Environmental and Social Impact Assessment

and

Environmental and Social Management Plan

Date

CEPF Grant -113826

Arboretum d'Antsokay

Advancing collaborative forest restoration and protection in Amoron'I Onilahy Area

Madagascar, Amoron'i Onilahy et Onilahy River (MDG-066)

Contents

Grant Summary

1. **Grantee organization :** Arboretum d'Antsokay

2. **Grant title:** Advancing collaborative forest restoration and protection in Amoron'I Onilahy Area

3. **Grant number :** 113826

4. **Grant amount (US dollars) :** $189,201.00

5. **Proposed dates of grant :** 3 years starting in November 2023

6. **Countries or territories where project will be undertaken :** Madagascar

7. **Summary of the project :**

7. 1 Project Rationale

a) Geographic scope of the project

This project will take place in Amoron'i Onilahy Protected Area (AO PA) that is part of Onilahy KBA, located within spiny forest (a priority Ecoregion for Madagascar).

The Spiny Forest is one of the world's most important and threatened biological regions. The spiny forest is widely recognized as a botanical wonderland, for its xerophytic (dry-adapted) plants. 53% of its plant species and 8 full genera are restricted to the Ecoregion (*Alluaudia* and *Didierea*). This high rate of local endemism suggests that the spiny forest may be the oldest surviving plant community in Madagascar. The "Spiny forest ecoregion" is a global hotspot, owing to its high rate of endemism. Its habitats support and shelter many animals including regionally endemic lemurs and tortoises (*Astrochelys radiata, Pyxis arachnoïdes*). And they are well-known birdwatching spot, with endemic, very localized birds (*Calicalicus rufocarpalis*).

The natural habitats of the spiny forest are not just important for biodiversity, but also for the people that live around them, offering complementary revenues to supplement their income, and providing a critical safety net to support rural communities through difficult time. During the last decades, due to both natural and social factors, many rural people do not have the choice but to use the forest in unsustainable ways in an efforts to make a living. The spiny forest is currently suffering from the highest rate of deforestation and landscape degradation in Madagascar, and is disappearing at an alarming rate, due to i) agriculture : shifting cultivation known as 'slash and burn' (due to the shortage of suitable agricutural land, due to the harsh, dry climate, nutrient-poor soils), ii) charcoal consumption, and iii) wildfires. The environmental impacts of 'slash and burn' are severe, because it results in the total, and often irreversible, destruction of the natural vegetation.

Amoron'i Onilahy Protected Area (AO PA) ensures the spiny forest connectivity (ecological corridor) between the largest spiny forest block in the south (Mahafaly and Androy spiny forest bmock) with the northern spiny forest block (Tsinjoriake PA, PK 32 Ranobe PA, Mikea PA). The AO PA ensures the connectivity of these two blocks to maintain gene flow among

biodiversity. The maintenance of this connectivity is the main justification of this project to target AO PA, as intervention area. The main ecosystems in AO region are spiny forest ecosystem, gallery forest and freshwater ecosystems (lake, wetland). The gallery forests and spiny forest of AO PA are key habitats for 27 recorded mammal species. The AO PA is one of the last strongholds for the endangered ring-tailed lemur (*Lemur catta*) and the endangered Verreaux sifaka *(Propithecus verreauxi).* The Onilahy River and its characteristic ecosystems were labeled a Ramsar site in 2017. They are home to a wide biological diversity with 79 species of birds.The spiny forest is a highly specialized habitat which is listed as one of the 200 most important eco-regions in the world which is dominated by the endemic plant family Didiereaceae. The spiny forest has the highest level of plant endemism both at the generic (48%) and species level (95%) in all ecosystems of Madagascar. In addition, AO is home to representative gallery forest that serves as climatic refugia for iconic Madagascar biodiversity (lemurs, birds, reptiles, and wetland fauna), oncentrating some fauna representative of the south Madagascar (lemurs : *Microcebus griseorufus*, lizards, chameleon, snakes, amphibians, Invertebrates…).

The AO PA is closely linked with the Onilahy River. With its 75km length, the Onilahy River and upstream lakes provide various types of ecosystem services for locals. These ecosystems are responsible for maintaining the hydrological regime of the south west region of Madagascar. The river and its satellite lakes also ensure the release of water supplies systems for agriculture, the main livelihoods of rural communities in this region.

b) Key threats and climate change challenges (climate rationale) :

- Deforestation: the direct threat for AO forest is the conversion of its forest into arable land for the small scale agriculture through slash and burn. The current forest cover of AO PA is 46 797 Ha and the latest deforestation rate record is 53 Ha (October 2022).
- Selective logging (charcoal production for energy needs of nearby big town: Toliara, Betioky) in AO watershed. With the proximity of big cities, AO serves as procurement zones of natural resources. With long lasting drought and collapse of agriculture crops, there is activity conversion (from farming to charcoal producing) for both local actors and migrants.
- Wildlife trafficking of woods with high economic value (ex: *Cedrelopsis* spp, Palissandre, etc.).

Those key threats are leading to environmental degradation (spiny and gallery forest habitat loss) and biodiversity loss. Climate changes are exacerbating the occurrence of those threats and increasing the vulnerability of both human and biodiversity:

- Variable water supplies : shortage or increase of water supplies (depending on extreme weather events) leads to long-lasting droughts or damaging floods. Both increase the vulnerability of local community ending into food scarcity and food insecurity. In the project intervention area, agriculture activities are all rainfed. There are negative trends of food production due to crop failure (cause of drought/flood), and livestock's death cause of the drought/shortage of water and fodder.
- Unpredictable rain: changes in rainfall patterns with irregular precipitation of less than 500 mm per year and precipitation anomalies in the long-term are more severe in the project area. The area is hit by heavy rain from cyclones. The combined effect of deforestation and water run-off leads to soil losses and landslides, and low

replenishment of underground water sources (water insecurity), sedimentation of agricultural land (erosion).

Regarding the context of Onilahy KBA, we identified the following challenges that affect local communities to be addressed in priority, if we want to deliver effectively on the KBA conservation : food security, water security, climate change, livelihood development, environmental degradation (deforestation, erosion) and biodiversity loss. Our project through this CEPF support will partly treat those challenges.

c) Conservation needs:

As above mentioned, the Spiny forest ecosystems, the people and their livelihood/agricultural lands are exposed to increasing vulnerability to climate change. The Southwest region of Toliara has a forest coverage of 21%, nearly 1/3 of which is considered degraded. Amoron'I Onilahy PA represent some of those remaining Spiny Forest (covering 100 482 ha). Its protection will help to reduce the decline of the KBA forest cover.

