

**MADAGASCAR  
DEFIS+**

**ANNEX 2.d**

**VALUE CHAIN ANALYSES**

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## Introduction

This Annex provides further details of the Public, Private, Producer Partnerships (4P approach) applied in DEFIS and the value chain analyses that have been undertaken on the prioritized commodities in the different regions. This Annex focuses on the market opportunities for the commodities while the climate risk analyses for the different commodities and regions are presented in Annex 2b.

### Public, Private, Producer Partnerships (4P approach)

DEFIS applies the **4P approach, whose main characteristics** (as opposed to PPPs) include the following: (a) Private-sector involvement is planned early on so that it becomes part of project design and implementation, and partnership results are systematically monitored and evaluated as part of the project's results framework. (b) To the extent possible and relevant, the private-sector partner is selected through a competitive or rigorous selection process that ensures transparency and objectivity, and meets the project's social, economic and environmental objectives. (c) Producers play an active role in the negotiations and partnership arrangements (both formal and informal), governance and monitoring. (d) A 4P is a true partnership in which each partner has clear roles and responsibilities, and shares risks and benefits. Private-sector partners are expected to allocate matching financial resources. (e) Linking with the private sector through a 4P ensures that interventions are sustained beyond the project lifetime because they follow business logic and all involved parties benefit. A 4P should be seen as an entry point to scaling up project results through private-sector investment.

There are **two modalities for identifying and selecting 4P partners**: (i) competitive selection; and (ii) purposeful selection. Both have their merits and disadvantages. The first is more transparent, ideally allowing broader outreach to potential partners (the project might not know all available or interested private entities) and is less vulnerable to "rent-seeking." The second is faster, which makes it easier to build on existing relationships and avoid time-consuming and costly selection processes; however, this modality may be vulnerable to "rent-seeking." It may also be the only available option: (i) in the project area (e.g. because there is a limited number of companies); (ii) in cases when a private partner has already been identified and pre-selected by the government; or (iii) when a 4P is initiated by a private company itself. To facilitate broad participation, it is recommended to either map the entire sector and proactively scout for companies, or broadly advertise any competitive calls.

Once a clear rationale for a 4P is defined and suitable partners are identified, the business case for the partnership needs to be developed and formalized. To this end, the type of business model chosen by the private partners (producers and private companies) is a critical element in ensuring efficient and profitable business for every party. The type of business model depends on the nature of: the product (perishable, bulk commodity, differentiated, etc.); partners (producers, buyers, processors, exporters, etc.); and end market. For example, a collaborative and highly integrated business model (e.g. contract farming) is more frequently employed with perishable commodities, such as fresh fruits and vegetables, dairy and meat sold in formal retail markets (e.g. supermarkets), which require continuous and consistent delivery, traceability and high food safety standards. The same applies to cash crops that are sold to a specific buyer who interfaces exclusively with several producers. In cases such as these, vertically integrated business models such as contract farming and out-grower schemes may be the natural choice. In both cases, the business model is binding for the partners, who become mutually dependent: farmers have only one buyer for their produce,

while the company relies on them to provide the raw material needed to make its processing business profitable.

Conversely, when there is enough competition among buyers and a good capacity among producers (e.g., well-established farmers organizations), the business model can be less integrated and based on a more horizontal relationship between the partners. This model is much less binding and the actors have more flexibility to choose their partners and diversify their business relationships.

## VALUE CHAIN ANALYSIS FOR THE MAIZE SECTOR IN THE IHOROMBE REGION

### Introduction

Maize is one of the priority sectors to be promoted under the DEFIS Program. For this, the strategy adopted by the Program for the implementation of its Component 2: "Development of inclusive supply chains" is the application of the aggregation system which consists in mobilizing private investors to become more involved with producers or producer organizations in a partnership based on medium or large-scale contract farming. As such, the program provides incentives such as, among others, the establishment of a legal framework (legislation) and financial incentive for interested investors to contribute to the related investments. Through this study, the DEFIS program is prospecting for investors potentially capable of assuming the role(s) of aggregators. At the current stage of the study, the following potential investors were pre-identified, namely: the company LFL Agri3, the company TOZZI GREEN and the company AGRIPRO and two other companies specializing in the collection and sale of local products whose headquarters are in Antsirabe.

