers consume some of their harvest (40 percent), save a portion for next season's seed (10 percent), and sell about half (50 percent). However, production levels in the study area are generally not sufficient to meet the population's rice needs, in part because rice consumption is on the rise in urban areas. Climate barriers, such as the lack of water or flooding, also limit production. To fill this gap, rice is imported from Pakistan and China (and until recently, India) through the ports of Tuléar, Taolagnaro, and Toamasina (near Antananarivo). In 2022, Madagascar imported 600,000 MT of rice (MINAE, 2023).

Local prices, whether for local or imported rice, are at their lowest during the harvest (May and June), when producers sell most of their production to buy gifts and food for the national holiday (June 26); and highest during the lean period, which generally corresponds to the depletion of food stocks and the implementation of agricultural activities (particularly December and January). Because producers generally sell their crop immediately, the price advantage goes to the collectors or wholesalers who buy paddy rice at low prices and sell white rice later at premium prices. Small producers do not have adequate storage and therefore cannot align their sales with higher prices later in the year. Consumers also suffer from this situation, as there is less competition, and therefore prices remain high.

Humanitarian agencies deliver rice to vulnerable households in December-January (the peak of the lean period). This rice is distributed as in-kind food assistance and is typically imported rice. Approximately 25 percent of the rice is "broken rice," which has a softer texture and cooks faster, using less fuel.

Market Actors

Agricultural input suppliers

The recent Seed Security Assessment (SSA) found that there were very few input providers in the study area, and the few that existed were largely concentrated in more urban areas—three in Tuléar and two in Taolagnaro (SeedSystem 2023). This means that a significant function in the rice market is largely missing. Countries with similar resilience contexts have found that supporting input providers by providing technical assistance, credit, improved varieties, safer farm chemicals, and small machinery has resulted in increased incomes for producers.

Given the shortage of agro-dealers, the SSA found that 79 percent of rice seed in the Grand South of Madagascar came from producers' own stocks (SeedSystem 2023). This practice leads to lower yields and a mixing of rice varieties in the same field. The SSA also found that 56.4 percent of producers did not have money to purchase seeds and the seed available in the market was not good quality or the right variety (67 percent); in other contexts, producers manage these issues through relationships with input providers.

Aid agencies operating in the area (FAO and WFP) have provided direct seed aid, generally improved varieties, especially during periods of shock (drought and cyclones). This aid is valuable to producers, as the market price of seeds can be beyond the financial reach of small producers. However, direct donation of seeds and other inputs has significantly reduced the incentives for private sector actors to develop agro-input businesses. There are indications that aid dependency is already setting in. During FGDs for this study, producers indicated that they "wait for the free distribution to improve [their] activities."

Efforts are underway to develop local seed production: a seed multiplication center in Behara multiplies new seeds (SEBOTA 281 and X265) from FOFIFA and works with seed producer groups and seed multiplication producers in the center's vicinity to obtain seeds of declared quality. This process is certified by the official Seed Control Department within the Ministry of Agriculture and Livestock. However, the seed multiplication center mainly sells its seeds to NGOs, which then distribute them. The NGOs in turn assist the seed producer groups and seed multiplication farmers to obtain more seeds, which are sold to other producers growing rice in the irrigated perimeters at affordable prices.

Producers

Unfortunately, the SSA found no instances of producers responding to market opportunities or focusing on more lucrative crops. Reasons for planting more or less of a crop had to do with good/bad weather, availability of seed from producers' own stocks or donations, and availability of funds—which the SSA described as an "unusually simplified" equation for determining what to plant. There were also signs of ongoing seed security stress among smallholder producers: buying 100 percent of seed from the market for multiple seasons, planting less desired crops, harvesting prematurely (for consumption), and sowing less of a given crop (SeedSystems 2023).

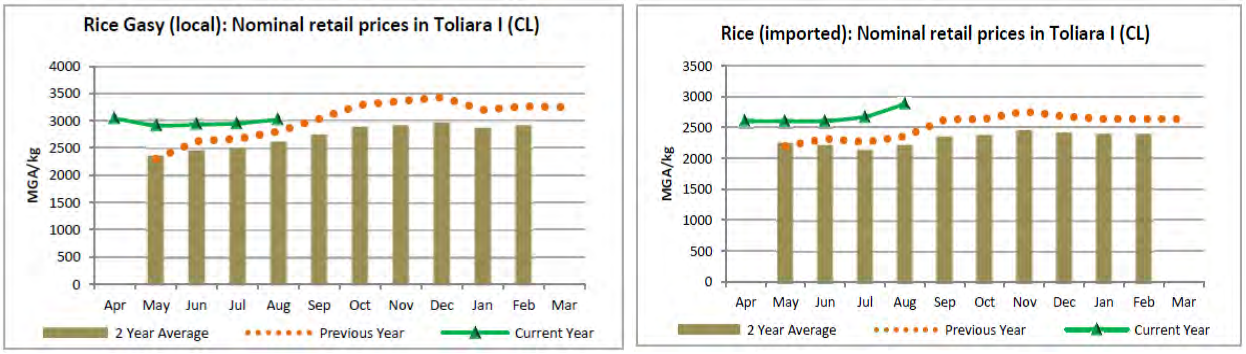
Rice yields are approximately 1.5-2.5 MT/ha, and the average area owned per small producer is 2-3 ha. This reflects low productivity and producers working largely at the subsistence level. In the study area, irrigated rice cultivation is practiced with and without water control. At Bezaha in the Betioka Sud district, in the Southwest, there is an irrigated perimeter of more than 5,000 ha that the AfDB has just rehabilitated. Also, at Behara in the Amboasary district, Anosy region, there is an irrigated perimeter of around 2,000 ha that the International Fund for Agricultural Development has just rehabilitated. The

Behara seed multiplication center is also located in this irrigated area. In the Anosy region, there are several irrigated micro-perimeters in the communes of Tsivory, Beraketa, Elonty, Esira and Ranomafana. In the Androy region, rice cultivation is only practiced in the far north, due to soil types and lack of rainfall. In the Atsimo Atsinanana region, rice is grown mainly in micro-perimeter rice fields and small valleys.

Producers form water associations to collectively manage the irrigation of rice fields. Producers also form cooperatives to collectively market goods and to gain access to financing or government grants. Cooperatives have greater negotiating power than single producers, allowing them to set prices. Members of cooperatives also receive support from aid agencies, in the form of free inputs and materials, training, and rice processing machines to improve agricultural production. There are more than 100 rice cooperatives; around 40 percent of rice producers are members. Each cooperative is made up of around 15-30 producers. Cooperative membership is voluntary, but access to resources and negotiating power incentivizes participation.

FEWS NET figures (Figure 8) show that rice prices are higher than last year, and higher than the two-year average, for both local and imported rice. While some of the price increase is likely due to India's decision not to export, locally the lack of storage (which helps to smooth prices) and storage chemical use which prevents losses from pests may be contributing to price increases. Without reliable storage, producers are forced to sell their crop immediately after the harvest (when prices are lowest) rather than when prices are good or at a specific moment of need. Increasing producer knowledge of affordable, appropriate storage solutions could address both these issues and help to keep prices stable and more affordable for households.

Figure 8: Rice Prices in Tuléar (September 2023)



Source: FEWS NET 2023e. Note: $1 = MGA 4,500

World Bank (2020) analysis indicates that producers bear the highest total costs and receive the lowest rate of return (per kilo). Producers yield just a few tons per year, while collectors handle several hundred tons, and wholesalers several thousand tons. For comparison, producers in Madagascar get approximately 36 percent of total available profits in the market chain, while similar producers in Mozambique and Nigeria get 47 percent and 71 percent, respectively (World Bank 2020). For producers to earn a living wage, maximizing profit from each kilo is critical for producers.

Collectors/Wholesalers

Due to poor market linkages, low producer knowledge of market prices, and lack of primary processing or local storage, collectors and wholesalers are estimated to capture 31-38 percent of total available profits in the market chain, compared to 5-18 percent in comparison countries (World Bank 2020). This

trend contributes to the low incentives for producers to expand production. Collectors generally travel to communal markets during market days to purchase paddy rice from producers and provide transport for the goods. Village-based collectors may also sell to town-based collectors. Often, these larger collectors/wholesalers provide village-based collectors with cash to buy paddy rice from producers and may even have several village level-collectors working under them in different locations. In some cases, the wholesaler provides transport and pays a commission to the village-level collector for the rice, but wholesalers may also leave it to the collector to arrange transport themselves and to make their profits based on the price they are able to negotiate with the producer. Atsimo Atsinanana reports shorter value chains than other regions, with nearly all collectors being from the Atsimo Atsinanana region, while other regions have collectors coming from Tuléar and larger secondary markets. This is reportedly due to smaller production volumes, which are fully absorbed by local markets.

The price the producer receives is negotiated on the spot and is reportedly set according to price trends at large urban markets (Antananarivo, Tuléar) and the quantity of produce on the market. World Bank (2020) analysis indicates that collectors may have limited negotiation power, but the larger wholesalers that they work for essentially set prices (this is consistent with the study findings). The analysis also indicates that improved market linkages and increased price information would help producers get a fairer deal. Although producers face multiple pressures to sell immediately, a larger share of the profits for producers would likely increase their production incentives and reduce the need for food aid.

Large collectors in urban areas have storage warehouses to store the paddy rice they buy for longer periods. Warehouse locations are outlined in Section 2.4.3. Collectors sell their product when market prices are attractive. They may also mill the paddy rice to deliver to wholesalers or directly to retailers in urban markets. Some wholesalers are simultaneously collectors, transporters, and processors.

Processors

Processors of paddy rice are key players in getting large quantities of white rice to market quickly. Small rice processing units (mills) operate in several rice-producing communes. There are an estimated 50 mills across the study area. As an example, in the commune of Vondrozo (Atsimo Atsinanana region), one of the three rice mills processes 150-165 kg every two days, but this quantity decreases to 30-60 kg every two days outside of the production period. Processing is not particularly efficient: the processing yield is around 65 percent; and the by-products (bran) are not converted into animal feed. Existing machines generally do not provide quality milling of local rice, but new modern machines are expensive. Competition from aid and increasing imports also reduces profitability (or at a minimum increases uncertainty to the point that significant investments are risky for local processors). Profits for processors depend on the season's productivity and the amounts that households sell on the market (rather than consume). Reducing the costs related to financing, rural transport and storage would also increase market efficiency. Some millers also process white rice, especially imported rice, into rice flour to make rice cakes *(mokary)* in both urban and rural areas. In rural areas, households use mortar and pestle to manually grind rice into rice flour. The manufacture of rice cakes is an activity generally practiced by women.

Importers

Rice importers based in Tuléar and Taolagnaro supply wholesalers with additional rice to make up for the lack of local production. Imported rice comes from India, Pakistan, and China, through companies such as Shanoor, Ranomandry, Maison de Sarah, and Avoro, although imports are likely to shift following the July 2023 Indian ban on rice exports (USDA 2023). Imported rice is typically cheaper than local rice, and

its sale on urban and rural markets sometimes stabilizes the price of rice in the area, keeping prices lower when demand outstrips supply.

Retailers

Retailers obtain rice from wholesalers and sell it directly to consumers. They use a 250g box ("Nestle box") as a unit of measurement. Prices range from $0.11 -0.22 (MGA 500-1000) per box, and retailers take a $0.01 (MGA 50) profit for each box. They sell 200 to 400 boxes each day. There are around 30 retailers at town markets and 10 retailers at rural markets. Retailers can obtain credit from collectors with which they have an established relationship and trust and must repay credit daily (at the end of the day) or weekly. See Figure 9 below for more on rice prices. Retailers rarely borrow money from banks or microfinance institutions because of guaranteed requirements.

Consumers

Rice makes up 46 percent of the average calorie intake in Madagascar, although a few communities (Antandroy and Mahafaly) consider rice a luxury for special occasions (Rigden 2022). People who don't eat rice, particularly in urban areas, are therefore seen as poor. Household preferences are often dictated by the price level and quality of the varieties of rice available on the markets. Middle-income urban populations (such as civil servants and NGO employees) prefer local "red rice" and, if it is unavailable, purchase imported rice. Rural populations, on the other hand, prefer medium grade imported rice, as it increases in volume during cooking and therefore is good for large families.

Figure 9: Rice Price Structure - MGA per kilos

To supply the Home-Grown School-Feeding Initiative, WFP is a bulk purchaser of local rice in Anosy. This program uses about 50 percent local purchases and should therefore provide a market incentive to increase local production, particularly as the program aims to scale up local purchases. Other aid agencies also purchase locally, but the study team was not able to get clear data.

Population growth in the major towns of the Grand South (Taolagnaro, Amboasary, Ambovombe) can be expected to increase rice consumption in the future. This may be driving the Malagasy government's goal of self-sufficiency. If political will is sufficient, the intention is to increase investments in the agricultural sector (to more than 10 percent of the national budget) with the support of various technical and financial partners, in order to improve the supply of local rice and address increasing future demand.

Policies, Rules, and Norms

Although rice is a major focus for the government of Madagascar, policy makers in the capital have very little information on market dynamics at the district level. Efforts to improve this information flow have been successful in the short term, but ended once donor funding ran out. Information flow is also limited at the local level. World Bank (2020) analysis indicates that producers have limited access to market information, and therefore lower negotiation power. However, our study found that some producers perceived that information flow was improving for households that had mobile access (even shared access) because producers were able to call contacts in nearby towns and check prices before finalizing sales. Although the data is anecdotal, this would indicate a positive trend for market connectivity and power dynamics.

Customs duties and Value Added Taxes (VAT) are waived for imported rice, and locally grown rice is not subject to VAT. These waivers are part of the Malagasy government's food assistance strategy, as rice is the main dietary staple in Madagascar, and all income groups consume imported rice. While this should mean that domestic producers still enjoy a strong comparative advantage over imported rice; in fact, the inefficiency of the market chain and cost of local transport means that imported and locally grown rice directly compete on price at the retail level. This competition reportedly encourages producers to produce more rice by adopting technical innovations in rice development.

Infrastructure Issues

The poor condition of roads linking major towns, and rural feeder roads linking crop-growing areas to urban markets (e.g., RN10, Tsivory -Amboasary, Betroka-Ambovombe Androy), are the most significant barrier for all markets. This constraint impacts the costs of products (rice, agricultural inputs) and reduces the number of collectors who buy from producers. As a result, collectors largely dictate prices to producers. The World Bank has noted plans to improve the road between Taolagnaro and the capital Antananarivo (World Bank 2020), but the study team saw limited evidence of this planned activity.

Trucks involved in the transport of agricultural goods are usually small, with a maximum load of 10-15 MT. Transporters reportedly budget up to 10 percent of their trip costs for repairs and assistance if trucks are stuck along the way (World Bank 2020). Overall, transport costs in Madagascar are significantly higher than other comparable countries. The increasing cost of petrol adds costs on top of this. The poor state of the roads exacerbates other bottlenecks in the market flow.

There is also insufficient agricultural development of irrigated perimeters in rice fields. Infrastructure investments are needed to ensure water management in the face of irregular rainfall due to climate change. For example, small dams help support water retention and manual or electric pumps can be used to irrigate fields.

Low levels of financial inclusion and poor access to credit are issues across the Grand South and Southeast, due to low literacy and financial literacy rates; norms around borrowing; high banking fees; lack of physical access to banks; and infrastructure constraints such as connectivity. Organizations such as *Crédit Agricole Mutuel de Madagascar* (CECAM) have introduced agricultural credit products, but producers still approach these products with some suspicion due to previous experiences where local police enforced loan repayments. For agricultural investments specifically, microfinance institutions offer loans targeting producers, including a medium-term investment loan with an interest rate of 2.25 to 3 percent per month. Nevertheless, borrowing is most common among households that are connected with mining (e.g., the gold quarry in Ampanihy). From the lender perspective, lack of collateral or credit history also complicates access to credit. Microfinance institutions and banks tend to have walk-in

locations only at the district level (sometimes regional). Many in the sector see mobile money as the best option for financial inclusion of rural poor (IFC 2023), and communities welcome increased access to mobile money tools. The study team also found that producers commonly used savings groups (*voamamy*) to smooth cash flow or make small investments. Regardless of whether a savings group was present in the community, these groups were positively viewed. The introduction of mobile money, either linked to savings groups or stand-alone, was also of interest to communities.

Women and young people are the most affected by the lack of a financing system suited to the context of the South. A better-adapted financial system would allow these groups to invest in agricultural activities, such as purchasing rice fields, implementing new rice-growing techniques for improved yields, and improving business practices. Land ownership is challenging for many small producers; large landowners already own around 50 percent of the land suitable for rice cultivation. These landowners rent rice fields to small producers, who are not motivated to invest in land improvement activities on land they do not own. Climatic hazards (drought, flooding) also disincentivize investment in rice-cultivation development.

Market System Resilience

Market systems resilience (MSR) is a lens that looks at the ability of markets to innovate, mitigate, and adapt, to solve problems in the face of shocks and stresses, and therefore better serve targeted households. The framing outlined in Table 11 and Table 12 looks at both structural and behavioral issues within a market system to determine how well the system can adapt and support household resilience. MSR also recognizes that market systems are constantly evolving; and positive or negative interaction with aid actors can shape how the system responds, making it either increasingly resilient or more fragile. Better understanding and programming around these factors improve outcomes for market actors and the households that rely on those market systems.

Table 11: Rice Market System Resilience - Structural Domains

Structural Domains (how markets are organized)	
DIVERSITY *How much variety is there in products, sales channels, business models, etc.?* ● Limited sales channels: rice is largely sold only on the market day at the local market. ● There is a medium level of diversity in products: both local rice and imported rice are available on the market (nine total varieties of rice) and some processing. There are two production systems.	**RULE OF LAW** *Who sets and maintains the rules (informal and formal)? Are they consistent and fair?* ● The Ministry of Agriculture and Livestock, Ministry of Trade and Industry, and local authorities set the rules for buying/selling. ● Paperwork required at the communal level for the movement of goods increases the opportunity for corruption rather than creating transparency, as less powerful market actors are never sure of the rules. ● Rules (such as the payment of taxes) are not equally applied for all market actors.
CONNECTIVITY *Who's trading and talking with whom, why, and how is this changing over time? How and to what extent do market actors interact across geographies, ecologies, and social groups?* ● Low producer connectivity contributes to a high	**POWER** *Where and how is power concentrated and exercised?* ● The rice sector is a focus of government policy, dominating national production and consumption (World Bank 2020).

Structural Domains (how markets are organized)	
proportion of value going to collectors/wholesalers. ● Cooperatives do not have strong connectivity with multiple sales outlets, further concentrating wholesaler and processor power. ● Market chains, particularly in the Southeast, are very short due to low production volumes. This contributes to poor connectivity, as producers do not build trading relationships with alternative trading partners.	● Negotiation power on price and volume sold sits entirely with collectors and wholesalers. ● There are anecdotes of petty corruption in the transport market, which skews power relations in the market system and affects prices.

Table 12: Rice Market System Resilience - Behavioral Domains

Behavioral Domains (what shapes the actions of market actors)	
COMPETITION *To what extent is there rivalry between market actors?* ● Competition is very limited due to market structure issues (described above), poor roads and storage, and low production volumes. ● There is limited incentive for producers to produce more or become more efficient, therefore reducing competition overall.	**BUSINESS STRATEGY** *To what extent do business strategies proactively plan for risks? To what extent are they fair and generate customer value*? ● Weather data for the coming season are available with the support of donors, but producers do not use them. ● Producers admit to using 'traditional' approaches, with very limited planning for known risks. ● The lack of resources prevents some risk prevention, such as the use of chemical pesticides in household storage.
COOPERATION *How are market actors collaborating to achieve a common purpose or function*? ● There is no evidence of cooperation between market actors at multiple levels, and there is limited cooperation through membership in associations or cooperatives. ● Wholesaler prices are widely seen as unfair, indicating that they have an extractive approach or 'zero-sum' approach to the market.	**DECISION-MAKING** *To what extent is evidence used to identify solutions?* ● There is no evidence of producers planning to respond to market demands; decisions are based on tradition/habit. ● Wholesalers and collectors generally fix prices based on "national prices," but producers do not have information on prices in other nearby markets (they use the price from past season). ● Aid agencies do not coordinate with market actors to let producers know when imported rice is likely to hit the market.

Conclusion

While the rice market system is a government priority and has good potential, it does not show high resiliency. This is due to the low level of producer knowledge, poor infrastructure, and lack of a sustainable inputs system. Producers and other market actors are reactive (to shocks and stresses)

rather than being proactive (in capturing market opportunities). Low market connectivity and power dynamics are a drag on potential opportunities for market actors.

Table 13 summarizes the market barriers or constraints and the opportunities for households to overcome them.

Table 13: Rice Market Barriers and Household Opportunities

Market Barrier or Constraint	Opportunity/Gap for Households
Low uptake of improved production practices because producers are uncertain that they will get extra profit for the extra effort.	Producers indicate that they would like to increase their skills in household budgeting and farm planning. To reinforce positive norms around decision-making, this skill-building should be done with husbands and wives together.
Poor rural feeder roads make it difficult for producers to bring their crop to market and make producers more reliant on collectors.	Linking livelihoods and graduation programming to rural infrastructure projects implemented by other actors will allow producers to benefit financially from improved production practices.
Financial inclusion is low for households, but savings groups have been well received.	There is an opportunity to build on the existing culture of savings and the successes of existing savings groups. While mobile phone ownership is not high, phones are often a shared asset in communities, and activities to increase phone ownership could catalyze outcomes related to improved market information and negotiation power.
Appropriate household storage facilities do not exist at the household or community level, and small processing facilities are limited. These limitations prevent households from safely storing paddy rice or processing so that it can be sold when prices are favorable, or it is needed for consumption.	Asset transfer activities and market-based programming should consider including storage and small processing facilities alongside other livelihoods support activities.
Input systems are weak, and producers feel they do not have enough money to "invest" in improved inputs and practices.	Using evidence on system approaches from other resilience programs, the project could layer graduation activities with activities implemented by other actors that will improve market systems, such as input systems, so that improvements made during program implementation can continue.
Direct aid to households is building dependency on the aid system for improved inputs, meaning improvements are likely to disappear at the end of the project.	Cash programming and market-based approaches will strengthen local systems so that there is less reliance on direct aid in the future.

Seasonal Calendar

There are two to three seasons for growing rice in the Grand South and Southeast, depending on the variety, type of irrigation, and location. See Figure 10, Figure 11, and Figure 12 for seasonal calendars. Growing cycles vary from 3 to 6 months. For the first season, planting begins in August, and harvest is in January. The second (main) season begins in November with planting and ends in December/January. The third season's planting begins in April with harvest taking place around August.

Figure 10: Seasonal Calendar for Rice (Anosy region)

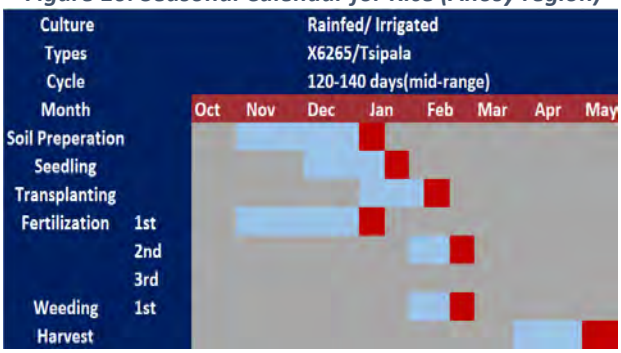
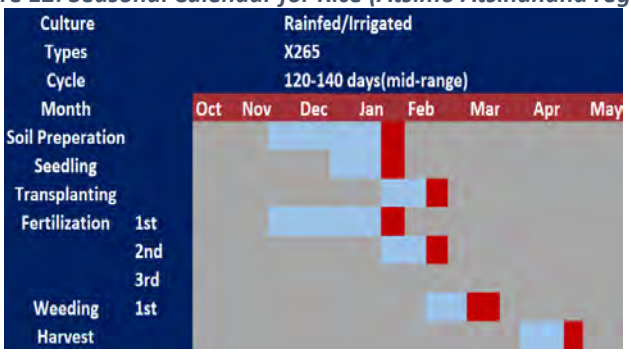


Figure 11: Seasonal Calendar for Rice (Atsimo Atsinanana region)

Figure 12: Seasonal Calendar for Rice (Atsimo Atsinanana region)



Annex C: Maize Market System Report

Market system overview

Maize is Madagascar's second most important cereal crop after rice, covering around 10 percent of cultivated land in Madagascar (FAO 2022a). It plays an important role in household food security, as it is used for both human consumption and animal feed. In Androy, maize has been cultivated since the 18th century, however during the 1980s it was introduced as food aid and became a preferred crop throughout the Grand South and Southeast (Healy 2017).

The Ministry of Agriculture and Livestock (MINAE) has defined maize as one of the priority agricultural sectors in its action plan. Although the Grand South is recovering from several years of drought, in 2023, maize production in Madagascar was projected to reach 260,494 MT, a 20 percent increase over 2022. While localized production increases were seen in some areas, the overall maize harvest for 2023/24 is expected to be similar to last year (USDA, 2023). Maize harvests remain insufficient to meet the needs of the local population for consumption and income; typically, 30-50 percent of production is consumed, 10 percent is saved as seed and the remainder is sold. During poor production years and the maize off season, maize is imported through the port of Tulear. MINAE has defined maize as one of the priority agricultural sectors in its action plan.

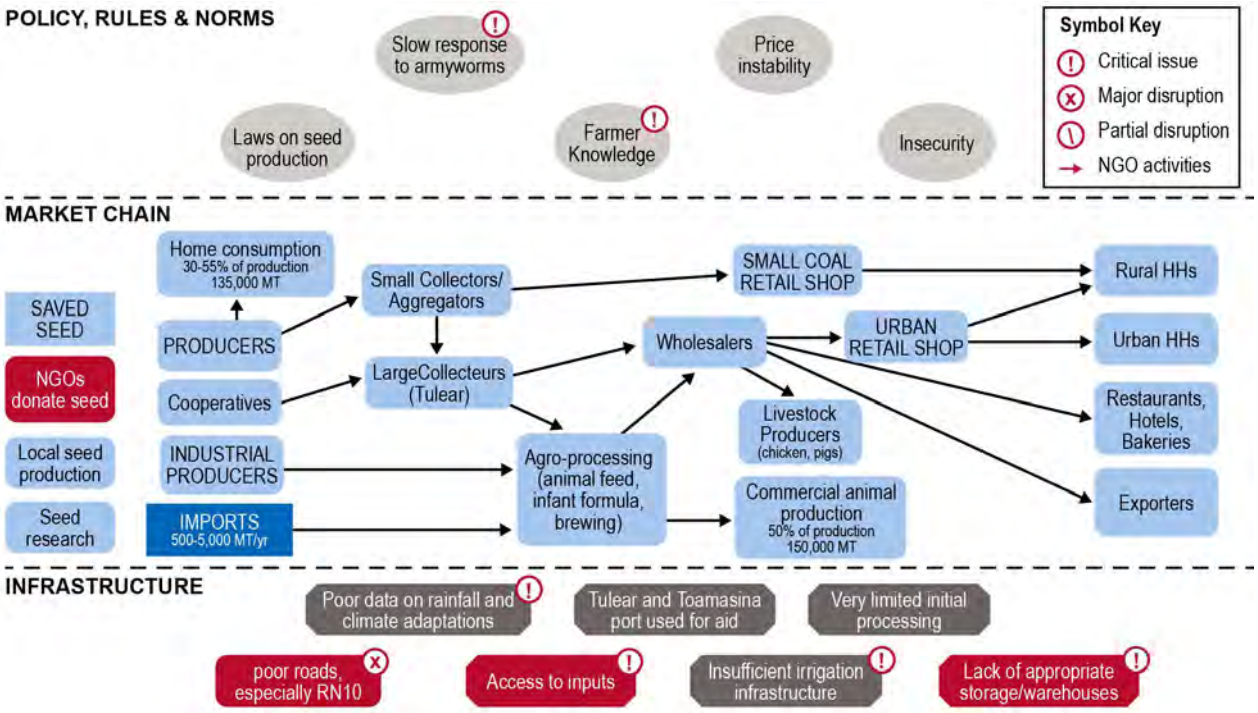
Over the past three growing seasons, recurring climate change issues and an infestation by Fall armyworm (*Spodoptera frugiperd)* have drastically reduced yields. The study team found that damage caused by armyworms has led to significant reductions in maize production, and even up to thirty percent in losses. However, in the 2022-2023 crop year, the Atsimo Andrefana zone enjoyed a favorable maize season due to the good distribution of rainwater.

The distribution of rainfall throughout the crop cycle impacts the production quality, since throughout all stages of growth sufficient water is required (around 350 to 600 mm, depending on the variety). The dominant maize varieties on the market are short-cycle (Bakoly), intermediate (IRAT 200) and long-cycle (Meva). The Bakoly variety is the most popular with producers, with a cycle length of 95 to 100 days and potential yield of 4.3 to 6 t/ha (SeedSystem 2023). One of the most widely cultivated varieties in the South is FOFIFA's IRAT 200. It is a productive variety with an intermediate cycle (3 months) and a potential yield of 5.4 to 6.6 t/ha (SeedSystem 2023). In the Anosy region, producers in the Amboasary and Taolagnaro districts cultivate another local variety, called *Amaninomby* or *Tsako gasy*. This variety is drought resistant and has a production cycle of 2.5 months. National average maize yields are around 1.3 MT/ha, depending on the variety (USDA 2023).

Market System Map

The market system map below (Figure 13) shows that producers sell largely to local collectors (or consume at home), who transport to larger urban collectors (and may also play a wholesaler function). Production for animal feed and other processed goods generally comes from industrial producers of maize or imports. Animal feed takes up about 50% of total production. Major barriers in the market system are access to inputs, poor roads, and appropriate storage.

Figure 13: Maize Market System Map



Market System Actors

Producers

Maize is the second most important crop after rice, with producers in Atsimo Andrefana, Anosy, and Androy prioritizing it in the top five crops for the most recent season (2022-23) and next season (2023-24) (SeedSystem, 2023). Other prioritized crops include manioc, cowpea, rice, and groundnuts. Nevertheless, yields remain below their potential due to the use of traditional production methods and limited use of inputs.