In consultation with AO PA co-managers (WWF, COBA : community-based organization), and based on the climate-risks undergone by AO managers, the following conservation needs are identified as the most important for AO to promote:

- forest protection of AO PA watershed (to avoid deforestation);
- restoration of spiny forest/gallery forest ecosystems of AO PA;
- restoration of degraded forest area and physical stabilization of ravines with high risks of erosion to reduce sedimentation of agricultural land and run-off.
- In addition, ex-situ spiny forest conservation (propagation of emblematic species of the spiny forest, endemic species) in Antsokay Arboretum is an added value to the conservation of Onilahy KBA. This initiative supports the maintenance of representative rare south west endemic species (plants, animals), maintenance of the genetic biodiversity of South West Madagascar succulent rare plants.

WWF has a commitment to establish 250 ha of forest restoration in AO annually. The restoration activities supported by this project are an additional contribution to these 250 ha to strengthen the restoration/rehabilitation of degraded areas of AO watershed. During the consultation with WWF in the development of this full proposal, their technical managers asked the Antsokay Arboretum (AA) to ensure forest restoration with species characteristic of spiny forests (Euphorbiacea). The propagation of these species is not yet mastered by the nursery keepers on site. In addition to difficult species propagation, there is needs from AO PA co-managers (WWF, CBO), that they addressed to AA regarding production of native, endemic and rare species. AA has expertise on those rare endemic species 'seeds identification, seeds collection, seedling production ex situ.

Regarding physical non biological restoration, there is also needs expressed by co-managers (WWF and CBO) regarding eradication of introduced invasive species (*Leucaena leucocephala*). For this full proposal development, we added this activity for Mahaleotse and Ifanato with the highest invasion.

d) Project added value :

By implementing those conservation needs, the project will contribute to increase the adaptive capacity of AO region human population and natural ecosystems as follow:

- Maintenance of healthy and functional ecosystems for AO (ecosystems providing the essential services people need (water, forest products) to adapt to climate change and variability). This will lead to reduced vulnerability to climate change, reduced disaster risk for AO vulnerable local people and ecosystems (+ associated watershed and wetland). The protection and restoration of forest in the Onilahy cover will help reduce erosion, retain water in the soil and help replenish groundwater sources. *(Note : Vulnerable : individuals who meet at least the following so-called "human development" criteria: i) lack of permanent income; ii) sources of income entirely linked to natural resources; iii) Female-headed household iv) no access to cultivated land).*
- Maintenance of climatic refugia (gallery forest) for iconic Madagascar biodiversity (lemurs) preservation of wetland and its rich biodiversity (aquatic birds …).
- Maintenance of forests production serving as local community "safety net" during leaning season.

The maintenance of the above mentioned ecosystem services (ex: water, food) as the contribution of this project, will increase both the resilience of ecosystem and the resilience of local communities. And finally, the improved protection of AO would support a healthy wildlife and biodiversity in the areas, which will in its terms improve the tourism potential and socio economic development of the Region.

e) AO PA governance :

The AO PA has a conservation vocation, and to ensure the sustainable use of its natural resources the PA is managed together with its primary users, AO PA is co-managed between grassroot communities' organization (Community based organization CBO), WWF Madagascar Country Office and Inter-municipality association (named OPCI OHEMIHA).

7.2 Project Approach

Through this CEPF project, we aim to solve the conservation problem of AO PA important conservation areas (deforestation, erosion, contributing to the decrease of natural regeneration of forest, sedimentation of agricultural land, and little underground water replenishment).

The solutions :

· Engaging local conservation areas managers in EbA (protection and restoration of forest habitats).

· Empowering and strengthening their local governance (local leadership), with the development of alliance/partnership public-private (partnership CBO-Antsokay Arboretum).

· Supporting intervention that promotes good farming practices/transition (ex: agroforestry) to address forest exploitation .

The theory of change that underpins the project interventions is summarized below:

IF local population restore and protect forest ecosystems in AO PA (KBA) as an EbA and derive benefits (motivation) from them **AND IF** they have a sustainable public-private model of co-implementation of EbA with Antsokay Arboretum private actor **THEN** AO PA biodiversity and ecosystem services will be preserved (secured forest provisioning: wood, food, medicinal plants; secured water provision), and the resilience of the local population living around the PA will be increased.

The proposed interventions with this CEPF project will be the continuation of the intervention of the co-managers (WWF) and Antsokay Arboretum NGO in AO PA. The big change is that the leadership of those interventions will be with CBO and AA. They are the direct beneficiaries of the good management and preservation of the conservation areas resources.

The project interventions are about enhancing participation and collaboration between local stakeholders. The project is aiming to operationalize a model of Biodiversity-friendly practices with the lead of Antsokay Arboretum. It is designed around 6 components:

a) Biodiversity and forest ecosystems protection and management (EbA 1) :

- Protection of forest in 3 Community-based natural resources management (CBNRM); within Amoron''I Onilahy Protected area (Ifanato, Mahaleotse, Ambiky). The project will support the presence on site for periodical patrolling,andcontrol). We will provide patrollers with equipments. Patrollers use GPS tracking units walking within the forests. Patrollers monitor the forest controling illicit use of forest products and record fauna and flora species for inventories and monitoring. The patrollers are conducting surveillance either at scheduled moments (twice/month), spontaneously or in case of emergency. They don't have any salary but receive financial compensation.

The surveillance and control made by the patrollers are very important for PA and CBNRM management regarding threat reduction. The patrollers' role is to ease information collection (threat monitoring, ecological monitoring). They report their patrolling results to the CBO President, that in his turn reports to the PA managers (CBO Federation). In case of offense (illegal activities), the patrollers report the case to their CBO President and Chief of fokontany (village). This reporting is very important as it is the first step to trigger law enforcement regarding the PA or CBNRM ("Dina" or the "Code des Aires Protégées'" or COAP). The CBO President reports the case to the Municipality and to the forest cantonment chief (in turn report to the DREDD). With the project, we support then this information collection (on illegal activities), information that will be used by local and regional authorities (Municipality in case of "Dina", DREDD in case of COAP) to support investigation and to begin legal proceeding.

- Improving local management of 3 CBNRM: the project will support effective sustainable management of natural resources, by providing capacity enforcement (institutional, organizational ex: associative life training; technical ex: performing SMART patrol).

b) Forest ecosystem restoration (EbA 2)

Restoration (spiny and gallery forest) will be supported by the project.: i) Community-based restoration in the 3 above mentioned CBNRM, with the CBO managers: ii) physical restoration of degraded ravine to avoid landslide with critical wetland (lakes); iii) eradication of invasive introduced species.