### Main Challenges and Opportunities

The strengths as well as the weaknesses that characterize the maize sector in the 3 study regions can be grouped together in the SWOT tables below:

#### Production level:

<b>Strengths</b>	<b>Weaknesses</b>
<ul style="list-style-type: none"> <li>▪ Maize occupies the 2nd if not the 3rd position among the food crops grown in the selected development poles;</li> <li>▪ Effort devoted by the Government to plant protection, particularly the fight against FAW;</li> <li>▪ Existence of an intensive support program to promote the production of improved seeds (via promotion of PMS / GPS through various agricultural programs / projects).</li> </ul>	<ul style="list-style-type: none"> <li>▪ Low capacity of producers and their organizations (technical, organizational, managerial);</li> <li>▪ Difficulty in accessing production factors (land, inputs &amp; adequate materials);</li> <li>▪ (Lack of investment security (agricultural insurance, development bank, etc.);</li> <li>▪ Insufficient public-private dialogue at regional / local level;</li> <li>▪ Non-compliance with contracts (for some producers who are already working in agribusiness).</li> </ul>
<b>Opportunities</b>	<b>Threats</b>
<ul style="list-style-type: none"> <li>▪ Possibility of expanding crops thanks to the large area of cultivable land;</li> <li>▪ Establishment of the agricultural integration system to be developed under the DEFIS Program;</li> <li>▪ Ease of agricultural supplies due to the proximity of the targeted development poles to the main roads (RN7, Ambositra-Ambatofinandrahana, Fianarantsoa –Ikalamavony);</li> <li>▪ Promotion of the multiplication of improved seeds at the regional / local level through support to farmers / seed multiplier groups, in collaboration with</li> </ul>	<ul style="list-style-type: none"> <li>▪ Proliferation of crop enemies, particularly FAW;</li> <li>▪ Risk of difficulty in applying the agricultural integration system for various reasons including: <u>Private sector's side:</u> <ul style="list-style-type: none"> <li>▪ Scarcity of private companies with the capacity and motivation to play the role of agricultural integrator(s);</li> </ul> <u>Farmer's side:</u> <ul style="list-style-type: none"> <li>▪ The low level of structuring and organization of producers in the target poles;</li> <li>▪ Peasants' low adherence to the partnership system (OP-OM couple);</li> </ul> </li> </ul>

<p>the Plant Protection Department (DPV) and FOFIFA research institution;</p> <ul style="list-style-type: none"> <li>▪ Existence of other training programs / projects for young farmers (eg FORMAPROD).</li> </ul>	<ul style="list-style-type: none"> <li>▪ Dishonesty of certain producers (non-respect of contracts);</li> <li>▪ Non-existence or poor conditions of infrastructure (hydro-agricultural, road) in isolated areas, making agricultural supplies difficult;</li> <li>▪ Land dispute.</li> </ul>
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Transformation level:

<b>Strengths</b>	<b>Weaknesses</b>
<ul style="list-style-type: none"> <li>▪ Existence of small maize hulling / grinding units in rural areas.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Insufficient, or even non-existence, processing units that are adequate and meet the standards required in rural areas.</li> </ul>
<b>Opportunities</b>	<b>Threats</b>
<ul style="list-style-type: none"> <li>▪ Existence of agro-industrial companies, which have grain treatment / processing units (degerming, production of feed).</li> </ul>	<ul style="list-style-type: none"> <li>▪ Risk of corn processing monopoly by large agro-industrial companies to the disadvantage of producers (especially in terms of price setting).</li> </ul>

Commercialization/distribution level:

<b>Strengths</b>	<b>Weaknesses</b>
<ul style="list-style-type: none"> <li>▪ The corn market is not yet saturated, both domestically and externally.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Long marketing circuit to the detriment of producers due to the existence of many players (touts, collectors, wholesalers, agro-industries, etc.).</li> </ul>
<b>Opportunities</b>	<b>Threats</b>
<ul style="list-style-type: none"> <li>▪ Increased demand for corn on the market (especially for animal feed).</li> </ul>	<ul style="list-style-type: none"> <li>▪ Risk of possible reduction in the prices of local products in general, and that of maize to the producer, following production in large quantities on the right bank of the Lower Mangoky River.</li> </ul>

### Recommendations

By referring to the characteristics of the sector as well as the above diagnostic analysis, the integration process would require the establishment of the prerequisites for a fair partnership between producers and future integrators, from upstream to downstream of the value chain. As such, the following actions should be carried out with diligence, namely:

- 1) The organization of an information-awareness campaign on the ins and outs of the DEFIS Program by highlighting the detailed explanation of the strategy for implementing the actions planned relating to component 2, particularly those related to the application of the agricultural integration system at the level of the intervention poles of the Program;
- 2) The organization of a “Business to Business” workshop involving representatives of producer organizations and those of agro-industrial and / or commercial firms on agricultural integration and the conditions for its implementation by region and by development pole;
- 3) Establishment of a strategy for securing investments to motivate all stakeholders in the sector, particularly investors, if necessary updating the legislative texts governing agricultural investments;

- 4) The development of a capacity building plan for producers which focuses on instilling a culture of partnership among the various actors in the maize sector, particularly producers; this prior capacity building is essential insofar as it is considered a guarantee of the success of future actions;
- 5) The development of business plans for producer organizations, with the support of the DEFIS Program, with a view to concretizing what will have been decided jointly among the participants in the workshop;
- 6) Preparation and signature of partnership agreements specifying the commitments and contributions (financial and material) of each stakeholder as well as the related budget;
- 7) Establishment of an action plan defining the activities to be carried out and the related monitoring schedule and including the appropriate support measures, including technical, organizational and managerial training for producers and their organizations, as well as risk sharing between stakeholders, making it possible to perpetuate the activities to be carried out.

