Implementation of a Baseline Survey and Development of Indicators and Targets

"Promoting Climate Resilience in the Rice Sector through Pilot Investments in Alaotra-Mangoro Region"

BASELINE REPORT – FINAL

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ACRONYMS

Acronym	Definition
CALA	*Centre Agricole du Lac Alaotra* (Agriculture Center of Lake Alaotra)
CARD	Coalition for African Rice Development
CIRAD	*Centre de Coopération Internationale en Recherche Agronomique pour le Développement* (French Agricultural Research Center for International Development)
DIREAU	*Direction Régionale de l'Eau* (Regional Water Direction in Alaotra Mangoro)
DRDR	*Direction Régionale du Développement Rural* (Regional Rural Development Directorate)
DREF	*Direction Régionale de l' Environnement* (Regional Environment Directorate)
MEF	Ministry of Environment and Forests
MIRR	*Modèle Intégré de Riziculture Résiliente* (Integrated Resilient Rice-growing Model)
MoU	Memorandum of Understanding
PDC	*Plan de développement communal* (Local Development Plans)
PMF	Performance Measurement Framework
SCV	*Semis direct sous Couverture Végétale permanente* (Direct seeding under permanent vegetable cover)
SNDR	National Strategy of Development and Rice Growing
SRA	*Système de Riziculture Améliorée* (Improved system of rice growing)
SRI	*Système de Riziculture Intensifiée* (Intensified system of rice growing)
ToRs	Terms of Reference
UNEP	United Nations Environment Programme

1. INTRODUCTION

The project "Promoting Climate Resilience in the Rice Sector through Pilot Investments in Alaotra-Mangoro Region" aims to address the vulnerability of rice farming systems in Madagascar to erratic weather patterns and identify promising pathways through which rice farming can be made more resilient. The project is targeted to the important rice growing region of Lake Alaotra-Mangoro, which is a region of Madagascar that is particularly vulnerable to the negative effects of climate change.

This project is funded by the Adaptation Fund. It will be executed by the Ministry of Environment and Forests (MEF) in partnership with the Ministry of Agriculture and Farming and implemented by United Nations Environment Programme (UNEP) in close cooperation with other stakeholders.

The project was designed to include activities and outcomes that form part of three overarching goals: (i) strengthening the scientific and technical capacities of Malagasy authorities to understand, analyze, and manage the climate risks posed to rice farming, including the identification of further adaptation options for the rice sector; (ii) implement and disseminate concrete changes to rice production practices ranging from obtaining inputs to post–harvest management, including measures designed to restore and maintain ecological services surrounding rice ecosystems; and (iii) identify and address the key policy barriers, gaps, and/or maladaptations that hinder adaptation in the rice sector so that pathways towards resilience have the potential to be scaled up in the future.

At this early stage of the project, the current consultancy was established to lay the groundwork for project activities by ensuring that the project is guided by a useful and accurate project results framework, including SMART[1] outcome and output indicators, and that the project is informed by a detailed understanding of current conditions in the project sites through the collection of baseline information for the project indicators. To that end, a detailed analysis and revision of the original project results framework and project output, outcome, and performance indicators was conducted early in the process in consultation with the MEF and UNEP. The revised project results framework, including revised outcome and output indicators, along with a plan for collecting baseline data, was submitted in an Interim Report and validated by the MEF and UNEP in May 2013.

Fieldwork was then conducted in Madagascar in June 2013 to collect detailed baseline values for the validated project outcome and output indicators, against which the project performance and impact will then be measured. This report, in adhering to the Terms of Reference (ToRs) for the consultancy, presents the detailed values of project outcome and output indicators obtained during the fieldwork in addition to a detailed description of how that data was collected. The goal of this report is thus to present a comprehensive picture of current rice growing practices, vulnerabilities, and steps towards resilience that already exist in the project site and to include a replicable protocol for data gathering so that the project monitoring and evaluation process as well as the mid–term and final project evaluations can be conducted with consistency and accuracy.

The report is divided into four parts: (i) an overview of the methodology used to conduct the baseline survey and presentation of the validated, revised performance indicators; (ii) the baseline values for revised and validated indicators presented in the Performance Measurement Framework (PMF); (iii) a detailed sampling design and data collection and management protocol, and (iv) a list of conclusions and recommendations for the project based on analysis of the baseline indicators.

[1] Specific, Measurable, Achievable, Relevant, Time–bound

2. METHODOLOGY

Approach

As proposed in the Interim Report to the MEF and UNEP, data collection for the baseline indicators was conducted according to the following stages. Firstly, a desktop review of the national policy strategies, plans, and documents was carried out to collect baseline data with respect to policies relevant to poverty reduction, climate change, agriculture, and land and water management issues. Following the document review, additional baseline data were collected during field visits to the project sites.

The information gathering tools used included:

1. Document review;
2. Institutional interviews with national and local authorities including the Regional Directorate of Agriculture, the Regional Directorate of Environment, local elected officials in the three visited municipalities, other projects active in the Region, and a regional agriculture research center named *Centre Agricole du Lac Alaotra* (CALA);
3. Focus group discussions with farmers, including the use of gender sensitive protocols; and
4. Sites visits to observe agricultural practices and infrastructure in the project sites.

Having gathered data from these many different sources, triangulation was an important part of data analysis used to cross-check and validate the different types of information collected throughout the evaluation.

Selected sites for focus groups and field visits

Pilot investments for the project target three different districts located in the Lake Alaotra-Mangoro Region and within each district three different municipalities: (i) Manakambahiny in the District of Ambatondrazaka; (ii) Bemaintso in the District of Andilamena; and (iii) Ambohijanahary in the District of Amparafaravola. Within these three municipalities, several different "fokontany" (villages) have been selected for project activities.

For the baseline data collection, it was decided to visit a total of nine of the fokontany selected for project activities. These nine fokontany were selected to preserve the proportion of targeted fokontany per municipality. Therefore, since the project includes three fokontany in Manakambahiny, ten fokontany in Ambohijanahary and three fokontany in Bemaintso, the data sampling maintained this ratio by working in two, five, and two fokontany respectively. The choice of particular fokontany was made in close collaboration with the national Consultant in Madagascar, and final data gathering sites were approved by the MEF and UNEP. Table 1 shows the total fokontany selected for the project alongside those selected for the baseline study.

Table 1: List of project sites and baseline sample sites.

Districts	Communes	All Project Fokontany	Baseline Sites
Ambatondrazaka	**Manakambahiny**	Ambalavato	**Ambalavato**
		Miaramanjaka	
		Ambaibo	**Ambaibo**
Amparafaravola	**Ambohijanahary**	Miarinarivo	
		Ambohipasika	
		Manakana	**Manakana**
		Ambatovola	**Ambatovola**
		Tanambaolaina	
		Morarano	**Morarano**
		Ambolomborina	**Ambolomborina**
		Sahanavily	**Sahanavily**
Andilamena	**Bemaintso**	Ambodifamotsotra	
		Fiadanana	**Fiadanana**
		Ambatolampy	**Ambatolampy**

Sampling approach for focus groups

In order to ensure basic representativeness of the targeted project stakeholders and beneficiaries and to contain the cost of the baseline data collection process and its replication for further monitoring during day-to-day project implementation, the team used a targeted sampling strategy to choose focus groups at the fokontany level (the exact sampling is described in more detail in Chapter 4 of this report).

More specifically, since the project involves a diverse group of stakeholders ranging from local decision makers to agricultural extension workers and direct farmers, the baseline data collection sought to achieve stakeholder representativeness through ensuring participation in each of the 9 fokontany of local leaders, local extension workers, rice farmers, water user cooperatives, and other farmer cooperatives.

In addition to accessing a cross section of stakeholders, data collection for the baseline also sought to achieve specific demographic representation through gender and age representativeness. To that end, farmers in each of the fokontany were selected to form one-third men, one-third women, and one-third young farmers under the age of 25. Similarly, data collection also aimed to speak to farmers with different wealth levels as represented by farmer landholding. In this vein, one-third of farmers were selected to be small farmers with less than two hectares of rice fields, one-third were selected to be medium sized farmers with between two and four hectares of rice field, and one-third were selected to have over four hectares of rice fields.

Performance measurement framework

As part of the first phase of this consultancy, the original PMF was analyzed and updated, and the finalized PMF, including reviewed outcomes, outputs and their indicators, was validated prior to the field mission. The results framework currently includes 20 output indicators for which baseline data has been collected. These validated indicators are presented in Table 2 below. One of the changes made to the original framework was the addition of mid-level indicators geared towards measuring progress of overarching project objectives. Seven such outcome indicators were added, and the baseline values for these metrics are also included in the results framework table in the next chapter of this report. All outputs and outcomes are organized according to the three project themes of scientific and technical capacity, adaptation actions, and policy reform.

Table 2: Original and revised outcome and output indicators list.

Outcomes & Outputs	Revised Suggested Outcome and Output Indicators
Component 1: Scientific and Technical Capacity	
Outcome 1.1. Knowledge base on best practices for climate resilience in rice, based on existing local knowledge and international research	**Outcome Indicator 1.1. Percentage of farmers with access to selected and publicized MIRR**
• Output 1.1.1 Best Available Technologies and Integrated Resilient Rice Model (MIRR) selected and publicized	• Output Indicator 1.1.1. Number and type of technical guidelines for MIRR developed and publicized based on best available technologies and techniques
Outcome 1.2. Malagasy government, research institutions and local communities have the tools and methods to assess, monitor, and understand climate change impacts on rice	**Outcome Indicator 1.2. Level of use of the tools and methods made available to Malagasy government, research institutions and local communities to assess, monitor, and understand climate change impacts on rice production**
• Output 1.2.1 Crop models are available for rice vulnerability mapping	• Output Indicator 1.2.1 Number of rice cropping system models based on expected climate change scenarios, including vulnerability maps of future rice production, and hydrological models developed
• Output 1.2.2 Updated, dynamic agricultural calendars and climate early warnings taking into account current and projected variability disseminated to local population	• Output Indicator 1.2.2 Frequency of dissemination of updated dynamic agricultural calendars and climate information including flood early warnings in the three project sites (Municipalities of Manakambahiny, Ambohijanahary and Bemaintso)
• Output 1.2.3 Agricultural extension staff trained on climate risk management in an agro–ecosystem context	• Output Indicator 1.2.3 Number of agricultural extension staff in the three districts trained on climate risk management in agro–ecosystem context (gender disaggregated)
Component 2: Adapted and resilient rice production cycle	
Outcome 2.1. Sustainable increase in rice yields (using MIRR)	**Outcome indicator 2.1. – Percentage of change in rice yields in all three project sites**
• Output 2.1.1 Climate resilient rice varieties selected through participatory field testing	• Output Indicator 2.1.1 Number and types of climate resilient rice varieties tested and selected within the three project sites (Municipalities of Manakambahiny, Ambohijanahary and Bemaintso)
• Output 2.1.2 An operational multiplication and dissemination scheme for adapted seed varieties	• Output Indicator 2.1.2 Annual quantity and quality of adapted certified seeds produced and distributed in each of the project sites
• Output 2.1.3 Updated fertilisation guidelines according to best available standards and taking climate conditions into consideration	• Output Indicator 2.1.3 Number of farmers who apply updated fertilisation guidelines in all three project sites (Municipalities of Manakambahiny, Ambohijanahary and Bemaintso)
• Output 2.1.4 Integrated pest management is implemented	• Output Indicator 2.1.4 Number of farmers trained in integrated pest management in all three project sites (gender and age disaggregated)
• Output 2.1.5 Water efficiency, management and conservation technologies and infrastructures are implemented	• Output Indicator 2.1.5.a Number of Km of rehabilitated irrigation canals and number of reservoirs dredged in all three project sites • Output Indicator 2.1.5.b Percentage of change in water availability and in water use efficiency in all seasons to water users associations in all three project sites
Outcome 2.2. Ecosystem services maintained	**Outcome indicator 2.2 Percentage change in land covered by biomass and in overall productivity (rice, vegetables and livestock) of project sites environment**
• Output 2.2.1 Best available land preparation, production and harvesting techniques disseminated to reduce deforestation, maintain soil fertility and integrity, and to provide adequate growing conditions	• Output Indicator 2.2.1 Percentage application of resilient rice model, including rice–vegetables rotation systems, in all three project sites (gender disaggregated)
• Output 2.2.2 Watershed rehabilitation in productive landscapes introduced, including through reforestation and adaptation of agro forestry practices	• Output Indicator 2.2.2.a Number of ha reforested in all three project sites • Output Indicator 2.2.2.b Number of farmers and land/forest users trained on sustainable agro forestry and land management in all three project sites (gender and age disaggregated)
• Output 2.2.3 Soil conservation and livestock management techniques adapted to topography and landscape in light of future climate conditions	• Output Indicator 2.2.3 % change in erosion rate
• Output 2.2.4 Revitalization of producer's cooperatives and	• Output Indicator 2.2.4 Number of members of farmer's cooperatives

Outcomes & Outputs	Revised Suggested Outcome and Output Indicators
water user associations for collaborative natural resources allocations (e.g. land and water) and management	and water user associations trained on water management and administrative management within the three project sites
• Output 2.2.5 Water quality assessments	• Output Indicator 2.2.5 Percentage change in water quality (e.g. reduction in turbidity, pollutant content, microbial content, sediment content) in all three project sites
Outcome 2.3. Post Harvest losses reduced	**Outcomes indicator 2.3 Percentage change in post harvest losses**
• Output 2.3.1 Increased utilization of rice by–product especially rice straw	• Output Indicator 2.3.1 Percentage change in use of rice straws in animal feeding and for briquetting
• Output 2.3.2 Post–harvest storage facilities with phytosanitary control, serving as trading points and markets	• Output Indicator 2.3.2 Number of renovated storage facilities in all three project sites
Component 3: Leveraging policy change	
Outcome 3.1 Technical norms and standards in rice cultivation reviewed and where necessary modified to take climate change into account	**Outcome indicator 3.1 Number and types of technical norms and standards in rice cultivation reviewed and modified at the national level to take climate change into account**
• Output 3.1.1 Gaps and possible maladaptations in the current rice policy are identified and recommendations on rice policy reform are made	• Output Indicator 3.1.1.a Number and types of activities identified and implemented for up scaling and replication from MIRR application in broader Alaotra basin and in other regions
	• Output Indicator 3.1.1.b Number and types of recommendations on rice policy reforms made
Outcome 3.2 Conditions in place for a full adaptation of the rice sub–sector	**Outcome indicator 3.2 and output Indicator 3.2.1 Number and type of stakeholders to which the report on best practices and lessons learned is distributed**
• Output 3.2.1 A report on best practices and lessons learned for rice adaptation in Madagascar	