The project will work with the 3 CBOs to restore their degraded forests and degraded land. For this, the project will refer to the management plan already established by the managers (WWF, CBO Federation, OPCI), to identify the location for restoration. WWF and CBO Federation already established also AO PA restoration plan (technical itinerary, the species to prioritize). The project will refer to this document too.

- For forest restoration : The project approach is to establish a nursery with each CBO, and produce seedlings, which will subsequently be planted in the restoration areas (agreed with the target CBOs and the co-managers of the PA). For each CBO, the project will recruit nurserymen/women among CBO members. Those people will be chosen by the CBO themselves. They will be trained on i) techniques for establishing plant nursery (how to do to make a sowing, seeds collection, location of nursery, soil composition ..), and on ii) nursery management. The nursery men/women are also in charge of maintenance and monitoring of restored areas (twice/month). As they are full time working for nursery and plantation, the project supports their salary. The seedlings produced in the nurseries are composed of both native fast-growing species, but also species representative of spiny forests and naturalized species wifdely used by local people (ex: *Gyrocarpus*). For the provision of seeds : the nurserymen/women and CBO members are the one in charge of seeds collection all year-round, or during seed maturation on the mother plants. The project provides the equipments to the nursery.

The tree nursery will provide plants to the CBO members for the restoration campaign. During the campaign, we will engage both with CBO members and also local communities to perform the tree plantation (pitting, transplantation, watering). We will organize the campaign with a "cash for work" system or "HIMO". Each participant is paid a daily stipend of 5000 MGA. The nursery men/women will be assigned the task of supervising the HIMO together with the project staff. As there is a prevision of El Nino for the Sothern part of Madagascar for the next years, we planned also to perform watering of new transplanted seedlings to ensure a better survival rate. For this watering, we will work also with local communities with HIMO.

- Restoration of degraded ravine :

i) Stabilization of ravine and toes of slopes involves both engineering and re-vegetation approach. Engineering solutions involve re-grading to decrease the angle of slope to manage water flow including terraces, the use of rock to stabilize the slope. Fast establishing species that will resist to drought (ex: Jatropha, succulents), will be used for slope stabilization. In addition deep rooted plants are also used to enhance the slope stability and the shear strength of the soil, thus preventing shallow landslides (ex: Fast growing Poacea Heteropogon).

ii) On degraded slopes near water source (Onilahy River), we will encourage and educate farmers on agroforestry-based restoration (native trees, fruit trees, crops). We will work with farmer leaders that will serve as model to raise awareness of local communities about the benefits of agroforestry and land restoration. We will organize exchange visit in areas with terrace agriculture, with agroecology, to showcase that crops that grow with tree (shadow, are much better.

The Antsokay Arboretum will serve as demonstration site with agroforestry, agroecology models of production adapted to drought (e.g drip irrigation, water management, use of organic fertilizer, waste management), where farmer leaders and CBO members could go and learn about those farming techniques. The farmer leaders in their turn will educate the

other farmers and villagers, assisting them by giving information they require. We will engage a consultancy (to identify the partner to support the project on agroforestry and agroecology).

The 3 tree nurseries established with CBO will produce also fruit tree seedlings for agroforestry. For fruit tree production, we will work with technicians from Welt Hunger Hilfe (WHH) in Toliara. The project will provide equipment and support training of farmers interested and willing to enrll in agroforestry.

For the terrace labor, we will work with HIMO system with local communities.

- Eradication of invasive introduced species (*Leucaena leucocephala*): we will first map the infestations (location, size of infestation) and share with CBO and PA co-managers to agree on the location to be treated. To limit the spread of the invasive species we will conduct a mechanical control method. The plants are removed (cutting) before they sets seed. For seedlings, saplings and small trees, they will be hand pulled/hand-cut. Cut plants will be dryed and burnt. The project will provie the equipments for the plant mechanical removal (gloves, machete, spade…).

As for the above restoration we will work with local communities with HIMO system. The CBO President, Chief of Fokontany will support the project with HIMO participants' identfiaction and will helps the project staff with HIMO eradication campaign supervision.

The cut plant materials will be gathered together and left to dry, to be burned afterwards. In order to deplete the soil seed bank with Leucaena, the area must be reprocessed each year (mechanically removing young shoots). The principle is to gradually deplete the Leucaena seed bank in the soil, while promoting the germination and growth of other species. This model is theoretical at this stage, as it is difficult to accurately model the structure of future plant formations. It is therefore appropriate to say that this project supports the experimentation of mechanical eradication of Leucaena, but will also make it possible to observe plant dynamics. These observations will serve as a basis for the co-managers of the AO PA, to enable them to develop and apply actions for preventive management of invasions.