## VALUE CHAIN ANALYSIS FOR THE HONEY SECTOR IN THE AMORON'I MANIA REGION

### Main opportunities:

The potential of the honey sector to become more innovative can be summarized in the few action points below:

1. Establishment of a bee resources protection system: professionalization of producers / swarm catchers and increase in plots occupied by honey plants;
2. Facilitation of access to beekeeping inputs;
3. Capacity building of beekeepers and improvement of pest control, especially varroa mites;
4. Restructuring of producers and strengthening of the synergy among actors;
5. Improvement of extractive infrastructure;
6. Establishment of the traceability mode for beekeeping products;
7. Improvement of commercial connections: targeting of the local / national market, with reference production units;
8. Improvement of the institutional framework for beekeeping: texts in force.

### Recommendations

Objectives	Actions
Swarm capture and queen rearing have become independent activities in the 'honey' value chain.	<ul style="list-style-type: none"> <li>▪ Identification of producers and / or existing swarm catchers: with OPRs or not;</li> <li>▪ Training and / or retraining in beekeeping technique, accompanied by practical application, depending on the context of beekeepers' activity: <ul style="list-style-type: none"> <li>• queen breeding;</li> <li>• swarming system;</li> <li>• capture technique.</li> </ul> </li> <li>▪ Certification / approval of producers and / or professional swarm catchers;</li> <li>▪ Equipment support for producers and / or professional swarm collectors;</li> <li>▪ Identification and establishment of a production area or a swarm multiplier centre.</li> </ul>
Seeds are available to promote honey plants and / or essences.	<ul style="list-style-type: none"> <li>▪ Bringing beekeepers and / or OPR into contact with a seed centre for forest seeds or not, e.g., SNGF;</li> <li>▪ Identify the needs for seeds in honey plants for possible collaboration with various centres;</li> <li>▪ Research on the various honey species and support of beekeepers in establishing a map representing the dominant honey species;</li> <li>▪ Collaboration with SNGF.</li> </ul>
The areas occupied by plants and / or honey species increase.	<ul style="list-style-type: none"> <li>▪ Identification of existing nurserymen: with OPRs or not;</li> </ul>

	<ul style="list-style-type: none"> <li>▪ Training and / or capacity building of nurserymen in setting up nurseries for honey plants;</li> <li>▪ Certification / accreditation of professional nurserymen;</li> <li>▪ Equipment support for nurserymen.</li> </ul>
Activities related to that of beekeepers are recognized as useful.	<ul style="list-style-type: none"> <li>▪ Identification of actors whose activity is related to that of beekeepers (e.g.: carpenters for beehives, blacksmiths for small metal equipment, etc.): with OPRs or not;</li> <li>▪ Training and / or capacity building of actors whose activity is related to that of beekeepers;</li> <li>▪ Certification / approval of actors whose activity is related to that of beekeepers;</li> <li>▪ Support for actors whose activity is related to that of beekeepers.</li> </ul>
Beekeepers have easy access to financial services.	<ul style="list-style-type: none"> <li>▪ Create financial products adapted to beekeeping (seasonality, storage credit, adequate amounts and reimbursements) or support for the creation of these with micro-finance institutions;</li> <li>▪ Facilitation of the supply of inputs and modern beekeeping materials (eg: beehives, embossed wax (even embossed wax machine), queen screens, refractometer, storage barrels, etc.): loans at very advantageous rates, equipment subsidies (hives).</li> </ul>
Good coordination is established upstream of honey production.	<ul style="list-style-type: none"> <li>▪ Support beekeepers in establishing a strong link between them and other clusters in their activities (nurserymen, fruit tree owners, local craftsmen, carpenters and blacksmiths).</li> </ul>
The supply of beekeeping inputs nearby and guaranteed in the long term.	<ul style="list-style-type: none"> <li>▪ Study of setting up a beekeeping counter;</li> <li>▪ Establishment of 3 counters in beekeeping inputs;</li> <li>▪ Support in the extension of beekeeping operations: renovation of beehives, acquisition of refractometer, acquisition of extractor, (4 frames for mobile extraction and 9 frames for extraction rooms), acquisition of dehumidifier, purchase of wax machine embossed, etc.</li> </ul>
Beekeepers master modern beekeeping technique, with control of the spread of varroasis.	<ul style="list-style-type: none"> <li>▪ Training and / or retraining in beekeeping technique, accompanied by a practical application, depending on the context of beekeepers' activity: -Conduct: domestication of bees and management of the apiary (good practice and beekeeping hygiene);</li> </ul>