3. DETAILED BASELINE DATA

Outcomes	Expected Outputs	Validated Indicator	Baseline Data	Target by End of Project	Source and Method for Collecting Data	Responsibility for Collecting Data
Component 1: Scientific and Technical Capacity						
Outcome 1.1. Knowledge base on best practices for climate resilience in rice, based on existing local knowledge and international research		Outcome Indicator 1 – Percentage of farmers with access to selected and publicized Integrated Resilient Rice Model (MIRR)	**There is currently no MIRR available, although various ameliorated rice production techniques have been developed in recent decades that can improve the resilience of rice production.** For instance, the World Bank's "Bassin Versant" project (BV Lac) has developed and disseminated SCV techniques (see below). SRI and SRA techniques have also been developed and partially disseminated (see below). According to farmers, however, there is a profound lack of awareness of resilient irrigated rice production practices, and there has been little dissemination or publication of technical guidelines for implementing ameliorated practices such as SRI and SRA. The level of ownership of these techniques by rice producers is thus quite low, and additional efforts need to be conducted to improve uptake. Furthermore, these techniques do not directly integrate elements of climate change.	Based on existing ameliorated techniques such as SCV, SRI & SRA, and based on new research, 1 Resilient Rice Model is selected and published. At least 90% of farmers targeted by the project has received technical support and has been trained to implement the technique according to technical guidelines.	Interviews with DRDR and the farming research center. Focus group with farmers. Documentation review: MIRR developed, including a series of technical guidelines.	Project team in close collaboration with agriculture extension services.
	1.1.1 Best Available Technologies and Integrated Resilient Rice Model (MIRR) selected and publicized	(i) Number and type of technical guidelines for MIRR developed and publicized based on best available technologies and techniques	**A series of technical guidelines were created for SCV techniques as part of the project BV Lac from 2003 to 2013. During the last decades, technical guidelines were also developed for SRI and SRA as part of other projects and programs. The guidelines are available from the DRDR but are not yet widely disseminated.** The following guidelines were created: • SCV – "Semis direct sous Couverture Végétale permanente," or direct planting with permanent crop cover, consists of three practices: (i) direct planting of seeds, (ii) permanent soil cover, particularly with crop residues, and (iii) crop rotation. The technique can be considered climate change resilient, in particular, because it improves soil moisture retention. According to BV Lac, use of SCV increased from application on roughly 30 ha of rice paddy by 100 farmers in 2003 to application on about 2,200 ha by over 2,000 farmers in 2013. SCV, however, is mainly targeted to rain-fed rice production so far.	1 Recommended Integrated Resilient Rice Model developed and published, including a series of at least 1 technical guidelines with the following key stages/techniques: • Seeding • Planting • Harvest • Post-harvest • Fertilization • Integrated pest management • Water management	Interviews with DRDR, extension services, and farming research center. Focus group with farmers. Documentation review: MIRR developed, including a series of technical	Project team in close collaboration with agriculture extension services.

Outcomes	Expected Outputs	Validated Indicator	Baseline Data	Target by End of Project	Source and Method for Collecting Data	Responsibility for Collecting Data
			• Particularly from 2008-2013, BV Lac conducted trainings in SCV with the help of outside providers, and they created numerous guideline sheets with the help of CIRAD on topics including crop growing calendars, production cycles, fertilization, and pest control. • SRI and SRA – "Système de riziculture intensifiée" and "système de riziculture ameliorée" techniques include: (i) use of young plants; (ii) planting in a row, (iii) following a growing calendar specific to each seed variety, and (iv) applying urea during planting and tilling. Different technical guidelines pertaining to the different growing stages were tested and compiled. With respect to the application of ameliorated rice production techniques in the visited municipalities and fokontany: • Overall, very few farmers in the fokontany visited have access to any guidelines for ameliorated irrigated rice techniques and practices. Overall, farmers have very low access to farming advice due to the low number of extension service staff present in the field. The Regional Agriculture Directorate has insufficient human resources to provide farmers with accurate advice. This institutional aspect is critical for the success of this project and should be strengthened as part of the institutional and management set-up. Technical staff, working in close collaboration and building capacities of extension service staff, should be recruited by the AF Rice Project and posted in the 3 targeted districts. • Manakambahiny municipality – In the Ambalavato fokontany only 1 farmer out of 10 plants in lines (part of SRA practices). All farmers apply urea during tilling, and most apply compost to seeds. • Bemaintso municipality – Farmers use chemical fertilizer only during nursery planting. No farmers have received guidelines for resilient rice growing practices; however, some have used SRA or SRI on their own without following guidelines: (i) Fiadanana, all 18 farmers interviewed use SRI and SRA; and (ii) Ambatolampy, 5 out of 15 farmers have tried the techniques before, though they no longer use them. In total, in Bemaintso municipality 23 out of 33 farmers use SRI and SRA, though without following the proper technical guidelines. • Ambohijanahary municipality – No farmers have received SRI or SRA guidelines; however, some are applying the techniques on their own: (i) Ambatovola, no farmers; (ii) Ambolomborona, no farmers; (iii) Manakana, no farmers; (iv) Morarano, 1 farmer; and (v) Sahanavily, 5 farmers. Only 6 farmers out of over 60 interviewed used SRI and SRA, and these were without following appropriate technical guidelines.		guidelines.	

Outcomes	Expected Outputs	Validated Indicator	Baseline Data	Target by End of Project	Source and Method for Collecting Data	Responsibility for Collecting Data
Outcome 1.2. Malagasy government, research institutions and local communities have the tools and methods to assess, monitor, and understand climate change impacts on rice		Outcome indicator 2 – Level of use of the tools and methods made available to Malagasy government, research institutions and local communities to assess, monitor, and understand climate change impacts on rice production	**Current tools to address, monitor, and understand climate change impacts on rice are hampered by a lack of data and weak potential to convey information to farmers.** **Data on observed climate patterns is not being systematically collected at an appropriately local level making it difficult to create models and planting calendars.** **Dissemination of what information exists is also weak given the limited number of extension staff. While these staff appear to already be trained in climate issues, the information is not being disseminated to farmers.**	All regional extension services, research institutions including CALA, and at least 90% of targeted farmers are aware of climate change trends and impacts through awareness raising and information sessions, have access to regular climate forecasts through local communication channels (radio, newspapers), and have been trained and implement MIRR and its technical guidelines, including vulnerability maps.	Interviews with DRDR and farming research center. Focus group with farmers. Documentation review: rice cropping system models, climate forecasts bulletin, training reports.	Project team in close collaboration with agriculture extension services.
	1.2.1 Crop models are available for rice vulnerability mapping	(ii) Number of rice cropping system models based on expected climate change scenarios, including vulnerability maps of future rice production and hydrological models developed	**Currently, there is no rice cropping system model that includes vulnerability maps of future rice production under potential climate change impacts and hydrological models developed.** • Although one study has been conducted in the region on Vulnerability and Adaptation of the rice sector in the Second National Communication Framework, and another study is now in progress in two project sites, Andilamena and Amparafaravola, as part of the development of the Third National Communication (TNC), access to data on current and future climate risks and impacts on rice production is very low at the regional and local level. • Detailed downscaled data at the local level must be compiled and disseminated to relevant stakeholders to develop an effective early warning system and an effective adaptation system for growing practices. Projected climate change modeling, including multiple scenarios, should be created to inform such an early warning system and adaptation strategies. • The Direction of National Weather does not have services that are well dispersed at the local/regional level, and there are no clear facilities for collecting weather observations. BV Lac installed a rain gauge system for its project areas consisting of 40 rain gauges as well as 2 automatic climate stations (data such as temperature, hygrometry, wind, etc.). Data from these sources were collected over the last 10 years and passed to	Detailed available downscaled data on expected climate change risks and impacts on rice sector at the local level compiled; identified gaps on available data are filled in; and all data are disseminated to relevant stakeholders at the regional and local levels. 4 rice cropping system models with vulnerability maps developed according to 4 different expected climate change scenarios (driest, low dry, low humid, and most humid scenarios) and 1 hydrological model developed based on available downscaled data	Documentation review: climate change study, rice models developed. Individual interviews with key stakeholders including DRDR, DRE, and the farming research center.	Project team.

Outcomes	Expected Outputs	Validated Indicator	Baseline Data	Target by End of Project	Source and Method for Collecting Data	Responsibility for Collecting Data
			the DRDR. Rain gauges and the automatic stations have been taken down and given to the DRDR since the BV Lac project end. • In general, the network for collecting climate data does not appear to be sufficiently robust to analyze climate conditions. It is important to carry through on plans to strengthen and rehabilitate the local climate data collection system.	on expected climate change risks and impacts.		
	1.2.2 Updated, dynamic agricultural calendars and climate early warnings taking into account current and projected variability disseminated to local population	(iii) Frequency of dissemination of updated dynamic agricultural calendars and climate information including flood early warnings in the three project sites (Municipalities of Manakambahiny, Ambohijanahary and Bemaintso)	Agricultural calendars under current climate conditions are well defined for all seed varieties developed, yet farmers do not necessarily apply them. **The challenge resides in distributing and encouraging the application of established calendars amongst farmers through training and diffusion.** Furthermore, new agricultural calendars will need to be developed on the basis of projected future climate trends. With respect to the diffusion of climate information, networks for analyzing and disseminating climate data are also insufficient: • Manakambahiny – In Ambalavato, farmers have access to daily meteorological forecasts in the newspaper and on the Radio Nationale Malgache. In Ambaibo, farmers also have access to daily forecasts. This information, however, is not very useful as it cannot provide longer forecasts that would aid in, for instance, determining seedling date or predicting potential floods. • Bemaintso and Ambohijanahary – Farmers have access to daily forecasts, but the forecasts do not help them adapt their growing calendar with enough forewarning or to choose which seed variety to use.	Climate information and 3- 4 day forecasts, including flood early warnings, made available to farmers through local communication systems. Dynamic agricultural calendars updated and disseminated to at least 80% of targeted farmers.	Interviews with DRDR, research center, local and regional radio. Focus group with farmers. Documentation review: climate forecasts.	Project team & Direction of National Weather.
	1.2.3 Agricultural extension staff trained on climate risk management in an agro–ecosystem context	(iv) Number of agricultural extension staff in the three districts trained on climate risk management in agro–ecosystem context (gender and district disaggregated)	**Extension workers were trained in climate change issues through the BV Lac project, and they do not necessarily lack training. The challenge is disseminating information from extension workers to farmers given how little contact they have with farmers.** The presence of extension workers in the project sites is the following: • Manakambahiny – The municipality contains the city Ambatondrazaka, which is the capital of the Alaotra-Mangoro Region. There are 15 to 20 agriculture staff, of which 9 to 11 extension workers cover the 5 districts of the region. Their presence in the field is weak. • Bemaintso – The municipality is part of the Andilamena district where 2 extension workers for rural engineering are located. They use radio to broadcast information to farmers. • Ambohijanahary – The municipality is part of the Amparafaravola district, for which there are 4 extension workers (2 for agriculture and 2 for engineering).	100 % of staff trained on climate change aspects and how to disseminate new knowledge to farmers, including women.	Interviews with the DRDR and the extension service. Focus group with farmers. Documentation review: training report.	Project team.

<table>
<tr><th>Outcomes</th><th>Expected Outputs</th><th>Validated Indicator</th><th>Baseline Data</th><th>Target by End of Project</th><th>Source and Method for Collecting Data</th><th>Responsibility for Collecting Data</th></tr>
<tr><td colspan="7">Component 2: Adapted and resilient rice production cycle</td></tr>
<tr><td>Outcome 2.1. Sustainable increase in rice yields (using MIRR)</td><td></td><td>Outcome indicator 3 – Percentage of change in rice yields in all three project sites</td><td>Rice yields in 2012-2013 for irrigated rice in the project areas were:
<u>Manakambahiny</u> – 3.41 tons/ha average (roughly 3 tons/ha for Mk34 and 3.5 tons/ha for Dista and Tsemaka)
<u>Bemaintso</u> – 0.7 tons/ha for MK34 and 1.5 tons/ha for Dista (the low yields observed in Bemaintso are due to floods – care should therefore be taken while analyzing these data)
<u>Ambohijanahary</u> – 2 tons/ha for MK34 and 3 tons for Tsemaka
The following gives an overview of the evolution in mean rice yields for irrigated rice over the last 3 years in each targeted district (tons/ha), according to DRDR data:<table><tr><th>District</th><th>2008/09</th><th>2009/10</th><th>2010/11</th><th>2011/12</th></tr><tr><td>Ambatondrazaka</td><td>3,60</td><td>3,69</td><td>3,34</td><td>3,40</td></tr><tr><td>Amparafaravola</td><td>4,10</td><td>4,22</td><td>3,88</td><td>3,40</td></tr><tr><td>Andilamena</td><td>3,20</td><td>3,32</td><td>2,44</td><td>3,24</td></tr></table>The only significant seed varieties in use are MK34 with some use of Dista and Tsemaka. The main research facility for creating new seed varieties lacks equipment, and production of new seed varieties is limited to a small number of providers. Cost of seed ranges from 1,400 to 1,600 Ar/kg.
Farmers lack information on which planting method to follow for different seed varieties, and they have virtually no information on fertilizer application and pest management protocols.
Finally, irrigation structures are consistently poor, and significant dredging is needed to improve water flow and water access. Farmers, for instance, do not have enough access to water to plant multiple crops.</td><td>Individual rice yields for targeted producers increase by 25% in relation to current averages in each project area.</td><td>Interviews with the DRDR and extension service.

Focus group with farmers.</td><td>Project team in close collaboration with agriculture extension services.</td></tr>
<tr><td></td><td>2.1.1 Climate resilient rice varieties selected through participatory field testing</td><td>(v) Number and types of climate resilient rice varieties tested and selected in the three project sites (Municipalities of</td><td>Current rice farming is dominated by the seed variety MK34, though it is not necessarily resilient. The next most prominent varieties are Dista and Tsemaka.
The following seed varieties were encountered in the project area:
<u>Makaluka (MK34)</u> – The variety likely represents as much as 90% of seed produced in the region. Its use is so widespread it could be seen as a tradition. The variety is dependent on rain and light conditions.</td><td>CALA facilities and capacities are strengthened to develop at least 5 varieties that are tested and proven resilient in both laboratory and field settings in the three</td><td>Interviews with CALA and the DRDR.

Focus group with farmers.</td><td>Project team.</td></tr>
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Outcomes	Expected Outputs	Validated Indicator	Baseline Data	Target by End of Project	Source and Method for Collecting Data	Responsibility for Collecting Data
		Manakambahiny, Ambohijanahary and Bemaintso)	• Tsemaka – Farmers use the variety to increase yields under challenging water conditions; however, farmers report that it does not sell as well at market as MK34. • MKx – Variety developed and distributed by CALA. • Dista – Farmers use the variety in cases where the planting rains start late. • SEBOTA – The variety was developed for the BV Lac project in partnership with CALA and with help from CIRAD. It is designed to tolerate poor water management conditions, but the seed has not been distributed to many farmers due to limited reproduction of the seed and to patent issues. • FOFIFA – This is a group of early maturing varieties that can be produced in the rainy and dry seasons. They are developed by CALA. The last variety developed under this group is FOFIFA 174. Farmers in the individual municipalities reported the following: • Manakambahiny – In both fokontany visited, MK34 is used on the majority of fields, while Dista is the second most common seed. Farmers reported paying 1,500 Ar/kg for seeds. Often farmers save rice grains in plastic bags to plant for the next year, and loss due to storage is 5-10%. • Bemaintso – Farmers use primarily MK34, which accounts for about 75% of rice fields. Farmers in all of the fokontany visited know of the seed varieties of SEBOTA, FOFIFA160, IR160, Tsemaka, and Dista. Seeds are available for sale in the district for about 1,500 Ar/kg. • Ambohijanahary – Most farmers in the 5 fokontany visited use MK34 seeds; however, when planting rains are late they use Dista. MK34 accounts for about 75% of rice while Tsemaka accounts for the remaining 25%. Seeds are available for sale in the fokontany for 1,400 Ar/kg. Research for new seed varieties is being conducted by CALA. Their activities include improving varieties, researching planting techniques, and producing seeds. • CALA has recently created two new irrigated rice varieties specifically adapted to poor water conditions (FOFIFA174 and Madikatra), and the two varieties are currently being distributed. CALA is also attempting to make new seeds with properties similar to SEBOTA. • Consultants observed, however, that CALA facilities are in poor condition. Laboratories do not appear to be maintained, materials seem sparse, and facilities are in need of renovations. It would be useful if as	project sites.		