Producers typically have farms of less than two (2) ha and are also producing other staple crops such as cassava or sweet potato, along with raising livestock, particularly goats and cattle. Households mainly produce for their own consumption and sell any surplus almost immediately to meet household needs and avoid spoilage. They use human or animal power to prepare the land for production. Rows are plowed, and organic fertilizer (manure) applied. Producers complete sowing and weeding manually, generally by women. If they can afford it, producers will spray fertilizer during the flowering period. The Seed Security Assessment found that post-harvest losses reported were in the range of 35% (SeedSystem 2023). This loss happens both in the field during harvesting and drying, as well as losses to pests during storage. Households do not have appropriate storage facilities at the household or community level, nor are they able to afford chemicals for storage, meaning that pests often destroy the produce.

The main production zones for maize are the coastal communes of Itampolo and Androka and riverine areas in Ampanihy Ouest district of Atsimo Andrefana; however, cassava and sweet potatoes are more common than maize in this district. In the Androy region, the commune of Marovato is renowned for its

production. This commune is the largest producer in the Tsihombe district. The communes of Faux Cap and Anjapaly also produce maize. In Anosy, maize is a key livelihood in the district of Amboasary-Atsimo. In Atsimo Atsinanana, the districts of Midongy and Befotaka are the main maize growing areas.

Because of low education levels and a lack of storage, producers are not in a good position to negotiate prices at harvest and must sell immediately (at lower prices). As a result, poorer households often face a food gap in December and January. This is when direct delivery of aid is often timed. Similarly, the SSA found that producers do not seem to plan or adapt the crops planted in order to respond to market opportunities (SeedSystem 2023).

Input providers

Nearly 90 percent of producers planted seeds obtained from uncertified sources in the local market. But there are also signs that, due to a lack of funds/high seed prices (maize seed costs an average producer $6.32 [28,458 MGA]), producers have not planted as much maize seed as they would have liked—56.4 percent of producers indicated this was a challenge for them in the 2023-2024 planting season (SeedSystem 2023). Producers also noted that for the 2023-2024 season they anticipated using saved seed (37%) or again purchasing on the local market (62 percent), but only 8.5 percent of producers have accessed improved varieties in the last five years. (SeedSystem 2023).

The recent SSA found that there are very few agro-dealers in the study area, and the few that existed were largely concentrated in more urban areas—three in Tulear and two in Taolagnaro. This means that a significant function in the maize market system is missing. Direct seed donations from aid agencies (which have reduced for maize recently), exacerbate this issue and have the potential to create an unsustainable parallel system for seed provision. Countries with similar resilience contexts to Madagascar have found that supporting agro-dealer MSMEs and, through them, increasing access to technical information, credit, improved varieties, safer farm chemicals, and small machinery has resulted in better overall outcomes for producers.

Low production is also driven by traditional cultivation techniques. Producers use traditional pesticides *(ady gasy*) made of ashes, red pepper and Neem leaves or seeds. Farm chemicals such as pesticides are largely imported, and therefore the prices fluctuate significantly throughout the year. Often, they are simply too expensive for most poor farmers: the SSA found that 45 percent of producers used pesticide sprays, 10 percent used chemical storage products, and 7 percent used mineral fertilizer in the 2022-23 season (SeedSystem 2023). In addition, there is limited agricultural mechanization and access to agricultural equipment such as ploughs and harrows. Work is often carried out manually.

Collectors

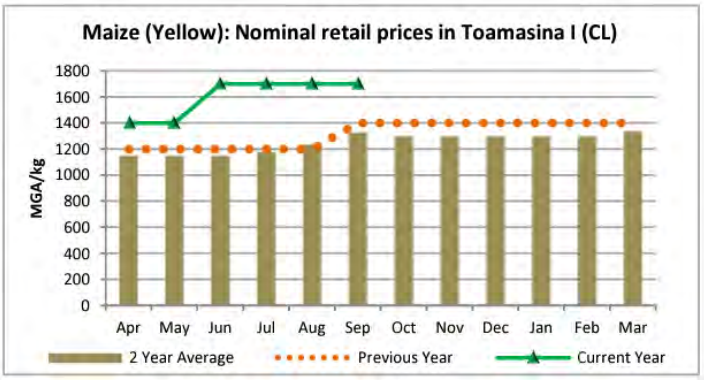
Collectors are individuals, sometimes from other regions or neighboring districts, who purchase large quantities from producers and sell the maize onward to larger wholesalers or processors. Often, they work as transporters as well, using 10-15MT trucks for transport of goods. In general, it is collectors who set the prices; this is based on transport costs, availability of production, national prices, and the margin needed for their own profit. Without appropriate storage, producers cannot wait to sell their produce at a more convenient time, and so they generally must take the price offered. No formal contract is drawn up beforehand.

Collectors must be registered and have a Collector's Card, which costs 0.36 USD (1,600 MGA). However, some collectors operate illegally without registering or paying any fees. Corruption also exists

throughout the transport chain. Truck drivers may pass through customs without the appropriate approvals and paperwork, paying bribes of around 11.11 USD (50,000 MGA) each time they pass.

Wholesalers/Retailers

Figure 14: Retail Prices for Maize, October 2023 (FEWS NET)



Wholesalers and retailers resell and distribute maize and other products. Often retailers are simultaneously undertaking both the wholesaler and the retailer function in the market system. Typically, there are around ten wholesalers per district. They work with transporters (directly or via telephone contact) to get the products to their respective districts/communes and points of sale. As the market systems map shows, they sell maize to a variety of consumers, whether urban households, farmers, or processors. For example, during normal times a wholesaler might sell two 50 kg bags of unground maize per day and one bag of ground maize every three days. During lean and drought periods, wholesalers increase their supply of maize (and often their prices). During these times, a typical store can sell up to 20 MT in a month, raising $1,700. However, prices also fluctuate significantly (see Figure 14): a cup is sold for between$ 0.04 to$ 0.06 (200 to 260 MGA) during the harvest period, but the same amount costs consumers $0.18-$0.27 (800-1,200 MGA) during the lean season.

Processors

Processors can be divided into two main categories: feed mills, which transform maize into a component for animal feed, and small-scale informal processors, who produce flour to be used in a variety of foodstuffs and baked goods. About 50 percent of Madagascar's maize production is used for animal feed, around 150,000 MT (PARM 2023). Most buyers of animal feed (using maize) are chicken breeders and other livestock producers. (See Annex H for more detail on the Poultry Market System). In the Grand South, there are very few local processors beyond some small grinding mills; most maize flour sold on local markets comes from Tuléar. The price of ground maize varies according to its quality from $0.44 to $0.67 per kilo (2,000 to 3,000MGA).

There are two large feed manufacturers, with four production sites in the country: Livestock Feed Ltd. (LFL) and AGRIVAL of the Malagasy parent company, INVISO (Kansas State University 2023). These are large professional mills that use locally produced maize and by products from other grains such as wheat and rice. LFL requires approximately 40,000 MT of maize for mill operations and has indicated that it is interested in establishing direct contracting agreements with maize producers (in addition to the ongoing contract production through Tozzi Green and AGRIMA). The capacity of AGRIVAL's mill is around 5000 MT per month, but it is currently operating at 50 percent production capacity, using about 1750 MT of maize per year. They have significant storage capacity, including bulk silo capacity (Kansas State University 2023).

Policies, Rules, and Norms

Maize, in part because of its links to livestock, is considered a ‘’man’s crop,” meaning that men are in control of seed purchases, tilling of the land, planting, applying farm chemicals and harvesting. Women generally still help with weeding.

Collectors and transporters frequently face checkpoints on the road and given the numerous administrative requirements and tax payments required to move goods from one district to the next, many small collectors reported they were unsure which requests were legitimate and which were forms of petty corruption. The study team also heard several anecdotal reports of racketeering in the transport sector, which had a significant effect on consumer prices.

Decree 2010-1009 (2010) regulated seed production, control, certification, and marketing. Seed certification in Madagascar is governed by Law No. 94-038, which was brought into force in 1995. Despite this regulation, informal seed trading remains very high.

Infrastructure problems

As noted in other market system reports, infrastructure is a significant barrier for the maize market system. At the household and systems levels infrastructure undermines the profitability of the market chain and the resilience of the maize market system overall, which then has implications for household food security in the targeted areas.

The poor condition of roads linking rural areas to urban markets are the most significant barrier for all market systems. This constraint impacts the costs of products (maize, agricultural inputs) and reduces the number of collectors who buy from producers, contributing to the power that collectors have over sales negotiations. The World Bank has noted plans to improve the road between Taolagnaro and the capital Antananarivo (World Bank 2020), but the study team saw limited evidence of this planned activity. Trucks involved in the transport of agricultural goods are usually small, with a maximum load of 10-15 MT. Transporters reportedly budget up to 10 percent of their trip costs for repairs and assistance if trucks are stuck along the way (World Bank 2020). Overall, transport costs in Madagascar are significantly higher than other comparable countries. The increasing cost of petrol adds additional costs on top of this.

Households do not have storage available at the household or community level. Maize needs to be dried and stored to meet household consumption needs and supply markets throughout the year. Due to the lack of appropriate storage facilities and lack of funds to purchase chemicals to protect the maize during storage, insects, mold, and rodents damage the crop when it is kept in the household. Producers regularly report experiencing high losses. This contributes to food insecurity and perpetuates a cycle where producers generally sell off most of their production immediately after the harvest, when prices are lowest, forcing them to buy from the retail market at a higher price later in the year.

Low levels of financial inclusion and poor access to credit are issues across the South, due to low literacy and financial literacy rates, norms around borrowing, high banking fees, lack of physical access to banks, and infrastructure constraints such as connectivity. Agriculture credit products have been introduced by organizations such as Credit Agricole Mutuel de Madagascar (CECAM) but are still approached with some suspicion by producers due to previous experiences where loan repayments were enforced by local police. For agricultural investments specifically, microfinance institutions offer loans targeting producers, including a medium-term investment loan with an interest rate of 2.25 to 3 percent per month. Nevertheless, borrowing is most common among households that are connected with mining (e.g., the

gold quarry in Ampanihy). From the lender perspective, lack of collateral or credit history also complicates access to credit. Microfinance institutions and banks tend to have walk-in locations only at the district level (sometimes regional).

Mobile money is seen by many in the sector as the best option for financial inclusion of rural poor (IFC 2023), and communities seemed to welcome increased access to mobile money tools. The study team also found that savings groups (*vonamy*) were commonly used by producers to smooth cash flow or make small investments. Regardless of whether a savings group was present in the community, these groups were positively viewed. The introduction of mobile money, either linked to savings groups or stand-alone, was also of interest to communities.

Market system resilience

Market systems resilience (MSR) is a lens that looks at the ability of markets to innovate, mitigate, and adapt, to solve problems in the face of shocks and stresses, and therefore better serve targeted households. The framing outlined below (Table 14 and Table 15) looks at both structural and behavioral issues within a market system to determine how well the system can adapt and support household resilience. MSR also recognizes that market systems are constantly evolving; and positive or negative interaction with aid actors can shape how the system responds, making it either increasingly resilient or more fragile. Better understanding and programming around these factors improve outcomes for market actors and the households that rely on those market systems.

Table 14: Maize Market System Resilience - Structural Domains

Structural areas (how markets are organized)	
DIVERSITY *What is the diversity of products, sales channels, business models, etc.?* ● Numerous maize varieties are available (short, intermediate, and long-cycle varieties), but they are not widely available or accessible to producers. ● Sales channels for producers are limited by poor roads and costly transport; therefore, they largely rely on collectors who come to the farmgate. ● Commercial production (business models) is being piloted with smallholder producers.	**RULE OF LAW** *Who sets and maintains the rules (informal and formal)? Are they consistent and fair?* ● Improved seeds are certified by the SOC (Service Officiel contrôle des semences), but most producers use informal mechanisms to obtain seeds. ● Seed certification in Madagascar is governed by local laws and regulations. ● Collectors at communal marketplaces pay fees for licensing and to participate in sales activities.
CONNECTIVITY *Who exchanges and talks with whom, why, and how does this evolve over time? How and to what extent do market players interact across geographical areas, ecosystems, and social groups?* ● Low producer connectivity contributes to a high proportion of value going to collectors/wholesalers. ● Connectivity is high for collector/wholesalers because maize is a strategic and highly valued crop. ● Road networks and the cost of fuel make it difficult to transport goods, decreasing connectivity; but wholesalers often take phone orders for goods.	**POWER** *Where and how is power concentrated and exercised?* ● Collectors set prices for maize purchases; producers have very little negotiating power. ● Wholesalers may be raising prices during lean periods based on opportunity rather than shortages of supply. ● Input prices are driven by exchange rates and the limited number of importers. ● There are anecdotes of dishonest business practices in the transport market, which skews power relations in the market system and affects prices.

Table 15: Maize Market System Resilience - Behavioral Domains

Behavioral domains (what determines the actions of market players)	
COMPETITION *To what extent is there rivalry between market players?* ● There appears to be healthy competition, but some market actors complain of too many sellers. In response they are diversifying to sweet potatoes and groundnuts.	**BUSINESS STRATEGY** *How proactively do business strategies anticipate risk? To what extent are they fair and do they generate value for the customer*? ● Poor connectivity and asymmetry of information means that producers have very limited negotiating power. ● Producers admit to using 'traditional' approaches, with very limited planning for known risks. ● The lack of resources prevents some risk-prevention, such as the use of chemical pesticides in household storage.
COOPERATION *How do market players work together to achieve a common goal or function*? ● No formal cooperatives at district level. ● Some (limited) informal credit is provided between retailers. ● Despite recent shocks, there is no collaboration among market actors to address future shocks and stresses. ● Industrial producers are identifying new ways to work with smallholder producers	**DECISION-MAKING** *To what extent is evidence used to identify solutions?* ● Market actors do not appear to use market or weather data to make decisions about future production or sales ● Market actors are reactive, initially resisting change rather than identifying opportunities. For example, they wait to see a clear advantage before risking a change to business practices.

Conclusion: Summary of Barriers and Constraints for Market Actors and Households

While maize is a priority crop, the maize market system is not particularly resilient due to low levels of producer knowledge (important for adaptation), poor infrastructure (increasing costs), and lack of a sustainable inputs system. Most market actors are reactive (to shocks and stresses) rather than being proactive (in capturing market opportunities), but industrial producers and processors have potential to demonstrate practical ways to improve decision-making, cooperation, and connectivity.

Table 16 summarizes the market barriers or constraints and the opportunities for households to overcome them.

Table 16: Maize Market Barriers and Household Opportunities

Market Barrier or Constraint	Opportunity/Gap for Households
Households do not use improved production practices or invest in inputs (fertilizer, pesticides, storage) because of lack of income, and likely because they do not understand the return on investment that these expenses would bring.	Helping households understand the payoff of increased investments in inputs would give them greater choice and increase their income potential. Training and inputs should be considered as part of any asset transfer package. To reinforce positive norms around decision-making, this skill-building should be done with husbands and wives together.
Financial inclusion is low, but savings groups have been well received.	There is an opportunity to build on the existing culture of savings and the successes of existing savings groups. While mobile phone ownership is not high, phones are often a shared asset in communities, and activities to increase phone ownership could catalyze other resilience outcomes.
There are no producer cooperatives for maize	Increasing participant knowledge on how to form producer cooperatives could increase access to credit and to storage, and improve the prices that producers receive through improved negotiation with wholesalers.
Input systems are weak, and producers feel they do not have enough money to “invest” in improved inputs and practices.	Using evidence on system approaches from other resilience programs, the project could layer graduation activities with activities implemented by other actors that will improve market systems, such as input systems, so that improvements made during program implementation can continue.
Poor rural feeder roads make it difficult for producers to bring their crop to market and more reliant on collectors.	Linking livelihoods and graduation programming to rural infrastructure projects implemented by other actors to ensure that producers can benefit financially from improved production practices.

Seasonal calendar

The maize cropping calendars below (Figure 15, Figure 16, Figure 17, and Figure 18) have been drawn up on the basis of the climate outlook for the 2022-2023 warm and wet season by the Ministry of Agriculture and Livestock (MINAE) and the Ministry of Transport and Meteorology (MTM).

Figure 15: Maize Seasonal Calendar for Androy Region

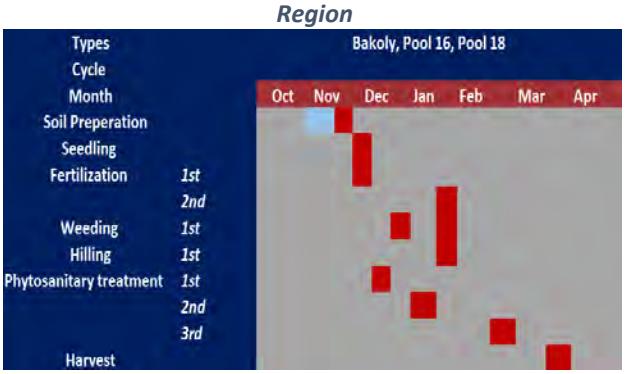


Figure 16: Maize Seasonal Calendar for Betroka and Amboasary Districts

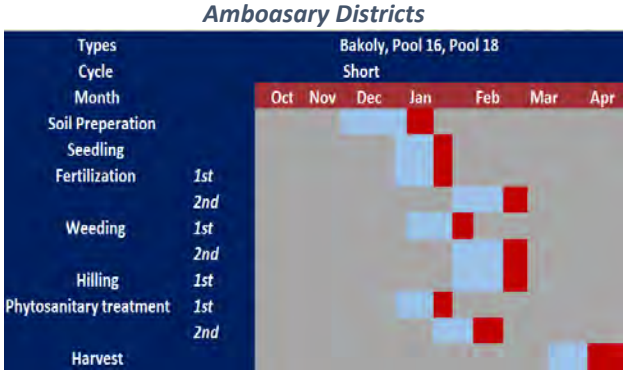


Figure 17: Maize Seasonal Calendar for Atsimo Atsinanana Region

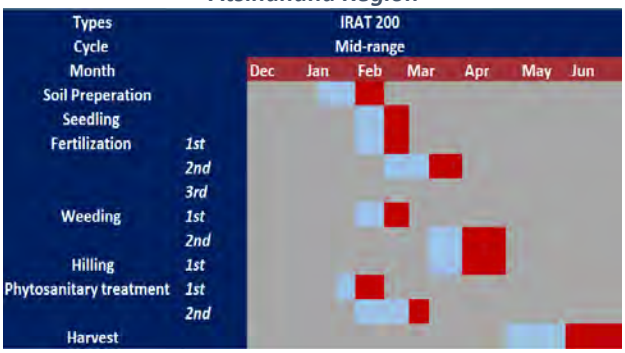
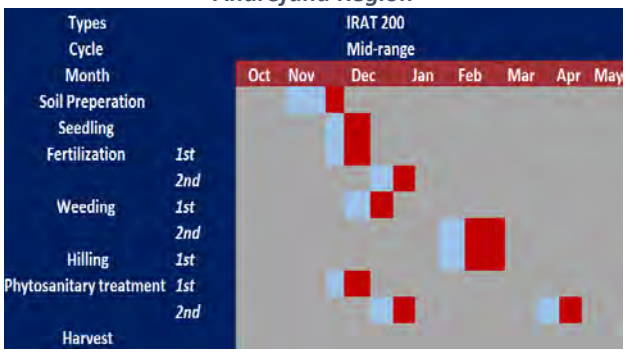


Figure 18: Maize Seasonal Calendar for Atsimo Andrefana Region



Annex D: Sorghum Market System Report

Market System Overview

Sorghum is better adapted than other crops to the difficult conditions in the Grand South; it has a shorter growing cycle (three months) and is more resistant to the dry conditions. It also has greater nutritional value than the other cereals (rice and maize) that are most widely consumed in Madagascar. Nonetheless, production has declined in recent decades as maize has replaced sorghum as a preferred crop (Kansas State University 2023). Current production is about 1,370 MT per year, largely by subsistence producers in sorghum-producing areas.

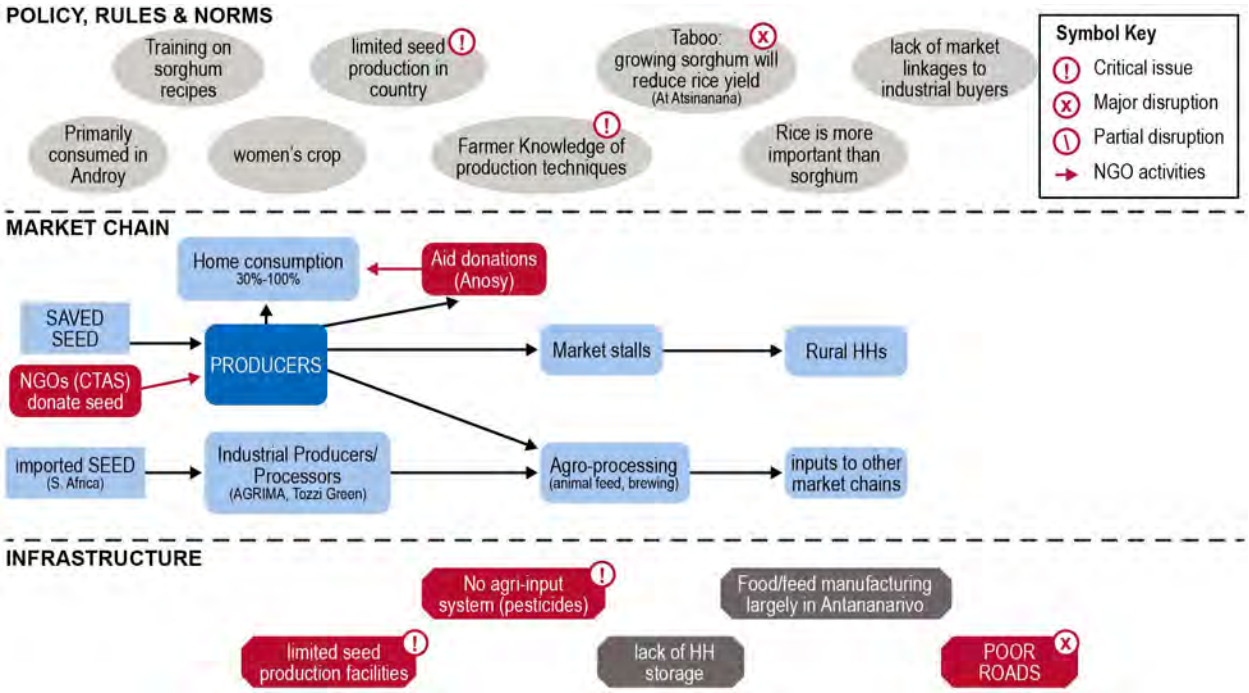
Sorghum is a staple food of the Antandroy ethnic group in Androy. In the Androy region, sorghum and millet are mainly grown in the districts of Beloha (Beloha, Marohita, and Mahely communes), Tsihombe (Faux-Cap and Taritarika communes), Ambovombe (Maroalimainty and Maroalipoty communes). In Androy region it is grown in the Ambatomirary, Isoanala, Ianabinda, Benatoby, Ambalasoa, and Analamary municipalities of Amboasary district. In these areas, the soil is sedimentary, which is ideal for sorghum growing.

After the COVID-19 pandemic and the very serious famine in 2022, the government is increasingly supporting sorghum and millet cultivation under the direction of the Ministry of Agriculture and Livestock, with substantial support from international donors including USAID (Maharo project), the European Union (AFAFI Sud) and the World Bank (Mionjo). Various local and international NGOs are implementing with communities and producers, including FAO, WFP, local NGO *Groupe de Recherche et d'Etudes Techniques* (GRET), *Centre Technique Agro-écologique du Sud* (CTAS), CRS, and other local NGOs.

MINAE and NGOs are introducing new varieties of sorghum and millet to Madagascar to obtain more productive plant material. These varieties have a cycle of 90 to 120 days (short- and intermediate-cycle varieties). The short-cycle varieties available are IRAT 204, *Miaritse, Botra*, and *Rasta*. The intermediate-cycle varieties available are MACIA and KIUMA. Rasta, which is available from CTAS, is most preferred by producers because it has a short cycle and higher yield. The Ministry of Agriculture promotes MACIA, and CRS makes it available via AGRIMA, which obtains its seeds from South Africa. At present, the absence of household milling to process sorghum into grain for cooking limits consumption, as manual processing is time-consuming.

Market System Map

Figure 19: Sorghum Market System Map



The market system map above (Figure 19) shows that sorghum is mostly grown by subsistence producers for their own consumption, but it has potential as an ingredient in processed foods and for animal feed, in some cases as a substitute for maize. Commercial firms such as AGRIMA have already indicated an interest in researching sorghum's appropriateness and usefulness in these sectors, and what varieties could best meet increased demand. Sorghum yields are estimated at 3.5 MT/ha (Kansas State University 2023). Local production is low compared with the production potential in the area. In recent years, producers have sold most of their production to CRS, WFP, and NGOs such as CTAS for use in food assistance programming. Nonetheless, imported sorghum still accounts for a large proportion of the food aid distributed to vulnerable households. Nonetheless, imported sorghum still accounts for a large proportion of the food aid distributed to vulnerable households: 6.43 million tons of imported sorghum versus 1.23 million tons of local sorghum production. (Panlibuton et al. 2022). In the study area, sorghum is produced mostly for home consumption with little processing or sale into local or other markets.

Currently, aid agencies are the main suppliers of seeds and agricultural materials to sorghum producers in the Grand South. They support producers doing seed multiplication in the process of producing seeds of declared quality. NGOs maintain shops selling seeds and small agricultural equipment in areas that are favorable for sorghum cultivation. These NGOs are currently the mainstay of sorghum promotion in the Grand South in the face of climate change. Small retailers, particularly women, or direct producers are the primary sellers of sorghum in urban markets or on communal market days.

The main constraint to a strong sorghum market system is the poor state of the roads, which multiplies the travel time for people and goods and increases the cost of inputs, processing, and production. Limited local seed production and low knowledge of production techniques among producers also pose challenges for the market system.

Market Actors

Inputs

The main pests that damage sorghum crops are birds, stem borers, and armyworms, which are also a major problem in maize cultivation. Some respondents reported losses of up to 30 percent from armyworms. However, in other studies, AGRIMA indicated that sorghum was less affected than maize (Kansas State University 2023). It is possible that pests prefer maize to sorghum and simply attack it first, although this remains unclear. Some producers use chemical treatments (ARCIDE) to prevent pest damage, but the results from these treatments are unsatisfactory. Most producers lack access to these products, and those who can access them often cannot afford a sufficient dosage. Natural treatments using neem leaves, soap, sisal, cow dung, and castor oil are also available. All these ingredients are abundant in the Grand South, but they require large quantities of water and must be repeated several times to be effective. A 20 L can of water costs $0.33-0.66 (MGA 1,500 -3,000) or more in places where sorghum is grown, making water the major obstacle to natural treatments.

Producers doing seed multiplication grow seeds of declared quality (SQD), under the supervision of the Ministry of Agriculture and Livestock's Seed Control Department. This type of seed is generally sold to producers. CTAS has created shops for inputs where producers can buy seeds needed for their production. However, the May/June 2023 SSA found that producers obtained over 85 percent of sorghum seed as donations from FAO or other humanitarian agencies.

The soil in this area of Madagascar is highly acidic and can be made more productive with the application of lime to raise the pH. As with other crops, sorghum producers lack access to lime, fertilizer, and other important inputs in part because of the very poor road network, which increases the cost of these products, but largely due to the lack of an input provider network in the region. CTAS has been expanding its network of shops, and CRS is training private service providers to sell seeds, tools, and other inputs in communities.

Producers

Sorghum cultivation techniques are almost identical to those for maize, although some producers interviewed for this study indicated that sorghum is easier to grow than maize. It has a short growing cycle and is drought resistant and more nutritious than rice or maize. Sorghum is grown in association with other crops (cowpeas, beans, groundnuts). Pigeon pea *(Cajanus cajan)* is used as a windbreaker to prevent loose soil from blowing away and crop fields from silting up due to the red wind phenomenon in the Grand South. The sowing density is 3 kg/ha. The crop is planted from October and harvested from February to May. If conditions are good, the average yield is 300 kg/ha. In the study area, producers do not consider sorghum a priority crop. They grow the crop for household consumption and income, but their primary motivation for production stems from NGO promotion of the crop.

The study team found that producers are growing new varieties of sorghum (MACIA, Rasta), in line with the quality standards required by the SQD process. Aid actors provide producers with agricultural inputs (direct aid and vouchers), equipment, and capacity-strengthening support. Producers are often grouped into cooperatives, and the transfer of technology is supported by FFSs. To date, 445 FFSs have been created by FAO to promote sorghum and other crops. These activities mainly focus on increasing sorghum production and have not yet been able to connect producers with formal markets due to constraints such as low production, quality control, lack of infrastructure, and poor road networks.

WFP has also trained two producers associations in Amboasary and Betroka (Anosy region) on procurement and tendering processing for the supply of sorghum to formal markets—the first step to support the government in promoting sorghum as a climate-resilient value chain. CTAS supports producers in the development of the sorghum sector in Androy with the free distribution of seeds (for multiplication) and the buyback of seeds produced. CTAS also purchases the crop at a fixed price of $0.56 /kg (MGA 2,500/kg), which producers have asked to raise to $0.78 /kg (MGA 3,500/kg).

The support that aid agencies provide may be one reason producers do not prioritize sorghum production; they do not yet understand its commercial value (as an input to feed) or potential contribution to climate adaptation. A recent Seed System Survey also noted that the real demand for sorghum seeds is masked by the high level of direct aid provided—over 85 percent of sorghum seed sown by producers was obtained through aid agencies (SeedSystem 2023). CRS has used vouchers as part of agriculture fairs, and this shift towards market-based approaches is important for changing producer attitudes about the commercial viability of different crops. There are potential private sector partners, such as the South African company Agrima, which have worked with CRS and CTAS, and this type of partnership is more sustainable than direct humanitarian aid.

Post-harvest loss is also an issue due to producers' lack of knowledge about newer storage technologies and techniques. To improve post-harvest management, WFP provided 92 plastic silos to 226 producers associations (11,049 members in total) in Betroka, Amboasary Sud, Ambovombe, and Tsihombe, while another 9,737 received training on post-harvest loss techniques in Atsimo Andrefana, Androy, and Anosy (WFP 2022).