	<ul style="list-style-type: none"> <li>-Mechanical control against varroasis;</li> <li>-Principle of extraction;</li> <li>-Beekeeping management.</li> <li>▪ Support cascade training;</li> <li>▪ Management advice;</li> <li>▪ Support for the fight against varroasis through Communal Animal Health Agents (ACSA);</li> <li>▪ Support for the accompaniment of the adoption of modern beekeeping technique through 'beekeeping' technicians within structured beekeepers;</li> <li>▪ Setting up an apiary - demonstration school.</li> </ul>
The quality of honey improves.	<ul style="list-style-type: none"> <li>▪ Training of supervisors in apiaries – school;</li> <li>▪ Training and / or retraining in standards and quality (good beekeeping practice and hygiene), accompanied by practical application;</li> </ul>
Beekeepers are aware of the profitability of beekeeping and consider the sector as a main activity.	<ul style="list-style-type: none"> <li>▪ Training in farm account keeping, accompanied by practical application;</li> <li>▪ Training in organizational management: time management, sustainability of activities and community life;</li> <li>▪ Calculation of the cost of the beekeeping operation with beekeepers.</li> </ul>
Beekeepers are aware of the profitability of beekeeping and consider the sector as a main activity.	<ul style="list-style-type: none"> <li>▪ Exchange visits between regional and interregional beekeepers.</li> </ul>
The situation of the fight against varroasis is known.	<ul style="list-style-type: none"> <li>▪ Capitalization of the various struggles against varroasis.</li> </ul>
Reliable statistics on honey production exist.	<ul style="list-style-type: none"> <li>▪ Support for the establishment of a regional database on honey production;</li> <li>▪ Strengthen the synergy between stakeholders through the revitalization of the Honey platform, for strong collaboration between the public and private sectors and establish reliable statistics in the context of beekeeping.</li> </ul>
The honey platform is revitalized.	<ul style="list-style-type: none"> <li>▪ Improve the possibility of exchanges between beekeepers to bring out great ideas and share experiences, thanks to the Honey platform;</li> <li>▪ Regional day driving on honey.</li> </ul>
The structuring of beekeepers is improving.	<ul style="list-style-type: none"> <li>▪ Organization of grassroots beekeepers in organization of grassroots producers (OPB);</li> <li>▪ Incentive for OPB membership in PROs.</li> </ul>
Beekeepers know their production capacity and have become solvent.	<ul style="list-style-type: none"> <li>▪ Training in market research, accompanied by a practical application: <ul style="list-style-type: none"> <li>• Production estimate;</li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>• Supply and demand management;</li> <li>• Marketing strategy.</li> </ul> <ul style="list-style-type: none"> <li>▪ Training on group sales organization and support with a practical case through the establishment of a sales counter;</li> </ul>
Beekeepers manage to create commercial structures.	<ul style="list-style-type: none"> <li>▪ Training on commercial structures: professional organization with an agricultural vocation, rural enterprise, cooperative</li> </ul>
Beekeepers manage to market products that are well packaged in quality according to standards.	<ul style="list-style-type: none"> <li>▪ Training on wrapping and packaging technique, accompanied by practical application;</li> <li>▪ Support improved packaging and product presentation: put beekeepers in touch with a packaging supplier;</li> <li>▪ Establish a phy.tosanitary surveillance and COS issuance system;</li> <li>▪ Protect the image of honey as a pure and healthy product by setting up a production sheet.</li> </ul>
Honey is certified according to standards and quality.	<ul style="list-style-type: none"> <li>▪ Study on the establishment of a certification laboratory for beekeeping products;</li> <li>▪ Establishment of a certification laboratory for beekeeping products;</li> <li>▪ Equipment and operationalization of the regional laboratory: motorbike (2), computers (2), gps (2), refractometer (2), lab support (honey quality test kit (1), acquisition of varroasis control products (batch 3000 hives);</li> <li>▪ Support for honey certification (organic, etc.)</li> </ul>
Beekeepers manage to position themselves in relation to the different types of markets.	<ul style="list-style-type: none"> <li>▪ Support for honey advertising and promotion actions;</li> <li>▪ Support for the participation of beekeepers in various commercial events (national, regional fair, etc.);</li> <li>▪ Make the label widely known;</li> <li>▪ Support for research and successful commercial connections between beekeepers and market operators and / or exporters.</li> </ul>
Relationships and / or commercial connections between the various actors are strengthened.	<ul style="list-style-type: none"> <li>▪ Support for conventional contractualization between the various players in the honey sector: beekeeper / collector - collector / transporter - beekeeper / packaging supplier.</li> </ul>

## VALUE CHAIN ANALYSIS FOR THE COFFEE SECTOR IN THE ATSIMO- ATSINANANA REGION

### Main Challenges

#### Historical factors:

Canephora, commonly called the name of the most widespread 'Robusta', was introduced in Madagascar towards the beginning of the 1940s.

#### Agroecological factors:

Coffee is suitable for a humid tropical climate, which requires altitude below 800 m, an annual average temperature of 20 ° C at 25 ° C, an average annual rainfall of 1500 to 2500 mm.