Outcomes	Expected Outputs	Validated Indicator	Baseline Data	Target by End of Project	Source and Method for Collecting Data	Responsibility for Collecting Data
			part of the MEF/UNEP project a partnership agreement could be signed with CALA to help renovate their facilities so that the center could better work towards generating improved seeds.			
	2.1.2 An operational multiplication and dissemination scheme for adapted seed varieties	(vi) Annual quantity and quality of adapted certified seeds produced and distributed in each of the project sites	**Seed multiplication appears to be dominated by four main facilities. Challenges include production capacity for CALA and the publication and dissemination of seed-specific planting guidelines.** • CALA – Produces the irrigated rice varieties of MK34, MKx, and MK4012 in addition to rain-fed varieties of B22. They produce two new varieties of FOFIFA. CALA does not have a patent to produce SEBOTA varieties. • Multiplication Center of Anosiboribory – Originally created by the government in 1975, the center is now operated by a private entity. They do not conduct research like CALA and Andri-KO, but rather only produce irrigated varieties of seed. Their site contains 500 ha and produces 3 seed types: (i) long cycle – MK34, Tsemaka, Dista (3338 and 1347), and Matakadrano; (ii) medium cycle – 27 87 Saomalandry and rojofotsy; and (iii) short cycle X1648, X1649, X265, FOFIFA160, IK64, MK45, 1734, 10737, 1721. Seeds are sold mostly in Amparafaravola, Ambatondrazaka, and Andranobe as well as at the headquarters in Antananarivo, and the cost of seed is 1,400 Ar/kg. The center does not publish their guidelines directly to farmers but, rather, only to retailers. Farmers are not sufficiently aware of the appropriate use of short cycle varieties in particular. • ANDRI–KO – A family–run cooperative that produces rice and maize seed varieties as well as legumes for crop cover. They produce SEBOTA (types 63, 68, 403, 406, and 410) and FOFIFA (X265, X235, Dista, Dombolo, and IR64). They sell seeds directly to farmers via their headquarters in Ambatondrazaka at a fixed price of 1,600 Ar/kg. Their production capacity is a maximum of 150 tons of seed per year on an area of 10 ha. 80% of their production is sold outside of the Alaotra Lac region. • Societe Semis Direct Madagascar – In addition to ANDRI-KO, SSD-Mad was contracted by the project BV Lac to produce SEBOTA seeds.	At least 5 tons total of seeds for all 5 varieties that were tested and proven resilient are produced annually and distributed in the 3 project sites.	Interviews with research center and DRDR. Focus group with farmers.	Project team.
	2.1.3 Updated fertilisation guidelines according to best available standards and taking climate conditions into consideration	(vii) Number of farmers who apply updated fertilisation guidelines in all three project sites (Municipalities of Manakambahiny, Ambohijanahary	**Farmers do not appear to follow any specific guidelines for fertilizer application. Farmers vary on how and when they use compost, manure, urea, NPK, and/or DAP. Many farmers do not use any chemical fertilizer practices.** • Manakambahiny – (i) In Ambalavato, farmers follow a variety of practices. Some apply compost at planting and others during hoeing. Some also apply NPK or DAP during replanting at anywhere between 50 to 100 kg/ha. Some farmers also apply urea during hoeing; (ii) In Ambaibo, some farmers use urea or NPK during planting, or else compost. Urea and NPK	90% of targeted farmers have been trained and/or received technical support and apply fertilisation guidelines updated as part of the development of the MIRR.	Focus group with farmers. Documentation review: fertilization guidelines.	Project team.

Outcomes	Expected Outputs	Validated Indicator	Baseline Data	Target by End of Project	Source and Method for Collecting Data	Responsibility for Collecting Data
		and Bemaintso)	cost about 60,000 Ar/50 kg. Overall, farmers do not follow a protocol for fertilizer, be it inorganic or organic. Some farmers made manure out of rice stalks and cattle manure. There was no training or awareness–building conducted with farmers about fertilizer techniques. • Bemaintso and Ambohijanahary – Farmers in the fokontany of these municipalities did not use chemical fertilizer.			
	2.1.4 Integrated pest management is implemented	(viii) Number of farmers trained in integrated pest management in all three project sites (gender and age disaggregated)	**In general, farmers had no information or training about the appropriate protocols for using pesticide in pest control. While some used commercial pesticides, they applied them with little knowledge of best practices.** • Manakambahiny – (i) In Ambalavato, some farmers use Sipermetrine (serpa) which they apply based on observations they make about their crops. (ii) In Ambaibo, farmers use different insecticides: Gigome, Karate, and serpa (though only one for the latter). There was no training concerning the use of pesticides for pest management, and farmers applied pesticides they bought at market without any real knowledge of the appropriate application protocol. • Bemaintso and Ambohijanahary – Similarly to Manakambahiny, farmers had no real training in pest control, and they applied insecticides without knowing the ideal protocol for use.	400 farmers trained in integrated pest management, gender and age disaggregated (and among them 50% women and young)	Focus group with farmers and site visits. Documentation review: training reports.	Project team.
	2.1.5 Water efficiency, management and conservation technologies and infrastructures are implemented	(ix) Number of Km of rehabilitated irrigation canals and number of reservoirs dredged in all three project sites	**Infrastructure in the 3 municipalities was in a state of significant disrepair with damaging siltation and reduced irrigation capacities throughout. There is a large need for rehabilitating canals and dam infrastructure.** • Manakambahiny – Two irrigation water intake points along the Ilakana River were visited (see picture 1 below). At both intake points, problems with water control valves and/or heavy siltation made water flow weak (cf. picture 2 below). Canals need to be enlarged and re-dug with tractors.  *Picture 1 – Artisanal water intake point along the Ilaka River*	*The following targets will require costly investments for which the current available budget (US$575,000) may not be sufficient. Some fund reallocations between outputs may be possible (see recommendation 8) to increase the available budget envelope and achieve the following targets. If budget reallocations are not possible, the following targets would therefore need to be decreased.* Manakambahiny: 35 km of primary canals cured, dredged, and maintained with norms that take	Site visits. Interviews with DRDR and extension services.	Project team in close collaboration with agriculture extension services.

Outcomes	Expected Outputs	Validated Indicator	Baseline Data	Target by End of Project	Source and Method for Collecting Data	Responsibility for Collecting Data
			 *Picture 2 – Silted primary canal in Ambalavato fokontany* In Manakambahiny, the 3 fokontany visited are fed by 4 water intake points from the river that need to be renovated. The length of primary canals needing to be dug is from 30 - 35 km. Additionally, there are more than 20 water intake points connected to the Ilakana River that are artisanal. <u>Bemaintso</u> – Irrigation is a dam connected to primary canals that splits into secondary canals (see picture 3 below). The dam was built in 1956, originally irrigating a reported 1,000 ha with a water depth of 7m. Today the dam is not able to irrigate more than 400 ha and has a water depth of 4m. The dam is connected to 14 km of primary canals and 21 km of secondary canals. Water loss is illustrated by a decrease in canal depth from 7 to 4m. The water flow regulation valves are also damaged and no longer distribute water evenly, particularly downstream. In January, 60% of rice fields close to the dam are irrigated while in the dry season only 40% receive irrigation. The dam's condition is typical of other hydro-agricultural projects in the region.  *Picture 3 – Bemaintso dam*	expected climate change impacts into account (future precipitation regimes, drainage and run-off); 4 water intake points along the Ilakana River rehabilitated, strengthened and made more resilient to expected climate change impacts. <u>Bemaintso:</u> The dam is drained and dredged; 14 km of primary canals and 21 km of secondary canals are cured, dredged, and maintained all with norms that take expected climate change impacts into account. <u>Ambohijanahary</u>: The dam at Anony is rehabilitated, primary water control valves are repaired; 13 km of primary canal are drained, dredged, and repaired; and primary canal is extended to irrigate 600 ha of additional rice fields all with norms that take expected climate change impacts into account.		

Outcomes	Expected Outputs	Validated Indicator	Baseline Data	Target by End of Project	Source and Method for Collecting Data	Responsibility for Collecting Data
			• Ambohijanahary – Problems of siltation and erosion are prevalent. The dam at Anony previously irrigated 3,000 ha and today does not irrigate more than 500-600 ha. The primary water control valves are damaged, and the canal depth and irrigation potential reduced (see picture 4 below). Also, canal width seems to have shrunk from 12m to 7m. Farmers in the area asked for a removal of the sand (about 7 cubic meters/linear meter need to be removed) and also an extension of the main canal length, which is currently 13 km. These changes would allow irrigation of an additional 600 ha of rice fields benefiting multiple communities in addition to allowing farmers to grow two crop cycles. Additionally, it was noticed that dykes in Ambohijanahary commonly ruptured, particularly along the "mail 9."  *Picture 4 – Primary canal in Ambohijanahary municipality*			
		(x) Percentage of change in water availability in all seasons to water users associations and in their water use efficiency (water losses estimations)	**There is a decrease in water availability during the dry season in all 3 Districts, and water losses reach up to 50 %.** • Manakambahiny – Water height in the rice fields is from 5 to 10cm. The volume of water used per hectare can be calculated as: 5cm by 100m² per 6 months under optimal conditions. Loss of water is estimated to be at a minimum of 50%. Furthermore, embankments are low, and there are leaks. • Bemaintso – Water level in rice fields is about 3cm deep. Loss of water is also estimated to be at 50% minimum. • Ambohijanahary – Water levels in rice fields range from 2 to 5cm deep across the different fokontany. The volume of water used is 8,000 m³/ha/6 months under optimal conditions. Water loss due to leaking through the embankments is estimated at 50%. Farmers are not planting crops in the off season in part due to lack of water.	35 % increase in water availability in all seasons in all 3 districts. Water loss estimation decrease from 50% to 25%.	Site visits – water flow measurement in dredged primary and secondary irrigation canals. Interviews with DRDR and extension services. Focus groups.	Project team in close collaboration with agriculture extension services and DIREAU – i.e. the Regional Water Direction in Alaotra Mangoro - (institutional arrangements to be developed with

Outcomes	Expected Outputs	Validated Indicator	Baseline Data	Target by End of Project	Source and Method for Collecting Data	Responsibility for Collecting Data
					with farmers	both agricultural and DIREAU extension services to undertake these measurements
Outcome 2.2. Ecosystem services maintained		Outcome indicator 4 – Percentage change in land covered by biomass and in overall productivity (rice, vegetables and livestock) in project sites	**There is no evidence of activities to increase land covered by biomass such as agro forestry practices, reforestation, or vegetable crop rotations. No farmers use soil quality or water quality improvement techniques.** Rice/vegetable crop rotations are used on only very small pieces of rice fields. Data on vegetables and livestock productivity/yields are currently not collected by extension services.	Change in overall land area covered by forests (i.e. net reforestation) of at least 50km2 across the combined 3 municipalities. Data on vegetables and livestock productivity/yields collected by extension services, and increase in overall productivity of rice, vegetables and livestock of 5 % throughout the life of the project and across the project sites.	Site visits. Interviews with DREF. Interpretation of satellite photos collected at project start, mid-term and end of project for the region (see next chapter for data collection protocols). Monitoring of productivity by agriculture extension through site visits and focus groups with targeted farmers.	Project team in close collaboration with DREF. Project team in close collaboration with private GIS consulting firm (total costs are estimated around US$25-30,000). Project team in close collaboration with agriculture extension services .
	2.2.1 Best available land preparation, production and harvesting techniques disseminated to	(xi) Percentage application of resilient rice model, including rice–vegetable rotation systems, in all three project	**Rice/vegetable crop rotations are used on only very small pieces of rice fields. Guidelines for rice/vegetable rotation practices were developed under the BV Lac project, but their dissemination was somewhat limited.** In the fokontany visited, overall only 10 to 20% of farmers practice rice/vegetable crop rotation mostly with beans, tomatoes, and/or potatoes, and on very small pieces of total rice field.	At least 75% of targeted farmers practice rice/vegetable crop rotation on an area larger than 0.1 ha and for commercial purposes (and among them at least 50%	Site visits. Focus groups with farmers.	Project team in close collaboration with agriculture extension services.

Outcomes	Expected Outputs	Validated Indicator	Baseline Data	Target by End of Project	Source and Method for Collecting Data	Responsibility for Collecting Data
	reduce deforestation, maintain soil fertility and integrity, and to provide adequate growing conditions	sites (gender and age disaggregated)		of women and young).		
	2.2.2 Watershed rehabilitation in productive landscapes introduced, including through reforestation and adaptation of agro forestry practices	(xii) Number of ha reforested in all three project sites	**Reforestation activities have been rather limited over the last decade in the project sites despite significant potential.** • Manakambahiny – There is no significant reforestation in the municipality. There is substantial erosion upstream along the Ilakana River, and the area to be reforested is estimated at 50 km². • Bemaintso – All of the dams deserve to be protected by reforestation since there are areas set aside for that purpose. For instance, Bemaintso contains 3,140 km² that could be reforested. In Fiadanana there are 300 ha and in Ambatolampy there are 300 ha that could be reforested. • Ambohijanahary – The 5 fokontany for the project contain a total of more than 150 ha that could be reforested.	In total, at least 50km² of area distributed in the 3 districts are reforested (5,000 ha).	Site visits. Focus groups with farmers. Interpretation of satellite imagery (see next chapter for description).	Project team in close collaboration with environment extension services and external GIS consultants (same as outcome indicator 4 – no additional costs)
		(xiii) Number of farmers and land/forest users trained on sustainable agro forestry and land management in all three project sites (gender and age disaggregated)	**Farmers have currently not been trained in sustainable agro forestry and land management practices.**	At least 400 farmers trained in sustainable agro forestry and land management (and among them 50% of women and young).	Documentation review: training reports.	Project team, in close collaboration with environment extension services.
	2.2.3 Soil conservation and livestock management techniques adapted to topography and landscape in light of future climate conditions	(xiv) % change in erosion rate	**The project PRODAIRE has been training workers for the DREF in monitoring erosion rates. The DREF has therefore the in-house capacities to monitor erosion rates in the project sites.** Average erosion rate in the region is 12 mm.yr.^{1}, according to Cox, R. et.al, 2009 " Erosion Rates and Sediment Contributions in Madagascar Inferred from 10 Analysis of Lavaka, Slope, and River Sediment"	50 % reduction in erosion rates.	Interviews with DREF. Documentation review: DREF annual reports.	DREF Institutional arrangements to monitor such erosion rates would have to be defined as part of the overall MoU between the

Outcomes	Expected Outputs	Validated Indicator	Baseline Data	Target by End of Project	Source and Method for Collecting Data	Responsibility for Collecting Data
						project and DREF. Additional human resources may be needed by DREF to undertake such monitoring.
	2.2.4 Revitalization of producer's cooperatives and water user associations for collaborative natural resources allocations (e.g. land and water) and management	(xv) Number of members of farmer's cooperatives and water user associations trained on water management and administrative management within the three project sites	**Water user cooperatives exist in the three project areas; however, in all areas members expressed a need for training in administrative management as well as training in water management.** • Manakambahiny – Two cooperatives exist: (i) Water cooperative Ami was founded in 2001 and has roughly 20 members with 3 people paid to maintain the common water canals. Membership dues are 50kg/yr/ha rice and members are not trained in water management. (ii) Soamahitra cooperative has 84 members and is 28 years old. Dues are 75/kg/yr, and members received training in water management conducted by the DRDR. • Bemaintso – There is a federation of water users, called Faribona, under which 5 different cooperatives in the area fall. The federation has existed for 4 years. Membership dues for each cooperative is 10,000 Ar/ha, and the federation obtained as much as 1,200,000 Ar to complete agriculture works. Due to poor management of leaders, however, no works were successfully completed, and farmers are discouraged. • Ambohijanahary – There are 9 cooperatives across the municipality with one for each "mail," and they form the federation Tsimlahy.	75 % of the members of water user cooperatives in the project area have been trained on water management and administrative management.	Interviews with water user cooperative members. Focus groups with farmers.	Project team
	2.2.5 Water quality assessments	(xvi) Percentage change in water quality (e.g. reduction in turbidity, pollutant content, microbial content, sediment content) in all three project sites.	**There is currently no water quality analysis conducted in any of the three municipalities.**	Water quality assessment is conducted in all 3 project sites by the DIREAU with technical support provided by the project if needed. Water quality increase by 10% from the date of the first analysis	Documentation review: water quality assessment	Project team in close collaboration with DIREAU (a MoU would have to be developed between the project and DIREAU for water quality assessment).