Collectors/Wholesalers

Due to the limited demand for sorghum outside its production areas, very few collectors or wholesalers deal in sorghum. Study investigators found only one sorghum seller on market day, with just 5 kg available, at $0.40 /kg (MGA 1,800 /kg). She noted that in October (drought period) when production runs low, the price goes up to $1.78/kg (MGA 2,000/kg). There are reportedly other collectors who travel to Tuléar to get supplies, and CRS is also working with collectors in Tsihombe and in Ambovombe.

Processors

Although processing capacity in the Grand South is very limited, there appears to be some commercial opportunity for sorghum. Two major commercial farms, Tozzi Green and AGRIMA, have expressed an interest in obtaining more sorghum as an input to their feed products; and two major food product companies, Basan Group and NutriFoods, are also interested in sorghum as an ingredient. Most food and feed companies are in the central part of the country, meaning that even if production levels can be raised, poor roads will remain a barrier to connecting with potential customers. Locally, GRET has partnered with TAZA, a local processing unit, to transform sorghum into "infant flour" and peanuts into peanut butter. GRET financed the construction of the premises and purchased the processing machines.

Households could also feed sorghum bran and stalks (byproducts of processing) to livestock. However, they complain that sorghum is more difficult to dehull and grind than other crops. Access to community mills could have a positive impact on livestock market systems as well as the sorghum market system. WFP has provided some processing equipment (five sorghum huskers) to producers' associations (WFP 2022).

Retailers

Most sorghum retailers are women who sell in urban markets or on communal market days. Currently, the profit margin for sorghum cultivation is lower than for other crops (corn, peanuts, cowpeas) given the level of yield obtained and the purchase price on the markets. CTAS buys producers' produce at $0.56/kg (MGA 2,500/kg). In urban markets, prices vary from $0.36 to $0.44/kg (MGA 1,600-2,000/kg) during the harvest period and can rise to $1.78 (MGA 8,000) or more when food stocks are depleted.

In Androy, retailers obtain supplies from Tsihombe or Tuléar (primarily during the drought period). There are only a few retailers in the urban market at Ambovombe, and prices range from $0.36 to $1.11/kg (MGA 1,600-5,000/kg), depending on the season. Producers also sell sorghum at this market directly, at a price of $0.53/kg (MGA 2,400/kg). See Figure 20 for the sorghum price structure.

Consumers

Because sorghum is a staple crop of the Antandroy ethnic group, it is less widely consumed than other grains. Households that traditionally produce sorghum do so primarily for their own household consumption, with a portion set aside to be sold. Due to this ethnic group's pastoral lifestyle, they sometimes introduce sorghum to new areas when they migrate.

Figure 20: Sorghum Price Structure (MGA per kg)

Once dehulled, sorghum is easy to prepare and does not require a large amount of cooking (compared to rice and maize), so it does not consume as much fuel. Ten cups of sorghum (2.5 kg) yields seven cups (1.75 kg) after grinding. Sorghum needs to be ground (usually by mortar and pestle) before cooking. Producers in Androy told the study team that they prefer the taste of sorghum to rice and corn, although millet reportedly tastes the best. Sorghum is also richer in nutrients. It is often eaten as porridge for lunch and dinner.

Policies, Rules, and Norms

Sorghum is associated with the Antandroy ethnic group, but it also suffers from negative taboos and beliefs among some households. For example, producers in Atsimo Andrefana told the study team that growing sorghum would lead to a reduced rice harvest (the key staple crop in Madagascar). Other producers believe that sorghum reduces soil fertility and prevents adequate rainfall (ADRA 2021). These

beliefs, combined with lack of familiarity regarding production techniques, will be the first hurdle to increasing production levels in the study area.

Aid agencies have focused on sorghum in part because of its drought resilience and its potential role in adapting to climate change. There appear to be commercial opportunities that could also drive household behavior change related to production choices and may provide opportunities for climate change financing. Encouraging producers to diversify their crops as part of an adaptation strategy has potential to contribute to both dietary diversity and resilience.

Aid agencies play a strongly supportive role in the sorghum market system. While this support is valuable, there are examples in similar contexts where the current level of engagement has led to the creation of a parallel system, or no market system has developed at all, leaving producers reliant on aid over the long term.

Infrastructure Issues

As noted in other commodity reports, infrastructure is a significant barrier for the sorghum market system. At both the household and systems level, poor infrastructure undermines market connectivity and the potential profitability of the market system, which then has implications for household food security in the targeted areas. The poor state of feeder roads that link rural areas with communal markets and processing locations, along with the high price of fuel, increases the cost of transporting goods and reduces the number of independent collectors who buy from producers.

Limited access to credit is an issue across the Grand South. This is due to low literacy and financial literacy rates, high banking fees, lack of physical access to banks, and infrastructure constraints such as connectivity. Organizations such as *Crédit Agricole Mutuel de Madagascar* (CECAM) have introduced agricultural credit products, including those for livestock owners, but producers still approach them with some suspicion due to previous bad experiences. From the lender perspective, lack of collateral or a credit history also complicates access to credit, which producers could use to pay for inputs or prepare in advance for shocks. The study team found that producers more commonly used savings groups (*vonamy)* to smooth cash flow or make small investments. Regardless of whether a savings group was present in the community, these groups were positively received. The introduction of mobile money, such as mVola, either linked to savings groups or standalone, was also of interest to communities.

Market System Resilience

Market systems resilience (MSR) is a lens that looks at the ability of markets to innovate, mitigate, and adapt, to solve problems in the face of shocks and stresses, and therefore better serve targeted households. The framing outlined below (Table 17 and Table 18) looks at both structural and behavioral issues within a market system to determine how well the system can adapt and support household resilience. MSR also recognizes that market systems are constantly evolving; and positive or negative interaction with aid actors can shape how the system responds, making it either increasingly resilient or more fragile. Better understanding and programming around these factors improve outcomes for market actors and the households that rely on those market systems.

Table 17: Sorghum Market System Resilience - Structural Domains

Structural Domains (how markets are organized)	
DIVERSITY *How much variety is there in products, sales channels, business models, etc.?* ● There are few sales channels; production is largely for home consumption. ● There are no business models in the market system; aid is currently driving most development of the market system.	**RULE OF LAW** *Who sets and maintains the rules (informal and formal)? Are they consistent and fair?* ● The high level of own consumption means that there are few rule-of-law issues within the market chain. ● Areas where sorghum is grown face conflict related to cattle theft.
CONNECTIVITY *Who's trading and talking with whom, why, and how is this changing over time? How and to what extent do market actors interact across geographies, ecologies, and social groups?* ● Very low connectivity--industrial producers do not have strong linkages with cooperatives or household producers. ● Small producers are unaware of opportunities for selling to larger processors.	**POWER** *Where and how is power concentrated and exercised?* ● While the Minister of Agriculture is interested in promoting sorghum, actual government investment is low, and the sorghum market in the Grand South of Madagascar is heavily dependent on WFP and NGOs. ● Aid agencies have the greatest influence in the market system, which raises questions about sustainability.

Table 18: Sorghum Market System Resilience - Behavioral Domains

Behavioral Domains (what shapes the actions of market actors)	
COMPETITION *To what extent is there rivalry between market actors?* ● There is very limited competition because other grains (rice, maize) have a higher perceived value. ● Market signals are muted by the high levels of aid in the system.	**BUSINESS STRATEGY** *To what extent do business strategies proactively plan for risks? To what extent are they fair and generate customer value?* ● Sorghum could be an important part of adaptation strategies, but this opportunity is not recognized. ● Producers are not strategic in their choice of crops.
COOPERATION *How are market actors collaborating to achieve a common purpose or function?* ● Cooperatives for seed production exist, but collaboration in the system is driven by aid agencies. ● Opportunities for partnership with private sector actors (processors) exist.	**DECISION-MAKING** *To what extent is evidence used to identify solutions?* ● Households make decisions on what is sold, in what quantity, at what price, and to whom based on their own needs, not market demand.

Conclusion: Summary of Barriers and Constraints for Market Actors and Households

Sorghum has the potential to be a new crop grown outside of Androy and Anosy if demand is built (and better understood by producers). The sorghum market system is currently a thin and reactive (rather than proactive) market. This means that it does not appear to have much resilience, although this could change rapidly if producers begin to understand the market opportunity, as they have in the groundnut market system (see Annex F). Connectivity is low, as it is in many market systems in the Grand South and Southeast, and despite potential opportunities there is no diversity of products. Market systems approaches focused on partnering with the private sector could open opportunities for new livelihood activities, increased adaptation to climate change, and potentially improved dietary diversity and nutrition.

Table 19 summarizes the market barriers or constraints and the opportunities for households to overcome them.

Table 19: Sorghum Market Barriers and Constraints for Market Actors and Households

Market Barrier or Constraint	Opportunity/Gap for Households
Households do not recognize the potential income opportunity and benefits of sorghum, and do not feel confident about production techniques. There are taboos about its production.	Production training for households, with asset transfer activities, can be layered with sensitization activities and market-based programming to capture potential opportunities. These activities could be eligible for climate finance or adaptation funding, implemented by other actors.
Direct aid to households is building a parallel system that could undermine longer-term sustainability, particularly with regards to improved inputs.	Cash programming (rather than direct seed provision) and market-based approaches will strengthen local systems so that there is less reliance on direct aid in the future.
Producers feel they do not have enough money to "invest" in improved inputs and practices; and do not prioritize sorghum.	Using evidence on system approaches from other resilience programs, the project could layer graduation activities with activities implemented by other actors that will improve market systems, such as input systems, so that improvements made during program implementation can continue.
Existing financing systems (banks, microfinance, subsidies) are not yet adapted to producers' financing needs, especially women and young producers who have no credit.	There is an opportunity to build on the existing culture of savings and the successes of existing savings groups. While mobile phone ownership is not high, phones are often a shared asset in communities, and activities to increase phone ownership could catalyze other resilience outcomes.
Poor roads inhibit market connectivity and increase the cost of inputs, processing, and production.	Asset transfer activities and market-based programming should consider layering with infrastructure investments implemented by other actors.

Seasonal calendar

Sorghum seed production takes place in September to October to prepare for the growing season. See Figure 21 and Figure 22 for sorghum seasonal calendars. The growing season begins in November and lasts until March for the Rasta variety and May for the MACIA variety. The production cycle for new varieties of sorghum is 90-120 days. The sorghum cropping calendars below (Figure 21 and Figure 22) rely on the climate outlook for the 2022-2023 warm and wet season of MINAE and the Ministry of Transport and Meteorology.

Figure 21: Sorghum Seasonal Calendar (IRAT 204, Miaritse, Botra, Rasta varieties)

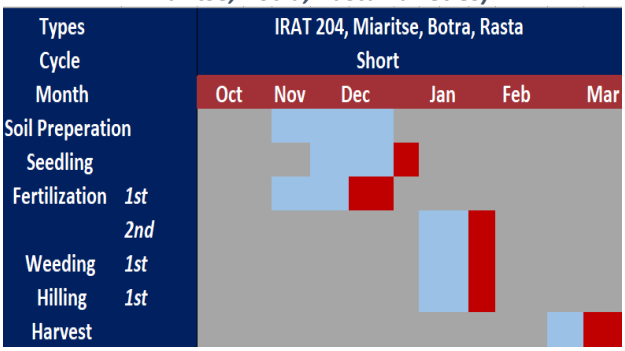
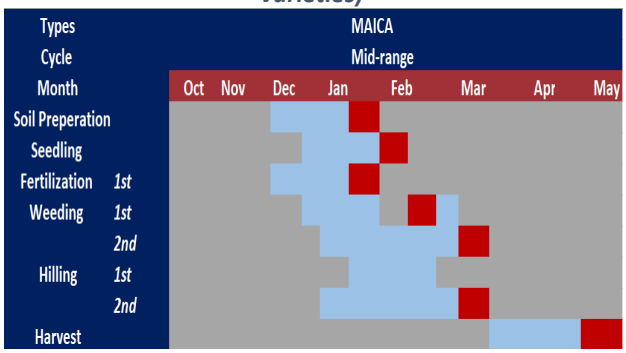


Figure 22: Sorghum Seasonal Calendar (MAICA varieties)



Annex E: Beans Market System Report

Market System Overview

Over 30 varieties of beans and other pulses are grown in Madagascar; beans are a source of protein for households and have a special place in household diets, ranking fourth after rice, maize, and manioc. Beans are produced in all parts of the study area (Ampanihy Ouest district of Atsimo Andrefana, Androy, Anosy, and Atsimo Atsinanana), but the area located between Amboasary-Atsimo district and Taolagnaro in Anosy is best known for its bean production, due to its favorable microclimate.

Madagascar's production capacity for beans is over 76,000 metric tons (MT) (Food and Agriculture Statistics [FAOSTAT 2021]). In the best conditions (for example certified bean seed production) bean yields can be as high as 500kg/ha. However, according to respondents from this study, yields in the Grand South and Southeast are often as low as 5-12 kg/ha, and bean production is mainly intended for own consumption. This is due to poor agricultural practices and post-harvest handling, meaning that high losses are incurred. To address local demand, beans must be transported from other parts of the country to the study area. As a result, the bean market system does not display high connectivity across the study area. For example, seed multiplication efforts for locally adapted beans are limited, and no processing is taking place. In general, development of the sector has largely happened through aid initiatives.

Some of the most produced beans are not drought resistant and therefore are more sensitive to changing climatic conditions. Producers often decide to grow beans only when they believe there is enough rain to avoid a loss of production. Beans are also sensitive to fungal diseases, stagnant water, and pests. In the study area, beans are grown in rainfed conditions (500 to 900 mm annually) on hillside terraces (*tanety)* over three to four months, depending on the variety (short or long cycle). Beans are also grown off-season on rice fields or in areas of flood recession.

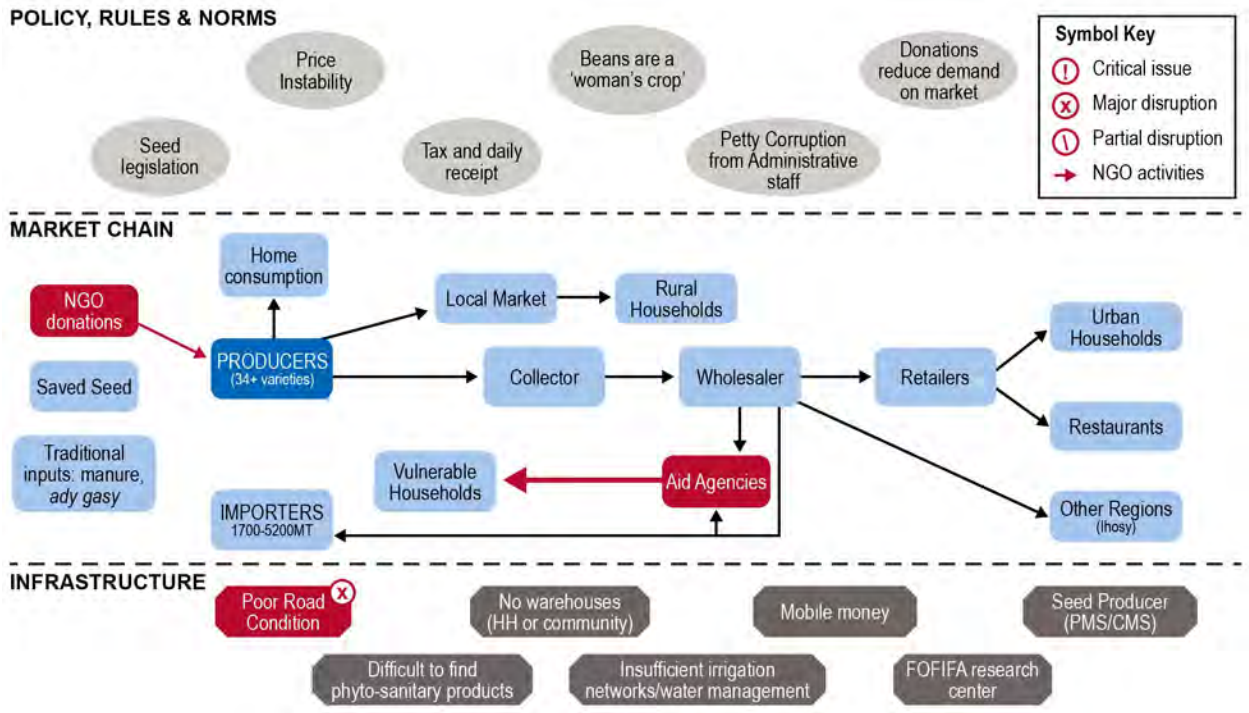
Figure 23 shows that, while a large proportion of beans are consumed at home, when producers sell it is generally to collectors or in their own local markets. Wholesalers buy from collectors and sell to urban retailers; however, wholesalers do a significant part of their business with aid agencies, which purchase beans locally and distribute them as humanitarian aid.

Local prices, whether for local or imported beans, are at their lowest during the harvest (August) and highest during lean periods, which generally correspond to the depletion of food stocks (around December–January). Because producers generally sell their crop immediately, the price advantage benefits the collectors or wholesalers that buy beans at low prices and sell them later at premium prices. Small producers do not have adequate storage and therefore cannot align their sales with higher prices later in the year. Consumers also suffer from this situation, as there is less competition, and

therefore prices remain high. At the time of high prices, vulnerable households receive humanitarian aid—aid agencies get beans for distribution from wholesalers, which may contribute to prices staying artificially high.

Market System Map

Figure 23: Beans Market System Map



Market Actors

Producers

Beans are not primary crops in the study area because producers prioritize drought-resistant crops and only cultivate beans when they believe there is sufficient rainfall. Producers do not have appropriate storage, and without chemicals for storage, pests are likely to destroy the produce. The Seed Security Assessment (SeedSystem, 2023) found that losses reported were in the range of 35 percent.

Human or animal power is used to prepare the land for production. Producers plow rows and apply organic fertilizer. Sowing and weeding are done manually, generally by women. If producers can afford it, they spray fertilizer during the flowering period. The number of days between sowing and harvesting is 70 to 90 days. Beans are then harvested by hand, dried for about a week, and packaged in 50 kg bags to be stored or sold to collectors. A value chain analysis done for Japan International Cooperation Agency (JICA) found that this practice resulted in a profit of approximately $31 (Malagasy Ariary [MGA] 141,027) per ha of beans planted (JICA 2023).

In addition to the difficulties associated with introducing and distributing improved varieties (see Section 2.4 for further details on infrastructure issues), one barrier is the cultivation techniques used. Improved seeds require the appropriate cultivation techniques to be fully successful. The agricultural training available is largely through aid actors, often based on the creation of FFS. This approach consists of bringing together a group of 20 to 30 learners on a plot of land, led by a facilitator, to carry out experiments, disseminate techniques, and produce recommendations. While this approach is successful in the short term, it often does not strengthen local systems to ensure that producer learning can continue beyond the life of the project.

In the Grand South, the low levels of production mean that the bean market system is not well structured, and there are no local producers' organizations for beans. Producers mainly grow beans for their own consumption (beans are eaten at least once a week) and sell a small portion of production at nearby local markets. Where producers sell beans to collectors, it is the collectors who determine the selling price, often to the disadvantage of the producers. Some producers benefit from the support of aid projects through the distribution of seeds and technical guidance.

Inputs

Access to inputs (e.g., seeds, fertilizer, farm chemicals) is a challenge for all market systems that the study explores. The lack of a market system for the sale of agricultural inputs and equipment means that producers have limited access to improved practices and instead use traditional cultivation techniques. Producers most commonly use organic fertilizer and traditional pesticides (a mix of ash, red pepper, and neem leaves or seeds). FFS do provide exchange visits and technical training, but other inputs, particularly certified, quality seeds, are difficult to access.

As noted in the recent Seed System Survey and other market reports of this study, most producers (98 percent) buy unimproved local seed from friends or family and at local markets (74 percent are sourced from local markets) (SeedSystem 2023), which may come from other markets (Betioky and Tuléar, Ihosy) because there are no input shops or sellers of improved or certified seeds outside of urban areas. CAL98 (improved variety) comes from the multiplication center in Behara. Lack of money is the main constraint for improved seed use. Although contract growing exists in Madagascar, the study team found no examples of contract growing among those interviewed.

Table 18: Bean Varieties in Madagascar

Bean Varieties in Madagascar
Black-Eyed Pea
Cowpeas (Baboke, Famimaso, Malaindrafe, Maramasake)
Pigeon Pea (Malaky, Androy)
Scarlet Runner
Kidney (CAL98, DRK64, Ranjonomby, RI-52, Mandronono, Menangoe)
Lingot Blanc
Lablab (Bevoa, Lohapitse, Manja, Ondragne, Vorompotsy)
Mucuna
Lima (Garadake, Atolinkibo, Mafiry, Mamy, Matsaotsaoke, Soamaso, Soramena, Tsimeda)
Soybean
Bambara
Groundnut (Canette, Boha, Fleur 11)

Source: FOFIFA

In the Grand South and Southeast the study team found four varieties identified and promoted: Lingot Blanc (long white), RI-52 Ranjonomby (large white), CAL98 Vangamena (speckled red), and DRKF Ran'omby 3 (dark red/black) (See Table 18). The last two varieties are recommended by the United Nations' Food and Agriculture Organization (FAO), which has activities to promote bean cultivation in the study area. CAL98 is an improved, fortified variety (high protein, iron, and zinc) designed to adapt to climate change and is suitable for all types of soil. It is produced at the multiplication center in Behara. DRKF is a newer variety, and because it is unfamiliar some producers are reluctant to grow it, although it is an improved version of a local bean variety.

Some producers perceive white beans as being less resistant to drought, but nevertheless producers in Ambovombe often grow them. Restaurants tend to use white beans because of foreigners' preferences. Red kidney beans are popular with many households because they are believed to have more flavor and do not require sauce or meat for cooking. White beans are the most consumed across Madagascar, and preferred by restaurants that cater to tourists. Black beans come from Amboasary.

One of the primary sources of certified seed is through donations from aid actors, particularly FAO and the Adventist Development Relief Agency (ADRA) in cooperation with research centers such as the National Center for Rural Development Research (known by its Malagasy acronym, FOFIFA). Certified seeds are also produced by seed multiplication centers such as the one located in the rural commune of Behara, in the district of Amboasary Sud.

Collectors

Collectors are people from other regions or neighboring districts who buy beans from producers. Most of the time, they are transporters or smaller wholesalers whose main activity is to gather agricultural products from producers during the local produce harvest period. Most collectors are men.

These collectors buy from producers or groups of producers in the surrounding communes (if there are any) and sell mainly to wholesalers and exporters. Collectors determine the selling price, which can fall by $0.11 to $0.22 (MGA 500-1,000) per cup during harvest periods. Producers report that they feel they have no choice but to take the price offered by collectors, as there are few other outlets for selling their bean production. Collectors come from Tsihombe, Bekily, Beloha, Faux Cap, Soamanitse, Taritarika, and the villages around Marovato to sell at the main Saturday market. Red beans are collected from Midongy; also, Mahafasy, Ambalantany, and Evanto. Other types are collected from Fianarantsoa.

During the off-season, collectors import beans from producing areas. These collectors must contend with the difficult conditions of the inter-regional and communal roads, especially during the rainy season. The transport fee is $4.44–$6.67 (MGA 20,000-30,000) per 50-kg bag, depending on distance and season. Collectors store goods in their warehouse, and when an appropriate tonnage is reached, they deliver the goods to wholesalers in Tuléar. They may also work with wholesalers to gather beans for food distribution.

Wholesalers

Wholesalers are market actors, generally men, whose business activities consist primarily of the distribution and resale of beans and other agricultural and non-agricultural products. There are estimated to be 10 wholesalers per district. Wholesalers work with transporters to fill a 10-15 MT truck and get the 50 kg sacks of beans to their points of sale in districts/communes.

Wholesalers obtain beans from collectors or buy them from producers in larger markets such as Amboasary. They store the beans in their warehouses until the desired tonnage is reached, at which point they are delivered. There is collaboration between wholesalers and aid organizations (e.g., World Food Programme [WFP], Catholic Relief Services, GRET) to supply the latter with beans as needed.

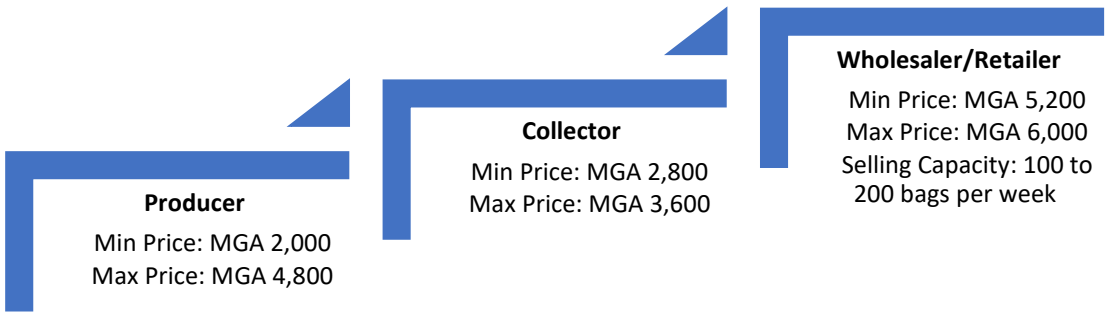
Wholesalers in Tsihombe report receiving their supply Tuléar, Fianarantsoa, Andranovory, Morombe, and Ankililoaka. They place orders over the phone, and transporters then move the beans to Tsihombe. In the lean season, wholesalers get beans from suppliers in Betioky, Bezaha, and Morondava. Some wholesalers cooperate with local associations that work with WFP to provide supplies for school canteens (30 kg/week) under WFP's local purchase program for school feeding.

Wholesalers in the South-East sell beans at $53 to $58 (MGA 240,000 to 260,0000) per 50-kg bag, or $0.29 to $0.31 (MGA 1,300 to 1,400) per cup for white varieties, and $51 (MGA 230,000) per bag, or $0.22 (MGA 1,000) per cup, for Vangamena (CAL98) beans. Wholesalers receive a profit margin of $0.44 (MGA 200) per cup. Transport fees are $4.44 (MGA 20,000) per 50-kg bag for inter-regional journeys (e.g., Taolagnaro to Beloha).

Retailers

Retailers are local or from neighboring towns, and sometimes also play the role of wholesaler or collector. Otherwise, they obtain products by placing orders with their wholesalers, who are generally in fixed locations at large (district or regional) markets. Retailers sell a variety of products, such as rice, maize, beans, vegetable oil, and groundnuts—a strategy that enables them to diversify their customer base. There are between 20 and 30 retailers at each district market, and a handful at communal markets. Most retailers are women. Retailers sell to a variety of end consumers, including producers who use the product as seed, households for their own consumption, and restaurants for commercial purposes.

Figure 24: Beans Price Structure (MGA per kg)



A typical retailer in a smaller town like Vondrozo will sell three 50-kg bags a week (two white and one red). In a larger city such as Ambovombe, it may be closer to 7 MT of beans in a day (5 MT of red beans and 2 MT of white) per week on average during market day, around 30 bags a month. In Vangaindrano, one retailer noted that beans are sometimes out of stock, and they cannot meet demand, so they have to order from Fianarantsoa. The factors determining the retail price are the availability of the product on the local market, transaction costs, and demand. Figure 24 demonstrates the beans price structure. Retailers align their prices so that they are similar, generally regardless of the type of bean. In rural areas, a *kapoaka* (cup) of beans typically costs between $0.18 and $0.22 (MGA 800 and 1,000); however, retailers will sell the same amount for $0.33 and $0.44 (MGA 1,500-2,000) per *kapoaka* in times of higher demand (following the drought or during planting season). Immediately after harvest (August) the price drops to $0.11 (MGA 500) per cup. Retailers make a total profit of $11 to $22 (MGA 50,000 to MGA 100,000) per week. Their profit margin on beans is $0.01 to $0.02 (MGA 50 to 100) per cup or $0.04 to $0.09 (MGA 200 to 400) per kilogram.

[8] A 50-kg bag is 200 cups.

Policies and Norms

Beans are not perceived as being climate resistant, but in fact, as noted in the Inputs section above, FAO has developed and introduced two drought-resistant varieties, CAL98 Vangamena and DRKF Ran'omby 3. Producers acknowledge that they do not use Good Agricultural Practices and have limited technical knowledge, which likely contributes to their discomfort with new varieties. (The limited availability of improved seeds is discussed in the Infrastructure section below.)

Beans are generally perceived as a women's crop, which may contribute to the lower prioritization for production. In addition, they are not always prioritized by local governments, despite their contribution to dietary diversity and improved nutrition outcomes. For example, in discussions with our study team, government officials in Vangaindrano indicated that beans are not a regional priority for the Ministry of Agriculture and Livestock (MINAE), as the Ministry gives priority to cash crops (coffee, cloves, and vanilla) and rice growing. These sectors bring in a lot of money and have existed for a long time in the study area. Donations from aid agencies further reduce the incentive to prioritize bean production, as there are unclear market signals regarding the level of profit that can be made.

In some areas, borrowing is considered shameful. Therefore, using credit to purchase inputs such as seeds or farm chemicals is not considered, although it would make a significant difference in yields and household incomes. Contract growing is practiced in other parts of Madagascar, but the study team found no evidence of it. This is another common way to provide "credit" to households—seeds and farm chemicals are provided to producers and do not need to be paid for until after the harvest. This may be perceived as a more appropriate way to borrow. Savings groups, however, do not suffer from any stigma related to using credit and are positively viewed in most communities.

Another norm that affects production of beans as well as consumer preferences is that in certain parts of Atsimo Atsinanana, consumption of red kidney beans is taboo (red is the devil's color). In these areas, production and sales of white beans is considerably higher.

With regards to policies that affect the market, Decree 2010-1009 (2010) regulated seed production, control, certification, and marketing. Seed certification in Madagascar is governed by Law No. 94-038, which went into effect in 1995. Despite this regulation, informal seed trading remains very high.

Infrastructure Issues

As noted in other commodity reports, infrastructure is a significant barrier for the beans market system. At the household and systems levels, infrastructure undermines the profitability of the market chain and the resilience of the bean market system overall, which then has implications for household food security in the targeted areas.