#### Economic factors:

- Coffee is the second most traded commodity in the world, behind the oil;
- 125 million people make a living from coffee growing in the world, including 25 million small producers;
- 400 billion cups of coffee are drunk per year, or around 12 000 cups per second;
- The international coffee market is considerable while Madagascar contributes only 1.4% of world production;
- There is a strong demand on the national market.

#### Problems related to factors of production:

- Most coffee growers only use manure as fertilizer;
- The yield is largely down.

#### Processing issues:

- There are no processing plants in the region (roasting, production of ground coffee, manufacture of soluble coffee, etc.);
- The virtual monopoly of industrial roasting in Madagascar is owned by the TAF Company with a current average capacity of 1000 t / year;
- Farmers rush to harvest when coffee arrives not yet mature (due to the need for money, following pressure collectors, for fear of theft) leading to problems of quality;
- Unsuitable solar drying, insufficient space, drying at night leading to the proliferation of molds;
- Lack of conditioning preparers.

#### Marketing issues:

- Decrease in quality not corresponding to international requirements;
- Price on the international market not competitive;
- High transport cost to transfer the products to Tamatave: 220 Ar / kg.

### ***A focus on environmental and climate factors***

#### Environmental impacts:

The entire coffee value chain has an impact on its ecosystem at the local level. This value chain has an interaction directly with the following elements:

- Water (for production);
- Land (for production);

- Fossil energy (for transport and processing);
- Forests (biodiversity).

The cultivation of coffee has an impact mainly on the soil and its fertility. Except at the planting phase, coffee does not generally benefit from any input (mineral or organic). However, the coffee tree draws the mineral elements that it needs from the ground. Without the addition of organic matter, the soil gradually becomes depleted and the microorganisms cannot no longer produce enough mineral elements for the tree. Soil without organic matter loses its structure and will be leached faster. This process is slow and invisible in the short term, but it is extremely damaging in the long term: soils can become sterile and unsuitable for cultivation. Finally, coffee plantations often start with the "Tavy" technique, consisting in burning the plots to weed and in enriching the soil with mineral elements that can directly be assimilated by the new plantations. This practice, if it is carried out on a slope, risks to cause erosion since no vegetation cover survives while booting. This erosion causes the topsoil (fertile) of the plot and if no vegetation cover reappears (in addition to the plantation), the phenomenon will continue and even accelerate with time. In addition, this practice contributes to deforestation and, eventually, to the decrease in biodiversity. This observation is not valid if the planting is done under natural forest cover.

#### Climate impacts:

One of the main climate hazards threatening the coffee value chain is the increase in dry sequences, coupled with the increase in temperature, which result in an increase in drought events. However, coffee cultivation requires at least 1,500 mm of water per year according to FOFIFA. Drought episodes can have serious consequences during the planting phase but also during the production phase. According to the DGM, the average minimum precipitation recorded between 1989 and 2018 were already below this limit at Atsimo-Atsinanana. Still according to the DGM, climate projections (RCP 4.5 and 8.5) show a decrease in precipitation of 4 to 6% by 2050 over most of the Astimo-Atsinanana region. This decrease could even reach 8 to 10% by 2080 in the north-eastern part of the region (RCP 8.5). Climate change is likely to accentuate these different impacts, thereby reducing the yields and the quality of harvests. It is therefore essential to consider these dangers in order to better adapt.

When planting, a water deficit risks causing:

- 1) A low germination rate from October to December;
- 2) Significant mortality of young seedlings at the time of transplantation (April - May).

In addition, once the coffee tree is well established, a water deficit and increase in temperatures will also have the following significant consequences:

- 1) The flowers may abort, which will limit the quantity of cherries produced (September to October);
- 2) The tutor may also lose his leaves, which will decrease beneficial shading, increasing the previous impact;
- 3) In addition, at the time of ripening (October to May), a water deficit will limit grain filling, reducing their size.

All these intermediate impacts generate a reduction in yields. The impact of climate change will be stronger among varieties that are more sensitive to high temperatures, such as the

“Arabica” varieties. There is therefore a risk of reduced income for producers of coffee because of the increase in the number of dry sequences and the increase in temperature.

### **Adaptation/Mitigation Measures**

#### Environmentally friendly measures:

Maintaining soil fertility is essential. For this, it is important to allow the recycling of soil conditions that are favourable to the plant growth, in particular by maintaining a level of sufficient organic matter in the soil. The "Tavy" practice must be regulated. The legislation is not enough, it is essential to sensitize the populations to practice this technique. For this reason, it is necessary to offer alternatives to what the "tavy" offers, that is to say weed and amend. Agroforestry is often seen as an obvious solution. The combination of different trees drawing their resources from various depths partially regenerate the rate of organic material (leaf, branch, fruit jute, etc.). It is strongly recommended to keep this type of practice in the area and avoid any monoculture. Agroecology is also an effective solution to safeguard soil fertility. Agroecological practices are already in use by some farmers. It is therefore necessary to rely on these farmers. This must first go through a census of practices, projects and potential partners. Public research should also focus on these practices and extension and technical support services (eg: DRAEP) should encourage farmers in this direction by strengthening their technical capabilities. The measures to be considered are numerous and must be the subject of an in-depth value chain study. However, the team strongly encourages:

- Protect the soil from meteorological aggressions such as mulching or plant cover to limit erosion and leaching;
- Develop mixed composting techniques (plant origin and animal) to maintain soil structure and fertility.