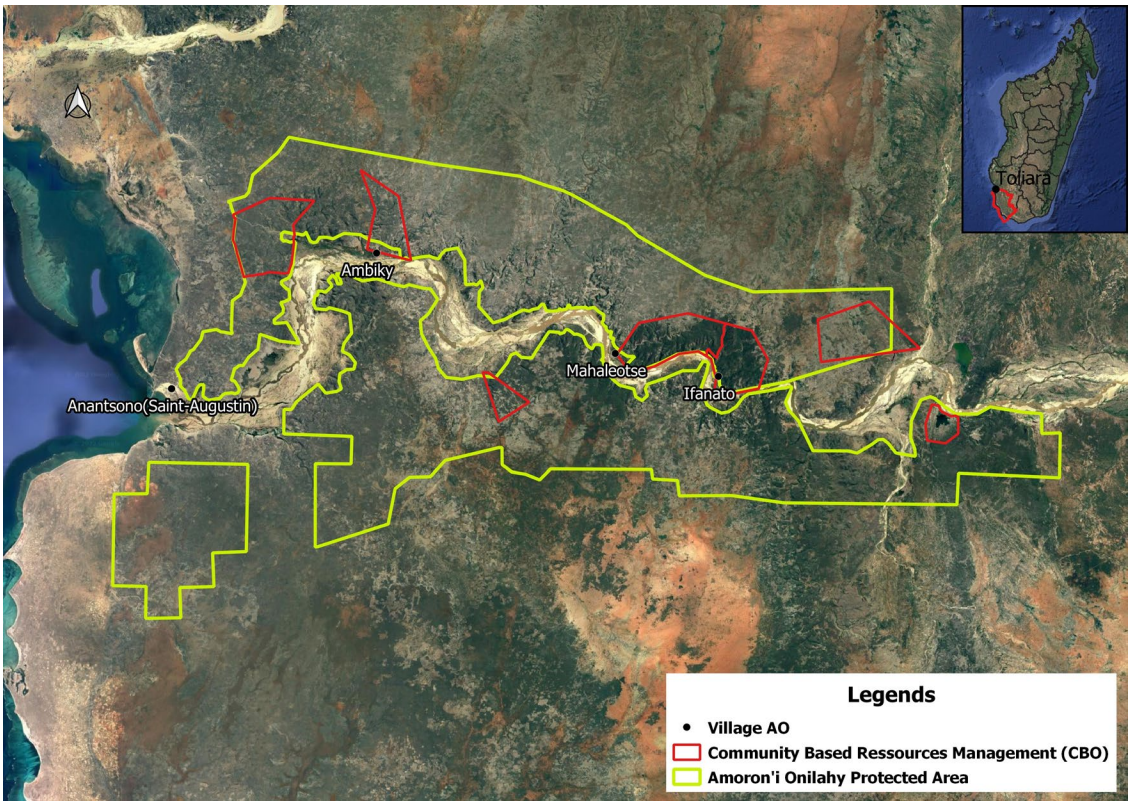

Figure 1 : Map of Amoron'I Onilahy PA and localization of the project 3 targeted CBOs (Ambiky, Mahaleotse, Ifanato.

c) Human Well-Being resilience

Promotion of nature-based solutions (drought-adapted-practices : water economy) to improve capacity of vulnerable communities, on agricultural production system adapted to climate change. Within the Antsokay Arboretum, a demonstration center for climate-resilient food production methods (e.g. agroforestry, drip irrigation, agro-ecological techniques) will be established. It will serves as a model to the surrounding farmers, to transition to more sustainable agriculture practice adapted to the changing climate.

d) Civil Society empowerment

including capacity enforcement of CBO to become conservation stewards, to become climate-smart agriculture champions and to become in general champions on EbA developped with the project. In addition, the project will support enforcement capacity of CBO on their organizational development competencies (managing project, leadership, leveraging funds ...).

e) Enabling Conditions supporting EbA

- Development of a model of Public-Private Partnership (CBO-Antsokay Arboretum) generating resources (inputs : seedlings, knowledge, salary), to support continuously

Antsokay Arboretum and CBO partners in implementing EbA activities. The AA in the mid and long term will support the CBO in their resources funding (ex: strategy of leveraging fund), autonomy, coordination of EbA implementation.

f) CEPF project management and monitoring for compliance:

The above mentioned interventions are aiming to reduction of threat, maintenance of ecological integrity, maintenance of ecosystems provision functions (supporting food and water security), ecosystem protection function (to reduce erosion, land silting, landslide). For this to happen, there is the necessity to have a good local communities leadership for implementing the EbA approach. The project will lead the emergence of effective local leadership promoting partnerships through the empowerment of local CSO (CBO and private AA).

8. Date of preparation of this document : September 2023

9. Legal and regulatory framework:

9.1 Madagascar Requirements

- **E&S assessment and risk management :** At national level, an Environmental and Social Impact Assessment (ESIA) is required for all projects with high risks for negative impacts on the environment and local population. This is embedded into respectively the Environmental Charter (Loi n°2015-003 of 2015) and the MECIE (Ensuring compatibility of investments and the environment, decree n°2004-167 of 2004. This also applies to the creation of protected areas and as such the Amoron'I Onilahy protected area underwent an ESIA (Environmental and social impact assessment) as part of its creation process and has an Environmental and Social Management Plan (PGES). The ESIA and PGES are approved by the National Office for the Environment (ONE).
  According to the MECIE decree, public participation can be done either through public consultation of project documents, public survey or public audience.

  In the case of the AO PA, public audiences were held during the creation process. The activities proposed in this project have been designed to respond to the needs of the communities affected by the AO PA as part of its ESMP. Regular stakeholder engagement will be conducted to ensure relevance of and adhesion to project activities.

  To support the CBO in their efforts of forest restoration, a nursery of endemic and rare plants (seedlings needing specific care and maintenance) will be established within Antsokay Arboretum (AA). A water drilling will be put in place in the AA area for a continuous propagation of rare endemic plants and supply of those rare and endemic seedlings to CBO for forest restoration. In addition the drilling will ease the establishment of a agroforestry model of production adapted to drought (e.g drip irrigation, water management, waste management, use of biological fertilizer …). The purpose is to have the AA serving as demonstration center for climate-resilient food production methods (agroforestry, agro-ecological techniques, aiming to increase transition of local farmers to those practices adapted to climate change.

The water drilling infrastructure will be established in Antsokay Arboretum land. It is a private land owned by the NGO Antsokay Arboretum and where the AA office is situated.
In June 2023, profiting from the semestrial meeting of AO PA co-managers (7 president of CBO, WWF staff, Intercommunality) held in Toliara, AA director (Andry Petignat) conducted consultation with AO PA co-managers about their thoughts on having the AA serving both as agro ecological and agroforestry demonstrating site and also as providers of endemic plants seedlings. All 3 co-managers gave their green light to the AA proposition.

- **Human Rights :** Madagascar ratified various international conventions and declarations in relation to the Respect of human rights (Universal Declaration on Human Rights, 1948). AA respects fundamental human rights in the exercise of its activities.

9.2 International requirements

The present project implementation will be compliant with the CEPF Environmental and Social Framework (ESMF), and adhere to its 10 safeguard policies: 1. Environmental and Social Assessment; 2. Labor and Working Conditions; 3. Resource Efficiency and Pollution Prevention; 4. Community Health, Safety and Security; 5. Restrictions on Land Use and Involuntary Resettlement; 6. Biodiversity Conservation and the Sustainable Management of Living Natural Resources; 7. Indigenous Peoples; 8. Cultural Heritage; 9. Gender Mainstreaming; and 10. Stakeholder Engagement.

The project process to apply the CEPF Environmental and Social Management Framework (ESMF) follows the following steps:

- Identification of key stakeholders and engagement, including communities that could be affected by forest management;
- Consultation with project-affected people on environmental and social issues that could potentially affect them;
- Disclosure of appropriate information on the project to have stakeholder views to be considered in the development of the project;
- Stakeholder consultation during the whole lifecycle of the project, and starting as early as possible;
- Operation of a procedure by which people can submit comments and complaints (Grievance Mechanism).