Insufficient local storage capacity

Households do not have storage available at the household or community level. Given that the growing season is limited, beans need to be dried and stored to meet household demand and supply markets throughout the year. Due to the lack of appropriate storage facilities and lack of funds to purchase chemicals to protect the beans during storage, insects, mold, and rodents damage the crop when it is kept in the household. Producers report experiencing losses of up to 35 percent. This perpetuates a cycle where few beans are produced, and often only for home consumption. As a result, producers generally sell off most of their production immediately after the harvest, when prices are lowest; forcing them to buy from the retail market at a higher price later in the year.

Limited access to improved inputs

In the South, bean yields average 500 kg/ha and vary according to rainfall. This is well below the national average yields for improved seeds, which, depending on the variety, range from 1,000 to 2,000 kg/ha (JICA 2020). One limiting factor is the availability of and producers' access to quality seed. While seed for the improved CAL98 variety comes from the Behara seed multiplication center and is technically available on the market, as a recent Seed Security Assessment (and this study team) noted, there are no agro-input providers outside of primary markets. Therefore, the network for distributing CAL98 seed is largely nonexistent. Ninety-eight percent of producers in the Grand South used local channels to access seeds: using their own saved seeds, purchasing from friends and family, or buying unimproved seed from local markets (SeedSystem 2023).

Another significant barrier for households is the cost of inputs, including improved seed. The study team frequently heard that inputs were too expensive. There are few credit facilities available to allow for the purchase of inputs.

Irrigation infrastructure problems

In the absence of crop irrigation infrastructure or rainwater conservation systems, beans can only be grown in the rainy season. Beans need between 300 and 400 mm of water during the growing season. However, in the rainy season, the crop requires regular, well-distributed, non-violent rainfall. As a result, the quality of production is partly correlated with the quality of the water supply. Producers therefore decide to grow beans only when there is enough rain to avoid a loss in production.

Higher transaction costs

Given that local production is not sufficient to meet demand, particularly out of season, beans are transported from other regions. The conditions of the inter-regional and communal roads are difficult, especially during the rainy season. Out of season, the beans come from Tuléar and Fianarantsoa in the Grand South and Southeast, respectively. On normal roads, for example beans sold in the Ihosy region (to the north of the study area), the transport cost is $0.04 (MGA 200) per kilogram. However, for beans transiting the RN10 (unpaved highway from Tuléar to Ambovombe), the transport cost per kilogram varies from $0.07 to $0.13 (MGA 300 to 600). In the Southeast, the price of beans from Fianarantsoa is the highest because of high transport costs. Depending on the variety, the off-season price per cup is between $0.27 and $0.33 (MGA 1,200 and 1,500).

Access to finance

Low levels of financial inclusion and poor access to credit are issues across the South, due to low literacy and financial literacy rates; norms around borrowing; high banking fees; lack of physical access to banks; and infrastructure constraints such as connectivity. Agriculture credit products have been introduced by organizations such as *Crédit Agricole Mutuel de Madagascar* (CECAM) but are still approached with some suspicion by producers due to previous experiences where loan repayments were enforced by local police. For agricultural investments specifically, microfinance institutions offer loans targeting producers, including a medium-term investment loan with an interest rate of 2.25 to 3 percent per month. Nevertheless, borrowing is most common among households that are connected with mining (e.g., the gold quarry in Ampanihy). From the lender perspective, lack of collateral or credit history also complicates access to credit. Microfinance institutions and banks tend to have walk-in locations only at the district level (sometimes regional).

Mobile money is seen by many in the sector as the best option for financial inclusion of rural poor (IFC, 2023), and communities seemed to welcome increased access to mobile money tools. The study team also found that savings groups (*vonamy*) were more commonly used by producers to smooth cash flow or make small investments. Regardless of whether a savings group was present in the community, these groups were positively viewed. The introduction of mobile money, either linked to savings groups or stand-alone, was also of interest to communities.

Market System Resilience

Market systems resilience (MSR) is a lens that looks at the ability of markets to innovate, mitigate, and adapt; to solve problems in the face of shocks and stresses; and therefore, to better serve targeted households. The framing outlined below (Table 20 and Table 21) looks at both structural and behavioral issues within a market system to determine how well the system can adapt and support household resilience. MSR also recognizes that market systems are constantly evolving; and positive or negative interaction with aid actors can shape how the system responds, making it either increasingly resilient or more fragile. Better understanding and programming around these factors improve outcomes for market actors and the households that rely on those market systems.

Table 20: Beans Market System Resilience - Structural Domains

Structural Domains (how markets are organized)	
DIVERSITY *How much variety is there in products, sales channels, business models, etc.?* ● A large variety of beans are available in Madagascar; several improved varieties exist, but they are not yet widely available. ● There is limited diversity in sales channels: very few sellers in the market, as production is largely for own consumption. ● No variation in sales models was observed.	**RULE OF LAW** *Who sets and maintains the rules (informal and formal)? Are they consistent and fair?* ● A bill on cooperatives was recently passed by the lower house. The implementing decree is pending. This law stipulates that producers must form cooperatives to protect themselves, avoid speculation, and better meet demand. ● In Ampanihy district, a prefectural decree was issued in 2022 banning the sale of aid commodities. ● For imported varieties, customs barriers are considered to be insufficient for the import of vines or seed varieties.
CONNECTIVITY *Who's trading and talking with whom, why, and how is this changing over time? How and to what extent do market actors interact across geographies, ecologies, and social groups?* ● Market players in the area are compartmentalized, limited by few sales channels and poor road and storage infrastructure. ● There is a reasonable level of connectivity with other regions, as beans are often imported or brought in from other regions. This does not have a smoothing effect on prices, however.	**POWER** *Where and how is power concentrated and exercised?* ● Prices are dominated by collectors/wholesalers, especially during the harvest period. The big operators dominate the market because they have vehicles that can travel to collect produce even from the most remote areas. ● Most collectors are unlicensed, which encourages petty corruption and bribes, especially during transport.

Table 21: Beans Market System Resilience - Behavioral Domains

Behavioral Domains (what shapes the actions of market actors)	
COMPETITION *To what extent is there rivalry between market actors?* ● Very limited competition; collectors set prices because producers have limited information and few sales options. ● Competition is limited by the low number of sellers and low volume available on the market in the Grand South and Southeast.	**BUSINESS STRATEGY** *To what extent do business strategies proactively plan for risks? To what extent are they fair and do they generate customer value*? ● Wholesalers do some planning: they purchase food supplies at a lower cost and store it to ensure that it is available during the off-season. ● Producers do no forward planning to mitigate risks. ● There is no evidence of market actors creating additional value for customers through processing or other services.
COOPERATION *How are market actors collaborating to achieve a common purpose or function*? ● There are currently no cooperatives for bean producers. ● Aid agencies are supporting research centers and seed multiplication centers to improve the yield and resilience of bean crops. ● Retailers engage in price setting and profit margin setting. ● There is no collaboration among the various players to address shocks and stresses.	**DECISION-MAKING** *To what extent is evidence used to identify solutions?* ● Market actors are reactive to changes in the market and initially resist change rather than identifying opportunities. For example, they wait to see a clear advantage before risking any change. ● Market actors do not appear to use market or weather data to make decisions about future production or sales.

Conclusion: Summary of Barriers and Constraints for Market Actors and Households

A trifecta of linked issues creates the main barrier for households in the beans market system: a lack of reliable outlets for obtaining improved seed and other agro-inputs (including information), a lack of income to purchase improved bean varieties and farm chemicals, and a lack of storage facilities at the household or community level to properly store beans so they can be used or sold as desired. Together, these issues point to the importance of systemic approaches to improving household livelihoods and food security issues.

Table 22 summarizes the market barriers or constraints and the opportunities for households to overcome them.

Table 22: Beans Market Barriers and Household Opportunities

Market Barrier or Constraint	Opportunity/Gap for Households
Households do not perceive beans as climate resilient.	FAO has introduced several drought-resistant bean varieties. Producers could be made aware of these new varieties as part of training on good agricultural practices.
Producers do not have the information and capacity to negotiate for better prices at the time of sale.	Producers indicate that they would like to increase their skills in household budgeting and farm planning. To reinforce positive norms around decision-making, this skill-building should be done with husbands and wives together.
Financial inclusion is low, but savings groups have been well received.	There is an opportunity to build on the existing culture of savings and the successes of existing savings groups. While mobile phone ownership is not high, phones are often a shared asset in communities, and activities to increase phone ownership could catalyze other resilience outcomes.
Appropriate storage facilities do not exist at the household or community level, preventing households from safely storing beans until prices are favorable or they are needed for consumption.	Asset transfer activities or market-based programming should consider including storage alongside other livelihood support activities.
There are no producer cooperatives for beans.	Increasing participant knowledge on how to form producer cooperatives could increase access to credit and to storage, and improve the prices that producers receive through improved negotiation with wholesalers.
Input systems are weak, and producers feel they do not have enough money to “invest” in improved inputs and practices.	Using evidence on system approaches from other resilience programs, the project could layer graduation activities with activities implemented by other actors that will improve market systems, such as input systems, so that improvements made during program implementation can continue.
Direct aid to households is building dependency on the aid system for improved inputs, meaning improvements are likely to disappear at the end of the project.	Cash programming and market-based approaches will strengthen local systems so that there is less reliance on direct aid in the future.

Seasonal Calendar

The best time to grow beans is May to July, when rain is more abundant and regular. The bean production cycle is 70-90 days for the four main varieties discussed above (Ravoninjatovo, 2022), and white beans are generally planted earlier and (due to shorter production cycles) harvested in June. In the South-East, the bean crop can also be grown in the off-season on rice fields (before irrigated rice is planted) for harvests in November. The bean cropping calendars below (Figure 25 and Figure 26) rely on the climate outlook for the 2022-2023 warm and wet season of MINAE and the Ministry of Transport and Meteorology.

Figure 25: Beans Seasonal Calendar, Betroka and Amboasary Districts

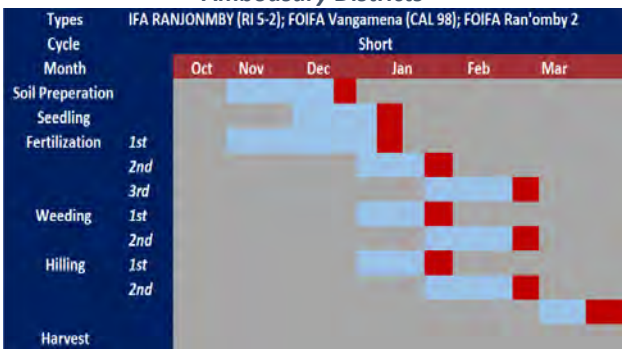


Figure 26: Beans Seasonal Calendar, Atsimo Andrefana; Tuléar, Morombe, Betioky, Ampanihy

Annex F: Groundnuts Market System Report

Market System Overview

Groundnuts are the leading oilseed crop grown in Madagascar. Production occupies around 5 percent of cultivated land, well behind rice (50 percent), manioc (25 percent) and maize (10 percent) (FAO 2022a). They have many uses including raw and roasted seeds (peanuts), butter, flour, sauces, confectionery, and oil. After oil is extracted, the residue is transformed into seedcake, which is used for animal feed. Demand for groundnuts is growing in local, national, and international markets. As a result, international prices for groundnuts have risen steadily over the last 20 years (Federal Reserve Economic Database [FRED] 2023). China is the world's largest importer of groundnuts and is currently the main exporter of groundnut production in the Grand South, often via Vietnam.

Madagascar's Grand South is well known for groundnut production; historically, it was the leading crop. Also, a groundnut oil mill operated in Tuléar until the 1980s, when it closed due to the country's difficult economic situation and the World Bank's structural adjustment program. But production volumes have steadily risen since 2009, and groundnuts remain an important part of the regional economy. Groundnut production nationally is currently estimated at 65,000 MT per year (PARM MINAE 2023).

Groundnuts are produced in 5 of the 12 districts of the study area: Ampanihy-Ouest district in Atsimo Andrefana; Ambovombe and Bekily districts in Androy; Amboasary-Atsimo district in Anosy region; and Befotaka district in Atsimo Atsinanana. Two varieties are generally grown in the Grand South: pink groundnuts (Fleur 11 variety) and red groundnuts (*Cannette* variety). The Fleur 11 variety is popular both for local consumption and for export, because of its taste and because it produces more oil; it is certified by MINAE's Seed Control Department and is distributed in the region by CTAS (the Technical Agroecological Center of the South, a Malagasy NGO) and FOFIFA (the National Center for Applied Research on Rural Development). It is well adapted to dry and semi-arid conditions. The red groundnut is blander and less drought resistant; seed for this variety comes from Antananarivo.

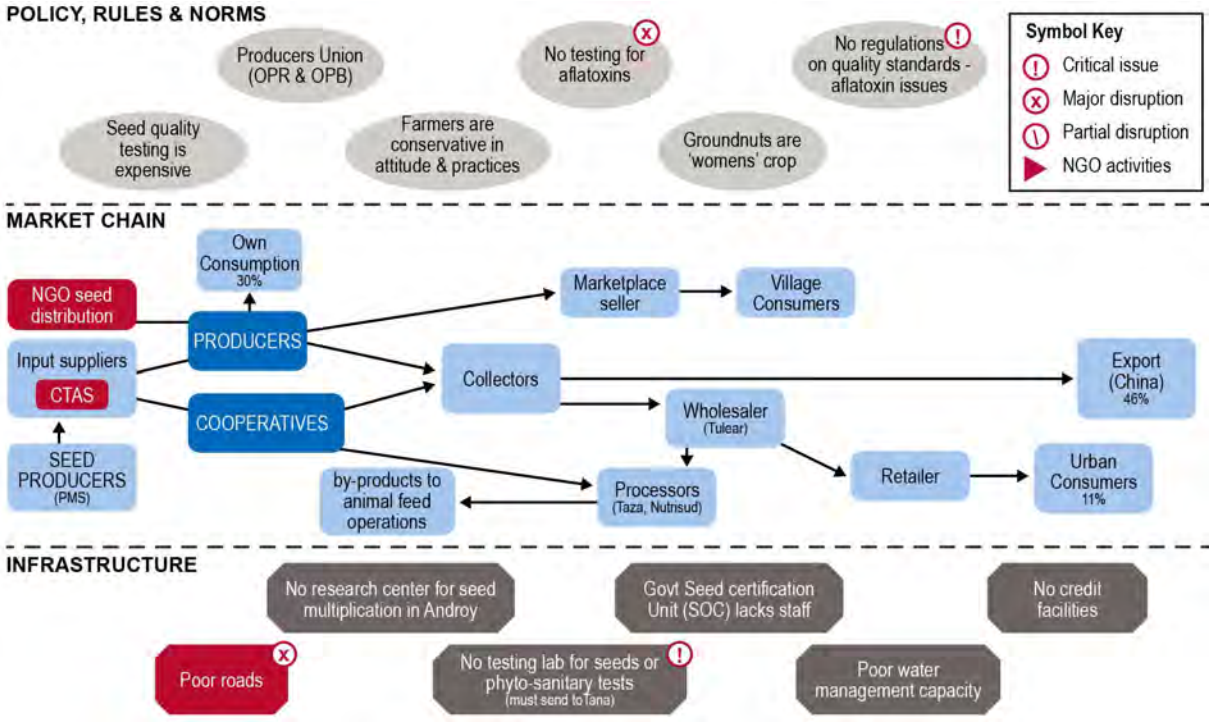
In addition to their versatility, groundnuts are more drought-resistant than other crops. This, combined with their status as both a food and cash crop, makes groundnuts a preferred crop from a resilience perspective. Most producers grow groundnuts on plots of 0.5 to 1.25 hectares, using traditional methods. The production cycle for groundnut varies from 100 to 120 days, depending on the variety grown. October to December is planting season, with peak volume in the local market in May and June. Yields are typically between 800 and 1,200 kg/ha, depending on the distribution of rainfall and the fertility of the soil. Producers generally apply only organic fertilizer (compost). Household production is divided into three uses: seed for the next crop, household consumption (15 percent), and the remainder for sale. The portion intended for sale can represent up to 95 percent of household groundnut production for poor households.

Groundnut exports from Madagascar have increased significantly since 2019 and have exceeded 30,000 MT. In 2021, groundnut production in Madagascar was estimated at 65,000 MT, with about half of production exported (PARM/MINAE 2023). However, in 2022, exporters confirmed the harvest was affected with poor yields and drops in production in the Grand South. The 2023 harvest has been more productive, and exports are expected to continue increasing.

The government of Madagascar, with the support of various donors (World Bank, IFAD, EU, FAO), is working hard to promote groundnuts as a climate-resilient value chain in the Grand South by organizing producers into associations or cooperatives, supplying agricultural inputs (quality seeds and small agricultural equipment), transferring improved groundnut production techniques through FFS, and linking associations/cooperatives with companies (major groundnut buyers) as part of a contract farming approach.

Historically, local groundnut prices have doubled every two years. In 2022, the average producer sold a kilogram for $0.44 (MGA 2,000) at harvest time and up to $0.89 (MGA 4,000) during the lean season. At the season's peak, the average profit margin for collectors and wholesalers is $0.22 USD/kg (MGA 1,000/kg), and $0.11 USD (MGA 500) for retailers in local markets of the study area.

Figure 27: Groundnuts Market System Map



Market System Map

The groundnuts market system map (Figure 27) above shows that local and international NGOs are the main providers of seeds in the groundnuts market system, and therefore are not yet part of a sustainable inputs system. Farmers largely sell their production to wholesale exporters but keep a small portion for home consumption or sale in local markets. Most production is sold to foreign wholesalers, who export the crop without additional processing. There are very few processors in the

groundnut sector, and the few that exist are mostly small-scale producers of peanut oil. One larger processor that uses groundnuts noted the company is forced to import groundnuts due to quality and volume constraints with domestic production. The lack of testing and management for aflatoxins presents a major barrier to growth of the market sector. Policies and norms that affect the market include power to set prices for collectors/wholesalers, lack of testing facilities for phyto-sanitary standards, and producers' poor production techniques. Infrastructure issues are consistent with those in other market systems: poor roads, poor water management, limited access to finance, and structural issues with seed provisions.

Market Actors

Producers

Producers consider groundnuts to be one of the most productive crops because they are drought resistant and less likely to be destroyed by insects. Within the study area, Betroka, is perceived to be the most productive district for groundnuts, despite the insecurity there. Typically, in the study area, a household might produce three to five 50-kg bags of groundnuts.

Producers typically leave the shells on the groundnuts, and in this form, they will keep for up to a year. They are peeled just before sale in local markets.

Input providers

The study team found that producers can buy groundnut seeds in the market or from vendors for about $0.44 (MGA 2,000) per cup. A bag of seeds costs approximately $6.67-8.89 (MGA 30,000-40,000). In Befotaka, the main groundnut-growing area, a cup of seeds is $0.18 (MGA 800). Aid agencies also collaborate with FOFIFA to support seed multiplication, which the Seed Control Department oversees. Produces then sell improved seeds to cooperatives at affordable prices: approximately $1.11 to $1.33 (MGA 5,000 to 6,000) per kilogram, as opposed to $1.77-2.22 (MGA 8,000-10,000) in markets at the start of the season.

Producers do not have access to chemical pesticides due to their cost (pesticides for 1 ha cost about $2.22 (MGA 10,000)) and report that they do not know how to use them, relying instead on traditional cultivation methods. The study team did not find any input dealers in the regional or district capitals who sold farm chemicals (pesticides, storage treatments). The lack of use of farm chemicals results in lower yields and significant post-harvest losses, up to 35 percent (SeedSystem 2023).

A 2023 Seed Security Assessment (SSA) has shown that about half of producers in the South get their groundnut seeds from local markets and traders and half is saved seed (SeedSystem 2023). Those households that get seeds from aid agencies (FAO and ADRA), often complain that seed distributions do not arrive prior to the onset of the first rains.

Several aid agencies (FAO, IFAD, GiZ, ADRA) and the Malagasy government support groundnut production through seed provision and training of producers (e.g., FFS). While this support may have been necessary during the recent drought, in the long run an aid agency- supported market system is not sustainable. Given the strong market system that exists for seed provision (SeedSystem 2023), support for a self-sustaining system must now focus on strengthening private sector actors to improve their outreach and the quality of seeds.

Collectors

Collectors bring groundnuts from the producer to a storage warehouse for sale to wholesalers. They generally work on an as-needed basis, collecting from producers when they obtain a contract, then traveling to the production locations. They also deliver groundnuts to Antsirabe and Antananarivo for processing into edible oil. During the collection season (May-June), almost 2 MT of groundnuts are collected per day. NGOs (CRS, GRET) buy groundnuts from wholesalers at more attractive prices: $1.11/kg (MGA 5,000 /kg), while the Chinese exporters buy at $0.67-0.89 (MGA 3,000-4,000) because they buy in large quantities (approximately 1,000 MT). Towards the end of harvest, Chinese exporters may increase their prices, while other collectors decrease; this has led to losses for households engaged in collection.

It is the collectors who set the purchase price, although cooperatives are beginning to change this norm. While there are some dishonest collectors who use rigged scales, cooperative members do not often encounter this problem. Cooperatives adjust their scales in front of the producers before the purchase, increasing transparency in the system overall.

There are two phases of transport: from the production area to Ampanihy, and then from Ampanihy to Tuléar. Because the roads are in such poor condition, collectors and wholesalers often take advantage of the transport of groundnuts (intended for Tuléar) to obtain other supplies. Once the groundnuts are sold, they purchase rice and stock up on groundnut oil. Some collectors grant credit to wholesalers, which they must repay in two weeks.

In Ambovombe, collectors visit villages at planting time to give seeds to producers. With their harvest, producers both repay the seeds they borrowed and sell part of the harvest to the collectors. Then the collectors send the groundnuts to Tuléar for onward sale. There are also collectors from Ambovombe and Tuléar who go directly to the farmgate to obtain peanuts, which they then sell to Chinese buyers.

In Betroka, most products are purchased by collectors and sold to Chinese buyers in Tuléar and Antananarivo; transport by truck costs $0.05-$0.09/kg (MGA 250-400/kg). Collectors from the surrounding communes often go to Amboasary on market day to sell groundnuts for $15.55-17.77 (MGA 70,000-80,000) per 50-kg bag. During periods of drought, the price rises to $40.00-66.67 (MGA 180,000-300,000) per 50-kg bag.

Collectors may use a truck or a taxi-brousse (a minivan) to transport goods, depending on the distance.

Cooperatives/Associations

Cooperative members represent around 30 percent of all groundnut producers in the Grand South and provide a foundation for increasing groundnut production, as they receive training and apply improved production techniques that respect the crop calendar. Groundnut cooperatives are formed at the village level with male, female, and young producers numbering more than 10 and no more than 30. These cooperatives are then grouped into unions at the commune level, and the unions are merged into federations at the regional level.

The *Organisation Paysanne Régionale* (OPR) is one of these: a regional farmers' organization composed of municipal-level producers' groups that come together to create a union at the commune level. The OPR is supported by the regional chamber of agriculture, IFAD, and GiZ to raise their awareness of prices and facilitate the group sale of their products. Previously, the OPRs

accepted collectors' prices, but now the OPR council, with the support of the chamber of commerce, negotiates with the collectors. Thus, all producers earn the same price.

The price is set annually in the partnership contract, at $0.89/kg (MGA 4,000/kg) for two groundnut harvesting seasons. In 2022, the purchase contract was for 800 MT and in 2023, for 1,200 MT; purchase contracts were reportedly honored by both parties (OPR and DAMERA), providing a good example of contract farming that could be used for other crops. WFP and CRS also buy from producers through contracts, especially in Ambovombe district.

Wholesalers

Wholesalers are key players in the groundnuts market. In general, they are looking for the best price for available quality. When the harvest is complete, buyers (retailers, processors, exporters) place orders with wholesalers. Prices vary from $44 to 88 (MGA 200,000 to 400,000) per 50-kg bag. Wholesalers then resell the 50-kg bags for $55-100 (MGA 250,000-450,000). The average volume sold in smaller, secondary markets is 20-50 kg per day, but this can go up to 100 kg on market days, when retailers from neighboring villages come to buy supplies. In primary markets such as Taolagnaro, wholesalers can sell five to six 50-kg bags a day, or around 100 bags per month. Most groundnuts come to Taolagnaro from Amboasary, Tsivory, Amanihy, Ambalantanosy, and Tuléar. Prices are lower in smaller markets such as Amboasary (MGA 160,000 to 170,000 per bag, depending on quality). In the Southeast, groundnuts may be completely sold out by January-February, despite being available in the Grand South.

Wholesalers may provide credit to retailers with whom they have a good relationship. To secure enough stock, wholesalers may also provide credit to collectors to finance their purchases from producers.

Like households, wholesalers sometimes do not have enough space for storing stocks and are forced to use their homes for storage. (Section 2.4.3 in the main report has information on private warehouse capacity in the study area.) Other risks to their business include poor roads (delaying and damaging goods), high fuel costs (increasing costs), and security risks related to transporting funds or the product to warehouses (racketeering, discretionary seizure of stock).

Export Wholesalers

Groundnuts are one of the most commercially oriented crops in the Grand South, and this is largely due to the presence of export wholesalers. Most export wholesalers in the Grand South are Chinese or Pakistani. They are perceived as offering higher prices, up to $1.12/kg (MGA 5,000/kg). Even when the prices are not higher, they offer a fair price and buy in bulk, which means producers feel they are better off overall and feel encouraged to invest more in their production.

Chinese buyers are based in Tuléar only during the May to June growing season, at which point they place orders with collectors and wholesalers. During the groundnut collection season, they offer competitive prices in order to obtain the maximum volume of each year's production. Collectors working directly with export wholesalers also buy groundnuts from producers on communal market days, or purchase directly from cooperatives, and deliver them to Tuléar. The produce is then shipped to China from Tuléar. In 2020-21 China imported 870,000 MT of shelled groundnuts, 215,000 MT in the shell, and 345,000 MT of oil from Madagascar (FAOSTAT 2021).

Other wholesalers perceive Chinese exporters as having significant power in the market because they are difficult to compete with. They are perceived by producers as "the only big buyers": they set the

price, and other collectors and wholesalers cannot compete with them in terms of volumes purchased. Chinese exporters are also seen as generally fair and honest players in the market; nevertheless, artisanal oil mills complain that export wholesalers buy up all the production at a very high price. These large-scale purchases leave very little volume on the local market, making it difficult for other market actors to obtain local groundnuts for their processing activities. This dynamic is an indication that if overall production was increased, producers would still have a good market for their product.

Processors

In this area, groundnuts are roasted and consumed directly, made into sweets for snacks (Koba Ravina pastries in particular), made into peanut butter, or pressed into peanut oil. Snack products are often produced at home and sold mainly by women and children in local markets; these are consumed by all segments of the population. Prices are affordable, and vendors can earn up to $1.11 (MGA 5,000) a day from this activity. Transformation of groundnuts into peanut butter is also popular, but peanut butter is generally sold locally because of poor roads connecting different regions of Madagascar.

Small peanut oil mills operate in Ambovombe, Ampataka, and Vangaindrano. The Vangaindrano cooperative often finds that their own production is not sufficient, and that they need to buy groundnuts from the retail market at a higher price. This then pushes up the production price of the oil produced, meaning retail prices are $1.78-2.67 (MGA 8,000-12,000). Because solidified bulk vegetable oil is sold at $1.60 (MGA 7,200), the competition is stiff. (See Annex G for more detail on the vegetable oil market.) After the pressing of groundnuts, the waste product that remains ("seedcake") is used in many countries as an ingredient in animal feed. There are no buyers of seedcake in the Grand South and Southeast, but seedcake is distributed to cooperative members for use as pig or chicken food. The groundnuts used to create 5 liters of oil produces approximately 10 kg of seedcake. Local processing companies also purchase a proportion of the groundnut harvest in the study area for semi-industrial processing. This includes enriched flours, oil, and paste for use in nutritional products. These processors add value to the groundnut value chain and create jobs. For example, Feedmax is currently launching a new, semi-industrial oil mill (PARM MINAE 2023). However, these operations also face risks related to low local production yields, including price volatility (reducing profits) and insufficient supply of nuts (competition from exporters) (PARM MINAE 2023). Insufficient testing infrastructure for aflatoxins and previously mentioned transport issues also add to production risks.

Nutrisud, a processing company in the Grand South of the country, produces fortified food for malnourished children (Plumpy'Nut). USAID is the main customer for the product, which it uses in nutrition, health, and education programs in the Grand South. Nutrisud requires 120 MT of groundnuts to produce eight million packets of the product each year. However, largely due to aflatoxin testing issues, it cannot obtain the quality of groundnut it needs in appropriate volumes and must import groundnuts from India via Antananarivo. The lack of procedures to manage and test for aflatoxins (storage and transport techniques, appropriate certifications) also prevents groundnut export to Europe. GiZ, EDFI, and USAID are reportedly collaborating on this. The challenge is to find a variety of groundnut that is heat-resistant, but still has high levels of Omega-3 and Omega-6. Nutrisud is currently doing research on both Fleur 11 and *cannette* varieties.

The Androy Zone Transaction Company (TAZA) also processes groundnuts into peanut butter and defatted flour. It has problems finding outlets for peanut butter because of the poor road conditions

and the testing requirements of foreign markets. The product is of high quality and is enjoyed by visitors to Ambovombe, but the price is out of the reach of most residents. On the other hand, defatted flour has buyers at the local level because it is used in enriched and fortified foods, including those used in hospitals in the Grand South.