Outcomes	Expected Outputs	Validated Indicator	Baseline Data	Target by End of Project	Source and Method for Collecting Data	Responsibility for Collecting Data
Outcome 2.3. Post Harvest losses reduced		Outcomes indicator 5 – Percentage change in post harvest losses	**Post–harvest losses are estimated to be between 5 and 10% of total harvest.**	Post-harvest losses are reduced to less than 4%.	Focus groups with farmers.	Project team.
	2.3.1 Increased utilization of rice by–product especially rice straw	(xvii) Percentage change in use of rice straws in animal feeding and for briquetting	**There are regional variations in the degree to which farmers exploit rice stalks for other uses. In some municipalities, residues are simply burned in the field.** • Manakambahiny – Rice stalks are used to feed livestock; for instance, in Ambaibo farmers reported that 100% of rice stalks are used to feed livestock. Rice husks are used for briquetting. • Bemaintso and Ambohijanahary – Farmers reported that 10% of crop residues are used to feed livestock while the rest is burned in the rice fields as a source of fertilizer.  *Picture 5 – Rice being dried on the field after harvest*	75% of farmers use or commercialize rice straws.	Focus groups with farmers.	Project team.
	2.3.2 Post–harvest storage facilities with phytosanitary control, serving as trading points and markets	(xviii) Number of renovated storage facilities in all three project sites	**Storage facilities in the project sites exist, but they are not in adequate condition.** • Manakambahiny and Bemaintso – Individual storage facilities are generally on the small side and insufficient. • Ambohijanahary – One storage facility exists and can store up to 10,000 tons of rice, but the facility needs maintenance.	75% of existing facilities have been renovated.	Sites visits . Focus groups with farmers.	Project team.
Component 3: Leveraging policy change						
3.1 Technical norms and standards in rice cultivation reviewed and where necessary modified to take climate change		Outcome indicator 6 – Number and types of technical norms	**No recommendation or revision has currently been made to technical norms and standards in rice cultivation.**	At least one national strategy on rice cultivation and at least one technical guideline for the following	Documentation review: Reviewed national	Project team.

Outcomes	Expected Outputs	Validated Indicator	Baseline Data	Target by End of Project	Source and Method for Collecting Data	Responsibility for Collecting Data
into account		and standards in rice cultivation reviewed and modified at the national level to take climate change into account		rice cultivation stages/techniques are revised and updated at the national level: • Seeding • Planting • Harvest • Post–harvest • Fertilization • Integrated pest management • Water management	strategy on rice cultivation and technical guidelines.	
	3.1.1 Gaps and possible maladaptations in the current rice policy are identified and recommendations on rice policy reform are made	(xix) Number and types of activities identified and implemented for up scaling and replication from MIRR application in broader Alaotra basin and in other regions	**While there is an Agricultural Development Strategy at the national level, it does not have a true application at the regional level due to financing. There is no specific policy for growing rice.** • A National Strategy of Development and Rice growing (SNDR) was completed in 2010 under the initiative of Coalition for African Rice Development (CARD) that was initiated by JICA. • At the municipality level, Local development Plans (PDC) exist; however, they do not include issues related to climate change in all of the municipalities visited. Reviewing and updating the PDCs could be a main entry point for inserting climate change issues into local development planning therefore contributing to the up scaling of MIRR at the broader municipality level.	1 replication strategy and action plan developed, including at least 5 to 10 operational activities for up scaling and replication of MIRR practices in the broader Alaotra basin and beyond.	Documentation review: Replication strategy and action plan.	Project team.
		(xx) Number and types of recommendations on rice policy reforms made	The above-mentioned SNDR was completed; however, this strategy has not been published or disseminated.	The SNDR is revised with measures to increase climate change resilience of rice production, and then the strategy is published and disseminated.	Documentation review: revised and updated SNDR.	Project team.
3.2 Conditions in place for a full adaptation of the rice sub–sector		Outcome indicator7 – Number and type of stakeholders to which the report on best practices and lessons learned is distributed	Lessons learned and best practices will be identified and collected during project implementation	1 report at end of project.	Documentation review: report on lessons learned and best practices.	Project team.

4. SAMPLING DESIGN AND DATA COLLECTION AND MANAGEMENT PROTOCOL

Part of the consultancy mandate included the creation of a detailed protocol for data collection and analysis so that the methods used to establish baseline values for the project PMF can be reproduced in a way that guarantees consistency and cohesion in the data. The following plan is provided to enable replication of data collection in a way that allows regular project monitoring and facilitates reporting on and communicating project results.

Data collection can be summarized in four broad categories: (i) individual key informant interviews with government, NGO partners, and local authority stakeholders knowledgeable about specific aspects of rice farming in the area, (ii) focus groups conducted in 9 of the total 16 project fokontany including a targeted variety of farmers as well as local authority and user association representatives when applicable, (iii) a select number of environmental indicators either collected through partnerships or direct monitoring, and (iv) an extensive documentation review to leverage as much existing information as possible.

Individual key informant interviews

Individual interviews with key stakeholders were conducted to collect data on specific elements of rice growing and included conversations with the DRDR, DREF, CALA, seed multipliers, and local elected officials in each of the three targeted municipalities. Table 3 lists the key stakeholders interviewed as part of this baseline survey process and the principle content covered in the interviews (with a reference to the key indicators monitored over time).

Table 3: Key informant interviews conducted for baseline

Key stakeholder	Key aspect of focus	Indicators covered
Chiefs of District	• Economic context of the district • Institutional set-up and capacities • Level of awareness vis à vis climate change aspects	• Outcome indicators 2, 6, and 7 • Output indicators iii, iv, and xx
The Regional Agriculture Directorate (DRDR)	• Institutional set-up and capacities • Project management • Level of awareness vis à vis climate change aspects • Rice cropping systems • Farming guidelines • Irrigation system and infrastructure • Rice yields	• Effectively all outcome and output indicators, except output indicators xii, xiii, and xiv
The Regional Environment Directorate	• Institutional set-up and capacities	• Outcome indicator 4

(DREF)	• Project management • Level of awareness vis à vis climate change aspects • Reforestation, erosion aspects	• Output indicator iv, xii, xiii, xiv, and xvi
Local elected officials in each of the 3 municipalities	• Local planning and PDC • Irrigation systems • Local needs and priorities	• Output indicators ix, xii, and xix
CALA	• Research aspects • Ameliorated seeds test, multiplication, and dissemination • Rice cropping systems	• Outcome indicator 3, 6, and 7 • Output indicators v, vi, vii, viii, xix, xx
ANDRI–KO	• Seed multiplication and dissemination	• Outcome indicator 3 • Output indicators v, vi
Multiplication Center of Anosiboribory	• Seed multiplication and dissemination	• Outcome indicator 3 • Output indicators v, vi
Key project partners such as BV Lac representatives	• Institutional set-up and capacities • Level of awareness vis à vis climate change aspects • Rice cropping systems • Farming guidelines • Irrigation system and infrastructure • Rice yields	• Most outcome and output indicators

Focus groups with farmers

In addition to individual interviews above, focus groups and field visits were conducted in 9 selected fokontany out of the 16 targeted by the project. These 9 fokontany were selected to preserve the proportion of targeted fokontany per municipality – since the project includes 3 fokontany in Manakambahiny, 10 fokontany in Ambohijanahary, and 3 fokontany in Bemaintso, the data sampling maintained this ratio by working in the following fokontany:

- Manakambahiny municipality: (i) Ambalavato and (ii) Ambaibo;
- Ambohijanahary municipality: (i) Manakana, (ii) Ambatovola, (iii) Morarano, (iv) Ambolomborona, and (v) Sahanavily;
- Bemaintso municipality: (i) Fiadanana and (ii) Ambatolampy.

With respect to the focus groups, sampling for participants was geared towards obtaining representation from diverse stakeholders, including female farmers, young farmers, and farmers of different sized landholdings. To that end, in each of the fokontany visited, focus groups were comprised of:

- 1/3 male farmers
- 1/3 female farmers
- 1/3 farmers under the age of 25

Additionally, the group of interviewed farmers was divided amongst:

- 1/3 farmers with less than 2 ha
- 1/3 farmers with 2 - 4 ha
- 1/3 farmers with more than 4 ha

For focus groups, a number of different representatives were included in each of the fokontany:

- 1 local leader (fokontany chief)
- 1 representative from a water users cooperative and/or farmers cooperative
- 1 agricultural extension worker if present in the fokontany.

Table 4 shows the stakeholders that took part in the focus groups in each of the 9 fokontany visited as part of this baseline survey. The detailed attendance lists during the focus group conducted in each of the 9 fokontany are presented in Annex A to this report. It should therefore be possible to replicate the organization of these focus groups in every fokontany involving the same stakeholders so as to collect and then compare data with baseline data presented in the PMF above. Most of the performance indicators were covered during these focus groups.

Table 4: Focus group lists conducted for baseline

Municipality	Fokontany	People interviewed as part of the focus group
Manakambahiny	Ambalavato	• Local elected official and deputy • Chief of Fokontany • President of the water cooperative Ami • 1 farmer with less than 2 ha • 3 farmers with 2 to 4 ha • 4 farmers with more than 4 ha
	Ambaibo	• Deputy local elected official • Chief of Fokontany • President and Treasurer of the water cooperative Soamahitra • Former DRDR extension service worker • 3 farmers with less than 2 ha • 3 farmers with 2 to 4 ha • 6 farmers with more than 4 ha
Ambohijanahary	Manakana	• Chief of Fokontany • 5 farmers with less than 2 ha • 5 farmers with 2 to 4 ha • 5 farmers with more than 4 ha
	Ambatovola	• Chief of Fokontany • 6 farmers with less than 2 ha • 6 farmers with 2 to 4 ha • 4 farmers with more than 4 ha
	Morarano	• Chief of Fokontany • 9 farmers with 2 to 4 ha • 7 farmers with more than 4 ha
	Ambolomborona	• Chief of Fokontany • President of user cooperative • 10 farmers with less than 2 ha • 4 farmers with 2 to 4 ha
	Sahanavily	• 4 farmers with less than 2 ha • 8 farmers with 2 to 4 ha • 6 farmers with more than 4 ha
Bemaintso	Fiadanana	• Chiefs of Fokontany • President of water cooperative • 20 farmers in total
	Ambatolampy	

Environmental indicators monitoring process

A number of the output indicators relate to measuring and monitoring physical data such as soil erosion, water quality, and land cover. In some cases, data collection processes for these indicators exist through different extension and/or regional Directorate activities in Madagascar, and in some cases new data collection and analysis may be advisable. Table 5 identifies the output indicators related to physical and environmental elements, noting which indicators are already being measured and captured by other sources in Madagascar and proposing potential ways for collecting the information where necessary.

Table 5: Proposed methods for evaluating and monitoring environmental indicators

Indicators	Proposed method for measurement and evaluation	Key partners
Water availability and water loss (Output x)	• Water availability and water loss determined by water flow measurement in dredged primary and secondary irrigation canals conducted by DIREAU.	• DIREAU
Land covered by biomass and crop/livestock productivity (Outcome 4, Output xii)	• Reforestation area determined using satellite images to create time series, land cover maps for the project site. ○ Includes acquiring land classification maps for a baseline time point at project start, at project mid-term and at project end (either through accessing existing land use imagery or acquiring satellite images and performing the land classification via GIS consultants). ○ Total estimated costs of US$25-30, 000. • Productivity of vegetable crops and livestock monitored by agriculture extension services through field visits.	• GIS external consultants • Agriculture extension services
Erosion Rates (Output xiv)	• Rates collected through the DREF existing data collection program on erosion in the project area.	• DREF
Water Quality (Output xvi)	• Water quality indicators such as turbidity, pollutant content, microbial content, and sediment content will be measured by DIREAU, with technical support from the project if needed.	• DIREAU

Documentation review

Certain indicators will be recorded, monitored, and measured based on document reviews of different types of reports , studies, research, and training reports. Table 6 lists the types of project indicators that will be monitored and evaluated via document review identifying the specific indicators that each type of document relates to and the anticipated source of the documents.

Table 6: Documentation review

Subject	Document Review Content	Indicators
Models and Forecasts	• Review of existing models for rice cropping systems and research on new models • Review of climate forecasts and climate models and hydrological models • Review of information to understand the effects of climate change on rice growing practices • Review of growing calendars and vulnerability maps	Outcome 1.1; 1.2 Outputs i, ii, and iii
Training Documents and Guidelines	• Review of guideline sheets created for different resilient rice growing practices • Review of guideline sheets for specific seed varieties • Review of guideline sheets for specific techniques such as fertilization application, pest management, sustainable agro forestry and land management. • Review of training reports for attendance and content	Outputs iv, vii, viii, and xiii
National and Local Strategy Plans	• Review of national strategy papers on rice cultivation and technical guidelines • Review of local development plans • Review of replication strategy plans	Outcome 6 Outputs xix and xx

5. CONCLUSIONS & RECOMMENDATIONS

The four tasks set out in the ToRs (see Annex B) were conducted following a rigorous methodology, including one field mission in Madagascar, project site visits, several interviews, focus groups, and an in-depth documentation review.