10. Status of area to be impacted:

- **AO Protected Area**

The AO PA is located within the Region Atsimo Andrefana, Districts of Toliara II, Betioky and touches 11 Municipalities, 62 villages, with 55 068 population. Within AO PA, we will work with villages involved in community management of natural resources (CBNRM). The 7 CBNRM within AO PA are located in 7 villages, namely Ambiky, Maroamalona, Antanimena, Ifanato, Mahaleotse, Ampoezy and Ranomay. The current project is supporting those CBNRM and specifically Ambiky, Mahaleotse and Ifanato. Those 7 CBNRM are situated within the Municipalities of Ambohimahavelona and Tongobory. The total number of the population of the 7 villages with CBNRM are 8524 with respectively Ambiky : 1386, Ifanato: 687, Mahaleotse : 1155. Overall, 80% of households are headed by men. Approximately one head of household out of 3 never attend school and

33% of heads stopped at primary school. On average, heads of households are 47 years old and approximately 48% is over 50 years old. On average, a household is made up of 6 people and 3 out of 4 household heads are married.

65 % of households own cultivable land which measures on average 4 hectares per household. Due to the persistence of drought in the area, 80% of those households are not sufficient with food. Their agricultural productivity does not meet the subsistence needs of their households. In this sense, households diversify their source of income (35% of households practice agriculture and livestock (26% Agriculture and 9% livestock) while the remaining 65% use other activities such as fishing, crafts and daily work. The main types of agricultural production are: cassava, corn, beans and sweet potatoes (market gardening in Maroamalona).

Regarding habitation, most households use precarious materials for the construction of their house. 74% of households live in a house with roof made of vegetal and use clay, mud or brick to build their walls.

There is a very uneven wealth distribution, the majority of households are in the middle and classes (very poor : 15%, poor: 25%, middle : 30%, rich: 30%, with distribution of incomes respectively of very poor : 11%, poor: 17%, middle : 23%, rich: 49%). Very poor households earn their living mainly by selling agricultural products, charcoal and doing daily work. Wealthy households earn their income by working as civil servants or state employees and as merchants or selling fishery products (from the Onilahy river). With indicator of the food accessibility, we use food consumption score (SCA) that reflects dietary diversity and frequency as well as the relative nutritional intake of household. (This indicator have 3 levels including "Poor" when the quantity and quality of food is inadequate, "Limited" in the case where the quality is inadequate and "Acceptable" in the case of adequate nutrition). In average 53% of households have "limited" consumption score and 6% of households in the critical case with " poor" SCA (note for Ampoezy the SCA for "poor" reached 28%).

Adaptation strategy to drought:

- Food security is one of the societal challenges that occur within the site of the project. Food insecurity in this area is mainly driven by the regular crop failure due to the heavy reliance on rain-fed agriculture, low-yield crop selection and siltation of agricultural lands.
- Water security : variable water supplies, (increase or shortage depending on extreme weather events (droughts, floods).
- Water source shortage due to drought.
- with drought women had to engage in negative coping mechanisms, such as restricting adult family members' food intake to provide for children and preparing cheaper and less nutritious food for their families. 68% of household adopt this reduced Coping Strategies (rCSI).
- Hunger forces young girls and boys to drop out of school to seek work to support their families or to get married at young age and create their own family and living, to reduce family burden (specifically food).
- Men and young boys increasingly migrated to other regions/city (Toliara) to escape hunger and to find job. Men and young boys are therefore more resilient.

- With drought, there is more migration in the AO area and activity conversion (from agriculture to charcoal producers).
- Following the exacerbation of the societal challenges such (drought, cyclones), communities are aware of the impact of climate change and take more easily ownership of the sustainable management of AO PA through a positive attitude for the strengthening of restoration and protection of natural resources.

Recent facts about cyclone:
In late December 2022 and during in February, March 2023, the Atsimo Andrefana Region was hit by 2 major cyclones (Chenesio and Freddy). Amoron'I Onilahy with those cyclones suffered mostly from flooding. For the 11 Municipalities, 2541 households lost their crops and seeds, limiting their capacity to renew their farming activities**.** Among those victims 1039 households had damage with their habitation.

Gender equality:
- Women are badly affected by the drought. Women had to engage in negative coping mechanisms, such as restricting adult family members' food intake to provide for children and preparing cheaper and less nutritious food for their families.
- Young girls and boys are also affected : hunger forces many to drop out of school to seek work to support their families. With such context, with this project, we will make efforts to ensure that the benefits generated by the project go equally to women, men, girls, boys. We will address also women and youth vulnerability to climate change by designing interventions in a way so as to benefit men, youth and women equally. Ex: When conducting restoration planting campaign, we will organize a system of "cash for work" with equal participation of youth, women and men.

- **Antsokay Arboretum**

The Antsokay Arboretum is located 12 km north of Toliara and was founded in 1980. The AA is situated in the midst of the Spiny Forest and plays an important role in in-situ conservation of the flora of the spiny forest. In addition four hectares of the arboretum were developed into a botanic garden, harbouring a comprehensive collection of plants from South West (SW) Madagascar. To date, the arboretum keeps 900 species of plants of which 90% are endemic to SW Madagascar and most (80%) have assigned medicinal properties. The IUCN/SSC Cactus and Succulent Action Plan (Oldfield 1997) recognizes the Antsokay Arboretum as an important collection of natural source succulents.

11. Anticipated impacts and risks:

Globally, the project approach is based on the principles of "Do no harm and Do good". It therefore naturally refers to promoting safeguarding procedures. An Environmental and Social Safeguard management plan (ESMP) for the present project is established, and outlines the environmental and social management commitments that Antsokay Arboretum (AA) will implement, to manage potential negative impacts and enhance potential positive impacts of the project. The ESMP plan also introduces the other Safeguard Instruments to be applied in this project (ex: stakeholder engagement plan, grievance mechanism, etc.).

Note :
- During the phase of proposal development, we developed a screening of Environmental and social Impact (ESIA) of the project (desktop work, village consultation). The ESIA results in the identification of potential risks regarding the

project implementation and provide directions on the mitigation measures to follow or adopt The identified mitigation measures have been integrated into the project design (approach, deliverables, activities) and resourced appropriately.

- AA staff will be trained on ES safeguards (ESS). We will ask WWF staff (as AO PA co-manager) to ensure this tasks (as they have already provide training on ESS to the other co-managers (MIHAVAO federation of CBO, OPCI OHEMIHA), and to the 7 Community based Organization of AO.