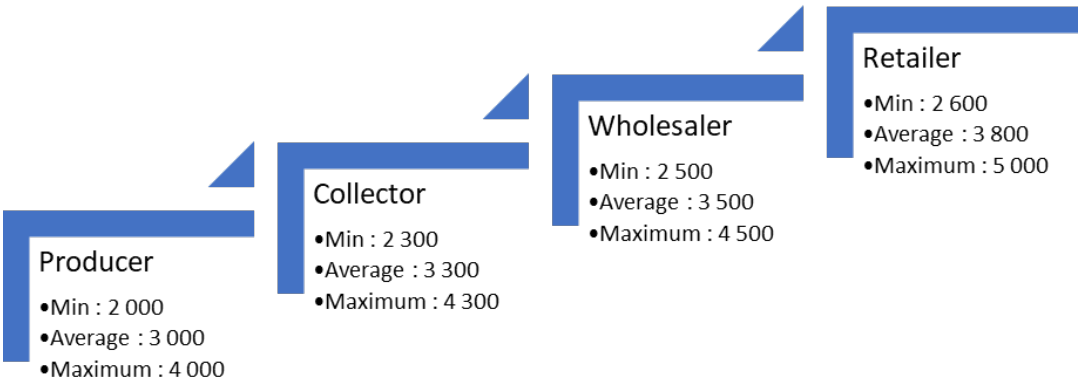
One of the flagship developments of the Malagasy government, the Fihariana project, is a peanut oil processing facility in Ihorombe (just north of the study area) with a production capacity of 2,600 MT of groundnut oil (4,000 MT of raw groundnuts), as well as technical support to help structure the sector.

Retailers

Many retailers also function as collectors or wholesalers, making it difficult to separate retail sales from wholesale sales. Figure 28 demonstrates the groundnuts price structure. A typical (secondary) market might have 20-30 retailers who sell about one bag of groundnuts per week. At the retail level, a kilogram of groundnuts costs $0.84 (MGA 3800) on average and up to $1.11 (MGA 5,000) per kilogram in September-February. At harvest, the price drops to $0.58 (MGA 2,600). The number of retailers in Tuléar (a primary market) is estimated at 100. Generally, each retailer sells one bag of shelled peanuts per day. Retailers (who are not wholesalers or collectors themselves) purchase from multiple wholesalers, but their choice is generally based on quality, availability, and price of the product. Only one groundnut variety is sold in the Vondrozo market, where groundnuts must be transported by bicycle, taking two days to transport.

Prices and volumes sold in the southeast tend to vary more than in other locations. People buy more during the clove campaign, when retailers may sell 40 cups per week at $0.27 (MGA 1,200) per cup, decreasing to 20 cups per week during the lean season (when prices go up) and cyclone season (when people have less money). By January-February, supplies may have completely run out.

Figure 28: Groundnuts Price Structure (MGA per kg)



Policies, Rules, and Norms

The Malagasy government has made groundnuts a clear priority, particularly through its collaboration with aid actors to improve access to seeds, organize farmers into collectives, and improve market linkages. Recently, the lower house passed a bill stipulating that producers must group together in

cooperatives for protection and to avoid speculative pricing but also to increase production and better meet groundnut demand. However, because of the effect that the presence of commercial buyers has on the market system, organization is not the biggest challenge that the groundnut market faces. A greater issue is the absence of government regulations on quality standards and availability of aflatoxin testing, which prevents the sale of groundnuts to many processors and potential international markets.

Aflatoxins are produced by a fungus that affects groundnuts and many other plants. When consumed, especially by children or animals, aflatoxins can lead to stunted growth, delayed development, and liver damage. Therefore, many countries have put a limit on permissible levels of aflatoxins for safety reasons (FAO 2002), and the inability to manage and provide proof that produce is free of aflatoxins is a barrier to business. There are no aflatoxin laboratories or phyto-sanitary testing facilities in the Grand South or Southeast, and processors described those available in the capital as too costly; processors would prefer to purchase locally.

In many areas groundnut cultivation is reserved for women, which may contribute to a lower prioritization for production. Men clear the land, and then women do the sowing. If men are not available, women can do both.

Producers' traditional agricultural practices may also affect production potential. Compounded with the limited access to inputs such as pesticides, these practices make groundnuts susceptible to lower yields due to pests and issues with quality.

The affordability of high-quality seeds is another barrier. Support from aid agencies is attempting to address access issues for poorer farmers, but sustainable, market-based structures for affordable inputs are limited (as discussed in the main DRMS report). This is a bottleneck for the market system as a whole.

Infrastructure Issues

As noted in other market system reports, infrastructure is a significant barrier for the groundnuts market system. At both the household and systems level, infrastructure undermines the profitability of the market chain and the resilience of the groundnuts market system overall, which then has implications for household food security in the targeted areas. The lack of infrastructure is a major challenge preventing market participants from taking advantage of local, national, and international demand opportunities that could strengthen the livelihoods of agricultural households that are vulnerable to climate change.

The poor state of the roads linking the major towns and growing areas with communal and urban markets is a constraint that increases the cost of transporting goods and reduces the number of independent collectors who buy from producers. The Fihariana project is reportedly improving main roads in the study area at a cost of $1.57 million, but feeder roads to the most rural areas will still need improvements. The study team also received multiple anecdotal reports of racketeering in the transport sector, leading to inflated transport costs, but the study team did not explore this issue deeply.

One of the most significant barriers for this market system is the lack of testing facilities for aflatoxins in the Grand South. This means that tests must be sent to the capital, Antananarivo, and this is cost prohibitive for many processors. Processors work around the issue by importing groundnuts that

have the necessary phyto-sanitary certifications, leading to a loss of opportunity for local producers and for the growth of the sector generally.

Continued research on seeds that are resilient to climate change and development of market-based systems for distributing these seeds are still needed. Aid agencies and local research agencies are supporting this process, but the lack of input providers in rural areas limits producers' access to improved production methods.

Access to finance also plays a role in improved production capacity. Low levels of financial inclusion and poor access to credit are issues across the Grand South and Southeast, due to low literacy and financial literacy rates; norms around borrowing; high banking fees; lack of physical access to banks; and infrastructure constraints such as connectivity. The government's Fihariana project provides technical and financial support to individuals wishing to start or improve their business, and credit is available at several levels of financing: $44.44 to $44,444.44 (MGA 200,000 to 200 million) (Fihariana 2019). Organizations such as CECAM have introduced agricultural credit products, but producers still approach these with some suspicion due to previous experiences where local police enforced loan repayments. For agricultural investments specifically, microfinance institutions offer loans targeting producers, including a medium-term investment loan with an interest rate of 2.25 to 3 percent per month. Because of the presence of commercially focused export wholesalers, there is likely to be greater interest from potential lenders, but a lack of collateral or credit history on the part of the producers will still complicate access to credit.

Mobile money is seen by many in the sector as the best option for financial inclusion of rural poor (IFC 2023), and the study team observed that communities seemed to welcome increased access to mobile money tools. The study team also found that producers more commonly used savings groups (*vonamy*) to smooth cash flow or make small investments. Regardless of whether a savings group was present in the community, these groups were positively viewed. The introduction of mobile money, either linked to savings groups or standalone, was also of interest to communities, and could be paired with other agri-tech initiatives to strengthen the market system overall.

Market System Resilience

Table 23: Groundnuts Market System Resilience - Structural Domains

Structural Domains (how markets are organized)	
DIVERSITY *How much variety is there in products, sales channels, business models, etc.?* ● There are several sales channels (local, national, and international markets), but due to low volumes these market channels are not robust. ● Diversity of products is good: roasted whole, enriched flour, paste, seedcake, oil; but development of these products is limited by quality issues.	**RULE OF LAW** *Who sets and maintains the rules (informal and formal)? Are they consistent and fair?* ● Quality standards (on aflatoxins) set the expectations from processors. ● The Ministry of Agriculture and Livestock sets the rules for buying/selling and has a good relationship with wholesalers, leading to acceptable management. ● There are concerns about disreputable business practices in the transport sector.
CONNECTIVITY *Who's trading and talking with whom, why, and how is this changing over time? How and to what extent*	**POWER** *Where and how is power concentrated and exercised?* ● Negotiation power on price sits with the wholesalers,

Structural Domains (how markets are organized)	
do market actors interact across geographies, ecologies, and social groups? ● Cooperatives (reinforced by NGOs) have created good connectivity between producers and wholesalers/collectors. ● Wholesalers/collectors have good connectivity, buying and selling in a variety of locations.	but Chinese exporters are seen as fair, and this drives other market behavior in largely positive ways. ● Groundnuts are a women's crop in all districts of the study area.

Table 24: Groundnuts Market System Resilience - Behavioral Domains

Behavioral Domains (what shapes the actions of market actors)	
COMPETITION *To what extent is there rivalry between market actors?* ● Competition is driven by large purchase volumes of export wholesalers. Local wholesalers must pay more per kilogram because they are unable to buy at the same volume. This leads to a healthy competitive environment. ● Quality issues mean that local producers are not competitive against imports (which have phyto-sanitary certifications).	**BUSINESS STRATEGY** *To what extent do business strategies proactively plan for risks? To what extent are they fair and generate customer value?* ● Some business strategies are injected into the system at wholesalers' request, but planning by producers is limited. ● Processors proactively plan according to risks, but this means importing the volume/quality of groundnuts needed (reducing local income opportunities).
COOPERATION *How are market actors collaborating to achieve a common purpose or function?* ● Cooperative membership supports producers in negotiating prices with collectors and wholesalers. ● No cooperation between wholesalers and other market actors was found (for example, to address phyto-sanitary issues in the system).	**DECISION-MAKING** *To what extent is evidence used to identify solutions?* ● Cooperatives make decisions on what is sold (quantity and price) and to whom according to contracts. ● Export wholesalers fix prices according to demand on the international market; other market actors respond to demand accordingly. ● There is limited evidence of climate change impacts being considered in production decisions.

The tables above (Table 23 and Table 24) show that the groundnuts market system is relatively resilient – connectivity and competition are good, and the market system shows a more proactive stance than other market systems in the area. The groundnuts market system is more resilient to shocks and stresses because of the nature of the crop and because its commercial orientation means that it is getting clear market signals. This situation makes it possible to take advantage of groundnut demand opportunities at local, national, and international levels. The support that aid agencies provide is currently constructive; however, market-based approaches are critical if results are to be sustainable in the long run. More focus must be placed on strengthening private sector actors to address existing challenges in the market system (aflatoxins, transport) and become long-term players in a self-sustaining system.

Conclusion: Summary of Barriers and Constraints for Market Actors and Households

The main constraints in the groundnuts market system are infrastructure (testing facilities, roads), access to finance for producers, access to improved seeds, and the low capacity of producers. Nevertheless, the groundnut sector has good commercial viability, and therefore activities to strengthen this sector are a strong candidate for livelihoods programming. This includes activities implemented under graduation models, particularly if layered with additional programming focused on strengthening market systems. Table 25 summarizes the market barriers or constraints and the opportunities for households to overcome them:

Table 25: Groundnuts Market Barriers and Household Opportunities

Market Barrier or Constraint	Opportunity/Gap for Households
Lack of laboratories and phyto-sanitary testing limits sales channels for producers and cooperatives.	Using evidence on system approaches from other resilience programs, the project could layer graduation modalities with activities implemented by other actors that will improve market systems, such as improved input systems and improved access to laboratory testing.
Financial inclusion is low, but savings groups have been well received.	There is an opportunity to build on the existing culture of savings and the successes of existing savings groups. While mobile phone ownership is not high, phones are often a shared asset in communities (see 2.4.7 Financial Services for more detail), and activities to increase phone ownership could catalyze other resilience outcomes.
Rural feeder roads are in very poor condition, reducing connectivity between farmers and potential future buyers.	Linking livelihoods and graduation programming to rural infrastructure projects implemented by other actors could ensure that producers benefit financially from improved production practices.
Input systems are weak, and producers feel they do not have enough money to “invest” in improved inputs and practices.	Using evidence on system approaches from other resilience programs, the project could layer graduation activities with activities implemented by other actors that will improve market systems, such as input systems, so that improvements made during program implementation can continue.
Direct aid to households is building dependency on the aid system for improved inputs, meaning improvements are likely to disappear at the end of the project.	Cash programming and market-based approaches will strengthen local systems so that there is less reliance on direct aid in the future.

Seasonal calendar

The seasonal calendars below (Figure 29, Figure 30, and Figure 31) reflect the production cycle of groundnuts. Most producers grow groundnuts on plots of 0.5 to 1.25 hectares, using traditional methods. The production cycle for groundnut varies from 100 to 120 days, depending on the variety

grown. October to December is planting season, with peak volume in the local market in May and June.

Figure 29: Groundnuts Seasonal Calendar, Fleur 11 Variety

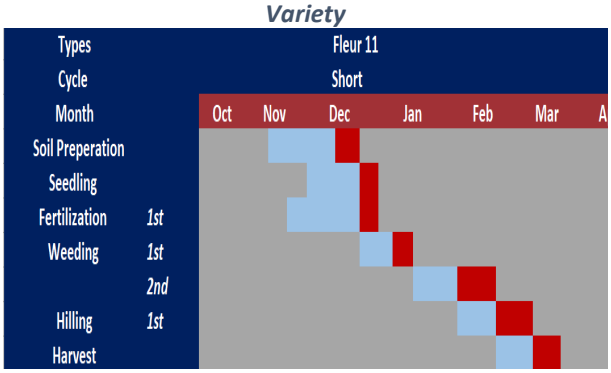


Figure 30: Groundnuts Seasonal Calendar, Valencia 247 Variety

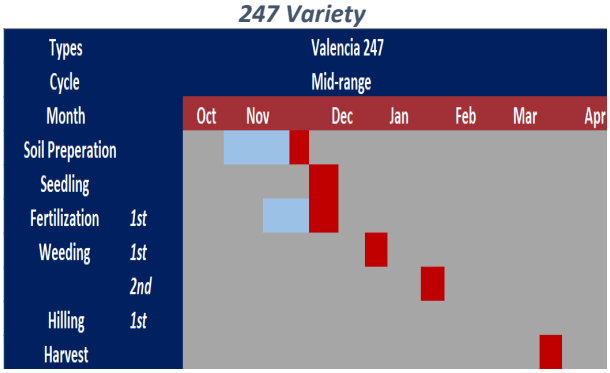
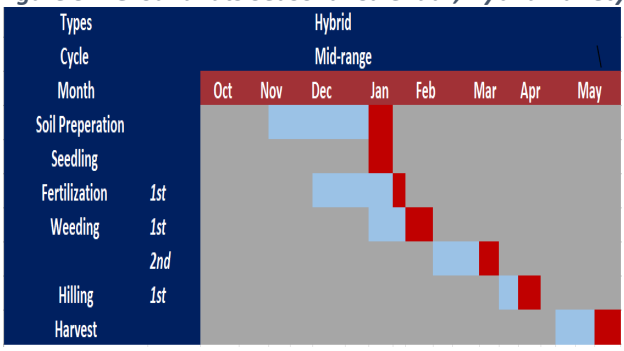


Figure 31: Groundnuts Seasonal Calendar, Hybrid Variety



Annex G: Vegetable Oil Market System Report

Market System Overview

Vegetable oil production is a major economic sector in many countries, as it stimulates agricultural production and contributes to the national economy by creating additional jobs in processing and distribution and promoting the development of agricultural regions. However, oil crops are not grown in the Grand South or Southeast, except for groundnuts, which have yet to be processed on an industrial scale. The vegetable oils on the market are refined and packaged at a factory based in Tamatave, or they are imported directly. Therefore, this market system assessment is largely an analysis of distribution networks and pricing dynamics, in contrast to the other market system assessments under the Desk Review and Market Study (DRMS).

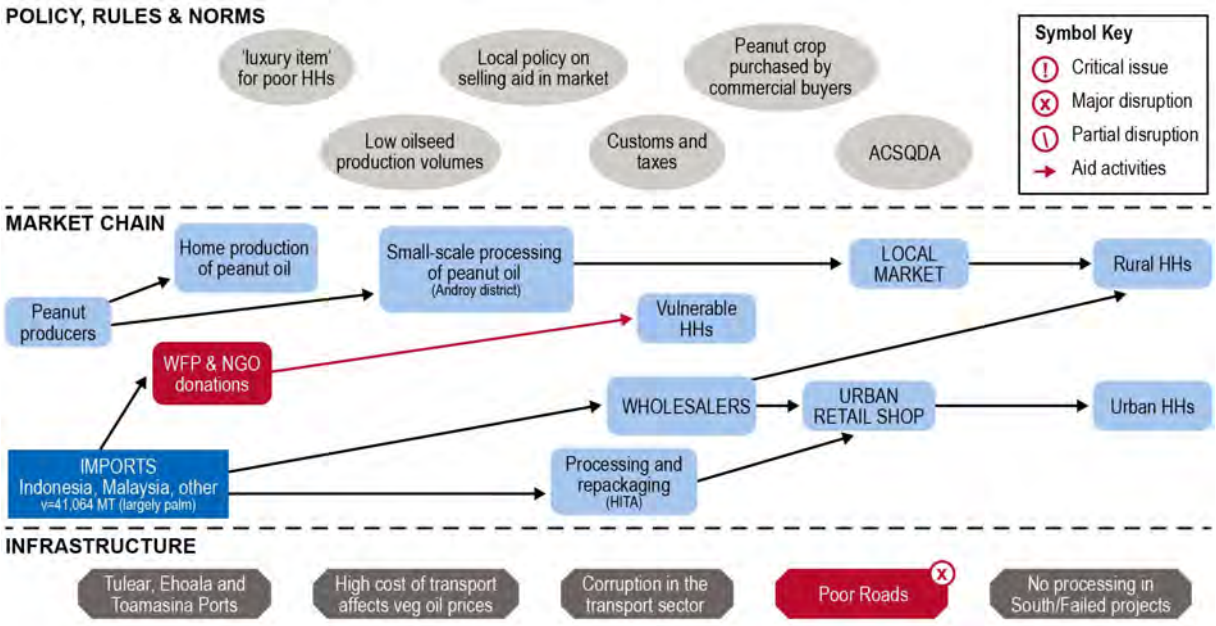
There are a range of vegetable oils on the market: different brands and with varying nutritional qualities. They are sold either in bulk or in small, sealed bottles. Households do not report having specific brand preferences for vegetable oil but do prefer unrefined oils, as they are cheaper and tastier. Households are price sensitive, and vegetable oil is considered a luxury good for the poorest households. Consumers expressed concern that food quality controls are not carried out rigorously, and fear that product quality is low as a result. With so many brands on the market, most consumers choose to buy the cheapest option, but some are selective for health or other personal reasons. The Malagasy government, through the Ministry of Public Health (MSANP) and the Ministry of Trade and Industry (MICI, *Ministère de l'Industrialisation, du Commerce et de la Consommation*), regulates the vegetable oil market and is responsible for guaranteeing consumer protection.

Vegetable oil is one of the most widely consumed household goods. It is commonly used in cooking, as it provides a source of vitamins, trace elements, and flavor enhancers. Consumption varies according to individual needs, but demand for vegetable oil is increasing. An average-sized household in the Grand South or Southeast consumes an estimated 3-5 liters of vegetable oil per month. Vulnerable households purchase vegetable oil at the market in small containers or receive larger quantities (4 liters) via humanitarian distributions (WFP, CRS, ADRA, CIP). The government also assists vulnerable households, particularly during emergency or shock periods. During these distribution periods, the market system can be disrupted, as insufficient local consumption poses a threat to retailers, distributors, and importers. To preserve market stability and ensure sustainability of vegetable oil supply for all households, aid agencies do not purchase vegetable oil from local markets.

Price instability for vegetable oil is one of the main challenges that impacts market actors. Due to food inflation in international markets, the price of vegetable oil can rise quickly—in the span of a few weeks or even a few days. As a result of increasing fuel prices and deteriorating roads, the cost of

transporting goods has also increased. However, market actors are learning to adapt to frequent price changes, to avoid selling at a loss. Retailers aim to build customer loyalty by encouraging customers to purchase other products from them regularly, balancing lower margins on some products with higher margins on others. Shocks, such as cyclones, also cause vegetable oil prices to increase; for example, from $1.44 (MGA 6,500) per liter to $1.78 (MGA 8,000) per liter, as supplies can be limited during recovery periods.

Figure 32: Vegetable Oil Market Map



Market System Map

As the map above (Figure 32) shows, vegetable oil is largely imported, purchased by humanitarian agencies, wholesalers, or *Huilerie Industrielle de Tamatave* (HITA), a factory based in Tamatave that imports crude oil for refining, packaging, and marketing. HITA is currently the primary oil processor operating in the country. Vegetable oil is transported from the port of Tuléar to districts in the Grand South via the Route Nationale 10 (RN10). Poor roads and the high cost of fuel contribute to the increasing costs of transport (and therefore the final product). The most notable elements of the market system are that there is little to no local production, and aid agencies play a significant role in market dynamics.

Previously, small processing units, such as an oil and soap factory in Isoanala, operated in the Grand South and Southeast, but operations have ceased due to a lack of raw materials. Vegetable oil use is highest during the harvest season, but infrequent during leaner periods. In some cases, groundnuts are used as oil by local consumers. The WFP and other humanitarian agencies distribute sealed 4-liter bottles of vegetable oil every two weeks to poor households.

Market Actors

The vegetable oil market is an import and distribution market, rather than a production market (where the raw materials are produced in country). The vegetable oil market system is comprised of

the following actors: importers, processors (refiners and re-packagers), transporters, wholesalers, retailers, and consumers. While not market actors, aid agencies, given the volume of vegetable oil they purchase and distribute, can also disrupt markets.

Importers

In Madagascar, there are an estimated 44 vegetable oil importers, working with 19 suppliers (Volza 2023). Unrefined vegetable oils are imported in 200-liter barrels or 20-liter cans from several countries, including India and Egypt. These barrels are imported through the port of Tuléar or the port of Ehoala in Taolagnaro. Crude oil enters the market through Toamasina port, bound for HITA. HITA imports crude sunflower, palm, and soya oil from countries such as Brazil, Argentina, and Malaysia, and refines and packages it for sale. WFP also directly imports and distributes vegetable oil in the study area.

Importers carefully monitor product orders to keep pace with rising prices and have procedures in place to guarantee goods to processors on time and without error. Prices are impacted by production yields and weather conditions in the countries of origin, the cost of sea freight, and occasionally geopolitical factors. These issues can lead to increased prices over relatively short periods of time.

Processors

Local oilseed processing capacity is limited in the Grand South and Southeast. Besides HITA, researchers identified several small, local processing plants in the Grand South that have closed due to the lack of input and infrastructure. In Androy, both an artisanal oil mill and a factory producing both oil and soap closed due to a lack of raw materials (groundnuts). Market connections are also an issue for processors. Poor roads and insecurity around factories can discourage collectors from traveling to factories to collect goods. As part of the One District One Factory (ODOF) project, the Ministry of Industry is planning to restructure the groundnut sector and again hopes to set up local plants to process groundnuts into oil. However, there are challenges linked to aflatoxin levels in cultivated groundnuts that pose problems for processing.

Transporters

Transporters include both truck drivers and "taxi-brousses" (minivans used for public transport). These actors act as intermediaries between suppliers and wholesalers and are responsible for handling products from the moment they leave the factory to the point of sale. Transport costs vary, and some transporters set the price of transport to ensure they do not incur a loss. Transport of Rajah oil from Tamatave to local markets in the Atsimo Atsinanana region costs $0.05-0.06 per 20 kg (MGA 210-250 per 20 kg). (Most large trucks have 10-20 MT in capacity.) In Tuléar, wholesalers may pay transporters a commission to transport a combined set of goods to their destination. As an example, the cost of transporting vegetable oil and other goods from Tuléar to Betroka is $0.04-0.06 per kg (MGA 180-250 per kg). The cost of transport is then incorporated into the wholesale and retail prices for vegetable oil, which contributes to price fluctuations for this good. The deterioration of the roads makes it challenging and expensive to transport goods by truck, as there is a greater risk that products will become damaged before they reach their destination and will need to be discarded or sold at a loss. During cyclone periods, road conditions worsen, making land transport even more challenging. In the Atsimo Atsinanana region, the Vangaindrano district has become inaccessible for transporters during cyclone periods due to poor roads, so wholesalers must pay for costly trans-shipments to transport goods into this region. For example, oil from Tamatave is transported by truck

from Tamatave to Mahanoro, then from Mahanoro to Mananjary by boat and from Mananjary to Vangaindrano by truck. Although wholesalers must pay more, it is the most reliable route for wholesalers to guarantee the safety of their goods.

Wholesalers

Wholesalers are responsible for distribution and resale of vegetable oil. There are an estimated 10 wholesalers per district. They work with transporters to get products to their respective districts or communes, and with dockworkers to get cartons and cans of oil to their points of sale. In Androy, wholesalers source vegetable oil from Taolagnaro, Ambovombe, and Antananarivo. There are typically three to five wholesalers working for every 100 retailers in markets in this region. Wholesalers in Atsimo Atsinanana purchase their products from Antananarivo or Tamatave, and these products are transported by truck or boat to districts. In the Vondrozo district, wholesalers purchase Rajah oil, Hina soybean oil, and Tropical palm oil from Farafangana and transport these products themselves by truck to market.

Wholesalers sell to retailers and households. Retailers purchasing larger quantities of oil receive discounted rates. During periods of shocks or shortages, wholesalers may show favoritism among customers or choose to sell only to loyal customers. Product availability, transportation costs, and demand all factor into vegetable oil prices. The price of a 20-liter can of vegetable oil from a wholesaler is $27.33-28.88 (MGA 123,000-130,000), depending on region and type of oil. In the Atsimo Atsinanana region, for example, wholesalers sell Rajah oil at $1.60/liter (MGA 7,200/liter), Hina oil at $2.00-2.22/liter (MGA 9,000-10,000/liter) for canned oil or $1.33/500 ml (MGA 6000/500 ml) for sealed oil and Tropical oil for $0.78/250 ml (MGA 3,500 MGA/250 ml). Prices can reach up to $40.00 (MGA 180,000) per can when road deterioration complicates transport.

Retailers

Retailers sell vegetable oils in district or communal markets. At the retail level, oil is generally sold in smaller containers, or even by the cup. Retailers handle direct sales to consumers, including households, and to merchants such as donut vendors. Retailers are often grocers or street vendors who purchase their supplies from a wholesaler and resell them in smaller quantities. The price of vegetable oil for retailers varies based on the wholesale price (which is affected by transport costs). Goods transported by land are more expensive than goods transported by sea.

Retailers develop a good relationship with a few wholesalers from whom they typically purchase, and often they can make purchases on credit with these wholesalers. Many small retailers are women. During the coffee and clove harvest season and during festival periods, vegetable oil sales increase, and retailers may take out loans from microfinance organizations (such as Microcred) to purchase additional goods to meet the increased demand. During shocks and during the rainy season, fewer customers purchase vegetable oil and the price of oil increases (due to transport issues), so retailers purchase less bulk oil from wholesalers. Retailers may sell vegetable oil by the cup (~$0.20; MGA 900), in 1-liter bottles ($1.55-2.89; MGA 7,000-13,000), or in 4-liter cans (~$31.11 USD; MGA 140,000), depending on availability and what consumers can afford.

In Anosy, retailers purchase vegetable oil from wholesalers in Taolagnaro, but reported that prices are unstable, as wholesalers set prices based on transport costs. Retailers generally visit about four markets in neighboring communes and may choose to travel to these markets by bicycle to avoid additional transport costs. A small retailer traveling between communes on a local market day can sell two 20-liter cans a week. In November or May, during the harvest period in the Grand South,

prices rise because there are more customers, but as soon as the drought starts in September, fewer customers purchase oil, and retailers must lower prices. In the Southeast, oil sales increase during the coffee harvest (July to September) because consumers have the most money during this period. To get through drought periods, retailers must reduce the quantity of products they sell, and shift to selling products that customers need to purchase year-round, such as soap.

Consumers

Consumers, including both rural and urban households, purchase vegetable oil for use in cooking and frying. Consumers do not select vegetable oils based on brand, but rather based on price and habits. In general, vegetable oil is considered a luxury good for poor households, so sales are highest among wealthier or foreign households. Aid distributions of vegetable oil come in 4-liter packaging, and are distributed about every two weeks.

There are several types of vegetable oil available at district and communal markets. Of these, unrefined oils are cheaper and more popular among producers, who consider them more flavorful. Congealed/solid oil is also preferred, as the price is low, and the oil can last longer than other types. Refined oils (sold in sealed containers) are regarded as bland and are therefore less popular. Vegetable oils are known by their brand names: soya oil is produced by Hina (a local company), refined congealed oil by Rajah, refined palm oil by Tropical, and sunflower oil by Lafatra. A detailed breakdown of vegetable oil varieties is provided in the table below (Table 26):

Table 26: Price Comparison of Vegetable Oil Varieties

Variety	Price
Refined congealed/solid oil, mix of peanut and palm oil (Rafah brand)	$1.60/liter (MGA 7,200 /liter); $28.22/can (MGA 127,000/can)
Refined palm oil (Tropical brand)	$3.11/liter (MGA 14,000/liter)
Soybean oil (Hina brand)	$2.00-2.89 /liter (MGA 9,000-13,000 /liter)
Sunflower oil (Sunny, Lafatra brands)	$2.67-2.89/liter (MGA 12,000-13,000 /liter)
Peanut oil	$1.78/liter (MGA 8,000/liter)
Vegetable oil (Elvia, Diana, Hayta, Diagram brands)	*Price data for specific brands are unavailable*

Policies, Rules, and Norms

Vegetable oil is taxed under a VAT tax. The *Agence de Contrôle de la Sécurité Sanitaire et de la Qualité des Denrées Alimentaires* (ACSQDA) attached to the Ministry of Public Health is responsible for certifying industrial vegetable oils placed on the market as safe for consumption. Wholesalers must declare their stock to local authorities from MICI to prevent price dumping and speculation.

Recently, in Ampanihy district there was a local decree forbidding the sale of humanitarian aid in local markets. Traders and local government officials indicated that vegetable oil is the type of aid most expected to be affected by this decree, as it is considered a luxury good by the poorest households and is therefore most likely to be sold to obtain cash for other household expenses.

Infrastructure Issues

Poor road conditions and insecurity are significant challenges in the vegetable oil market system. Transportation costs for vegetable oil are impacted by seasonal weather changes, which degrade the quality of the RN10 and other inter-district roads in the Southeast during the rainy season and especially during the cyclone season. The deterioration of roads delays delivery of goods and causes localized inflation. Local conflict and insecurity, particularly in the Androy region, limits the potential for private sector investment in this market. Poor road quality and regional insecurity can discourage collectors from traveling to factories, as they are often in isolated areas, which makes it challenging to sustain local processing facilities.