These examples generate an additional cost in terms of time and / or finance without allowing a growth in yields (but at least by limiting their decrease) which is obviously not a very strong incentive for a farmer whose survival depends on his crops.

Also, financial support may be necessary in addition to capacity building and increased awareness. This financial support can be channelled through so-called smart grants, which very often, provide co-financing to set up particular agricultural practices.

#### Climate adaptation measures:

In order to limit the risk of drought events, it is important to consider the following adaptation options:

- The development of water conservation techniques (mulching, association of cultures) by building the capacities of support services and through exchange visits for the discovery of new practices;
- The possible (but costly) installation of drip irrigation systems;
- Research and introduction (with support to nurserymen) of new varieties that are more resistant to water stress;
- Strengthening the resources of support and research services to allow the dissemination of technical data sheets.

### **Constraints**

#### Economic constraints:

- Aging of the plantation, lack of cultural maintenance and no renewal.

- Drop in production and poor quality (neglected plantations after price drops, neglect of product quality, picking cherries that are still green because of insecurity and poor living conditions).
- Unorganized market: collectors determine prices and there are several informal collectors who buy before the date of campaign opening - there are many intermediaries, non-professional collectors and opportunistic exporters.
- Insufficient quality control and non-existence of standard product calibration.
- Production areas inaccessible due to the poor condition of roads and the failure of ferries.
- Poor quality of the region's production due to early harvests compared to other producing regions such as on the east coast, in the Atsinanana, Vatovavy Fitovinany and in the Sambirano Valley.
- Lack of material and financial means: no infrastructure storage of cherry coffees during drying, missing of equipment.
- Lack of statistical data on the coffee value chain.
- Technical and agroecological standards exist but are not broadcast in the entire region.
- Lack of support structure and supervision of producers (insufficient capacity building).
- Variety of Arabica coffee in great demand by transformation companies, but that does not exist in the region.

Inclusion constraints:

- The lack of supervision of the sector allows opportunistic operators to bring poor quality products into the market.
- Sector not yet structured, the reputation of Malagasy coffee is threatened by the lack of professionalism and structure of the sector.
- The selling price of coffee on the national market is higher than that of the quotation of coffee on the export market.

Climatic constraints:

- Frequent climatic hazards.

**Recommendations**

***Opportunities***

Economic opportunities:

- Presence of a coffee orchard of more than 220,000 ha.
- Possibility of increasing production by rejuvenation and upgrading density of the orchard.
- The commercial margins currently generated allow investments in orchard renewal (size and coppicing) and replanting of certain plots.
- Existence of demand on the international and local market (neighbouring islands).
- The demand for coffee is constantly increasing, especially in emerging countries like India, Russia, but also in coffee producing countries, from Brazil to Kenya.
- Commercial product appreciated on the national market.
- Increase in demand from the national market.
- Transformation of the product on the local market into a product for export (roasted coffee).

Opportunities for inclusion:

- Existence of large farmers and several small producers in the sector.
- With current coffee prices on the international market, the sector is profitable for the small producers because the national market demand is strong.

- Job creation for sorting coffee (with a capacity of sorting of 64 kg per day) and handling with a need for 10 h.j for 3 tons of coffee.

Environmental opportunities:

- Possibility of extension of culture which begins to be done little by little (167 ha for large farmers only).
- Possibility of expanding the cultivated area in the region: 2,510 ha, there is availability of vast plantations of coffee trees that can be harvested. However, there is a risk of deforestation if the appropriate techniques are not implemented by the producers.
- Region very favourable to the cultivation of coffee trees.
- Dominance of plants used as shade (Albizzia lebbeck).

Adaptation to climate change:

- Cultures adapted to the climatic conditions of the region (temperate tropical climate and humid tropical climate).

Opportunities through ICT:

- Production areas mostly covered by telephone networks.
- Production areas covered by national radio broadcasts and local radios.

**Priorities**

The priorities of the coffee value chain at the MICRO level:

- Generalization of the rejuvenation and regeneration of coffee trees.
- Sensitization / training / retraining of all stakeholders (producers, and operators) on good practices, standards - this in order to improve the quality of crops and finished products.
- Creation and promotion of medium-sized production centres to get rid of the excessive atomization of plantations.
- Awareness of operators to get directly involved in base (at producer level) in order to minimize intermediaries. In particular, support to the marketing of harvests for the benefit of producers.
- Improvement of infrastructure (roads, tracks, ports).