The assessment of the pre-identified indicators followed a systematic process guided by eight criteria. Based on this assessment, some modifications were needed to propose indicators that are SMART, neutral, reflect proposed outputs, measurable at reasonable cost and effort, and for which data are available in the field. The proposed revised indicators were validated by UNEP and the MEF prior to the data collection field mission.

The results framework currently includes 7 outcome indicators and 20 output indicators for which baseline data have been collected and compiled in a PMF. For each indicator, target by the end of the project, source of information, and main responsibilities in collecting data and regularly monitoring indicators have also been detailed in this PMF.

Following a detailed consideration of the different types of information collected in the field to analyze the current baseline indicator levels and comparing that information to the overall project goals and objectives, a number of recommendations have been made to steer project activities in the most useful direction given current conditions observed in the project site areas. The recommendations are the following:

Partnerships and human resources

1. The institutional arrangement between the DRDR, the DREF, and the project needs to be clarified through MoUs in regards to project implementation and monitoring. **An institutional agreement between these two regional Directorates and the project should be established and signed to clarify the specific roles and responsibilities for project management, technical backup, capacity building, and monitoring that each institution will assume.** Specific roles of each institution in monitoring specific indicators would have to be clarified in this MoU, including technical supports needs.

2. **A partnership agreement (MoU) should be established with the DIREAU for undertaking regular (annual or semi-annual) water quality assessment and water flow measurements** in irrigation canals that clearly identifies the role and responsibilities of both parties as well as the technical needs required by DIREAU to undertake such assessments.

3. **A partnership agreement (MoU) should be established with CALA that clearly identifies what types of support the organization should receive** to be fully operational and what roles and responsibilities CALA will play in project implementation.

4. Because DREF and DRDR are short staffed and lack the resources to dedicate a fulltime position to the project, **support staff need to be recruited to serve as project facilitators in the region supporting the DREF and DRDR in the coordination of project activities. Ideally, a person could be recruited for each district and placed at the DREF offices while working with the DRDR**. The roles of this new position would need to be clarified accordingly based on what kind of support the person can give to the DRDR, CALA, and how information will be diffused to farmers. The position would need access to motorcycles paid for by the project to facilitate field work.

Information dissemination

5. Develop strategies for communicating information on adaptation techniques to farmers given the fact that there is a large information gap between research and projects and the farmers themselves.

Facilities

6. **CALA's facilities are in need of renovation and support** that will enable the organization to make progress towards researching improved seed varieties under better laboratory conditions.

7. Observations in all three districts revealed that hydroagricultural infrastructure is in very poor condition. **The project should begin the processes of identifying what types of renovations and repairs need to be made and then issue a call for proposals amongst service providers to carry out the work**. Local technical workers recruited per recommendations above could help create a detailed list of the specific improvements that need to be done. This list would ideally be made by the end of 2013 so that service providers can be found in 2014 and contracts established for March/April 2014. The works could then begin just after the next rice production cycle.

8. The available budget for Output 2.1.5. Rehabilitate and Extend Water Management and Irrigation Infrastructures appears to be quite low (US$575,000[2]). This is especially true when compared to outputs that do not need costly investments, such as Output 2.1.3 Updated Fertilization Guidelines (US$535,000), Output 2.2.1 Dissemination of Land Preparation, Production and Harvesting Techniques (US$375,000), and Output 2.2.3. Soil Conservation and Livestock Management Techniques (US$330,000).

   The target expected for Output 2.1.5. is to cure and dredge 83 km in total of primary and secondary irrigation canals with norms that take expected climate change impacts into account, to rehabilitate 4 intake-points on the Ilakana River, to drain and rehabilitate the dam in Bemaintso, and to rehabilitate the dam at Anony**. These rehabilitation investments will cost more than US$575,000**. In the meantime, updating and disseminating fertilization guidelines will cost less than US$535,000, disseminating production and harvesting techniques will cost less than US$375,000 and developing soil conservation and livestock management techniques may cost less than US$330,000. It is therefore recommended **to reallocate funds across the different outputs in Outcome 2 according to the following:**

   (i) Increase the available budget for Output 2.1.5. Rehabilitate and Extend Water Management and Irrigation Infrastructures up to US$1,015,000

   (ii) Decrease the budget for Output 2.1.3. Updated Fertilization Guidelines to US$300,000

   (iii) Decrease the budget for Output 2.2.1 Dissemination of Land Preparation, Production and Harvesting Techniques to US$250,000

   (iv) Decrease the budget for Output 2.2.3. Soil Conservation and Livestock Management Techniques to US$250,000

[2] According to AF Project Document p.20

Changes to program activities

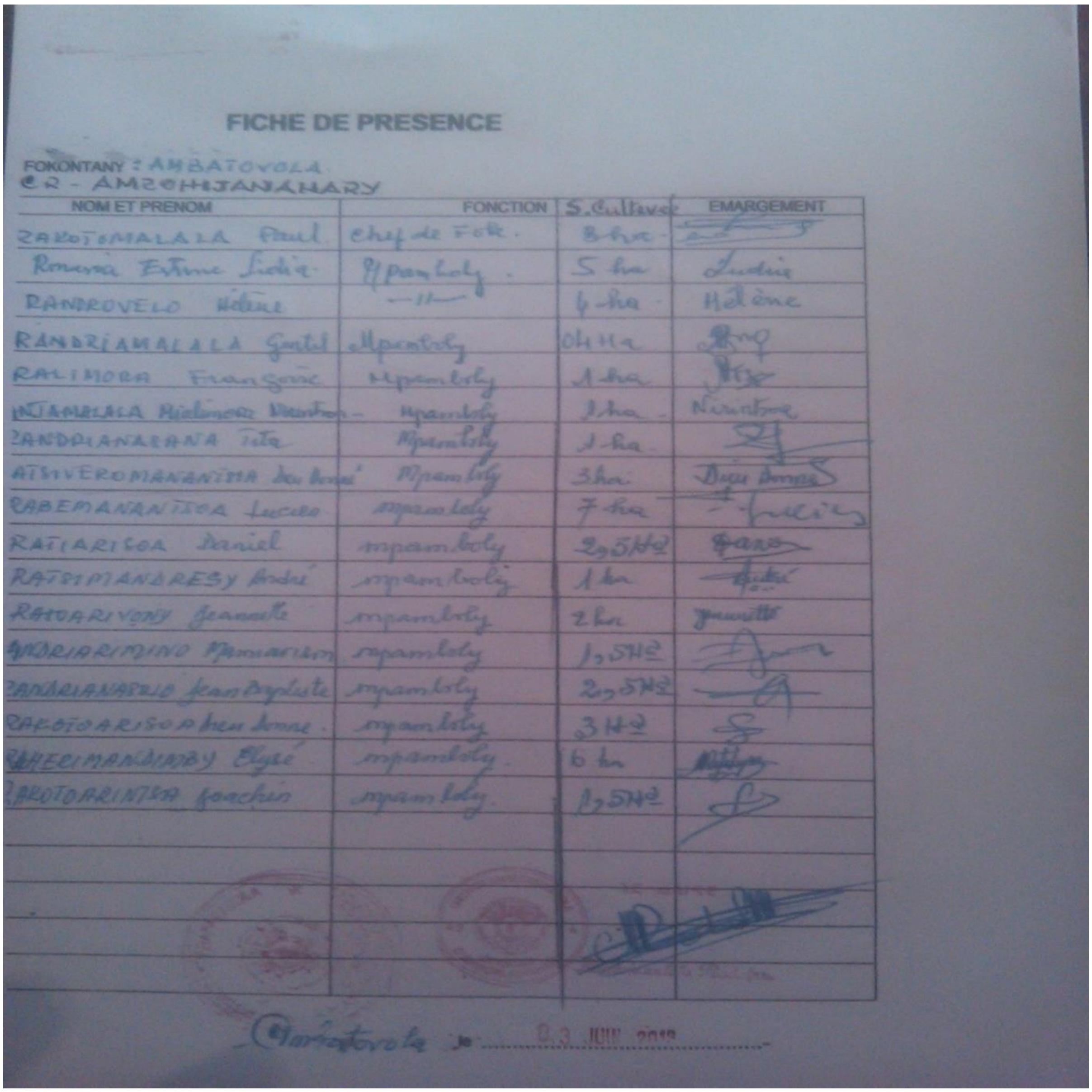
9. Instead of creating new trainings on climate change for agriculture extension workers, who have already been trained in these topics, it would be better **to organize sessions on awareness raising at the town hall for the three municipalities with participation from chiefs and farmers of the fokontany.**
10. A **careful analysis of soil quality amongst farmers** is needed to determine what the actual soil quality is and what specific types of fertilizer application are needed.
11. The project should **capitalize on the SCV farming techniques,** which have already been disseminated for 10 years in the area. These techniques should be integrated in the project's MIRR models.
12. **Models of climate change effects need to be scaled down** to the regional and local level so that the vulnerability of rice production in the project area can be better specified.
13. **Establish responsibility for the two automatic climate reading stations including who will maintain and collect their data**. This is especially important given that no other climate data collecting activities are being performed in the area.
14. **Update the PDC of the three targeted municipalities** to incorporate elements of climate change.

ANNEXES

A. Attendance sheets from focus groups

A. Ambohijanahary Focus Groups

1. Ambatovola Focus Group



FICHE DE PRESENCE

FOKONTANY : AMBATOVOLA
CR - AMBOHIJANAHARY

NOM ET PRENOM	FONCTION	S.Cultivée	EMARGEMENT
RAKOTOMALALA Paul	chef de Fkt.	8 ha	[illegible]
Romena Estime Lidia	Mpamboly	5 ha	Lidia
RANDROVELO Hélène	—11—	6 ha	Hélène
RANDRIAMALALA Gentil	Mpamboly	04 Ha	[illegible]
RALIMORA Françoise	Mpamboly	1 ha	[illegible]
[illegible]	Mpamboly	1 ha	Nirintsoa
RANDRIANARANA Tita	Mpamboly	1 ha	[illegible]
RATSIVEROMANANIMA Dieu Donné	Mpamboly	3 ha	Dieu Donné
RABEMANANTSOA Lucien	mpamboly	7 ha	[illegible]
RATIARISOA Daniel	mpamboly	2,5 Ha	[illegible]
RATSIMANDRESY André	mpamboly	1 ha	André
RAKOTOARIVONY Jeannette	mpamboly	2 ha	Jeannette
ANDRIARIMINO Mamiarison	mpamboly	1,5 Ha	[illegible]
RANDRIANARIVO Jean Baptiste	mpamboly	2,5 Ha	[illegible]
RAKOTOARISOA Dieu Donné	mpamboly	3 Ha	[illegible]
RAHERIMANDIMBY Elysé	mpamboly	6 ha	[illegible]
RAKOTOARINTSOA Joachin	mpamboly	1,5 Ha	[illegible]

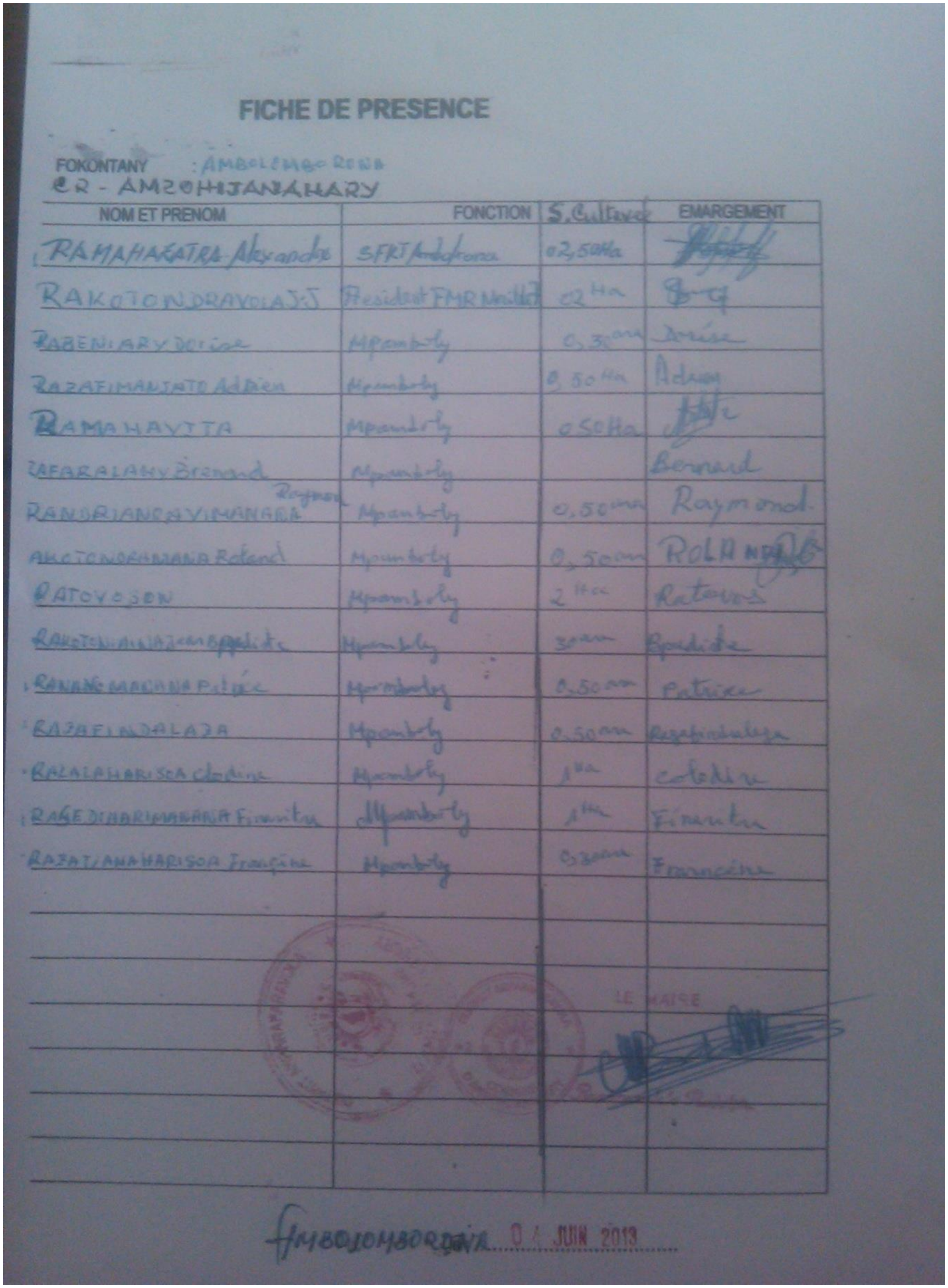
Ambatovola le 03 JUIN 2013

FOKOTANY : AMBATOVOLA

CR : AMBOHIJANAHARY

NOM et PRENOM	FONCTIION	SURFACE CULTIVEE
RAKOTOMALALA Paul	Chef Fokotany	3ha
RINASOA Lidia	Mpamboly	5ha
RANOROVELO Hélène	-	4ha
RANDRIAMALALA Gentil	-	4ha
RALIMORA Françoise	-	1ha
ANJAMALALA Mialimora	-	1ha
RANDRIANASANA Tita	-	1ha
RANTSIVEROMANANTSOA Dieu Donné	-	3ha
RABEMANANTSOA Lucien	-	7ha
RATIARISOA Daniel	-	2,5ha
RATSIMANDRESY André	-	1ha
RASOARIVONY Jeannette	-	2ha
ANDRIARIMINO Mamiarison	-	1,5ha
RANDRIANASOLO Jean Baptiste	-	2,5ha
RAKOTOARISOA Dieu Donné	-	3ha
RAHERIMANDIMBY Elysée	-	6ha
RAKOTOARINISA Joachin	-	1,5ha