Risks identified with the screening (ESIA) and mitigation measures:

11.1 Environmental and social risk :

Climate risks (drought, flood, desertification, kere (starvation), ecosystem degradation, decrease of local population resilience)

Conducting forest restauration within the AO PA and implementing fruit tree plantation. To enhance the viability status (species richness, plants abondance, forest cover) of the spiny forest, gallery forest ecosystem, with the project support we will conduct forest restauration within AO PA as NbS. This action has the purpose to tackle challenge regarding forest degradation due to fire exacerbated by climate change/drought, water scarcity,food insecurity. Such restauration activities will be performed with local communities. In parallel, we will develop also fruit tree plantation as income diversification for vulnerable people depending on AO PA resources for rheir daily life**,** with a system of effective water management.

Physical construction : we plan for the Arboretum d'Antsokay site the set up of drilling with storage tanks. The drilling will hugely improve access to water to ensure a high survival rate of seedlings (plants nursery for restoration). But also to ensure the long-term viability of the Arboretum important endemic plant collection, that acts as a genetic reservoir for the South west plant species, and productive habitat for the local fauna. The Arboretum plants need watering year round.

11.2 Social risk :

a) **Competition on water use** (beverage, agriculture and tree nursery, tree plantation).

b) **Strengthened management of Amoron'i Onilahy protected area (AO PA):** we plan to support local communities involved in forest Community-Based-Natural Resources Management (CBNRM, that are part of AO PA), in the conduct of patrolling. This to reduce threats towards the PA and CBNRM forest resources (cutting, slash and burn, overgrazing). The improvement of AO PA is one part of Nature-based solution (NbS) the project is implementing. Through the patroling the project supports the development and implementation of the CBNRM management plans designed to address unsustainable use of resources and therefore includes some degree of restriction of access to these resources, such as bans on slash and burn agricultural practices, regulated grazing area for example.

11.3 Political risk :

Pre and post electoral crisis (presidential and municipal).
There is the risk that there is Non state continuity that might delay project implementation, involving Municipal and Regional authority (ex; DREDD).

12. **Mitigation measures:**

- **Mitigation measures regarding risk related to restauration activities :** the restauration activities performed under this CEPF grant follow a well-thought-out forest restoration schemes developped with WWF Madagascar Office since 2021 for the AO PA watersheds. 1) The restauration area targeted with the project will be situated in degraded and deforested land within AO PA, following established restauration zoning of the PA. The CBNRM of Ambiky is chosen in priority as target CBNRM for the project, as it has the biggest forest restauration zone to be afforested. 2) In addition, the restauration area targeted is agreed with WWF following restauration priority identified ing established from the restauration plan document.

WWF has developed for AO watersheds with scientists. In addition, we avoid monoculture by restoring the degraded land with different plant species including fast growing native species (ex: *Jatropha madagascariensis*) with succulent plants characteristic of the spiny forest structure. Those succulent plants (ex: *Operculycaria decaryii*), are difficult to propagate, justifying the valuing/ mobilization of Antsokay Arboretum long term scientific expertise on ex situ native species propagation (more than 20 years experiences).

All 4 nurseries to be established won't use chemical or pesticides.

- **Mitigation measures regarding fruit tree seedlings production and plantation :** Planting of fruit trees will take place in the crop fields of households' beneficiaries of the project support (vulnerable individuals, local communities identified as champions for climate smart agriculture systems). The fruit tree species (papaya, goyava, citrus) are already tested by WWF in the area during the last decades and prove to be well adapted to the area climatic conditions. Once transplanted from the nursery, those fruit trees don't require frequent watering. The risk linked with fruit trees plantation is fruit crop-raiding by lemurs that might create human-wildlife conflict, harming lemurs' population. The fruits (papaya, goyava …) attract lemurs' individuals that come to farmers' field and eat the crops. People risks to chase, trap or kill those adventurous lemurs that . As mitigation measures, we will enforce sensitization of local people on conservation of lemur species, as emblematic species. And we will conduct awareness raising on alternative to hunting and killing of lemurs. Ex: Chasing animals collectively back to the forest, using bells and shouting to make noise and keep lemurs away from the farmland.

- **Mitigation measures regarding protection of environmenet and protection of water resource related to the well drilling**: the well drilling will be set up in open area (no vegetation clearing). With water withdrawals, we will comply with local laws, and will have a reasonable use of water for the Arboretum. Ex: implementation of environmentally sound and economically water conservation measures: use of drip irrigation/micro irrigation with plantation.

- **Mitigation measures regarding the drilling related excavation**: To capture water from the groundwater, we will have a drilling instead of a open well. The borehole and pipe, will have a maximum diameter of 125 mm (5 inches).

Drilling methods description: The first step of the drilling is to find water of good quality by doing a borehole to reach the good water table. The drilling in this case is a small hole (diameter 125 mm) that is dig deep enough to reach good quality water. It will be dug with a special machine (a drill). The technique that will be used for the water borehole drilling will be the "rotary drilling", with the use of a machine that use rotation and pressure. This is a rotation and grinding method. The soil excavated are carried to the surface by the circulation of a drilling fluid (drilling mud) in the annular space between the ground and the drill string. The down-the-hole hammer operates on compressed air. The depth of the drilling varies depending on the location of the aquifers. This hole drilled will be consolidated by steel tubes. At the level of the water table, tubes will be placed (the walls of which will have holes) to allow the water to flow inside the tube. To prevent the sand from falling into the drilling, the driller places gravel around the screens. Once the drilling and installation of the casings are completed, a pump will be installed to bring the water from the groundwater to the surface. The pump will use electricity from solar panels.**Head of drilling :** the drilling head will be made of reinforced concrete. Drill head includes installation of all hydraulic devices, special parts and accessories.
Water tower : the water will be stored in a tank placed on a raised metal structure. At the foot of the tower a concrete slab will be poured to stabilize the structure.

Company employee safety : i) the company will distribute personal protective equipment and make it compulsory to wear it; ii) Make the wearing of personal protective equipment compulsory; iii) Provide the site with a medicine box.

Pollution risk linked with the drilling:

- Soil pollution is also likely to occur due to possible accidental spills of fuel and maintenance products from drilling equipment. As mitigation, AA together with the drilling company will i) immediately scrape the soiled floor in the event of an accidental spill of cleaning products or fuel; ii) set up a maintenance area on the drilling site; iii) create a storage area for maintenance products and fuel.
- Impact on the Acoustic Environment (noise and vibration nuisance) : noise and vibration caused by the use of generators for the operation of the drilling engine (during drilling construction) will disturb the tranquility of wildlife and microfauna. As mitigation, during the construction phase of the drilling, the company will avoid working at night to avoid disorienting the animals.