The priorities of the coffee value chain at the MESO level:

- Introduction and popularization of performing varieties for which there is demand on the market.
- Facilitate the revitalization of the regional coffee council (former CNC) to ensure quality control.
- Sensitization / training / retraining of all stakeholders (producers, and operators) on national and international norms and quality standards.
- Consolidation of links between participants in the value chain (structuring of the sector).
- Organization of public-private dialogues.
- Implementation of an insurance product.
- Advocacy for the improvement of infrastructure (roads, tracks, ports) to improve the price competitiveness of coffee on the international market.
- Certification is one of the means for promoting products.

The priorities of the coffee value chain at the MACRO level:

- Establishment of a database on the sector.

## VALUE CHAIN ANALYSIS FOR THE ONION SECTOR IN THE ANOSY REGION

### Main Challenges

#### Historical factors:

- From the Latin name "Allium cepa", native of central Asia and introduced to Madagascar from the 15th century, speculation places the island in the 64<sup>th</sup> rank of onion producing countries. Currently, it occupies an important place in the national economy.
- Continuation (and / or finalization of the management actions initiated previously through projects such as ADRA (setting up input shops).
- Current intervention: FAO - PBF: Support for production and marketing.

#### Agroecological factors:

- The onion adapts to clayey-sandy or alluvial soil, humus, not acidic, structurally stable soil that dries quickly and heats up good.
- The temperature below 18 ° C favors the emergence of dormancy of bulbs, vegetative growth, and the issuance of flower stalks. However, the high temperature promotes constitution and formation bulbs. Bulb maturity must occur before installation rains.

#### Economic factors:

- At least 10 trucks per week transport the onion from Betroka in the months of May - June.
- 5 large local collectors are identified in Betroka and are in contact with wholesalers in large cities.
- Strong international demand (COI market (Ocean Commission Indian), COMESA (Common Market for Eastern and Southern Africa), SADC (Southern African Development Community), Europe, India, China, Vietnam, Dubai, etc.), and consumers at the national level (households and restaurants). Export as part of these markets is ensured by the private sector.

#### Problems related to factors of production:

Low productivity linked to the quality of unimproved seeds which are used.

- Problem of access and availability of phytosanitary products and agricultural equipment.
- Poor crop protection, insufficient phytosanitary products suitable for biological control of plant pests.
- Problems of insecurity - theft of cattle - which made access difficult to organic manures, that occupy an important place in the onion production, with needs of 10 tonnes per hectare.
- Producers do not benefit from specific technical frameworks to increase the productivity and quality of the bulbs.
- Difficulty of access to services developed by microfinance structures: high interest rates and difficult collateral requirements to be satisfied by the producers.
- Lack of control over post-harvest operations: method of drying and storage often resulting in significant losses, of the order of 15% according to AAROPA (Support for the Strengthening of Professional Organizations and agricultural services).

#### Marketing issues:

- Sector being revitalized: the majority of producers are almost structured and organized in groupings, but they have a weak negotiating capacity vis-à-vis market operators (OM).
- Degradation of the national road RN13 (Isoanala - Ihosy), long 210 km, main communication route.
- Isolation of the main production areas and insecurity, which limits the intervention of market operators and the quantity of onion produced by the peasants.
- Lack of an umbrella organization promoting dialogue between different marketing partners.
- Absence of a storage warehouse, which would have enabled organizations farmers (PO) to make group sales, for more transparency on pricing and negotiating ability.

### ***A focus on environmental and climate factors***

#### Environmental impacts:

The entire onion value chain has an impact on its ecosystem at the production level, and to a lesser extent at the transport level. This value chain has a direct interaction with the following elements:

- Water (for production);
- Land (for production);
- Fossil energy (for transport).

The cultivation of onions has a significant impact mainly on the soil and his fertility. Indeed, like many cultures, onions do not seem to benefit from sufficient organic manure. Material extractions (bulbs) each year decrease the rate of mineral elements in the plot. In addition, soil microorganisms are responsible for transforming organic matter in the soil into mineral elements. However, without input of material organic, the soil becomes impoverished and microorganisms can no longer produce enough mineral elements for the plants. This process of non-mineralization can be balanced by the addition of mineral fertilizers. These contributions seem non-existent in the study areas. A soil without organic matter loses its structure and will be more leached, which can result in making the earth barren. This mineralization process, coupled with a deficit of organic intake, is slow and invisible in the short term but it is extremely damaging in the long term: soils can become sterile and unsuitable for cultivation.

#### Climate impacts:

One of the main climate hazards threatening the onion value chain is the increase in dry sequences, coupled with the increase in temperature, which will result into more drought events. Drought episodes can have serious consequences at the time of planting but also during the production phase. According to the General Directorate of Meteorology (DGM), climate projections (RCP 4.5 and 8.54) show a decrease in precipitation of 2 to 10% between 2020 and 2089. Climate change therefore risks accentuating these different impacts, thus reducing the yield / quality of crops. It is therefore essential to consider this danger in order to better adapt. When planting, a water deficit risks causing:

- 1) A shift in the agricultural season (soil difficult to work);
- 2) Significant mortality of young seedlings at the time of transplanting (April May);
- 3) Limited maturation (May-June).