2. Ambolomborona Focus Group



FICHE DE PRESENCE

FOKONTANY : AMBOLOMBORONA
CR - AMBOHIJANAHARY

NOM ET PRENOM	FONCTION	S. Cultivée	EMARGEMENT
RAMAHAKATRA Alexandre	SFRT Ambolomborona	02,50Ha	[illegible]
RAKOTONDRAVOLA J.J	President FMR [illegible]	02 Ha	[illegible]
RABENIARY Doriise	Mpamboly	0,30 are	Doriise
RAZAFIMANJATO Adrien	Mpamboly	0,50 Ha	Adrien
RAMAHAVITA	Mpamboly	0,50Ha	[illegible]
ZAFARALAHY Bernard	Mpamboly		Bernard
RANDRIANDRAVIMANGA Raymond	Mpamboly	0,50 are	Raymond.
RAKOTONDRAMANA Roland	Mpamboly	0,50 are	ROLAND
RATOVOSON	Mpamboly	2 Ha	Ratovos
RAKOTONIAINA Jean Baptiste	Mpamboly	30 are	Baptiste
RANANGMAHAHA Patrice	Mpamboly	0,50 are	Patrice
RAZAFINDALAZA	Mpamboly	0,50 are	Razafindalaza
RALALAHARISOA Clodine	Mpamboly	1 Ha	Clodine
RAKEDIHARIMANANA Finaritra	Mpamboly	1 Ha	Finaritra
RAZAFIMAHARISOA Françine	Mpamboly	0,30 are	Francine

LE MAIRE

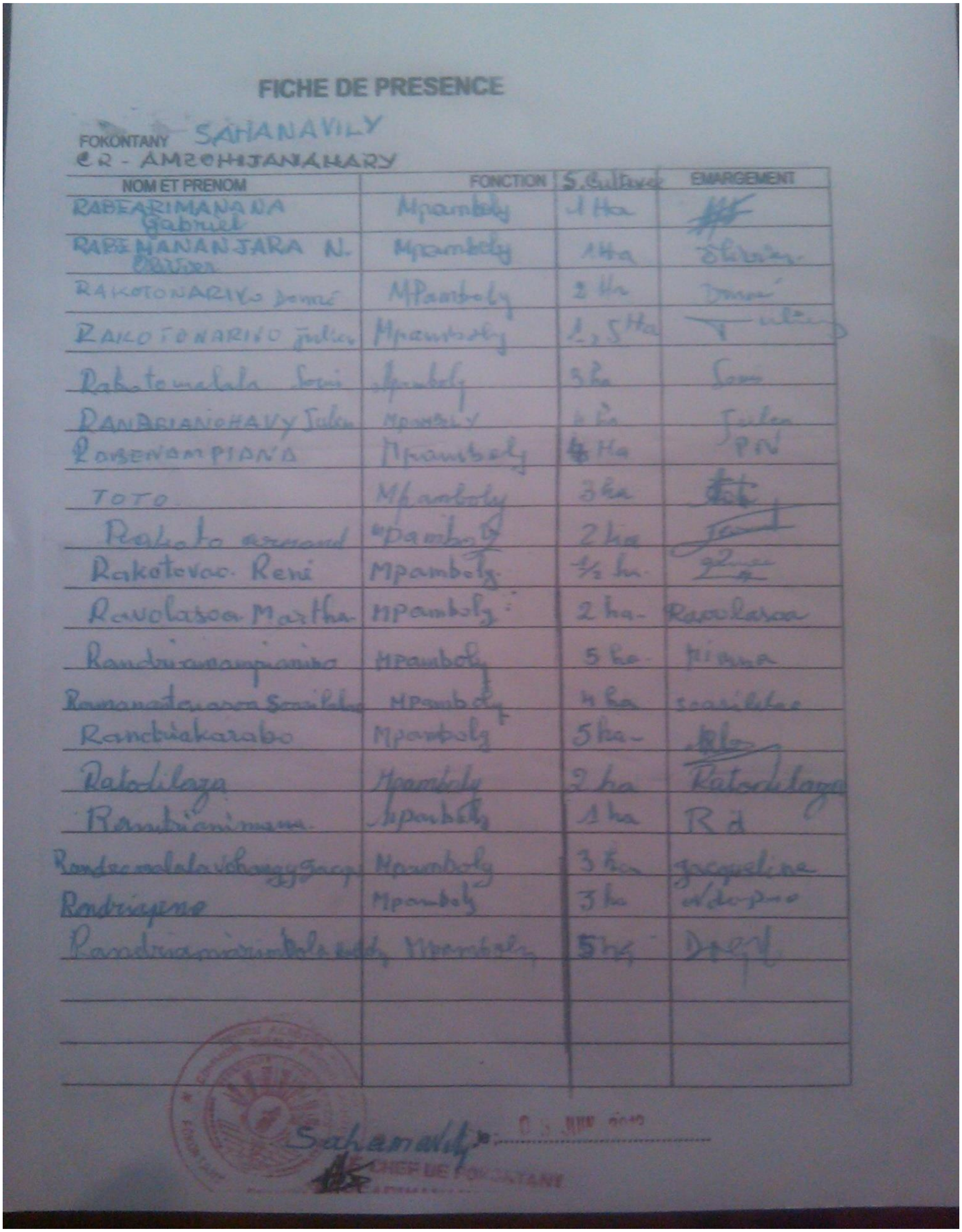
AMBOLOMBORONA 04 JUIN 2013

FOKOTANY : AMBOLOMBORONA

CR : AMBOHIJANAHARY

NOM et PRENOM	FONCTIION	SURFACE CULTIVEE
RAMAHAZATRA Alexandre	SFKT Ambolomborona	02,50ha
RAKOTONDRAVOLA J.J	Président FMR Mail 7	02ha
RABENIARY Dorise	Mpamboly	0,30ha
RAZAFIMANJATO Adrien	-	0,50ha
RAMAHAVITA	-	0,50ha
RAFARALAHY Bernard	-	
RANDRIANOHAVIMANANA Raymond	-	0,50ha
RAKOTONDRAMANANA Rolland	-	0,50ha
RATOVOSON	-	2ha
RAKOTONIAINA Jean Baptiste	-	0,30ha
RANAIVOMANANA Patrice	-	0,50ha
RAZAFINDALAZA	-	0,50ha
RALALAHARISOA Claudine	-	01,ha
RASEDIARIMANANA Finaritra	-	01,ha
RAZAFITIANAHARISOA Francine	-	0,30ha

3. Sahanavily Focus Group



FICHE DE PRESENCE

FOKONTANY SAHANAVILY
CR - AMBOHIJANAHARY

NOM ET PRENOM	FONCTION	S. Cultivée	EMARGEMENT
RABEARIMANANA Gabriel	Mpamboly	1 Ha	[illegible]
RABEMANANJARA N. Olivier	Mpamboly	1 Ha	[illegible]
RAKOTONARIVO Dominé	MPamboly	2 Ha	[illegible]
RAKOTONARIVO Julien	Mpamboly	1,5 Ha	[illegible]
Rakotomalala Soni	Mpamboly	3 ha	Soni
RANDRIANOHAVY Julien	MPAMBOLY	4 ha	Julien
ROBENOMPIANA	Mpamboly	4 Ha	PN
TOTO	Mpamboly	3 ha	[illegible]
Rakoto armand	Mpamboly	2 ha	[illegible]
Rakotovao Reni	Mpamboly	1/2 ha	[illegible]
Ravolasoa Martha	MPamboly	2 ha	Ravolasoa
Randrianampianina	MPamboly	5 ha	Pianina
Ramanantenasoa Sonilalao	MPamboly	4 ha	Sonilalao
Randriakarabo	Mpamboly	5 ha	[illegible]
Ratodilaza	Mpamboly	2 ha	Ratodilaza
Rambinianimana	Mpamboly	1 ha	Rd
Randrcmalalavohangy Jacq	Mpamboly	3 ha	Jacqueline
Randriajeno	Mpamboly	3 ha	[illegible]
Randriamanarimbola [illegible]	Mpamboly	5 ha	[illegible]

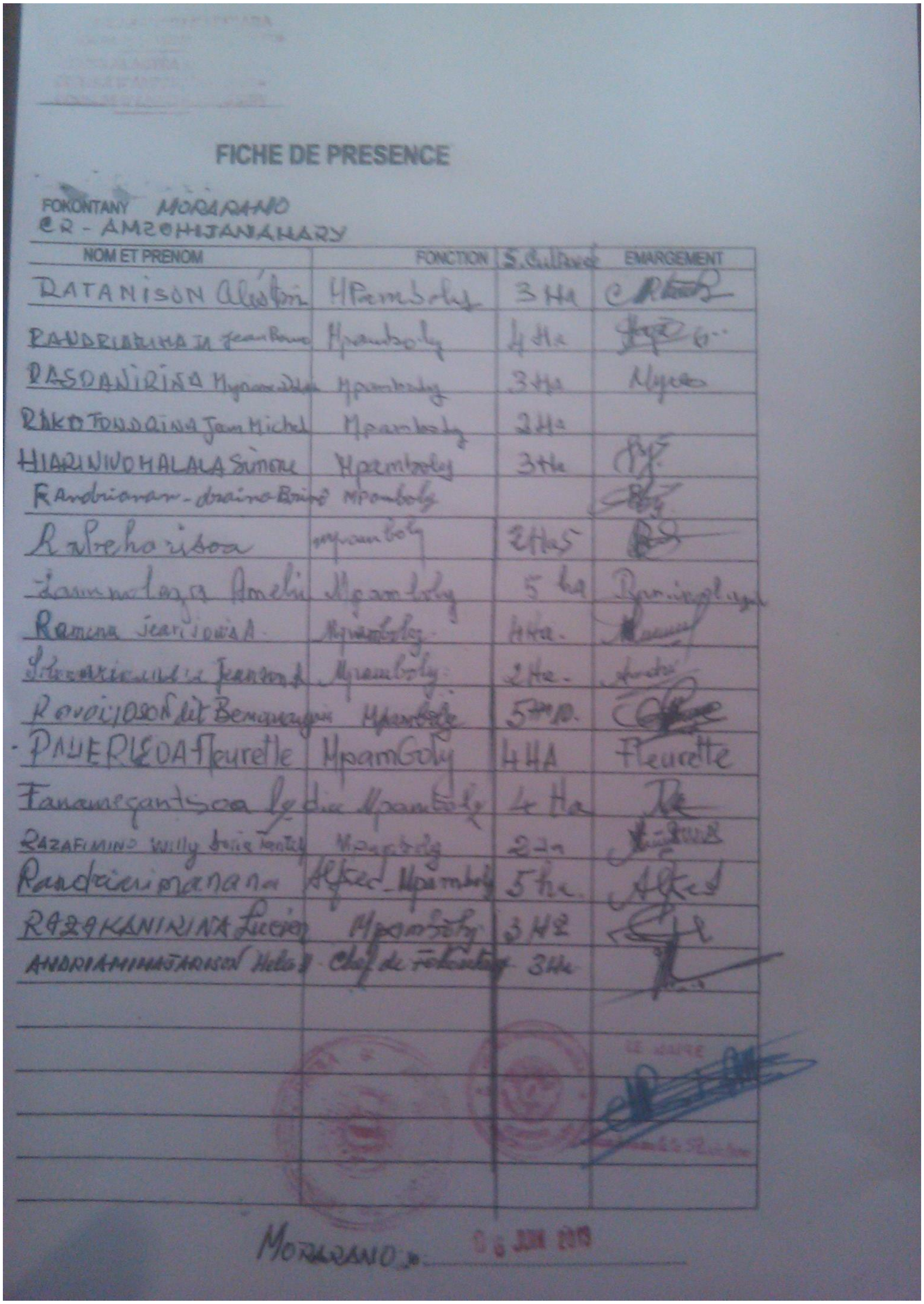
Sahanavily
LE CHEF DE FOKONTANY

FOKOTANY : SAHANAVILY

CR : AMBOHIJANAHARY

NOM et PRENOM	FONCTIION	SURFACE CULTIVEE
RABEARIMANANA Gabriel	MPAMBOLY	1 ha
RABEMANANJARA N. Olivier	-	1ha
RAKOTONARIVO Donné	-	2ha
RAKOTONARIVO Justin	-	1,5ha
RAKOTOMALALA Louis	-	3ha
RANDRIANOHAVY Jules	-	4ha
RABENAMPIANA	-	4ha
TOTO	-	3ha
RAKOTO Armand	-	2ha
RAKOTOVAO Réné	-	1/2ha
RAVOLASOA Marthe	-	2ha
RANDRIAMAMPIANINA	-	5ha
RAMANANTENASOA Soarilalao	-	4ha
RANDRIAKARABO	-	5ha
RATODILAZA	-	2ha
RANDRIANIMANA	-	1ha
RONDROMALALA Vohangy	-	3ha
RANDRIAPENO	-	3ha
RANDRIAMIARIMBOLA	-	5ha

4. Morarano Focus Group



FICHE DE PRESENCE

FOKONTANY MORARANO
CR - AMBOHIJANAHARY

NOM ET PRENOM	FONCTION	S. Cultivée	EMARGEMENT
RATANISON Aliston	Mpamboly	3 Ha	[illegible]
RANDRIAMAHAJA Jean Bruno	Mpamboly	4 Ha	[illegible]
RASOANIRINA Myriam	Mpamboly	3 Ha	[illegible]
RAKOTONDRAINA Jean Michel	Mpamboly	2 Ha	
HIARINIVOMALALA Simone	Mpamboly	3 Ha	[illegible]
Randrianarindraina Bruno	Mpamboly		[illegible]
Rahelirisoa	Mpamboly	2 Ha 5	[illegible]
[illegible] Amelie	Mpamboly	5 ha	[illegible]
Ramena Jean Louis	Mpamboly	4 Ha.	[illegible]
[illegible]	Mpamboly	2 Ha.	[illegible]
Ravelojaona dit Benjamin	Mpamboly	5 Ha.	[illegible]
PAUERLEDA Fleurette	MpamGoly	4 HA	Fleurette
Fanamezantsoa Lydia	Mpamboly	4 Ha	[illegible]
RAZAFIMINO Willy [illegible]	Mpamboly	2 Ha	[illegible]
Randrianomanana Alfred	Mpamboly	5 ha.	Alfred
RAZAKANIRINA Lucien	Mpamboly	3 Ha	[illegible]
ANDRIAMIHAJARISON Helo	Chef de fokontany	3 Ha	[illegible]