Limited access to credit is an issue across the Grand South and Southeast, due to low literacy and financial literacy rates, high banking fees, lack of physical access to banks, and infrastructure constraints such as connectivity. Organizations such as *Crédit Agricole Mutuel de Madagascar* (CECAM) have introduced agricultural credit products, but producers still approach these with some suspicion due to previous bad experiences. From the lender's perspective, lack of collateral or credit history also complicates access to credit, which could be used to pay for inputs or prepare in advance for shocks. Market actors, particularly wholesalers, need a substantial amount of working capital, and they rely on credit to manage price fluctuations and replenish stocks. In Anosy, there is a microfinance institution that provides credit to retailers, although there are strict procedures for obtaining this credit, and interest rates are perceived as high. Wholesalers must therefore earn back their money quickly to avoid incurring a loss.

The study team found that producers more commonly used savings groups (*vonamy)* to smooth cash flow or make small investments. Regardless of whether a savings group was present in the community, these groups were viewed positively. The introduction of mobile money, such as mVola, either linked to savings groups or standalone, was also of interest to communities.

Market System Resilience

Market systems resilience (MSR) is a lens that looks at the ability of markets to innovate, mitigate, and adapt, to solve problems in the face of shocks and stresses, and therefore better serve targeted households. The framing outlined below (Table 27 and Table 28) looks at both structural and behavioral issues within a market system to determine how well the system can adapt and support household resilience. MSR also recognizes that market systems are constantly evolving; and positive or negative interaction with aid agencies can shape how the system responds, making it either increasingly resilient or more fragile. Better understanding and programming around these factors improve outcomes for market actors and the households that rely on those market systems.

Table 27: Vegetable Oil Market System Resilience - Structural Domains

Structural Domains (how markets are organized)	
DIVERSITY *What is the diversity of products, sales channels, business models, etc.?* ● There are several types of products, but consumers do not have strong preferences between oil products or brands.	**RULE OF LAW** *Who sets and maintains the rules (informal and formal)? Are they consistent and fair?* ● MICI monitors the vegetable oil trade, and ACSQDA monitors product quality.

Structural Domains (how markets are organized)	
● Sales channels are consistent, with three main supply patterns coming into the country and through the target regions.	
CONNECTIVITY *Who's trading and talking with whom, why, and how is this changing over time? How and to what extent do market actors interact across geographies, ecologies, and social groups?* ● Most vegetable oil enters the market through Tuléar and Tamatave. Key roads such as RN10 connect these ports to regional markets, but in some areas, boats are more reliable than roads. ● Transporters and wholesalers connect international importers to local markets; these links are fairly stable.	**POWER** *Where and how is power concentrated and exercised?* ● Wholesalers may exhibit favoritism and sell only to loyal retailers or consumers during periods of shortage. ● Wholesalers with good access to credit are often more powerful in the system because of their ability to extend credit to retailers. That said, retailers and wholesalers appear to have good, trusting relationships.

Table 28: Vegetable Oil Market System Resilience - Behavioral Domains

Behavioral Domains (what shapes the actions of market actors)	
COMPETITION *To what extent is there rivalry between market actors?* ● Retailers select suppliers based on proximity and relationship. ● Competition appears to be at an appropriate level and largely positive in nature.	**BUSINESS STRATEGY** *To what extent do business strategies proactively plan for risks? To what extent are they fair and generate customer value*? ● Wholesalers and retailers are proactive in limiting their risk due to price increases and reduced demand. ● There is some evidence that retailers seek to build customer loyalty and encourage customers to buy multiple products from them.
COOPERATION *How are market actors collaborating to achieve a common purpose or function*? ● There is no evidence of market actors collaborating to achieve a common purpose or benefit for the market.	**DECISION-MAKING** *To what extent is evidence used to identify solutions?* ● Vegetable oil use/sale is highest during the harvest season for cash crops (cloves, coffee), as households have the highest income during this period. Retailers may take out loans from microfinance organizations (such as Microcred) during this period to purchase additional goods to meet demand.

Overall, the vegetable oil market shows a medium level of resilience—it is subject to international price fluctuations and local transport-related price fluctuations, but wholesalers and retailers appear to have strategies in place to manage these issues. Humanitarian aid is probably putting downward

pressure on local oil prices, but as oil is not locally produced and is considered a luxury item for the poor, this is not of great concern.

Conclusion: Summary of obstacles and constraints for market actors and households

Table 29 summarizes the market barriers or constraints and the opportunities for households to overcome them.

Table 29: Vegetable Market Barriers and Household Opportunities

Market Barrier or Constraint	Opportunity/Gap for Households
Vegetable oil prices are prone to inflation due to production issues (in country of origin), sea freight costs, and local transportation challenges.	Investments in local production of oilseeds and processing facilities could decrease long-term reliance on imports and create additional production jobs for households.
	Increased access to warehousing and credit could help stabilize local prices by smoothing supply/access issues in the rainy season and after destructive storms.
Food distribution by aid agencies decreases household purchases, reduces profit for market actors, and is not always aligned with household needs.	Cash programming could increase the efficiency of aid and prevent the distribution of 'unwanted' aid. Cash also creates a 'multiplier effect' in local markets (cash spent in shops contributes to local economic growth).
Local oilseed production and processing capacity is limited in the South.	Using evidence on system approaches from other resilience programs, the project could explore oilseed production as a livelihood option and link to MICI's planned ODOF activities by the Ministry of Industry.
Poor roads and insecurity inhibit market connectivity and limit the potential for private sector investments, such as local processing facilities.	Asset transfer activities or market-based programming should consider layering with infrastructure investments implemented by other actors.

Annex H: Poultry Market System Report

Market System Overview

In 2019, the official per-capita consumption of chicken meat in Madagascar was estimated at around 3 kg, a small portion of which comes from commercial production (Kansas State University 2023). Although beef and seafood, mostly fish, are the most consumed categories of meat per capita, poultry is in third place, ahead of pork and small ruminants (sheep and goats). In 2021, poultry meat production was estimated at 52,860 MT (FAOSTAT 2021). Poor households consume only small numbers of eggs, as producers prioritize hatching. Egg consumption appears to be on a downward trend in Madagascar, and consumption levels are lower than in other countries in Southern Africa (Kansas State University 2023, HelgiLibrary 2021). National per capita consumption levels for eggs are 11.5 eggs per year (HelgiLibrary 2021). The price of chicken has risen considerably over the last three years, although prices vary according to the season and circumstances.

In the study areas, poultry farming is considered a risky business for producers, as local varieties are comparatively slow growing and vulnerable to various diseases, resulting in a loss of profit margin. The main challenge facing the chicken sector is the high mortality rates among flocks due to a common chicken disease, namely *barika* (Newcastle disease), and *poultry influenza*. Vaccination coverage is very low. Most households have just a few local breed chickens. Households report that harsh climatic conditions weaken chickens in certain regions, making them more prone to the disease, but lack of appropriate animal husbandry also plays a major factor. This perception means that households feel they must sell their chickens relatively quickly. Producers do not use improved methods of rearing, such as providing feed, building coops, and vaccinating. These are regarded as unnecessary and expensive (rather than as an investment in improved production.) This approach to rearing increases the risk for disease, prevents the chickens from growing larger, and lowers the production of eggs.

The Food and Agriculture Organization (FAO) is supporting the poultry market system, hoping to increase local production through the distribution of improved breeds of chicken. The breeds' characteristics include an increased resistance to disease; high meat quality; a short reproduction cycle that significantly increases the quantity of products and frequency of laying eggs; and improved egg quality.

Large-scale industrial breeding does not exist in the study area; 90 percent of national production is at the smallholder level (Kansas State University 2023). This production includes many poor households; 30-70 percent depending on the region and district. Androy and Atsimo Atsinanana appear to have the highest level of holdings (SDA 2023), but prior to the drought Androy region reported that the average number of chickens per household was 9.1, with households in Beloha district owning an average of 16.7 (INSTAT 2021; data from 2017). The difference in chicken holdings after the drought is notable. Table 30 below demonstrates chicken ownership by region.

Table 30: Chicken Ownership by Region (DHS 2021)

	Atsimo Andrefana		Androy		Anosy		Atsimo Atsinanana	
	Poorest quintile	2nd Poorest Quintile	Poorest quintile	2nd Poorest Quintile	Poorest quintile	2nd Poorest Quintile	Poorest quintile	2nd Poorest Quintile
% of households with chickens	32.0%	36.3%	43.3%	50.4%	29.5%	41.1%	60.3%	69.8%
Avg # chickens owned	1.5	2.7	1.5	1.6	1.3	2.6	4.9	8.6

The *akoho gasy* breed is widespread in markets because it is more resilient to climatic conditions and does not require special feeding. Other breeds on the market include Bengal cocks for cockfighting and *Pil coqs*, a mixed variety. The FAO, through their Sustainable Wildlife management program (SWM), recently distributed *KC3* hens, a laying breed from Kenya valued for the size of its eggs, which are larger than those laid by the local breed. The breed was introduced as part of a drive to boost the livelihoods of vulnerable households in the Androy region, and around 30 laying hens were offered to several families. FAO is also planning distributions for the Ampanihy district. The laying capacity is one egg per day. According to FAO, when hens produce eggs, beneficiary households often share them with other households. These eggs are then incubated by local hens. This FAO program also provided chicken feed and vaccination.

There is also an improved breed from Africa called *kurokee*; a mixed breed used for both meat and eggs. The distribution of the latter is part of the implementation of the MIONJO project carried out by the CSA (Centre de Service Agricole) in technical and financial partnership with the FAO. The main beneficiaries are women. The Bourbonnaise breed is not common, largely because it is not popular with breeders due to higher feeding requirements which producers can't afford, and the climatic conditions in the Grand South are not favorable for their growth.

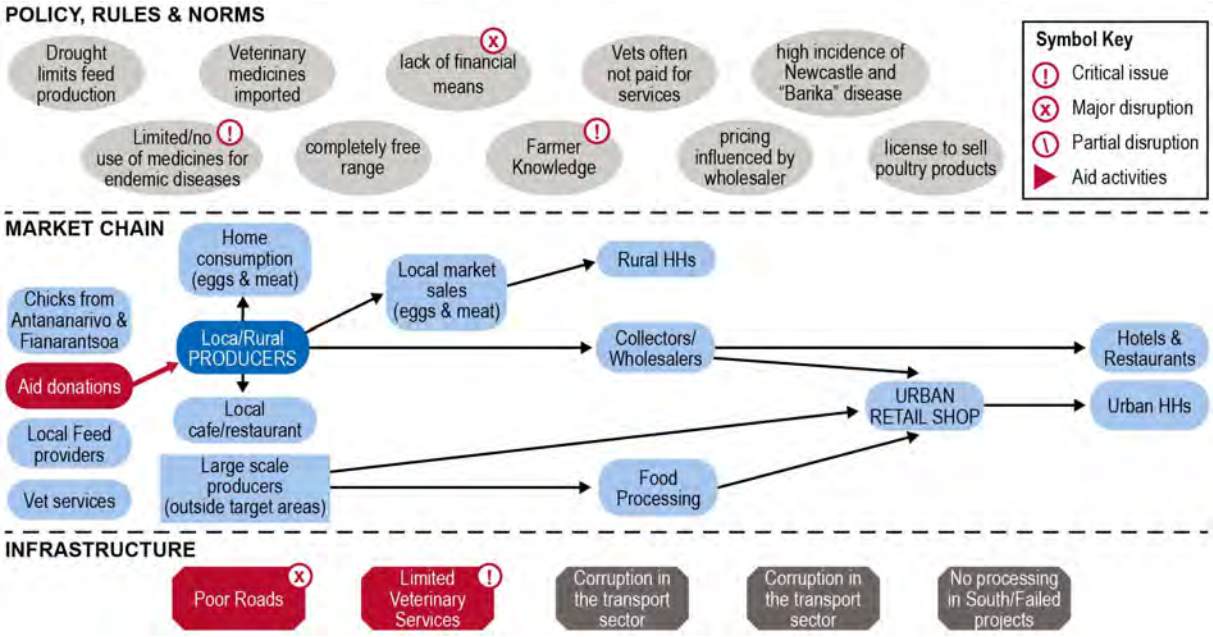
In the Atsimo Andrefana region, chicken donations are provided by the *Conseil de Développement Diocésain* (CDD), a local NGO working with CRS on the USAID Maharo project. The region of Androy--particularly Beloha, Tsihombe, Amboasary--is known for poultry production, as is Mahafasy and Vangaindrano in the Southeast, particularly the commune of Lopary. Lopary supplies the Farafangana district, the city of Antananarivo and the city of Tamatave (East Coast). In Taolagnaro, chickens are brought from Analamaro, Ivahona and Ibinda communes, while in Ampanihy market they come from Ankilimovory. The chickens in larger markets come mainly from villages located within a radius of 20 to 30 km of the major towns.

Market System Map

As the map below (Figure 33) shows, there is limited infrastructure in the poultry market system. Limited infrastructure impedes households' capacity to breed, maintain, and sell poultry. Most breeding is done very locally, particularly for indigenous varieties such as *Gasy* chickens and mixed breeds. Aid projects are the main providers of inputs such as their distribution of improved breeds to vulnerable households for a source of protein from both meat and eggs. Most households will sell

poultry locally or consume it themselves, as these households struggle with limited access to the financial means, knowledge to improve production, and proper veterinary care.

Figure 33: Poultry Market System Map



Market Actors

Producers

Small-scale producers (typically have between two to five chickens) tend to sell their chickens in the market on market day or by going door-to-door (especially at local restaurants) during the week. CRS's Maharo program found that producer profitability per chicken was $0.97 (4,350 MGA) per bird, or $11.60 (52,200 MGA) per year. Larger producers (around 60 head) hire labor to take the chickens to the big town markets to store and sell there (USAID 2022). The goods are transported by bicycle, on foot for the producers selling only a few chickens, and by taxi-bus if a larger quantity is being sold. When more than a dozen heads of chickens are being transported, *taxis-brousse* (minivans) are the most common means of transport, as they are much cheaper than lorries ($2.67 (12,000 MGA return)).

There are few commercial producers of chickens and eggs in the Grand South or Southeast, because households are generally wary of having too many chickens at one time. This hesitancy has two origins: first, they are worried there is not sufficient demand and therefore they will not make money; second, they worry about diseases, which may destroy the flock. Lower production numbers are a risk-mitigation strategy for producers, but also a self-fulfilling prophecy: lack of inputs (feed, vaccination, coops) raises the risk of disease and loss, reducing income overall. To give an example, local breeds have low egg-laying performance compared to improved breeds, with a maximum of 60–75 eggs per year, while commercial breeds can lay up to 130–150 eggs per year. Although the weight gain and egg-laying potential of local chicken breeds are already low, productivity is further limited by minimal disease control and inadequate feed (Kurtz, 2023).

With 90 percent of production at the smallholder level, poultry production is vital to households, particularly poorer households (Kansas State University 2023). As part of the CDD project in collaboration with the FAO, some households are benefiting from improved breeds as well as technical and material support. Women are generally responsible for raising chickens and typically make most of the decisions regarding their husbandry and sales, but other members of the family may also contribute to the poultry business, both in terms of tasks and decision-making. In general, chickens represent a savings mechanism for households and are likely to be the first thing sold when additional cash is required, such as during the lean season. Poor households eat eggs and chicken only rarely, for example on special occasions. National per capita consumption levels for eggs are 11.5 eggs per year.

Rural households located within a 20 or 30 km radius of the district capitals are the most common producers of chickens, because of their proximity to larger urban markets. Larger producers, with more than 50 birds, are more independent and prefer to hire labor to sell and look after their goods in the big towns. This can be a source of labor for poorer households.

Improved poultry farming also promotes the use of local cereal products (maize, sorghum, groundnuts, manioc), as they form the basis of poultry feed. Therefore, the poultry market system is linked to other market systems (see Annex C on Maize, Annex D on Sorghum, and Annex F on Groundnuts). The limited production of cereals can impede feed availability for both local and improved production.

At the time of the study team's visit in July 2023 (normal period), live g*asy* chickens (local variety) were sold for between $5.56-6.67 (MGA 25,000 and MGA 30,000), but this can double during festive periods. In the lean season, prices may drop to $4.44 (20,000 MGA). The study team found that stakeholders in the poultry market system have the impression that the price of poultry, particularly chicken, has doubled over the last 5 years, perhaps due to nutrition programs designed to increase consumption of poultry products (Global Nutrition Report 2023). Feed and vaccinations cost about $0.11 (500 MGA) per chicken.

Input suppliers

Small-scale producers can buy 3-day-old local chicks at the nearest market to raise to the *vantony* stage (14-16 weeks old, medium size) at around $1.33-2.22 (6,000 to 10,000 MGA). They may buy breeders (to lay eggs) or broilers (for meat). For medium-sized producers, the breeds chosen may be local or improved short-cycle breeds. Improved breeds come from Antananarivo and Fianarantsoa (incubator stage, 3-day old chicks) and arrive by minivan at a cost of $0.98 (4,400 MGA) and $1.11 (5,000 MGA), respectively. At this chick stage, prices are significantly lower than the price of a mature chicken. As part of the CDD project in collaboration with the FAO, vulnerable households receive two chickens and one cockerel of an improved breed (a different breed from that distributed by the country's supplier companies), as well as technical and material support from the start until the product is sold. Aid agencies rely on local feed suppliers and input providers for their distribution packages, purchasing for example 200 heads of mixed (breeder and broiler) chickens for distribution. If the local supply capacity is not sufficient, the input provider service provider obtains supplies from nearby markets, for example in Ambovombe or Beloha.

There are two types of feed that are available from animal feed suppliers, starter feed and grower feed. A bag of feed costs about $0.89 (MGA 4,000). In Farafangana, suppliers sell around one bag of each type every fortnight. Producers often don't see the point in giving local breeds a richer feed. The goods come from Antananarivo and are transported by truck. Starter feed from AGRIVAL is also

distributed under the contract rearing method, for a two-month ration for five chickens per household. In addition, locally produced feeds derived from sorghum, maize, groundnuts, and manioc are also available. The main customers are modern livestock producers.

Phyto-sanitary and animal health products are imported, packaged, and marketed by the island's main suppliers: Agrivet, ArchBiochem, PRV, FIVAMA, MPS and PROCHIMAD. From the producer's point of view, it is these companies that control prices. A dose of vaccine costs between 300 and 500 MGA per chicken, which households consider very expensive, essentially equivalent to selling 10 chickens to obtain the sum needed to vaccinate 50 chickens.

Veterinary services

Vaccination campaigns typically run from April to June; however, the number of veterinarians is insufficient. For example, in Ejeda, a single vet is responsible for all rural districts and provides veterinary services for animal health, including vaccination and deworming. The ACSAs (*Agents Communautaires de Santé Animale,* also known as Community Animal Health Workers) are no longer operational since the closure of aid projects (e.g., ASOTRY). Vets must travel to isolated rural areas but are not paid for costs incurred for travel, and the roads are not passable year-round. Vaccines also require cold storage for transport, which can be highly problematic for producers located in rural areas far from market access. This limits the incentive and ability for vets to travel to rural areas. Vets often provide treatment services on credit, but producers are not always able to pay at a later date, even though they are only paying for treatment and not the full cost incurred by the vet.

The lack of accessibility to veterinarians means that smallholder producers are often working with a veterinary technician if a veterinarian is not available in the region. The process is time-consuming and often inaccurate: when there is a problem, producers contact a technician, who transmits the information to a veterinarian, who then passes recommendations back in response to the information received. In many cases, the veterinarian cannot diagnose problems in person, and lab results can take several days or weeks to be made available. The result is significant loss in flock numbers (Kansas State University 2023).

Collectors

The collectors travel to the production areas on each market day. They buy live chickens from small producers at around $2.89 to $4.00 (13,000 -18,000 MGA) each. Prices of chickens depend on the age and size of the chicken, and collectors might sell at lower prices due to competition with other sellers or low demand for chicken (USAID 2022). Collectors source from villages around 20 to 30 km from towns to get supplies. This is the case in Mahafasa, Lopary and the villages near the town of Vangaindrano. Chickens are grouped into large *garaba* baskets containing 10 to 25 heads and then transported as luggage on the taxis-brousses. For their regular runs, collectors, or retailers subcontract with trusted transporters to minimize costs and ensure the transfer of goods. For example, chickens are transported by minivans, which carry people; transport costs $11.11 (MGA 50,000) because there are no cars for transporting goods. They go to supply wholesalers at major markets. Sometimes, the transaction is carried out from one collector to another, especially in areas where roads are difficult to access, such as the Atsimo Atsinanana region.

For the most remote areas, there can be up to five links in the poultry market system before the product makes it to market, with the household selling to a local collector, who sells it to another collector or wholesaler and so on until it reaches a larger market. Meeting points for these transactions are well established.

Wholesalers

Because of greater volumes, wholesalers tend to have considerable influence over market prices and structure. District level wholesalers gather around 100 chicken heads per week, and their main buyers are restaurants and urban households. Restaurants buy between 20-30 heads and tend to build relationships with a specific wholesaler.

Sometimes collectors from Taolagnaro or Tuléar come to buy from these district wholesalers. Beloha, Tsihombe and Amboasary in the Androy region are known to be areas of high production. Each market day, a plot of land is made available to commune-level chicken wholesalers who will sell around 20 heads; on other days of the week, sales are made door-to-door, with about five to ten sold. Often, wholesalers will receive orders from their potential buyers and then reach out to collectors to gather the required number of birds from rural markets. Particularly during lean periods, wholesalers may make an agreement with collectors, paying in advance as a symbol of commitment.

Processor

Processing is extremely limited in this value chain, with the main forms of processing being selling chickens dead instead of alive and selling it as hot food (a processed "broiler"). With regards to processing, the sale of fried chicken by street vendors and local cafes is a main form of chicken processing method noted in the South. Fried chicken sellers generally buy five to six chickens a day from collectors. Their main customers are bars and households on their way to the market, who are interested in fast, cheap food. Consumers prefer local chicken, because it is believed to be tastier (with a stronger flavor) and cheaper.

Retailers

Chickens are sold live or dead, depending on household preference, and prices differ for the two types of meat. Intensively reared broilers are mainly sold dead. Broiler chickens are more attractive to consumer households because they are practical and easy to prepare. Retailers also supply small cafés in large towns as well as local households. They often face difficulties at this level of the market system, as they often are unable to make a sufficient profit margin. The selling price does not exceed $6.67 (30,000 MGA) (See Table 31). Figure 34 demonstrates the poultry price structure. Small retailers report that they only take $0.22 (1,000 MGA) in profit margin per chicken, and in some cases, they don't make a return on investment. If they cannot get an appropriate price, then they must feed the chickens, incurring additional cost.

For some regions, a significant drop in purchasing power and a lack of financial resources decreases the demand for chicken. There is typically no credit from wholesalers, although some retailers help each other by providing informal credit between themselves to obtain supplies.

The purchase price of eggs in the market is $0.18 (800 MGA) a piece. Egg sellers typically sell ten to twenty eggs a day (Kansas State University 2023). There are around fifteen sellers on the market. Some eggs are bought by the distribution company to be hatched in Taolagnaro. When seafood is available at the market, chicken can be competitively priced, as consumers will quickly shift between the two.

Figure 34: Poultry Price Structure

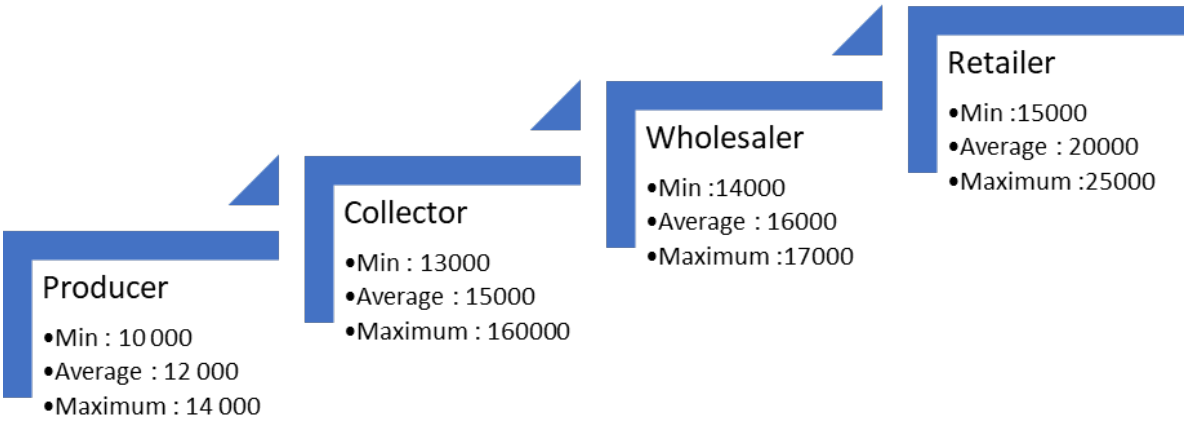


Table 31: Price of Chickens by Region

Region	Price of one live, local-breed chicken (may fluctuate depending on weight, time of year)
Atsimo Andrefana	1.56-2.67 USD (7,000 – 12,000 MGA)
Androy	5.56-6.67 USD (25,000 – 30,000 MGA) (4.44 USD (20,000 MGA) In the lean season)
Anosy	5.56-6.67 USD (25,000 -30,000 MGA) (urban)
Atsimo Atsinanana	2.89-4.44 USD (13,000-20,000 MGA)

The spaces reserved for chickens in urban markets are often crowded or not suitable in other ways. In Ampanihy, the *gasy* chicken market (on market day) has moved to the informal goat slaughterhouse because there are over 50 sellers. Taolagnaro has 69 chicken sellers.

In general, the volume of sales does not exceed ten heads per day, on market days or public holidays, when many producers from other rural communes go to the market in the urban commune. However, chicken sales peak during the end-of-year festivities, on Independence Day (26 June), and during other holiday periods. During these times, a trader can sell between 60 and 100 heads of chicken in a single day.

Policies, Rules, and Norms

Chickens are generally regarded as the responsibility of women, and the income that comes from them also belongs to women. Areas with higher poultry production often have a cultural reason for doing so: for example, in the Atsimo-Atsinanana region, the commune of Lopary produces a lot of chickens because of the traditional practice of giving a chicken to as a sign of respect. For the Atsimo-Atsinanana region in particular, poultry demand also fluctuates according to the clove season (November to January), when a retailer may sell four times as much as during lean periods.

During certain times of year, other protein sources, such as seafood, sell better than chicken because they cost less. The study team was told that as soon as there is seafood on the market, the price of

chicken drops because customers turn to fish and prawns, which are only available at a certain time of year and which, during this period, are cheaper than chicken. During the back-to-school period, the chicken market also shrinks because parents focus on school supplies and registration fees.

Infrastructure Issues

Across all market systems, poor roads make it challenging for producers and wholesalers to transport goods and access markets. This is particularly true for poultry products such as eggs which are fragile. This contributes to shorter value chains for poultry products. This study did not explore the demand for improved cold chain equipment, although as the sector develops this could be an important way to extend markets.

Access to credit is one of the limiting factors for all market actors. There are very few formal credit providers--many producers and small businesses are unaware of MFI options or feel that they do not fit their needs. Mobile money is seen by many in the sector as the best option for financial inclusion of rural poor (IFC 2023), and communities seemed to welcome increased access to mobile money tools. The study team also found that savings groups (*vonamy*) were often used by producers to smooth cash flow or make small investments. Regardless of whether a savings group was present in the community, these groups were positively viewed. The introduction of mobile money, either linked to savings groups or stand-alone, was also of interest to communities.

Market System Resilience

Market systems resilience (MSR) is a lens that looks at the ability of markets to innovate, mitigate, and adapt, to solve problems in the face of shocks and stresses, and therefore better serve targeted households. The framing outlined below (Table 32 and Table 33) looks at both structural and behavioral issues within a market system to determine how well the system can adapt and support household resilience. MSR also recognizes that market systems are constantly evolving; and positive or negative interaction with aid actors can shape how the system responds, making it either increasingly resilient or more fragile. Better understanding and programming around these factors improve outcomes for market actors and the households that rely on those market systems.

Table 32: Chicken Market System Resilience - Structural Domains

Structural Domains (how markets are organized)	
DIVERSITY *How much variety is there in products, sales channels, business models, etc.?* ● Not well organized, but there are a significant number of collectors and wholesalers to sell/buy from (sales channels) ● Very little diversity in products due to lack of processing and strong preference for local breeds	**RULE OF LAW** *Who sets and maintains the rules (informal and formal)? Are they consistent and fair?* ● Ministry of Agriculture and Livestock, local authorities and Enterprises set the rules for buying/selling ● Wholesalers and collectors have considerable influence over market prices and structure

Structural Domains (how markets are organized)	
CONNECTIVITY *Who's trading and talking with whom, why, and how is this changing over time? How and to what extent do market actors interact across geographies, ecologies, and social groups?* ● Good inter-connectivity between producing regions ● Market appears to be dynamic and accepting of new market actors ● Integration of the poultry market system with other agricultural market systems (e.g., maize, sorghum)	**POWER** *Where and how is power concentrated and exercised?* ● Negotiation power on price is better for households than in some market systems, but wholesalers and larger enterprises still have considerable influence over prices ● Two main input suppliers--Agrival, LDL—have large storage facilities and reportedly pay a fair price, which will help keep input prices low. ● Chickens are perceived as a women's crop, and this means women and youth have decision making power over production choices and use of funds

Table 33: Chicken Market System Resilience - Behavioral Domains

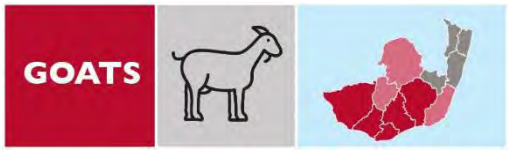
Behavioral Domains (what shapes the actions of market actors)	
COMPETITION *To what extent is there rivalry between market actors?* ● The market system shows healthy levels of competition given the large number of actors in the market ● Prices adjust according to competition levels both with other chicken sales, as well as with products such as seafood	**BUSINESS STRATEGY** *To what extent do business strategies proactively plan for risks? To what extent are they fair and generate customer value*? ● Actors in the market chain do not appear to plan well for risks (for example, do not vaccinate). ● Business strategies are not extractive, but not creating customer value either. They are neutral.
COOPERATION *How are market actors collaborating to achieve a common purpose or function*? ● Informal credit (delayed payment) indicates trust between various actors in the market system ● Working with carriers, to transport chickens to selling points ● Some cooperation on market demand between collectors and wholesalers	**DECISION-MAKING** *To what extent is evidence used to identify solutions?* ● Decisions on what is sold, in what number, at what price are made by women or jointly with husband, based on HH need rather than market opportunity ● Very little investment made to increase productivity or reduce costs (including no investment cold chain) ● Other market actors make decisions based on some market demand data

Conclusion: Summary of Barriers and Constraints for Market Actors and Households

Poultry provides a good opportunity for addressing poverty and food security, as sales of poultry products are already commonly used for coping and income smoothing. The main barriers relate to inputs and producer knowledge. Table 34 summarizes the market barriers or constraints and the opportunities for households to overcome them.