Impact on the landscape (modification of the visual aspects of the drilling site and its surroundings with the water tower): i) vine type vegetation will be planted to cover the metal structure of the water tower; ii) collect and treat all waste produced during the drilling construction work(including removal of mud from the excavation).

- **Mitigation measure regarding enforcement of Amoron'i Onilahy Protected Area management rules (patrol) :** the project conducts consultation with the AO CBNRM managers, and also WWF Madagascar Country Office (co-manager of AO PA) when developping the LOI and the full proposal. We ensure that the project intervention areas are situated in places already agreed with local communities to be sustainably managed (CBNRM of Ambiky, Ifanato and Mahaleotse).

This to avoid new livelihood access restriction (for land, woods) for local communities. We choose those areas following the CBNRM and WWF suggestion. In addition, in the restauration activities the project will implement as NbS, we will identify and target vulnerable men and women to be the beneficiaries of the project, (vulnerable beneficiaries identified after socio economic vulnerability assessment). Those vulnerable groups are those being impacted by natural resources access restriction. We will work with WWF and the CBNRM managers (CBO : community-based-organization) in documenting/assessing the beneficiaries'vulnerability (dependence on resources). The project will support income generating activities (tree nursery for restauration, adoption of fruit tree seedlings production and plantation), and cash for work with physical restauration activity (ex: ravine and slope stabilization to reduce landslide and erosion).

- **Mitigation measure regarding the security of local communities working with the project involved in patrolling :** To increase the security of patrollers, we will ensure that patrollers always go out in pairs. Patrollers (in pairs) will have also an outfit that allows villagers and possible delinquents to identify them as rangers. Wearing these outfits helps ensure their safety, they are recognized as people who only patrol, but not officers involved in repressions. We will conduct also at the start of the project special session to remember to patrollers working with the project their role : forest control and surveillance, reporting of forest status, threats and no "law enforcement" activities.
  The project will provide the targeted CBO with smartphone, for SMART patrol data collection, but also to ensure that patrollers in action can communicate their situation in case of trouble.

Table 1. Risks and mitigation measures

Social and environmental risks and impacts	Risk Rating (High, Medium, Low)	Management measures	Residual Risk Rating (High, Medium, Low)	Location	Costs	Implementation responsibility	Schedule
Environmental and social risk : drought, flood, Cyclones/or occasional heavy rain resulting in Low success rate of tree plantation, food insecurity.	High	Respect restoration schedule and undergo regular maintenance of restoration area.	Medium	Village-level	Budgeted in restoration activities (2.3.2)	Project Technician	Year 1, 2, 3

		Conduct periodic Awareness raising on bush and forest fires		Village-level	Budgeted with field trip (technician, agent)	Field agent, Technician	
		Strengthen communities against vulnerability through promotion of sustainable farming techniques (agroforestry, tree seedlings production)		Household level	Budgeted in 3.2.2 ; 3.3.2 activities.	Field agent, Technician	
Exposure/interaction of patrollers with offenders that may result in patrollers physical insecurity	Medium	Patrol at least with 2 persons, patrol planning not communicated, avoid conflicts with offenders, non uses of weapons …	Medium	Individual	Budgeted in 1.1.2 activity	Individual	Year 1, 2, 3
		Equip the patrollers with specific outfits to be recognized as obseevers and not as law enforcement agent		Individual		Project Manager	
		Equip the patrollers with phone to ensure they can communicate when in trouble.		Individual		Project Manager	
		Suspend field missions in high insecurity areas when and as needed.		Individual	No budget required	Project Manager	

Social risk : Competition on water use (beverage, agriculture and tree nursery, tree plantation), resulting in Low sucess rate of restoration, and social conflict	Medium	Prioritize rainwater storage for nursery and seedlings watering purpose in case of water deficit.	Low	village level	Budgeted with activity 2.2.3	Field agent, Technician	Year 1, 2, 3
		Establish tree nursery in villages where there are water in permanence.		village level			
Political risk : Pre and post electoral crisis (presidential and municipal)	Medium	Communication with donor in case of pre or post electoral crisis occurs	Medium	Poject level	No budget required	Project Manager	End of Year 1, Year 2
		Discussion with donor with a possible crisis management plan.		Poject level			
		Limiting activities requiring policy decisions during year one of the project (2023).					
		Strengthen communication and relationship with local communities to maintain the gains made.		Village level, individual level	Budgeted with field trip (technician, agent)	Field agent, Technician	
Physical construction: well drilling in AA	Low	Well drilling will be set up in open area (no vegetation clearing).	Low	Project level	Budgeted with	Project Manager	Year 1

		Use "rotary drilling" technique for the water borehole drilling . The borehole and pipe, will have a maximum diameter of 125mm.			activity 3.2.3		

13. Actions to ensure health and safety:

In addition to the above health and safety mitigation measures, we will also have the following security plan:

- Workplace : the AA NGO office has a system for fire evacuation. AA workers are provided with boots, gloves as protection against accident (ex: scorpion bites, cuttings …). First aid kit is available, including venin suction pump.
- Cyclone and bad weather : we will always check weather and postpone, reschedule activities both with AA staff and partners during severe weather seasons.
- Insecurity : the co-managers of AO (WWF, intercommunality) have a system of monitoring risky zones with high insecurity (zone called "red zone": due to zebu theft, attack, remoteness). We suspend activities and travel to all "red zone".

14. Monitoring and evaluation:

Monitoring of project implementation:

A project implementation plan and its monitoring and evaluation plan will be developed during the first quarter of the project implementation, in order to measure deliverables and achievement of the project, and to assess whether the results are contributing to the long term impact of the project, and contributed to the strategic directions of CEPF program .

We will conduct the following monitoring :

- Monitoring of achievement/activities: the project team establishes an annual workplan, that will be splitted in quarterly workplan. This tool will allow planning progress forecasts and measuring achievements or progress for each activity on a quarterly basis during the project period. The results of the monitoring will serve as the basis for adaptive management of the project with respect to unmet or unrealized activities.

- Monitoring of deliverables: provides information on the progress made toward achieving the deliverables and the impact of the project (short term, long term). This is assessed and reported in the Monitoring and Evaluation Plan at the end of each year. The project team will measure on a yearly basis the indicators set for each deliverables.

Together with the ESMP, the monitoring and evaluation tool on this ESMP plan will be established and updated on an annual basis and will be used to report on relevant ES safeguards for the project.