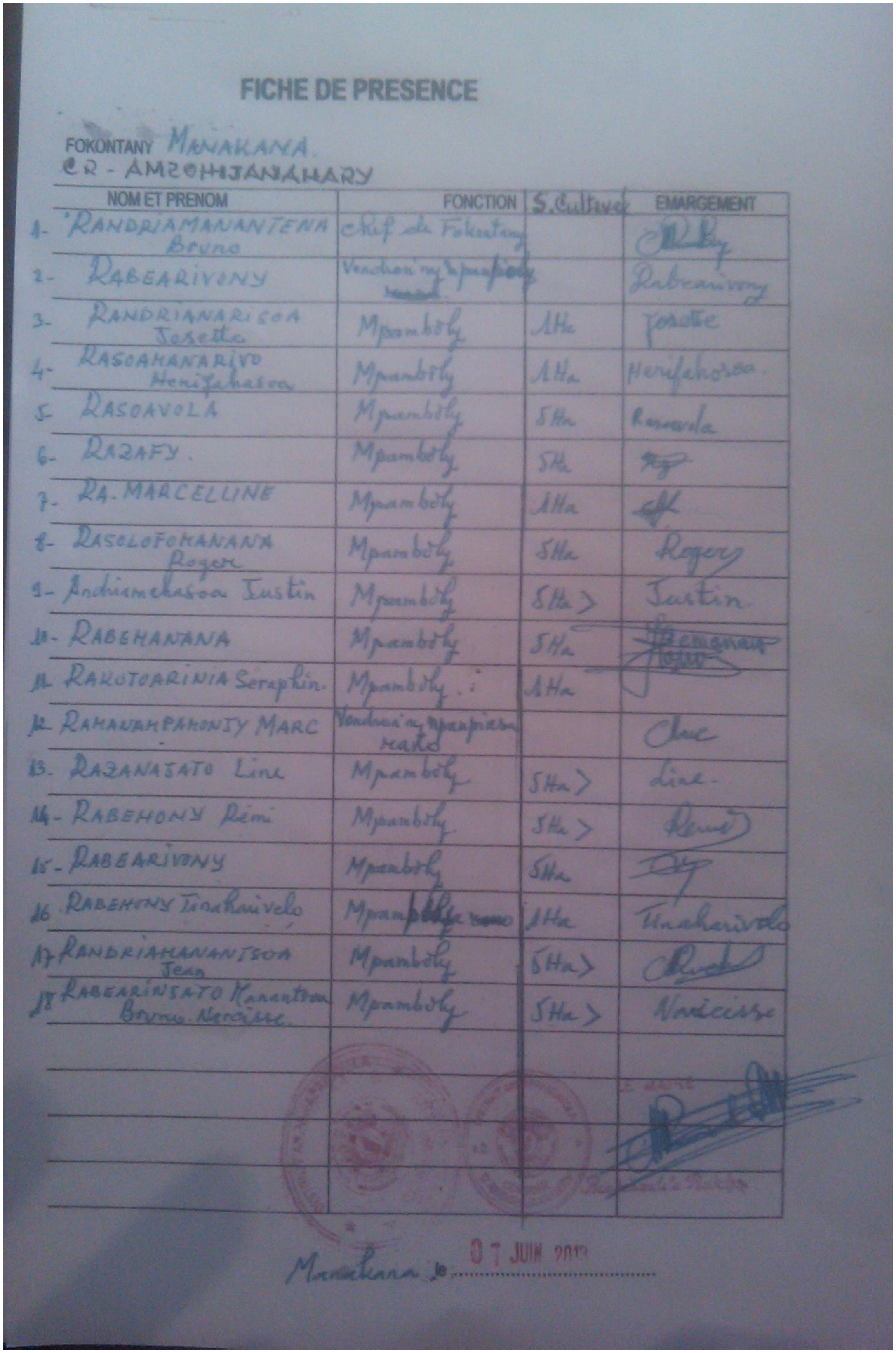
MORARANO, le 08 JUIN 2013

FOKOTANY : MORARANO

CR : AMBOHIJANAHARY

NOM et PRENOM	FONCTIION	SURFACE CULTIVEE
RATANISON Celéstin	MPAMBOLY	3ha
RANDRIAMIHAJA Jean Bruno	-	4ha
RASOANIRINA Myriame	-	3ha
RAKOTONDRINA Jean Michel	-	2ha
HIARINIVOMALALA Simone	-	3ha
RANDRINANDRAINY Bruno	-	
RABEHARISOA	-	2ha5
RAMINOLAZA Amélie	-	5ha
RAMENA Jean Louis	-	4ha
SOLONARIMANANA Jeanson	-	2ha
RAVOINASON Bemananjara	-	5ha10
RAHERISOA Fleurette	-	4ha
FANOMEZANTSOA Lydie	-	4ha
RAZAFIMINO WILLY	-	2ha
RANDRIARIMANANA Alfred	-	5ha
RAZAKANIRINA Lucien	-	3ha
ANDRIAMIHAJARISON Helio	Chef Fokotany	3ha

5. Manakana Focus Group



FICHE DE PRESENCE

FOKONTANY MANAKANA
CR - AMBOHIJANAHARY

	NOM ET PRENOM	FONCTION	S.Cultivé	EMARGEMENT
1-	RANDRIAMANANTENA Bruno	Chef de Fokontany		[signature]
2-	RABEARIVONY	Vondron'ny mpamboly		Rabearivony
3-	RANDRIANARISOA Josette	Mpamboly	1Ha	Josette
4-	RASOAMANARIVO Herifahasoa	Mpamboly	1Ha	Herifahasoa
5-	RASOAVOLA	Mpamboly	5Ha	Rasoavola
6-	RAZAFY	Mpamboly	5Ha	[signature]
7-	RA. MARCELLINE	Mpamboly	1Ha	[signature]
8-	RASOLOFOMANANA Roger	Mpamboly	5Ha	Roger
9-	Andriamahasoa Justin	Mpamboly	5Ha >	Justin
10-	RABEMANANA	Mpamboly	5Ha	[signature]
11-	RAKOTOARINIA Seraphin	Mpamboly	1Ha	
12-	RAMANAMPAMONJY MARC	Vondron'ny mpamboly		Marc
13.	RAZANAJATO Line	Mpamboly	5Ha >	Line
14-	RABEHONY Rémi	Mpamboly	5Ha >	Rémi
15-	RABEARIVONY	Mpamboly	5Ha	[signature]
16	RABEHONY Tinahaivelo	Mpamboly	1Ha	Tinahaivelo
17	RANDRIAMANANTSOA Jean	Mpamboly	5Ha >	[signature]
18	RABEARINSATO Manantsoa Bruno Narcisse	Mpamboly	5Ha >	Narcisse

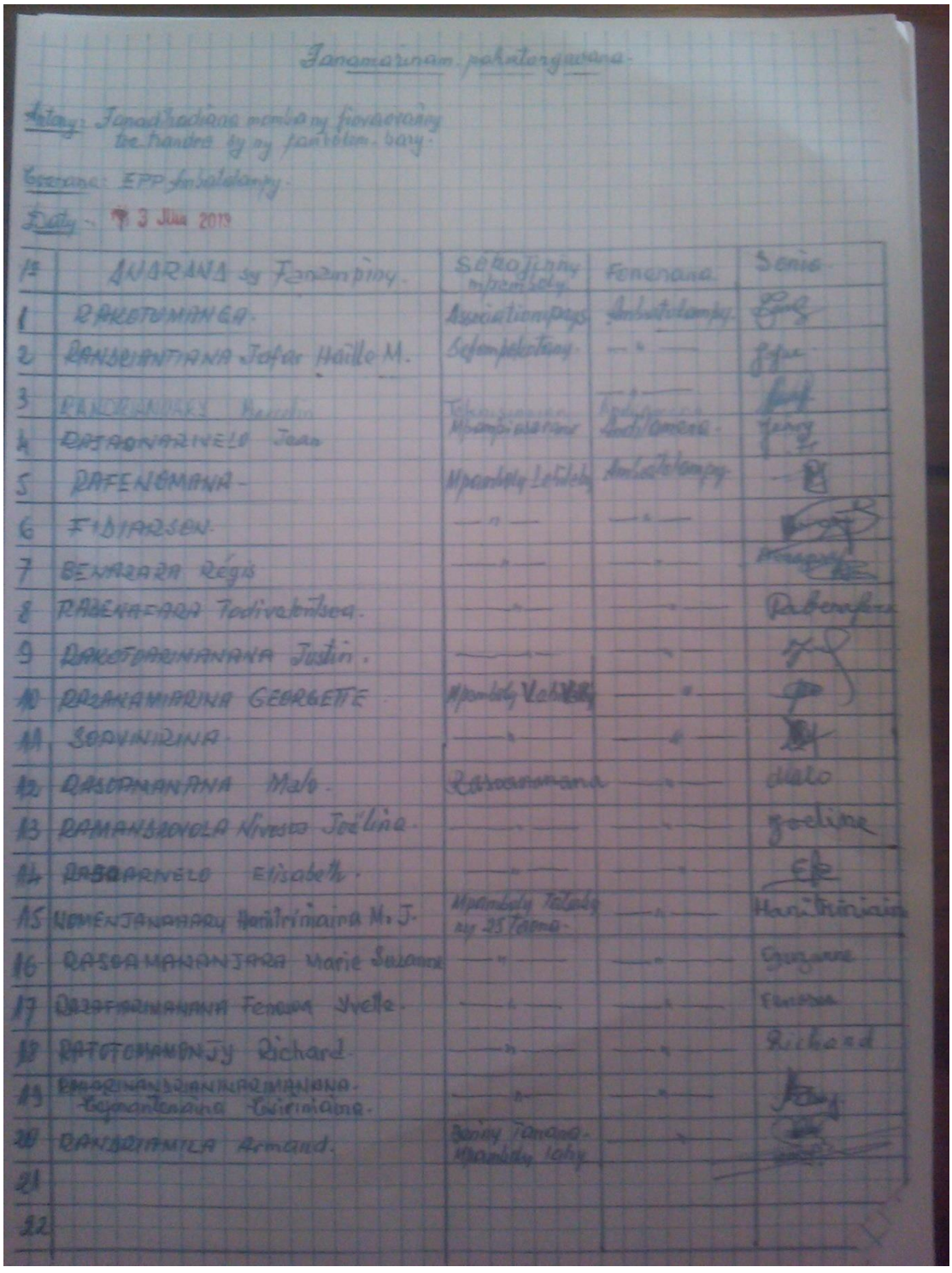
Manakana le 07 JUIN 2013

FOKOTANY : MANAKANA

CR : AMBOHIJANAHARY

NOM et PRENOM	FONCTIION	SURFACE CULTIVEE
RANDRIAMANANTENA Bruno	Chef Fokotany	
RABEARIVONY	Vondron'ny Mpamboly	
RANDRIANARISOA Josette	MPAMBOLY	1ha
RASOAMANARIVO Herifarasoa	-	1ha
RASOAVOLA	-	5ha
RAZAFY	-	5ha
RA.MARCELLINE	-	1ha
RASOLOFOMANANA Roger	-	5ha
ANDRIAMAHASOA Justin	-	Plus de 5ha
RABEMANANA	-	5ha
RAKOTOARINIA Seraphin	-	1ha
RAMANAPAMONJY Marc	AUE	
RAZANAJATO Line	MPAMBOLY	Plus de 5ha
RABEHONY Rémi	-	Plus de 5ha
RABAERIVONY	-	5ha
RABEHONY Tinaharivelo	-	1ha
RANDRIAMANANTSOA Jean	-	Plus de 5ha
RABEARINJATO Manantsoa Bruno	-	Plus de 5ha

B. *Bemaintso Focus Groups in Fiadanana and Ambatolampy*



Toerana : Fokotany Fiadanana

CR : BEMAINTSO

N°	Anarana sy Fanampiny	Velaran-tany	Fonenana	Sokajin'ny Mpamboly
1	RANDRIANILA Armand	1 ha 70	Ambatolampy	Ben'ny Tanana
2	RAZAFITSINARINA	3ha	Fiadanana	Sefom-pokotany
3	RAZAFIMAHEFA Justin	1ha 50	-	Association Paysanne
4	RASATASON Adrien	4ha	-	Président Féderation AUE
5	TSIMANIRY	5ha	-	Mpamboly Lehilahy
6	RANDRIAMBOLA	2ha	-	-
7	RANDRIANIA Tody	1ha	-	-
8	RAKOTONDRABE Raymond	0ha 50	-	-
9	RAKOTONIAINA Pierre	1ha	-	-
10	RAETIARISOA Angèle	1ha 50	-	Mpamboly vehivavy
11	RAHELIARISOA Suzanne	0ha 50	-	-
12	RAZANABOLOLONA Nestine	2ha	-	-
13	MAMA RAVELOARISOA	0ha 50	-	-
14	ROVANAMBININA Anna	2ha	-	Latsaky ny 25 taona
15	RAVAORISOA Jeannette	0ha 50	-	Mpamboly vehivavy
16	RAJASOA Messin	1ha	-	Latsaky ny 25 taona
17	RAZAFINDRABE François	0ha 50	-	-
18	BERANTO Roger	1ha	-	-
19	RAKOTOVOLOLONA Laurent	0ha 50	-	-