Table 34: Chicken Market Barriers and Household Opportunities

Market Barrier or Constraint	Opportunity/Gap for Households
Households do not invest in inputs (coops, vaccinations, feed) because of lack of income, and likely because they do not understand the return on investment that these expenses would bring.	Local varieties are perceived as more robust and needing less care; however, they are also less productive. Helping households understand the payoff of increased investments in inputs would give them greater choice and increase their income potential. Training and inputs should be considered as part of any asset transfer package for poultry.
Input systems are weak, and producers feel they do not have enough money to "invest" in improved inputs and practices.	Using evidence on system approaches from other resilience programs, the project could layer graduation activities with activities implemented by other actors that will improve market systems, such as input systems, so that improvements made during program implementation can continue.
Veterinary service provision is low due to understaffing and lack of payments. Previous attempts to train community animal health workers have ended at the end of the project.	There is an opportunity to use market system approaches to provide training on revised business models for vet care, change household perceptions about vet care through training, and create 'off-farm' jobs (for youth) with new business models.
Financial inclusion is low, but savings groups have been well received.	There is an opportunity to build on the existing culture of savings and the successes of existing savings groups. While mobile phone ownership is not high, phones are often a shared asset in communities, and activities to increase phone ownership could catalyze other resilience outcomes.
Some potential for overwhelming the market system if high levels of aid (using bulk purchases) are provided without coordination across aid agencies and with private sector actors.	Cash programming is less likely to cause large demand spikes, as households will spend at different times and volumes. Contracts with grain producers and other market signals can help ensure that the market responds to opportunities in appropriate ways, rather than experiencing a shock that increases prices.



Annex I: Goat Market System Report

Market System Overview

Goat breeding is well established in the Grand South of Madagascar, particularly among the Mahafaly and Antandroy ethnic groups. Goats are the type of livestock that is most resilient to climate change, as they are well adapted to the arid and dry conditions in the Grand South. Goat breeding is limited in the Southeast because goats are poorly adapted to the rainy climate in this region. Given goats' climate resilience, various donor-backed programs, financed by the World Bank, International Fund for Agricultural Development (IFAD), and EU/*Deutsche Gesellschaft für Internazionale Zusammenarbeit* (GIZ, the German development agency), operate in the Grand South to improve the organization and marketability of the goat sector. This extensive support is part of the drive to strengthen climate-resilient livelihoods for vulnerable households and improve food and nutrition security in the Grand South.

Goat farming is an important economic activity in the Grand South, as goats serve as a form of savings and economic risk reduction for agro-pastoralist households. Goat farming is the second-most common livestock livelihood practiced by the Mahafaly and Antandroy ethnic groups, after zebu (INSTAT 2021; Centre De Recherches, D'etudes Et D'appui a L'analyse Economique À Madagascar (CREAM) 2013a-d). On average, a goat-breeding household owns nine goats. The Atsimo-Andrefana region has an estimated 389,000 goats, 50 percent of which are in the Ampanihy-Ouest District (CREAM 2013c). There are 321,880 goats in the Androy region, 37 percent of which are in the Beloha District (CREAM 2013a). The Anosy region has an estimated 120,000 goats, the majority of which are from the Amboasary District (CREAM 2013b). Goat breeding is considered taboo in several regions, including the Antesaka and Antefasy ethnic groups in the Southeast and the Bara tribe in Betroka, Anosy, and is therefore limited in these areas (CREAM 2013d).

In the study area, 95 percent of goats are a local breed. There are three to four popular goat breeds, but Angora is the only improved variety. Goat herds are predominantly composed of female goats (56.5 percent), compared to male goats (43 percent). As with zebu breeding, goat breeders aim to maximize the number of offspring per herd, as owning many goats is a sign of wealth in many communities. In the absence of zebu, goats are also sometimes used for social events and funerals (*havoria*). Producers sell goats to meet urgent financial needs or to purchase zebu.

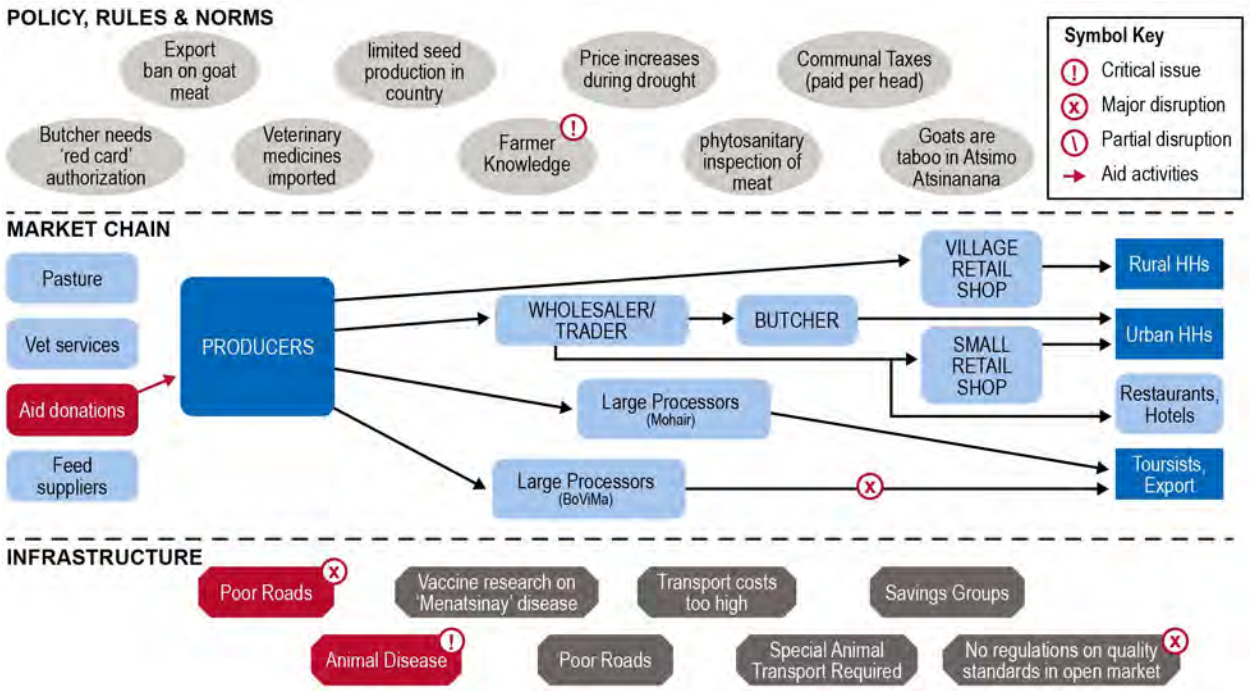
Goat breeders adhere strictly to traditional breeding practices, typically inbreeding, which produces smaller kids. Inbred goats weigh around 5 kg, but goats must weigh 20-25 kg to qualify for purchase by BoViMa, the primary collection and processing company operating in the study area. Goat fattening is an underdeveloped practice. Breeding is inhibited by several other key challenges. During the rainy season, goats are vulnerable to diseases such as anterothexemia and internal parasites (worms, ascariasis, and moneziosis). During the dry season (June to October), water scarcity causes poor pasture quality and results in insufficient fodder to sustain herds. Pasture availability is also reduced due to agriculture activities.

Fleece from local black-haired goats and Angora (white-haired goats) is used to produce mohair rugs. Goat's milk is typically not collected for household consumption (FEWS NET 2017) or for sale in markets, as milk production in goats is generally low. But a few households produce and sell goat cheese to both households and restaurants. Goat and sheep meat is particularly favored by Muslims and members of the Mahafaly tribe. Goat meat purchases are highest on weekends and holidays, particularly in June and December. BoViMa also operates in Manambaro in the Anosy region to process goat meat into meat powder (for use in soups, sauces, flavoring, etc.) for sale in foreign markets.

There are numerous local, regional, national, and export outlets for the goat industry, which has contributed to a rise in goat prices. Goat prices in the high season range from $33 to $111 a head (Malagasy Ariary [MGA] 150,000 to MGA 500,000 a head), depending on weight/size and sex. The goat industry is most profitable from March to August, which generally coincides with the crop harvest period, as people have money to purchase goats during these months. However, during the lean season (September to March), prices drop considerably, as producers become unable to feed large herds and need income to purchase food and agricultural inputs. Goat prices during the lean season range from $11-$22 a head (MGA 50,000 to MGA 100,000 a head), for the same animals.

Market System Map

Figure 35: Goats Market System Map



The goats market system map (Figure 35) shows NGOs are a significant driver for the goat market system. They purchase goats and distribute them as part of aid packages for poorer households. The purchase of goats for resilience programs has contributed to an overall increase in the price of livestock. NGOs also connect producers with veterinary service providers, large collectors, and processing companies.

Producers organize into associations/cooperatives, which are facilitated by NGOs to build capacity and establish a sustainable breeding system. Unfortunately, once the program or support ends, the system slows down or even deteriorates.

Butchers supply meat to rural and urban consumers. Business is normally high on market days and holidays (end of year/New Year, national holidays, Muslim holidays), but on other days, sales drop off. Meat consumption is generally low in the Grand South. Meat consumption is highest among Muslim communities and the Mahafaly tribe in the Atsimo Andrefana region.

BoViMa has contributed to the development of the goat sector in the Grand South, by increasing the income of agro-pastoralists and increasing their resilience to climate change.

Market Actors

Producers

Most producers in the Grand South are agro-pastoralists, and male, as herding work is not considered appropriate work for women. Producers sell goats to rural or urban markets in the Grand South to support large household expenses, such as investments in agriculture, food, children's education, and animal care. In the Atsimo Andrefana region, goats primarily come from Marolinta, Ankoboka, Tranovao, Beloha, Ikopoke, Behabobo, and Tranoroa. In the Androy region, producers are primarily from the Ambovombe, Taritarika, Antanimora, Andalatanosy, Ampamata and Tsihombe communes. While goat breeding is taboo in parts of Anosy and most of Atsimo Atsinanana, producers are emerging in the Beapombo I, Isoanala, Andiambatomivaly and Ibinda districts.

Profits are highest during the harvest period (March and August). During this period, the price of adult goats (25kg and more) ranges from $33.33-66.67 (MGA 150,000 to MGA 300,000). Many producers purchase goats during this time using savings or income from agriculture products. During the lean season, the goat prices fall between $11.11-$17.78 (MGA 50,000 to MGA 80,000), and producers sell at a loss. Buyers include local and regional consumers, wholesalers, large processors, and local suppliers for resilience projects that distribute livestock to vulnerable households. Goat prices are not regulated, so the price is fixed by the offeror.

Men are responsible for transporting livestock to the market for sale, as this is viewed as a task that requires physical strength and endurance. Women’s participation in goat livelihoods is limited by local customs and taboos.

Associations/cooperatives

Formal cooperatives are registered with the local authorities in the commune, region, and regional Directorate of Commerce and Industry. Members benefit from the support of development programs, such as CDD and FAO. This support includes donations of goats (two females and one male per household), capacity-building for leaders on technical innovations, structural management, leadership and business plan development, entrepreneurship and financial education, access to financing, and cooperation with key players including veterinary services and companies to buy their products. In the Androy and Anosy regions, BoViMa works with formal associations/cooperatives to ensure the successful implementation of planned activities and to develop mutually beneficial, sustainable partnerships. BoViMa establishes small associations of producers and provides technical assistance to ensure production of high-quality goats for export. GIZ has also set up producer associations in the Anosy region, including technical assistance, and processing and collection support.

Veterinary Services

Veterinary services are scarce and underutilized in the South. Goats face risk of bacterial disease, endoparasites, and hair loss, which can negatively impact producers' profits. Veterinarians provide vaccinations, medications, and deworming services, but often one vet is responsible for caring for a large geographic area, which can make it hard for producers to access these services. The cost of veterinary visits and medications is another barrier to service uptake. In the Atsimo Andrefana region, a veterinary visit costs $0.22 per visit (MGA 1,000 per visit). Medication for menatsinay, a diarrheal disease that can cause death in goats, costs $4.44 per bottle (MGA 20,000 per bottle). Agrivet, ArchBiochem, PRV, FIVAMA, MPS, and PROCHIMAD are the main suppliers of phytosanitary and animal health products. Ministry technicians also provide training on animal health to managers of input shops. Some traditional breeders choose to forego veterinary products altogether.

Feed Suppliers

Goats and sheep owned by local producers are typically pasture-fed. Children or youth, mainly boys, are responsible for taking the goats out to pasture to graze in the morning and bringing the herd back to the village in the evening. Herds are typically allowed to wander freely, which can cause conflict within communities when livestock damage crops. Since 2017, BoViMa has worked with landowners to promote the growth of animal fodder. BoViMa imports grass (bracharia nalato II and pennisetum varieties) and legume (STZ losanthes juiaenes and leucaenes leuwcephaba) seeds from Thailand for fodder. In Anosy, BoViMa uses 100 tons of animal fodder per year. BoViMa works with 152 landowners in this region, totaling over 50 hectares of land, to grow fodder for animals. However, these efforts have been met by local resistance, as animal fodder cannot be grown in tandem with dietary staples such as maize and sweet potato. AGRIVAL also distributes fodder seeds to local producers to meet feed needs.

Collectors and Wholesalers

Producers sell their goats to collectors, who transport the goats by truck to wholesalers in Antananarivo, Tulear, or Taolagnaro. If a producer has strong trust with a wholesaler and is selling many goats to the wholesaler at the same time, the wholesaler may pay a partial advance to the producer: the wholesaler pays for a portion of the cost upfront and pays the remaining balance once all goats are sold. MFIs are not used because of past negative experiences. Collectors pay producers in cash, or through mobile money or bank transfer, depending on the contract type. Long distances and transportation issues can create barriers between producers and wholesalers. Producers in Ampanihy, for example, may travel 15-55 km on foot for several hours to deliver goods to wholesalers.

Processing companies/Exporters

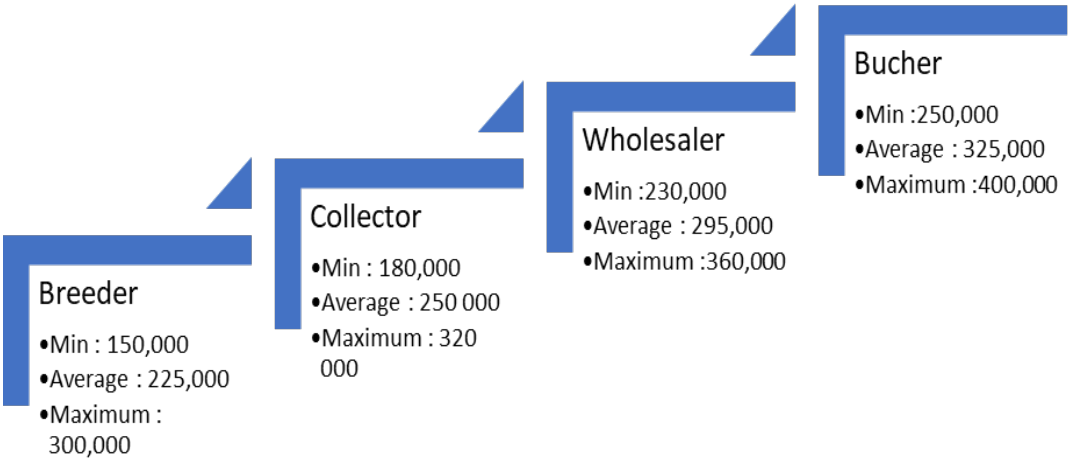
BoViMa contributes to the development of commercial goat breeding by providing technical support and income to the associations it collaborates with. To qualify for purchase by BoViMa, goats must be between 12 and 24 months of age, weigh 20-25kg, be vaccinated and have received anti-parasitic medication, have an ear-tag to identify it, and have NIF/STAT documentation. As part of BoViMa's agreement with producer associations, the company cannot source goats from any sellers who are not members of their partner associations. BoViMa purchases goats at the same price year-round, which provides consistent income to producers. BoViMa does not provide credit to producers. They maintain traceable receipts (no mobile money) for all payments, to preserve trust with producers. In the Anosy region, 500 associations and 160 member producers' partner with the BoViMa program. The Manambaro slaughterhouse in Anosy processes meat into meat powder for export to Dubai. Although

BoViMa was created to be an exporter of meat, and provide value addition to the market system, a Presidential decree banning meat exports shortly after their opening has forced the business to pivot their business model. The zebu market report discusses this ban in more detail.

Fleece from local black-haired goats and Angora (white-haired goats) are used to produce mohair rugs. One rug requires 12 kg of goat hair, which costs $4.44 per kg (MGA 20,000 per kg). Underfed goats have less fleece, which drives up the price of raw inputs for mohair carpets. Mohair rug production also requires cotton ($4.44 per kg; MGA 20,000 per kg), daro wood for black dye ($4.44-$6.67 per bag; MGA 20,000-MGA 30,000 per bag), somotrala for brown dye ($6.67 per bag; MGA 30,000 per bag), and labor fees for straightening goat hair ($0.67 per kg; MGA 3,000 per kg). Tourists make up the primary market for mohair rugs, which can make the market inconsistent.

Goats milk is used to produce cheese, but production is limited by the goats' low milk supply (roughly half a liter per goat). There are three cheese sellers in Tulear. They sell to households and restaurants. Processed cheese is sold for $1.33 per 100g (MGA 6,000 per 100g) and byba cheese is sold at $1.22 (MGA 5,500). Cheese sales are highest during national holidays and in the month of December.

Figure 36: Goat Price Structure



Retailers

The goat sector is most profitable from March to August, when households have more income to spend at markets. Households prefer *soramena* goats for breeding and black goats for consumption. Goat vendors in Atsimo Andrefana sell an average of 100 goats per week but can sell thousands of goats during Muslim festivals in June. There are roughly 20 semi-wholesalers, 50 retailers, and 30 wholesalers for goats in the Tulear market. There are about 400 goat butchers in Tulear, about half of which are very small shops. Butchers in Tulear can have up to 50 customers a day when the market is good, especially in the months of June and December. The drought did not seem to change purchasing behavior in Tulear. One retailer reported he was able to access credit from an MFI, but it was used to "reduce other hardship in their lives." In Anosy, producers supply goats to butchers in Betroka directly. The price of goat meat ranges from $2.67-$3.11 per kilo (MGA 12,000-MGA 14,000 per kilo). Figure 36 demonstrates the goat price structure.

Policies, Rules, and Norms

Goat collectors are required to adhere to transaction procedures of Fokontany communes and districts. Goats do not have livestock passports, but producers must obtain a certificate from the Fokontany president to verify their ownership of the animal, prior to sale. Producers who wish to sell a goat must pay taxes to the commune at the marketplace for each goat sold, to cover veterinary inspection and market costs. Similarly, collectors pay fees and taxes and must obtain a health certificate for goats that are being transported outside of the region. Butchers must obtain a "red card" authorization to slaughter goats. Phytosanitary inspection is required for all meat sold on the market.

Goat breeding is considered taboo by several ethnic groups, including the Antesaka and Antefasy ethnic groups in the Southeast and the Bara tribe in Betroka, Anosy. In Atsimo Andrefana, it is seen as taboo for women to milk goats, so this task is reserved for men. It is also seen as taboo for women to build, maintain, or even enter goat enclosures, particularly while menstruating (IMPEL 2022).

Infrastructure Issues

As shown in the goat market system map, lack of infrastructure is the major challenge to the development of commercial goat farming. Poor roads make it challenging for producers and wholesalers to transport goods and access markets. It is illegal to transport animals by public transportation, so producers and wholesalers must have a car to transport goats or must travel on foot. Transport costs range from $3.33-$4.44 (MGA 15,000-MGA 20,000).

Limited access to credit is an issue across the Grand South, despite the government's Financial Inclusion Strategy. This is due to low literacy and financial literacy rates, high banking fees, lack of physical access to banks, and infrastructure constraints such as connectivity. Agriculture credit products, including those for livestock owners, have been introduced by organizations such as Credit Agricole Mutuel de Madagascar (CECAM), but are still approached with some suspicion by producers due to previous bad experiences. From the lender's perspective, lack of collateral or credit history also complicates access to credit, which could be used to pay for inputs or prepare in advance for shocks. The study team found that savings groups (*vonamy)* were more commonly used by producers to smooth cash flow or make small investments. Regardless of whether a savings group was present in the community, these groups were positively received. The introduction of mobile money, such as mVola, either linked to savings groups or stand-alone was also of interest to communities.

Market System Resilience

Market system resilience (MSR) is a lens that looks at the ability of markets to innovate, mitigate, and adapt; to solve problems in the face of shocks and stresses; and therefore, to better serve targeted households. The framing outlined below (Table 35 and Table 36) looks at both structural and behavioral issues within a market system to determine how well the system can adapt and support household resilience. MSR also recognizes that market systems are constantly evolving; and positive or negative interaction with aid actors can shape how the system responds, making it either increasingly resilient or more fragile. Better understanding and programming around these factors improve outcomes for market actors and the households that rely on those market systems.

Table 35: Goats Market System Resilience - Structural Domains

Structural Domains (how markets are organized)	
DIVERSITY *How much variety is there in products, sales channels, business models, etc.?* ● Overall, diversity is adequate. There are several sales channels for goats and goat products (local, regional, national, and export markets). There is cooperation between actors, and support from the Malagasy government and NGOs. ● There is diversity in household business models. Some households use goats as a form of savings; others use goats for breeding or commercial goals. ● There are several goat breeds available, but producers prefer local breeds, which are more resilient to difficult climate conditions in the Grand South.	**RULE OF LAW** *Who sets and maintains the rules (informal and formal)? Are they consistent and fair?* ● The Ministry of Agriculture and Livestock, local authorities, and enterprises set the rules for buying and selling. There can be a lack of transparency around policies and taxes, which can negatively impact market actors at lower levels, especially producers. ● Producers complain about taxes and the volume of paperwork required. ● The Presidential decree prohibiting meat exports is respected but is very likely dampening economic opportunity in the Grand South.
CONNECTIVITY *Who's trading and talking with whom, why, and how is this changing over time? How and to what extent do market actors interact across geographies, ecologies, and social groups?* ● Associations/cooperatives have mixed connectivity with wholesalers and enterprises. Those connected with BoViMa have a reliable market, but connectivity for other groups is unclear. ● Wholesalers are well-connected to buy and sell goods in a range of locations. They understand demand in their region, and work with associations and collectors to meet this demand.	**POWER** *Where and how is power concentrated and exercised?* ● Wholesalers and enterprises hold negotiation power on the price, limiting producers' ability to increase profit margins. ● Goats are not generally raised by women; they are perceived as a man's responsibility. ● BoViMa, due to its size, has considerable market power, even if it is unable to export the products originally intended.

Table 36: Goats Market System Resilience - Behavioral Domains

Behavioral Domains (what shapes the actions of market actors)	
COMPETITION *To what extent is there rivalry between market actors?* ● Competition is limited by the structure of the market overall. Producers have limited knowledge of market prices or demand beyond their local area, which limits producers' negotiating power and profit margins. ● The seasonal fluctuation of prices is a signal that competition is healthy and aligned with market demand.	**BUSINESS STRATEGY** *To what extent do business strategies proactively plan for risks? To what extent are they fair and generate customer value*? ● Given the frequency of shocks and stresses in the area, some planning for shocks is taking place (e.g., purchase of feed). However, there was no evidence of using longer-term forecasts to make production decisions.

Behavioral Domains (what shapes the actions of market actors)	
COOPERATION *How are market actors collaborating to achieve a common purpose or function*? ● Membership in associations/cooperatives gives producers access to buyers but limits members' control over individual prices. ● BoViMa has formed mutually beneficial partnerships with associations/cooperatives but has faced some local resistance.	**DECISION-MAKING** *To what extent is evidence used to identify solutions?* ● Wholesalers generally fix prices, giving producers limited decision-making power. ● Producers make production decisions based on trends from the past season or information received from communal market days.

As shown in the table above, the goat market system is not very resilient. The system is reactive to shocks and stresses, which makes it challenging for market actors to take advantage of existing innovations and opportunities to advance goat farming. NGO programs aim to change the behavior of market actors to better structure the goat market system by establishing consistent business for producers and developing mutually beneficial partnerships between all actors. Programs run by the GIZ and BoViMa provide producers with important technical assistance and resources, including veterinary services, fodder, and processing capacity. Market functioning is inhibited by the lack of infrastructure, such as bad roads, limited veterinary services, poor vaccine and medication access, water scarcity, and limited fodder processing. Market players have limited capacity to develop their businesses and establish a sustainable market system in which all players achieve their own interests.

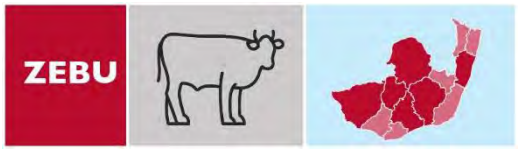
Conclusion: Summary of Barriers and Constraints for Market Actors and Households

Table 37 summarizes the market barriers or constraints and the opportunities for households to overcome them.

Table 37: Goats Market Barriers and Household Opportunities

Market Barrier or Constraint	Opportunity/Gap for Households
Improved breeds--more productive and better adapted to the climate conditions—are needed.	FAO has programming to introduce improved breeds. Producers could be made aware of where to purchase improved breeds (in the market) and vulnerable households could be given support to purchase.
In-breeding is common, resulting in smaller goats.	Training is needed to improve animal husbandry practices.
Producers have limited knowledge of technical innovation and business development and do not have the financial resources to develop their businesses.	Producers acknowledge that they do not consistently use best practices for animal husbandry. Training activities to support increasing producer technical knowledge, paired with farm planning and cash transfers to allow them to put their knowledge to use, could improve productivity.
Input systems are weak, and producers feel they do not have enough money to "invest" in veterinary	Using evidence on supporting veterinary systems from other USAID programs, the project could layer

services. Direct aid for vet services is likely to undermine veterinary systems in the long run.	graduation activities with activities implemented by other actors that will improve market systems, so that 'graduates' do not fall back into poverty and/or poor practices once the program has ended.
Producers do not have the information and capacity to negotiate for better prices at the time of sale.	Producers indicate that they would like to increase their skills in household budgeting and farm planning. To reinforce positive norms around decision making, the project could offer skill building to both husbands and wives together.
Financial inclusion is low, but savings groups have been well received.	There is an opportunity to build on the existing culture of savings and the successes of existing savings groups. While mobile phone ownership is not high, phones are often a shared asset in communities, and activities to increase phone ownership could catalyze other resilience outcomes.
There is insufficient production of fodder, despite availability of raw materials, which limits animal fattening.	Fodder production could be included in the livelihood activities of graduation programs, and linking activities created between livestock producers and fodder producers.
Capacity-building initiatives of NGOs have increased women's and youth's interest in goat production; however, they face all the problems listed above as well as social barriers.	Include women and youth in targeting for any livestock production activities, remembering to be sensitive to local taboos and buying preferences.



Annex J:Zebu/Cattle Market System Report

Market System Overview

Zebus are the local variety of cattle in Madagascar. They play an important economic and social role in Madagascar, both as a form of wealth accumulation and a sign of power at the community level. Zebus are used for household agricultural activities: ploughing, harrowing, trampling, sowing, and transporting crops from crop fields to living areas and from the house to marketplaces to sell produce. The zebu also plays a key role in the social events of the various ethnic groups in the study area, including weddings, funerals, tomb-building, sacrifices to settle community conflicts, and the payment of fines for legal offenses.

Zebus are the highest-value livestock in Madagascar, as they hold both economic and social value for Malagasy people. There are an estimated 6,500,000 zebu in Madagascar (see Table 38). The four study regions represent 24 percent of the national zebu ownership, including 11.7 percent in Atsimo Andrefana, 4.1 percent in Androy, 6.5 percent in Anosy, and 1.7 percent in Atsimo Atsinanana. About 57% of households own zebus, with average herds ranging from two to thirty zebus. In the Atsimo Andrefana region, the Ampanihy Ouest district has the most zebus (30.8 percent). In the Androy region it is Bekily District (42.5 percent), in Anosy region it is Betroka District (53 percent) and in Atsimo Atsinanana region it is Vangaindrano (38 percent) (CREAM 2013a-d).