All these intermediate impacts generate a reduction in yields or a shift in the campaign, and therefore in marketing, with the risk of seeing sales prices fall.

There is therefore a risk of reduced income for onion producers because of the increase in the number of dry sequences and the increase in temperature.

### **Adaptation/Mitigation Measures**

#### Environmentally friendly measures:

Water and soil fertility seem to be the two critical natural resources that influence onion cultivation. Agroecological practices are often simple solutions. It is therefore necessary to promote these practices, get closer to the organizations that disseminate them and rely on the farmers who implement them. It must first start with an inventory of these practices, projects and potential partners. The measures to be considered are numerous and must be the subject of an in-depth study for each value chain. Nonetheless, the team encourages strongly to:

- Limit monocultures and set up long-term rotations and the combination of crops, to limit the decline in fertility and strengthen soil cover to control erosion;
- Protect the soil against different types of erosion with techniques such as mulch or plant cover to limit erosion;
- The contribution of animal manure (and / or the straying of small ruminants during fallowing) could also help to maintain a significant rate of organic matter. Unfortunately, the contribution of manure does not seem to be used enough. Worse, surveys show a decrease in breeding and the availability of organic manure;
- Develop mixed composting techniques (plant origin and animal) to maintain soil structure and fertility.

These actions, the benefits of which are only visible in the medium or long term, must be supported. Also, financial support may be necessary in order to develop capacity building and increase awareness. This financial support can go through the so-called smart grants, that provide co-financing to set up specific agricultural practices. This can also lead to the development of the private sector through the sale of goods and services by input suppliers specific to agroecology.

#### Climate adaptation measures:

In order to limit the risk of drought, it is important to consider the following adaptation options:

- The development of water conservation techniques (mulching, association of crops) by building the capacity of support services and through exchange visits for the discovery of new practices ;
- The possible (but costly) improvement of irrigation systems;
- Research and introduction (with support to seed companies) of new varieties that are more resistant to water stress;
- Strengthening financial services to improve investment capacities of producers.

### **Constraints**

#### Economic constraints:

- Low negotiating capacity of Manamisoa producers, unions and OPRs.
- Lack of storage infrastructure and post-harvest stores.
- Limited access to agricultural inputs and materials (distance from sale points, very high prices of pesticides and seeds).

- Drought or decrease in rainfall leading to a lack of water for irrigation.
- Low investment capacity.
- The technical standards do not take sufficient account of climate risks.
- Little meteorological information (to help with the decision).
- Production affected by the change in rainfall regime (water stress).
- Insufficient irrigation.
- Decreased fertility (lack of organic matter, availability farmyard manure due to a lack of livestock due to cattle theft).
- According to the producers: destruction of crops by the abundance of dew during the months of June and July, which favours the attack of insects and diseases.

## Recommendations

### Economic opportunities:

- Opening of Port Fort Dauphin: construction of the new port in deep water of Taolagnaro. Certainly, it was built for evacuation of the export of ilmenites from the QMM company, but only one week by month, so other economic activities can benefit from the existence of this port. The export of onions (if only for the countries of the Indian Ocean) could thus be facilitated and developed.
- Regional market with a high demand for onions: cannot be satisfied in onion in the Indian Ocean region, Mauritius and Réunion source from India for their demands. Product quality of the Anosy region can perfectly meet the export requirements.
- Interest of operators: Betroka onions are starting to be known to operators, some of whom have already expressed an interest in obtaining supplies in the region for export.
- Establishment of financial structures: micro-credit services are one of the tools ensuring an extension of the current capacity of peasants in the implementation of this remunerative activity. The body of microfinance FIVOY is already established in the South but has not yet supported onion production.
- Onion is one of the vegetables bought daily and consumed by households even when its price is high in the market.
- It is also prized for its therapeutic virtues, which justifies the significant quantity consumed at local, regional and national levels.
- Two main actors are present to assist in the development of the sector: GIZ and FAO.

### Adaptation to climate change:

- Technical and socio-organizational support to unions and to the OPR Manamisoa to provide services to members and their financial empowerment (training, access to inputs, search for commercial outlets, etc.).
- Support in finding outlets and strengthening the capacity of negotiation of unions and OPR.
- Technical support to seed producer groups for the production of quality seeds. Construction of storage infrastructure and post-harvest stores.
- Development of an insurance product against climate risks.
- Development of local investment structures dedicated to financing activities of small agricultural producers.
- Technical support to adjust the technical benchmarks used by the ministries.
- Development of access to meteorological services.
- Support for irrigation and the dissemination of drip irrigation methods.
- Support for increasing the availability of organic manure (composting techniques, agriculture / livestock integration).