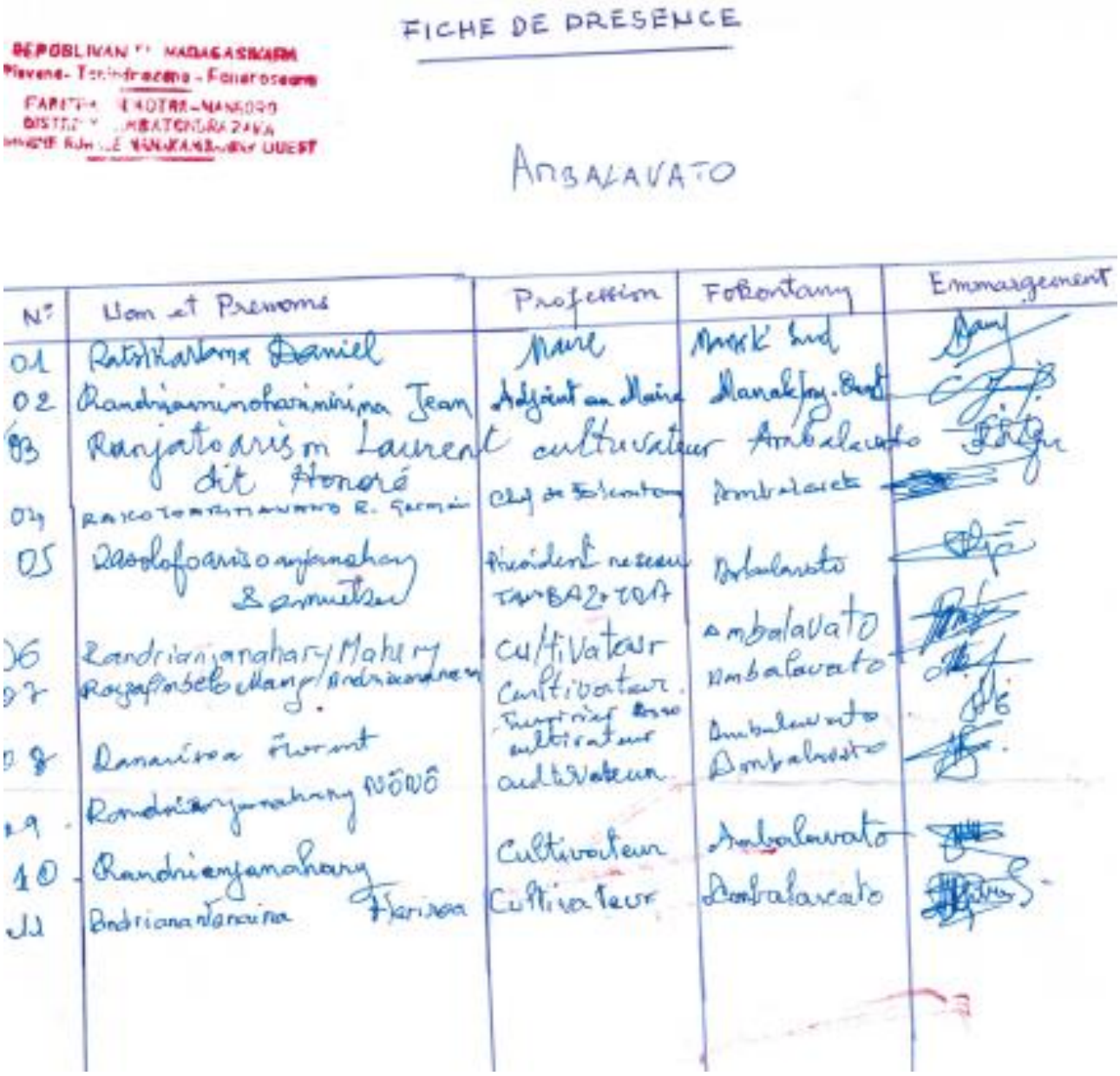
Toerana : AMBATOLAMPY

CR : BEMAINTSO

NOM et PRENOM	FONCTIION	DOMICILE
RAKOTOMANGA	Association Paysanne	Ambatolampy
RANDRIANTINA Jafar	Chef Fokotany	-
RANDRIANOARY Marcellin	Teknisiana	Andilamena
RAJAONARIVELO Jean	AUE	-
RAFENOMANA	Mpamboly Lehilahy	Ambatolampy
FADIARISON	-	-
BENAZARA Régis	-	-
RABENAFARA Todivelontsoa	-	-
RAKOTOARIMANANA Justin	-	-
RAZANAMIARINA Georgette	Mpamboly Vehivavy	-
SOAVINIRINA	-	-
RASOAMANANA Malo	-	-
RAMANDROVOLA Nivosoa	-	-
RASOARIVELO Elisabeth	-	-
NOMENJANAHARY Hanitriniaina	Mpamboly Latsaky ny 25 taona	-
RASOAMANANJARA Marie Suzanne	-	-
RAZAFIARIMANANA Fenosoa	-	-
RAKOTOMAMONJY Richard	-	-
RAHARINANDRIANINARIMANANA	-	-
RANDRIAMILA Armand	Ben'ny Tanàna	-

C. *Manakambahiny Focus Groups in Ambahibo and Ambalavato*

1. *Ambalavato Focus Group*



FICHE DE PRESENCE

AMBALAVATO

N°	Nom et Prenoms	Profession	Fokontany	Emmargement
01	Ratsiharana Daniel	Maire	Marché Sud	
02	Randrianinoharinirina Jean	Adjoint au Maire	Manakjay. Sud	
03	Ranjatoarison Laurent dit Honoré	cultivateur	Ambalavato	
04			Ambalavato	
05		Président reseau TAMBAZO TOA	Ambalavato	
06	Randrianjanahary Mahery	Cultivateur	ambalavato	
07		Cultivateur.	Ambalavato	
08			Ambalavato	
09		cultivateur	Ambalavato	
10	Randrianjanahary	Cultivateur	Ambalavato	
11	Andriananarivo	Cultivateur	Ambalavato	

FOKOTANY : AMBALAVATO

CR : MANAKAMBAHINY

NOM et PRENOM	FONCTIION
RATSIHANAMA Daniel	Maire
RANDRIAMINOHARINIRINA Jean	Adjoint au Maire
RANJATOARISON Laurent dit Honoré	Cultivateur
RAKOTOARIMANANA R. Germain	Chef de Fokotany
RASOLOFOARISO Samuel	Président Réseau Tambazoava
RANDRIANJANAHARY Mahery	Cultivateur
RAZAFINBELO Mamy	Cultivateur
DANARISOA Florent	Cultivateur
RANDRIANJANAHARY Nono	Cultivateur
RANDRIANJANAHARY	Cultivateur
ANDRIANANTENAINA Hairsoa	Cultivateur

2. Ambaibo Focus Group

FICHE DE PRESENCE

AMBAIBO

N°	NOM et PRENOMS	PROFESSION	FOKONTANY	EMARGEMENT
01	Randriamirohanimina	Adjoint au Maire	Manakambahiny-O Sud	
02	RAKOTOARIVONY Nerosoa Christian	Agriculteur	Ambaibo	
03	RASATA Bernard	chef du Fokontany	Ambaibo	
04	RASAMOELINA Rolland	Adjoint FKT	Ambaibo	
05	RASAMISAONA Williame	Mpamboly	Ambaibo	
06	RANDRIANTSARALAVA C.J Romain	Mpamboly	Ambaibo	
07	Rahantamalala Philomène	Mpamboly	Ambaiboa	
08	Rabeharinoro Alfred	Mpamboly	Ambaiboa	
09	Rakotozafy Normand	chef secteur	Ambaibo	
10	RANOELY Jean Toco	EFM et cultivateur	Ambaibo	
11	Randriantoady	Agent Dagu rotaka Mpamboly	Ambaiboa	
12	RANDRIANJAFY Charles		Ambaibo	
13	Rakotondrabenjy	Mpamboly	Ambaiboa	

FOKOTANY : AMBAIBO

CR : MANAKAMBAHINY

NOM et PRENOM	FONCTIION
RANDRIAMINOHARINIRINA Jean	Adjoint au Maire
RAKOTOARIVOMY Christian	Cultivateur
RASATA Bernard	Chef de Fokotany
RASAMOESINA Rolland	Adjoint Fokotony
RASAMISAONA William	MPAMBOLY
RANDRIANTSARALAVA Romain	MPAMBOLY
RAKANTAMALALA Philomène	MPAMBOLY
RABEHARINORO Alfred	MPAMBOLY
RAKIMIZAGY	Chef secteur
RANOELY Jean	Cultivateur
RANDRIANTODY	Cultivateur
RANDRIANJAFY Charles	MPAMBOLY
RAKOTONDRAOLY	MPAMBOLY

B. Project Terms of Reference

TERMS OF REFERENCE: IMPLEMENTATION OF A BASELINE SURVEY AND DEVELOPMENT OF INDICATORS AND TARGETS

for the project:

"Promoting Climate Resilience in the Rice Sector through Pilot Investments in Alaotra-Mangoro region" – funded by Adaptation Fund (AF)

1. BACKGROUND

The context

Adaptation Fund resources are provided to the Government of Republic of Madagascar to implement the project **"PROMOTING CLIMATE RESILIENCE IN THE RICE SECTOR THROUGH PILOT INVESTMENTS IN ALAOTRA – MANGORO REGION"** which seeks to demonstrate an integrated approach that addresses the vulnerability of the rice sector to climate variability and projected climate change in Alaotra–Mangoro region, as the potential basis for up–scaling resilient agricultural and rural growth.

This project responds to the impacts of climate change in precipitation patterns and the variability in the onset of rains, delays in the rainy season, as well as disruptions in the amount of rainfall during the rice–growing season. In addition, climate change causes droughts, floods and cyclones which are known to destroy crops, property and infrastructure.

The project is delineated into three components, each containing a number of outcomes:

Component 1: Scientific and Technical Capacity

- Outcome 1.1. Knowledge base on best practices for climate resilience in rice, based on existing local knowledge and international research.
- Outcome 1.2. Malagasy government, research institutions and local communities have the tools and methods to assess, monitor and understand climate change impacts on rice.

Component 2: Adapted and resilient rice production cycle

- Outcome 2.1. Sustainable increase in rice yields (using MIRR)
- Outcome 2.2. Ecosystem services maintained
- Outcome 2.3. Health improved and new disease spread prevented
- Outcome 2.4. Harvest losses reduced.

Component 3: Leveraging policy change in the rice sector

- Outcome 3.1. Technical norms and standards in rice cultivation reviewed and where necessary modified to take climate change into account
- Outcome 3.2. Conditions in place for a full adaptation of the rice sub–sector.

The total project budget is **5,104,925 USD**. The project targeted area is the Alaotra – Mangoro region. The project will be executed by the **Ministry of Environment and Forests** in partnership **with Ministry of Agriculture and Farming** and implemented by United Nations Environment Programme (UNEP) in close cooperation with other stakeholders.

A copy of the project document can be obtained at the AF website: http://adaptation–fund.org/sites/default/files/Final%20to%20post.pdf

The project indicators

The output level indicators for the **AF funded project** are as follows:

Component 1: Scientific and Technical Capacity.

i) Number of resilient rice models developed
ii) Number of vulnerability maps of future rice production
iii) Number of hydrological models
iv) Timely availability of climate information, including flood early warnings
v) Number of people trained (gender disaggregated)

Outcome 2: Adapted and resilient rice production cycle

i) Availability of information on climate resilient rice varieties
ii) Availability of seeds from resistant varieties
iii) Change in use of organic fertilisers and sustainable bio–organic fertilisers.
iv) Number of people trained in integrated pest management (gender disaggregated)
v) Km of rehabilitated irrigation canals
vi) Number of reservoirs dredged
vii) % increase in water availability in all seasons
viii) % increase in water use efficiency
ix) % application of resilient rice model (gender disaggregated)
x) Change in rice productivity
xi) Number of ha reforested
xii) Number of people trained (gender disaggregated)
xiii) Reduction in erosion rate
xiv) Number of operational water users associations
xv) % change in water quality (e.g. reduction in turbidity, pollutant content, microbial content)
xvi) % use of rice straws in feed and for briquetting
xvii) Number of operational storage facilities

Outcome 3: Leveraging policy change in the rice sector

i) Number of operational intersectoral mechanisms for rice policy making
ii) Number of replication strategies
iii) Number of recommendations on rice resilience
iv) Number of lessons learned reports

2. TASKS

Working with the project management team and ensuring close collaboration with the Ministry of Environment and Forests (MoEF) and UNEP, the main objective of the consultancy is to establish: i) an updated project logical framework; and ii) baseline information for the project indicators, against which the project performance and impact will be measured. The consultant is expected to carry out baseline surveys in each of the three districts targeted by the project (Ambatondrazaka, Andilamena, and Amparafaravola).

The specific tasks of the consultant are to:

1. Assess and briefly describe the status of each of the indicators, and where appropriate, validate or further develop the indicators and targets for each outcome and output included in the project documents according to the adaptation results the projects are aiming to generate. Indicators and targets should be SMART (Specific, Measurable, Achievable, Results–based, and Time–bound), results based and gender–senstive, and means of verification should be as easy and cost–effective as possible. This will include the folllowing steps:

    - Familiarise with the project document, including the project log–frame, budget, and detailed work plan.

    - Carry out a desktop review of national/sectoral strategies, plans and policy documents related to planning, poverty reduction, climate change, agriculture, land and water relevant to the determination of project indicators baseline (e.g. NBSAPs, national communications, NAPAs, NAPs, NIPs, TNAs, PRSPS, etc.).

    - Consider whether the current outcome/output targets are achievable and relevant, and if necessary, propose how they could be revised.

2. Collect baseline data for the project indicators established. Baseline values should be fully established for the relevant project indicators on the basis of the data collected.

3. Identify data gaps and agree in consultation with UNEP and MoEF on a methodology to fill in the data gaps. The consultant should prepare complete baseline information.

4. Develop a sampling design and a data collection and management protocol. This data sampling protocol should provide a detailed description of the methodolgy used to obtain values for each indicator so that monitoring of each indicator can be independently replicated by external reviewers – e.g. for Mid Term Reviews, and Terminal evaluations.

3. DURATION OF THE CONTRACT

Up to 60 days over the period: 1 November 2012 – 31 March 2012

4. EXPECTED DELIVERABLES

i. **Inception report** detailing the evaluation design, methodology, tools, and workplan schedule to carry out the assignment.

ii. **First draft report** which should contain at least the following information:

- Description of the baseline survey methodology and vulnerability assessment for local communities at the project sites.
- Evaluation methodology and recommended indicators, targets and their baselines
- Recommended methods that will be used to measure and track indicators during project implementation.
- Updated version of the logical framework with validated and proposed indicators, baselines (fully quantified and validated values), targets, sources of verification and risks assessments.
- Recommended strategies for monitoring project indicators during the project implementation.
- Annexes: mission report, documentation of interviews, surveys made, list of people involved / consulted, references etc.
- Data collection tools and data set (original and cleaned with codebook).

iii. **Final report** incorporating all the comments from the stakeholders.

5. TIMING OF WORK

The consultant is expected to spend:

- Up to 6 days for preparing the field mission, and elaborating data gathering tools (e.g. surveys). It is recommended that part of this preparation time is spent in–country.
- Up to 30 days work in Madagascar to carry out the necessary data collection (depending on actual needs as defined in the inception report).
- Up to 24 days for drafting and review process.

A draft final of the report should be completed by 1 March. UNEP Task Manager and National Project Coordinator of MoEF will provide comments before March 15. A final report responding to comments should be submitted no later than 31 March 2012.

6. TERMS OF PAYMENT

Payment will be trenched according to the following schedule and upon receipt of deliverables to a satisfactory standard by MoEF and UNEP:

i. Payment 1: 20% upon submission of the inception report.

ii. Payment 2: 50% upon submission of the first draft report.

iii. Payment 3: 30% upon submission of the final report.

No additional costs will be claimed.

7. COMPETENCIES

The selection of candidates will be based on the following criteria:

i. Masters degree in environmental sciences or related area.

ii. A minimum of 5 years relevant work experience.

iii. Demonstrated knowledge of climate change adaptation and development with a focus on agriculture and land management. In addition, specific experience with the rice sector is an added advantage.

iv. Demonstrated experience in project development, implementation and management.

v. Demonstrated experience in i) the development of project log–frames and SMART–based indicators; ii) the appraisal of projects on the basis of log–frame indicators and participatory rural appraisal methods;

vi. Experience in vulnerability assessment particularly related to climate change.

vii. Demonstrated understanding of donor–funded national climate change programmes and projects.

viii. Strong interpersonal and communication skills (particularly with regards to good team leadership).

ix. Fluency in English and French with excellent writing skills is a requirement. In addition fluency in Malagasy and working experience in Madagascar is an added advantage.

x. Availability to conduct this assignment as soon as possible.

8. ROLE AND RESPONSIBILITIES

MoEF will provide the logistics and project documents and be the link between the consultant and the project sites. MoEF will also support in mobilizing the required persons for interviews. The consultant will be responsible for guiding the entire evaluation process and all other specifics responsibilities as stipulated in the ToR.

Final responsibility for quality assurance will be shared between the National Project Coordinator and UNEP Task Manager.

9. PROPOSAL SUBMISSION SPECIFICATIONS

Those interested in the consultancy must include in their application the following components:

- Understanding and interpretation of the ToR
- Methodology to be used in undertaking the assignment
- Time and activity schedule
- Organisational and personal capacity statement
- Relevant experience related to the assignment
- Appropriate references
- Curriculum vitae

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