Table 38: Evolution of the number of zebus in Madagascar

Livestock census estimates							
2005	2013	2014	2015	2016	2017	2021	2023
9 500 140	10 030 00	10 198 800	10 280 300	10 301 490	10 284 429	7 000 000	6 500 000

Source: (FAO et al 2022)

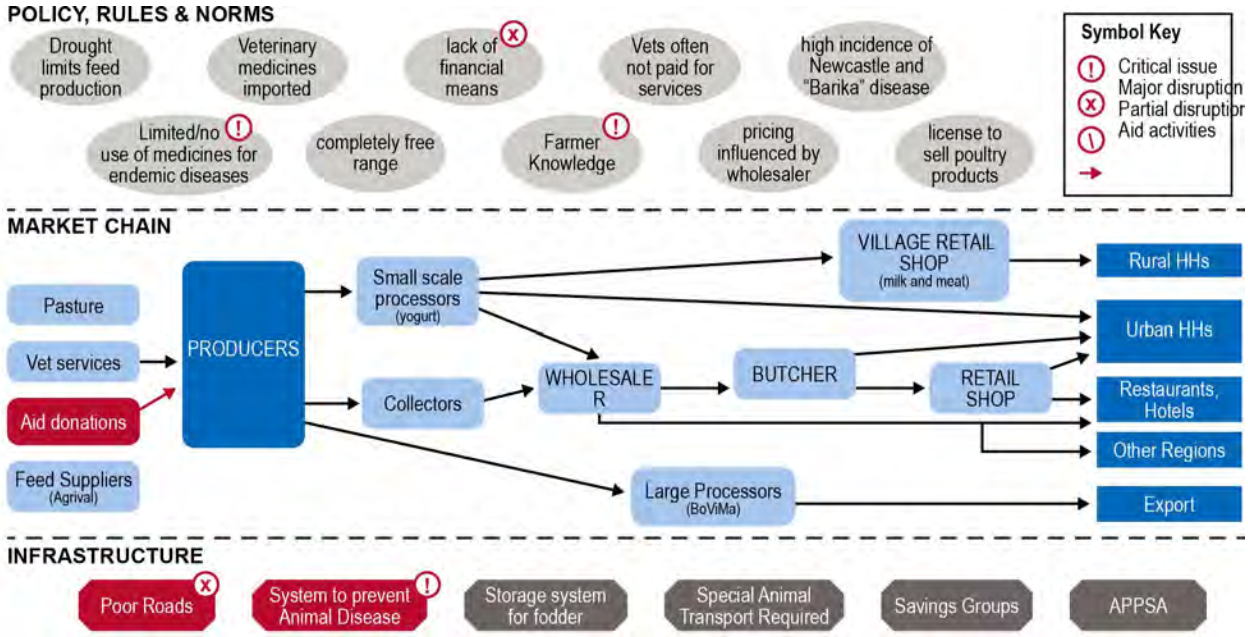
Producers are both farmers and breeders. Households use income from the sale of crops to purchase goats, which are then bred to sell and purchase zebus. If a producer has large, cultivated fields and a good harvest, they may have sufficient income to purchase zebus directly. The main purpose of zebu breeding is reproduction, to increase the number of zebus owned by the household, rather than for food security or commercial gain. Producers generally sell zebus to meet urgent money needs, such as for food purchases during the famine period or for the construction of tombs.

Zebus are brought out to pastures, along with goats and sheep, in the morning by shepherds (generally boys or young men) and are brought back to an enclosure in the village in the evening. In addition to pasture, zebu feed on the by-products of crops in the field after the harvest. During the dry season and

times of stress (when there is no pasture) zebus may be fed burnt cactus leaves. Producers follow traditional breeding practices and therefore the animals receive limited veterinary care.

The study area includes regions that are classified as "the red zone" due to insecurity and theft. Zebu theft, which is on the rise, hampers the development of zebu breeding, particularly in Betroka, Amboasary and Befotaka South. It is generally practiced by young men in the region, and the practice was previously considered a rite of passage (Healy 2017). Networks of bandits, known as *dahalo*, operate at local, regional, and national levels, and sell zebu on the black market to meet the demand for zebu meat in Antananarivo or for export.

Figure 37: Zebu Market System Map



Market System Map

As shown on the market system map (Figure 37), producers are the key players in the zebu market system. Producers sell their zebu to collectors and wholesalers on market days in rural communes and larger district-level livestock markets. Wholesalers sell zebus to butchers, who supply meat to consumers (urban and rural households and restaurants/hotels). Processing activities are limited; they are currently constrained by a government export ban on meat.

Market Actors

Producers

Zebu producers follow traditional breeding practices, which means limited inputs and veterinary care is provided, although supplemental feed is not uncommon. Because the primary purpose of production is to increase social status and power, zebus are not a primary source of income, but will be sold for important household expenses that cannot be covered by the sales of goats (such as to cover the construction of tombs, health expenses, and justice penalties) and during periods of financial difficulty.

Prices are highest during the harvest season (March to August), when households have income from the sale of other agricultural goods. At this time zebu calves are worth $88.88- $177.78 (400,000 MGA to 800,000 MGA), young zebu are worth $333.33-$355.56 (1,500,000 MGA to 1,600,000 MGA) and adult zebu are worth$ 555.55- $666.67 (2,500,000 MGA to 3,000,000 MGA). Castrated zebus (300kg - 400kg) are worth $888.888 (4,000,000 MGA). During the lean season or shock periods, zebu prices decrease by half or even a third.

Producers breed zebu with the goal of increasing herd size, but the rise in zebu theft has made producers reluctant to maintain this practice. Producers that own as few as two zebus are at risk of cattle theft. To cope with insecurity, producers have reduced the number and size of zebus they breed, as large zebu are at risk of being stolen or killed by thieves.

Zebu breeding is also complicated by the risk of animal diseases and parasites. Most commonly, zebus are infected by symptomatic anthrax, bacterial anthrax and faciola (liver fluke). Despite this, producers do not invest in veterinary care such as vaccinations for their animals, in part because of the weak animal health system. According to a 2017-2018 livestock survey in the Androy region, the zebu mortality rate is 6.2 percent, and the off-take rate is 15.5 percent, meaning the net growth rate for zebu is negative (-0.5%) (INSTAT 2021).

Associations/cooperatives

Producers form associations and receive support from government projects and programs aimed at developing zebu production. Associations receive seeds for pasture, training on technical innovations and cattle breeding techniques, and animal care. BoViMa, a large private feedlot with international investment, works with formal associations in the Androy and Anosy regions on breeding improvement techniques and feed production techniques to increase market access for association members. The intention is to develop a mutually beneficial, sustainable partnership where smallholder producers can contribute to BoViMa's larger operation. In the Ambovombe district, for example, BoViMa partners with 6,170 producers.

Veterinary Services

Veterinary services are provided by veterinarians and district animal health agents, as mandated by the government. Veterinarians are generally based in the district capital, with supporting animal health agents (APPSA: Agent de Proximité de Production et de Santé Animale, similar to Community Animal Health Workers (CAHWs)) serving surrounding communes. Veterinarians and animal health agents are responsible for providing veterinary care and vaccinations to animals in each commune, but staffing levels are too low to adequately address the needs of producers in the study area. Vets are also responsible for completing health inspections of animals and meat sold in the market. A FIB (Fiche Individuel de Boeuf) verifying the animal's health and vaccination status must be signed off by a veterinarian prior to slaughter.

Zebus are vulnerable to diseases such as diarrhea, symptomatic anthrax, faciolla, internal endoparasites, and intestinal worms. Medications for these diseases are available at veterinary offices and veterinary drug depots. However, producers typically only seek out veterinary care in serious cases, often when the disease is more progressed, and therefore more difficult to treat. This delay of treatment (and provision of preventative care) is due to challenges of access: the number and location of vets and APPSAs, the cost of treatment, and a lack of farmer knowledge in recognizing diseases. Instead, producers choose to use traditional treatments such as sea water to treat ailments.

Vaccinations are administered only at veterinary offices, but vaccine use among producers is high for zebu in some areas (90 percent in the Amboasary district). One visit cost the producer between $0.88-1.78 (4000-8000 MGA), in addition to the cost of vaccines or medicines. Vaccines must be administered in two doses, 21 days apart, and cost $0.22 (1000 MGA) per dose. Government and FAO programs provide livestock vaccination and treatment campaigns, particularly in times of stress (such as disease outbreaks), but these programs do not help to address the underlying issue of poor access to animal health care for rural producers.

Feed Suppliers

Zebu are generally pasture-fed, but more prosperous producers and those with less access to pasture may provide feed for their animals. There are two large feed manufacturers, with four production sites in the country: Livestock Feed Ltd. (LFL) of the Mauritius-based Eclosia group and AGRIVAL of the Malagasy parent company, INVISO (Kansas State University 2023). These are large professional mills that use locally produced maize and by products from other grains such as wheat and rice. The capacity of AGRIVAL's mill is around 5000 MT per month, but it is currently operating at 50% production capacity, using about 1750 MT of maize per year (Kansas State University 2023). AGRIVAL also distributes fodder seeds to local producers and has worked with aid organizations to support the increased production of maize and sorghum by smallholder farmers.

Since 2017, BoViMa has worked with landowners to promote the production of animal fodder. BoViMa imports grass (*bracharia nalato II* and *pennisetum* varieties) and legume (*STZ losanthes juiaenes* and *leucaenes leuwcephaba*) seeds from Thailand for fodder. BoViMa works with 152 landowners (over 50 hectares of land), to grow fodder for use in their fattening operations. However, these efforts have been met by some local resistance, as animal fodder cannot be grown in tandem with dietary staples such as maize and sweet potato.

Collectors/Wholesalers

Collectors and wholesalers work in commune-level (tertiary) and district (secondary) markets. Collectors purchase zebu from producers on the main market day in commune-level markets, selling them onward to wholesalers who take them to larger (secondary and primary) markets. Collectors typically sell three to five zebus at each tertiary market they visit but can sell more than ten zebus when business is successful. Their profit margin is around $11.11 (50,000 MGA) for each zebu sold. Wholesalers circulate in the district and regional capital markets to buy and sell zebus. There are between ten to fifteen wholesalers operating in the study area, with additional collectors operating in outside regions such as Ihorombe and Haute Matsiatra. They purchase ten or more zebu at each market. Wholesalers may employ shepherds to accompany the zebus between regions. The number of shepherds changes based on the herd size, for example a herd of thirty animals has five accompanying shepherds. Shepherds are paid $2.22-$3.33 (10,000MGA-15,000MGA), according to the distance traveled. Wholesalers bring zebu to the large livestock markets in Betroka, Ihosy and Ambalavao, where collectors from Antananarivo come to buy cattle to supply butchers and slaughterhouses in the capital. Zebu are transported by truck from these markets to the capital. Collectors make a profit of about $22.22 (100,000MGA) for each zebu sold. For collectors that have a well-established relationship, producers may provide a form of credit to the collector, allowing him to take the animals and pay the producer once the animals are sold.

Due to the negative growth rate of zebu and insecurity, the price of an adult zebu has increased threefold in the last few years. Prices have risen from $555.56 (2,500,000 MGA) to $1,666.67 (7,500,000

MGA) for castrated zebu and from $177.78 (800,000 MGA) to $666.67 (3,000,000 MGA) for (female) heifer zebu.

Butchers and Other Processors

Local processing of meat is done through butchers. Butchers purchase zebus at markets during market days and slaughter the animals at the government abattoir (slaughterhouse). An abattoir may slaughter from four to over twenty zebu per day, depending on its size and location. The number of zebus a butcher purchases also depends on their location and capacity to sell the meat; butchers will avoid purchasing too many animals to minimize the cost of feed and avoid being left with unsold meat. Refrigeration is not normally used by butchers. Butchers typically purchase between one to three zebu per market visit, which will last for one to two days of meat sales. The number of butchers depends on the size of the market (rural or urban market)—rural tertiary markets typically have between three and five butchers, selling only during market days. These butchers typically have around 30 customers. Urban markets have between eight and twenty butchers that sell zebu meat every day. During market days, urban butchers can have up to 50 customers. Butchers sell meat to retailers at a wholesale price of $2.67 (12,000 MGA). The carcass weight of zebu is between 250 kg to 350kg, and butchers make a profit of $0.22 (1,000MGA) per kg. Butchers must have a FIB to slaughter animals, to show that it is not ill or stolen. However, some butchers will buy and slaughter zebus without the appropriate documentation to increase their profits.

Women process zebu milk into curdled milk (*habobo*) or homemade yogurt. This is done in the home, and therefore the supply depends on seasonality and the number of zebus owned by the household. During the dry season, when there are insufficient pastures, milk supply is lower, and therefore production of dairy products is also lower.

On a larger scale, BoViMa operates an industrial-scale fattening and abattoir operation, with investments from the World Bank's investment arm, International Financial Corporation (IFC). The model was designed to provide income opportunities for small producers, either growing crops that could be sold as fodder, or providing animals that met BoViMa's criteria. It was expected that through private sector-led technical support and market opportunities, production practices would improve. However, there has been strong local opposition from producers who fear the operation will lead to the loss of Madagascar's unique cultural heritage around zebu (given that numbers are already declining), in addition to increasing cattle theft as market linkages and commercial opportunities are further strengthened. These producer concerns led to a presidential decree banning the export of meat from Madagascar.

Retailers

At the retail level, there are two categories of products that are derived from zebu: dairy and meat products. Dairy products include curdled zebu milk (*habobo*) and yogurt. Women (who are both dairy processors and retailers) purchase 20L of milk at $10.00 (45,000MGA) and sell one cup of curdled milk (250ml) for $0.11-$0.22 (500 to 1,000MGA). They can sell 20L of curdled milk per day, yielding a profit of $3.33-$4.44 (15,000MGA-20,000MGA) per day. They also process milk into homemade yogurt. One jar of yogurt (125ml) is sold for$ 0.11-$0.22 (500 MGA to 1,000MGA) on the market. Zebu milk prices range from $0.22-$0.66 (1,000MGA to 3,000MGA), depending on the season.

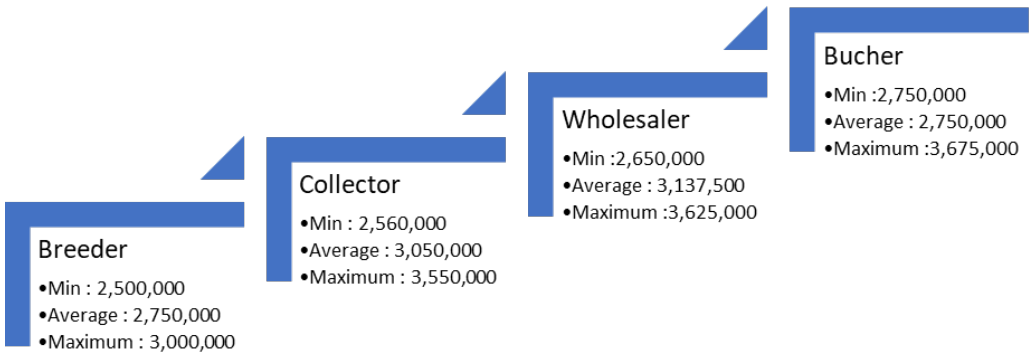
Zebu meat is also sold on the local market. In Tulear (primary market), there are around 50 retailers selling meat on the market. Households and restaurants purchase from these retailers. Retailers sell meat at a price of $3.56-$4.00 (16,000-18,000 MGA), depending on the cut. In tertiary markets, there

are around five retailers selling meat. Some consumers also purchase directly from butchers. Retailers may extend credit to trusted consumers, but repayment is required within a day. See Figure 39 for the Zebu price structure.

Consumers

Households typically purchase 0.25-1.0 kg at a time, while restaurants and hotels purchase 3-20kg/day. The price of meat varies from $2.67-4.00 (12,000 MGA to 18,000 MGA), depending on the quality (steak, minced meat, sausages) and the size of the market. Urban markets, such as Tulear and Taolagnaro, have higher prices. Households in the study area do not frequently consume zebu meat. Instead, they consume alternate protein sources such as fish, pork, and chicken, all of which are cheaper than zebu.

Figure 39: Zebu Price Structure



Policies, Norms, and Rules

Zebus are an important economic and social asset in the Grand South and Southeast: they are a symbol of wealth and a form of savings, used to pay for important social events, such as funerals, weddings, and circumcisions. For the Antandroy ethnic group, zebus are sacrificed as part of a funeral ritual (for more detail, see the Political Economy Analysis associated with this report). When the owner of a herd dies, the entire herd is slaughtered and used to feed the family and mourners. Women may independently own zebu, but when their husband dies, they will be strongly encouraged by the men in their family to slaughter their zebu alongside their husband's. As a result of these roles, producers do not put a priority on making each animal as productive as possible, instead more animals (even if lower weight or producing little milk) are the priority.

Men are the primary managers of the zebu market system, but women play a role in the market as retailers. Men are responsible for guarding and raising zebu, as these tasks are viewed as requiring strength. Women work as retailers, selling zebu dairy products. Couples discuss the sale and purchase of zebus jointly, but final decisions ultimately rest with men. Young men generally depend on their parents' decisions or support for the acquisition of zebus and the development of livestock farming. Young people follow their parents' breeding techniques, so the application of new breeding techniques can be slow, particularly in the face of challenging environmental conditions. Young men looking for a quick source of income and zebu ownership are sometimes tempted into zebu theft and banditry.

The zebu marketplace is managed by local officials, including the head of the fokontany, commune staff, gendarmerie officers, the health veterinarian, and the administrative delegate. The head of the

Fokontany administers a certificate of origin to zebu, to verify that the zebu taken to the market come from the fokontany in question. Commune staff collect communal fees and certify the deed of sale and purchase at the commune level. All zebus must have the FIB (Fiche Individual Bovine) to be sold and slaughtered by butchers. Gendarmerie officers verify and sign off on this documentation. Veterinarians, appointed by the Ministry of Agriculture and Livestock, must also sign off on this documentation, after completing a health inspection and ensuring all zebu have received vaccinations and ear tags. Administrative staff check the accuracy of the FIB for zebu sale and purchase transactions at the communal markets. Because of these requirements, producers and collectors are only permitted to sell zebus on the main market day, when administrative procedures and paperwork can be handled.

The presidential decree banning the export of meat products, while founded in legitimate community concerns, does dampen the potential growth of the market system; including opportunities for increasing income for poor households. While BoViMa has creatively pivoted to ensure that it can make the most of the IFC investment, the company is not able to play the “Leading Firm” role originally imagined, which would have demonstrated improved animal husbandry practices and created market incentives for poor households to apply them.

Infrastructure Issues

As shown in other market system maps, lack of infrastructure is the major challenge to improving livelihoods in the Grand South and Southeast. Poor roads make it challenging for producers, collectors, and wholesalers to transport goods and access markets. It is illegal to transport animals by public transportation, so producers and wholesalers must have a vehicle to transport animals or must travel on foot. Transport costs range from $3.33-$4.44 (15,000 to 20,000 MGA).

Poor veterinary health coverage, particularly in districts like Vondrozo and Befotaka, means that cattle are less resilient to disease. This problem is further exacerbated by the cost of veterinary products, which are relatively expensive compared to farmers' incomes. Additionally, much of the pastureland in the region is now cultivated, which limits the availability of feed for zebu. The poor state of the roads linking the markets and major towns limits the movement of actors and zebus. Poor roads also make market actors more vulnerable to zebu theft.

Limited access to credit is an issue across the Grand South and Southeast, due to low literacy and financial literacy rates, high banking fees, lack of physical access to banks, and infrastructure constraints such as connectivity. Agriculture credit products have been introduced by organizations such as Credit Agricole Mutuel de Madagascar (CECAM), but are still approached with some suspicion by producers due to previous bad experiences. From the lender’s perspective, lack of collateral or credit history also complicates access to credit, which could be used to pay for inputs or prepare in advance for shocks. Market players, particularly wholesalers, need a substantial amount of working capital, and they rely on credit to manage price fluctuations and replenish stocks.

Mobile money is seen by many in the sector as the best option for financial inclusion of rural poor (IFC, 2023), and communities seemed to welcome increased access to mobile money tools. The study team also found that savings groups (*vonamy*) were more commonly used by producers to smooth cash flow or make small investments. Regardless of whether a savings group was present in the community, these groups were positively viewed. The introduction of mobile money, either linked to savings groups or stand-alone, was also of interest to communities.

Market System Resilience

Market systems resilience (MSR) is a lens that looks at the ability of markets to innovate, mitigate, and adapt, to solve problems in the face of shocks and stresses, and therefore better serve targeted households. The framing outlined below (Table 39 and Table 40) looks at both structural and behavioral issues within a market system to determine how well the system can adapt and support household resilience. MSR also recognizes that market systems are constantly evolving; and positive or negative interaction with aid actors can shape how the system responds, making it either increasingly resilient or more fragile. Better understanding and programming around these factors improve outcomes for market actors and the households that rely on those market systems.

Table 39: Zebu Market System Resilience - Structural Domains

Structural Domains (how markets are organized)	
DIVERSITY *How much variety is there in products, sales channels, business models, etc.?* ● There is a very good diversity of sales channels: local, regional, and national sales channels exist. ● There is a diversity in business models: Zebu are used for saving at the household level, and commercial purposes by processors ● Good diversity of products, including meat, yogurt, curdled milk.	**RULE OF LAW** *Who sets and maintains the rules (informal and formal)? Are they consistent and fair?* ● The government has put in place a high level of administrative oversight in the market system to reduce the sale of stolen cattle. ● Lack of secure property rights and enforceable contracts creates risk for producers and traders, constraining trade ● Administrative procedures are onerous, and this can lead to opportunities for petty corruption, including fake sale and purchase papers for stolen zebus.
CONNECTIVITY *Who's trading and talking with whom, why, and how is this changing over time? How and to what extent do market actors interact across geographies, ecologies, and social groups?* ● Connectivity is good. Collectors and wholesalers connect rural producers to district and urban zebu markets. ● BoViMa helps link producers to market opportunities.	**POWER** *Where and how is power concentrated and exercised?* ● Producers have a reasonable understanding of prices and can negotiate better than in other market systems. Concerns about scarcity meant that producers are in a better negotiation position. ● Dahalo, and the threat of violent conflict, exercise considerable influence over market system behavior, as market actors seek to protect themselves from losses. ● BoViMa has less power than would be expected for a market actor of their size, due to the limitations initially placed on them by the government.

Table 40: Zebu Market System Resilience - Behavioral Domains

Behavioral Domains (what shapes the actions of market actors)	
COMPETITION *To what extent is there rivalry between market actors?* ● Competition is reduced by the structure of the market system: households breed zebu primarily to increase their herd size (rather than to make a profit) but competition remains robust due to the cultural importance and declining number of animals.	**BUSINESS STRATEGY** *To what extent do business strategies proactively plan for risks? To what extent are they fair and generate customer value?* ● Households manage the risk of cattle theft by limiting the size and number of animals raised. ● Collectors take advantage of low zebu prices during periods of crisis (drought, lack of feed) to increase profits. ● High insecurity (zebu theft) disincentives producers from investing in technical innovations and business investments related to zebu production.
COOPERATION *How are market actors collaborating to achieve a common purpose or function?* ● Producers form associations and partner with companies like BoViMa to increase market access. ● There is some evidence of community activities to address cattle theft.	**DECISION-MAKING** *To what extent is evidence used to identify solutions?* ● Producers use traditional animal husbandry approaches and make production decisions based on culture rather than opportunity. ● Butchers and retailers are reactive, generally resisting change (e.g., use of refrigeration) rather than identifying opportunities. ● BoViMa has demonstrated innovative thinking on how to operate in a challenging environment.

Overall, the zebu market system is quite resilient and more proactive than many market systems in Madagascar, as evidenced by the way it has responded to issues of cattle theft and the export ban. Connectivity is good throughout the market, but this has not translated into innovation or adaptation for all market actors. The diversity of products and business models is good given the challenges of the context. The rule of law is restrictive to the market system, but this is understandable given community concerns of dropping zebu numbers and potential for conflict.

Conclusion: Summary of Barriers and Constraints for Market Actors and Households

While the zebu market system is functioning better than several market systems explored in this assessment, activities to strengthen this sector are not recommended for livelihoods programming under graduation models. This is due to the lack of incentives for households to increase productivity or gain income from zebu. The exception might be investments in dairy, and the linked market chain of animal feed. (See also the discussion in Annex C and Annex D regarding animal feed.) Where there is a wider goal of improved animal husbandry (within graduation programs for example) it may be possible to leverage household interest in zebu to help producers learn the necessary skills, which can be applied to other market systems. Table 41 summarizes some of the other market barriers or constraints and the opportunities for households to overcome them.

Table 41: Zebu Market Barriers and Household Opportunities

Market Barrier or Constraint	Opportunity/Gap for Households
Farmers have limited incentive to invest in technical innovation and business development, given high rates of cattle theft, and do not have the financial resources to develop their businesses.	Producers acknowledge that they do not consistently use best practices for animal husbandry. Training activities to improve animal husbandry knowledge, paired with farm planning and cash transfers to allow households to put their knowledge and improve productivity. To reinforce positive norms around decision-making, the project could offer skill building to both male and female heads of household together.
Input systems are weak, and producers feel they do not have enough money to "invest" in veterinary services. Direct aid for vet services is likely to undermine veterinary systems in the long run.	Using evidence on supporting veterinary systems from other USAID programs—including private veterinary provider models—graduation activities could be layered with market system approaches implemented by other actors that address producer challenges, so that 'graduates' do not fall back into poverty and/or poor practices once graduation programs have completed.
Producers do not have the information and capacity to negotiate for better prices at the time of sale.	Identify opportunities for the use of mobile technology to better track animals, provide information on pasture, and other opportunities for climate adaptation.
Financial inclusion is low, but savings groups have been well received.	There is an opportunity to build on the existing culture of savings and the successes of existing savings groups. While mobile phone ownership is not high, phones are often a shared asset in communities, and activities to increase phone ownership could catalyze other resilience outcomes.
There is insufficient production of fodder, despite availability of raw materials, and decreasing pasture availability.	Fodder production could be included as an option for the livelihood activities of graduation programs, and linking activities created between livestock producers and fodder producers.
The potential of private sector partnership is not fully realized for producers in terms of increased knowledge, increased access to markets, and increased income	Learning from the BoViMa experience to date, identify other private sector partners who are interested in helping find market opportunities for poor households; then link these opportunities to graduation program beneficiaries.
The zebu market is particularly vulnerable to corruption.	The Ministry of the Interior recommends a one-stop-shop approach to organize and manage the zebu market and minimize corruption and zebu theft. The goal of this approach is to facilitate sale and purchase transactions of zebu and increase transparency around these transactions (including required paperwork and taxes). This approach is partially administered by most communes in the region.

Annex K: Region Profiles

REGION PROFILE:
Atsimo Andrefana

ATSIMO ANDREFANA

Household Size
Average Household size is **5.1**

Assets
28.3% of HHs own no livestock or land

Youth
58.5% of the District is age 18 or younger

Education
52.2% Heads of Household with no education; while **28.3%** have only primary education

Financial Inclusion
42.3% own a mobile phone; phones also support better access to market information

Livelihoods
40.5% of men and **31.2%** of women work in agriculture

Common Agricultural Livelihoods for Poorer Households in Atsimo Andrefana

Poorer households

Cassava	Rice
Maize (near river)	Wild plants
Groundnuts	(cactus, legumes)
Zebu	Pumpkins
Chickens	Watermelons
Sweet potatoes	

Better off households

Cassava	Cattle
Maize (near river)	Sweet potato
Groundnuts	Rice
Zebu	Legumes
Chickens	Fish

Typical Household Consumption in Atsimo Andrefana

Foods typically grown/raised

manioc/yams	Legume
Zebu	Cassava
Maize	Sweet Potato
Sorghum	Cowpeas
goats	Mung beans
local chicken	Lima beans
Groundnut	

Foods typically purchased

Rice	goats
Veg oil	Maize
beans	Legumes
cape peas/peas	Sweet Potato
onions	Meat
tomatoes	Sugar

REGION PROFILE: **Androy**

ANDROY

Household Size
Average Household size is **5.3**

Assets
16.4% of HHs own no livestock or land

Youth
65.4% of the District is age 18 or younger

Education
61.1% Heads of Household with no education; while **31.7%** have only primary education

Financial Inclusion
27.1% own a mobile phone; phones also support better access to market information

Livelihoods
60.5% of men and **62.3%** of women work in agriculture

Common Agricultural Livelihoods for Poorer Households in Androy

Poorer households

Maize	Zebu
Rice (north)	Goats
Sorghum	Chickens
Sweet Potato	Oxen
Cassava	Cactus
Beans (north)	Cowpea
Groundnuts (north)	Rice

Better off households

Maize	Fishing
Rice (north)	Zebu
Sorghum	Goats
Sweet Potato	Chickens
Cassava	Oxen
Beans (north)	Dairy products
Groundnuts (north)	Fish

Typical Household Consumption in Androy

Foods typically grown/raised

maize	chickens
black-eyed peas/	sorghum
manioc/sweet	Cassava
potato	Cowpea
beans	Watermelon
Zebu	Groundnuts
goats	

Foods typically purchased

rice	water
oil	maize
tomatoes	groundnuts
onion	cassava
salt	

REGION PROFILE: **Anosy**

ANOSY

Household Size
Average Household size is **4.6**

Assets
17.6% of HHs own no livestock or land

Youth
59.4% of the District is age 18 or younger

Education
62.6% Heads of Household with no education; while **27.4%** have only primary education

Financial Inclusion
28.4% own a mobile phone; phones also support better access to market information

Livelihoods
62.9% of men and **56.9%** of women work in agriculture

Common Agricultural Livelihoods for Poorer Households in Anosy

Poorer households

Sisal	Sorghum
Cassava	Zebu
Sweet Potato	Chickens
Rice	Cowpeas
Maize	

Better off households

Maize	Fishing
Rice (north)	Zebu
Sorghum	Goats
Sweet Potato	Chickens
Cassava	Oxen
Beans (north)	Dairy products
Groundnuts (north)	Fish

Typical Household Consumption in Anosy

Foods typically grown/raised

cassava	cabbage
rice	chicken
sweet potato	cowpeas
maize	groundnuts
beans	pumpkins
cucumbers	watermelons
peanuts	goats
eggplant	zebu
peppers	

Foods typically purchased

cassava	maize
rice	sweet potato
beans	sugar
oil	

REGION PROFILE: **Atsimo Atsinanana**

ATSIMO ATSINANANA

Household Size
Average Household size is **5.3**

Assets
10.7% of HHs own no livestock or land

Youth
60.0% of the District is age 18 or younger

Education
49.2% Heads of Household with no education; while **37.8%** have only primary education

Financial Inclusion
22.8% own a mobile phone; phones also support better access to market information

Livelihoods
83.9% of men and **47.8%** of women work in agriculture

Common Agricultural Livelihoods for Poorer Households in Atsimo Atsinanana

Poorer households

Cassava	Beans
Sweet Potato	Zebu
Rice (east)	Chickens

Better off households

Maize	Zebu
Rice (north)	Chickens
Rice (east)	Cash crops
Beans	(vanilla, cloves)
Groundnuts	

Typical Household Consumption in Atsimo Atsinanana

Foods typically grown/raised

Cassava/sweet potato	Zebu
Rice	Chickens
Beans	Coffee
Groundnuts	Vanilla

Foods typically purchased

Oil	chickens
Rice