ESMP evaluation for the project will be carried out by the AA team on an annual basis and will be based on the Table 1 template. ESMS reporting will be done and included as part of the project Annual Reporting. For each mitigation measure, it will be reported whether implementation is on schedule (or ahead of schedule or completed), slightly delayed or delayed. Where delays are encountered, the reasons will be explained, and solutions suggested.

15. Permission of the landowner:

Restoration campaign will be performed within the CBNRM boundaries. The restoration areas will be those taken from the PA AO development plan and the CBNRM. The choice of restoration sites as well as the techniques/practices to be adopted will be submitted to the CBO concerned and to the co-managers (WWF, MIHAVAO, OPCI) for their validation and green light.
The location of the nurseries will be decided by the villagers and local authority (traditional leaders, Chief Fokontany).

For agroforestry trial and environment friendly practices (farming practice), the villagers themselves choose the location, whether it will be in their farm land or in common public land.

16. Participatory preparation:

To engage project's partners, beneficiaries and stakeholders we apply Free Prior and Informed Consent (FPIC), Informed Consultation and Participation (ICP), Consultation, and Information Sharing.
FPIC is conducted following culturally and socially appropriate forms of engagement that increases community ownership and engagement in the project efforts to sustainably manage natural resources and improve local livelihoods.

16.1 Consultations during proposal development:

- Profiting from a meeting of MIHAVAO federation and the 7 CBO representants held in Toliara in November 2022, and organized by WWF, the project manager (Andry Petignat) present a summary of this CEPF project.
- We conducted local consultation session in one of the future intervention village (Ambiky) during the development of this full proposal. During the day of consultation, the CBO President and some CBO members were present, including women. The purpose of the consultation session has been shared with the local communities, and the informations collected are used for the development of the project proposal. A meeting note is established.
- In addition to local consultation, we also discussed with the representatives of the stakeholders intervening in AO : WWF (Landscape Manager, Monitoring and evaluation officer, Biodiversity and protected area officer), and UNDP project manager in Toliara. We then triangulated the information collected from local consultations inAmbiky with that collected with resource persons from WWF and UNDP, to frame the logical framework of the project (updated logical framework developped with LOI).

16.2 Engagement plan during project implementation :

During project implementation, the AA project Team will engage with and provide information to all partners. This will be done as follow:

- **<u>During inception phase of the project :</u>**

- **With the 3 CBO partners :**, establishment of collaboration agreement (integrating ToRs and respective tasks for the implementation of activities) with planning of activities. The objective of the agreement is to have a good understanding of the roles and commitments of participating partners (AA staff, CBO members).

- In addition with the targeted CBO, we will conduct consultation to identify capacity enforcement gap and needs and an agreed capacity enforcement plan will be developed (ex: capacity enforcement plan on tree nursery, seeds collection, treatment, ….). This ensures that capacity enforcements that will be further developed meets real needs and knowledge/know-how gaps. AA will support building the technical capacity of the CBOs.

- **with AO PA co-managers (WWF, CBO federation named MIHAVAO, Inter Municiplaity Association named OPCI OHEMIHA):** We share with those stakeholders the target and scope of the project, the goals, the deliverables and activities, our planned/projected impacts on natural resources and the project socio economic impacts.

- **Between CEPF implementing partners (ADES, AA) :** the above mentionned informations will be shared between AA and ADES. To discuss the project approaches and see the complementarity of the 2 CEPF projects on AO KBA, we will establish between AA and the ADES project team a date for a coordination meeting.

- **<u>During the project implementation:</u>**

- **With targeted CBO board:** monthly planning and meeting.

- **With WWF, CBO federation MIHAVAO, ADES :** there is a planned monthly meeting between WWF and MIHAVAO. Together with ADES, we will ask WWF and MIHAVAO to have a 1h meeting with them after their monthly meeting, profiting that MIHAVAO is in Toliara. This meeting can be organized every 2 or 3 months and the aim is for AA and ADES to have systematic information and communication with AO PA co-managers (identification of synergies between AA and partners' interventions, exchange, to identify the partners' contribution/commitment to the project, to establish an agreed action plan, to have a clarification of roles and responsibilities between each participating partners and AA).

All partners' engagement ex: meetings, workshops, etc. will be documented, with aims, key outcomes, concerns raised, agreements, as well as time, date, place and attendance. In addition project email address and telephone number will be shared so that all stakeholders (including local communities) can email or call to request information, and/or raise issues/concerns.

20. Disclosure:

The AA team will ensure that the disclosure of the relevant information will inform the partners and stakeholders about:

- The purpose, nature, and scale of the current CEPF project;
- The duration of the project and associated activities (during the inception phase of the project and during the implementation phases);
- Risks and potential impacts of each activities to affected persons and communities;
- The mitigation plan, which will list out the measures that the project will undertake along with timeline for each activity, required resources and responsible units or persons within the project;
- Stakeholder engagement process including grievance mechanism.

The purpose of disclosing information is also to solicit information and input from community members and other project stakeholders through engaging in two-way discussions with project stakeholders.

The project manager and focal person for ES safeguard with AA will make sure the disclosure programs are organized in culturally appropriate manners and ensure participation of all (women and vulnerable groups).

The project will ensure that the information disclosure materials that will be presented or distributed to the participants are prepared in the local language understandable to participants. Information will be displayed in well-publicized, visible and publicly accessible locations (Communes and "Fokontany" office on their notice boards, CBO offices, schools, health centers (CSB), and community centers (ex: cooperative building), various local places where general public gather (weekly markets, shops).

The project will make sure that : the date, time and place of disclosure events are well communicated in advance (by phone, by letter, by mail to the AO PA co-managers : WWF, CBO federation, Intercommunality) to inform stakeholders about the events occurrence. For local stakeholders, we will organize a pre-visit session on sites).

Key disclosure and consultation materials include:

- Project Information Document: this document consists of a non-technical summary of the project, updates, consultation program contact details for questions and queries. The Project Information Document will be updated to reflect the Project development and key activities at each phase.
- Project Factsheet: A short (two-pager) factsheet in Malagasy highlighting crucial project information in simple, plain language accompanied with map, graphics and pictures.
- Grievance Mechanism: It details how to access the grievance mechanism and lodge grievances. This will include information on how the grievance management process will work, including the timeframes for responses. Please refer to the project proposal for the content of the grievance mechanism.
- ESMP, stakeholder engagement plan.

Consultation methods include:

- Community meetings appropriate to the local culture;
- Focus group discussion;
- Household visits;
- Face-to-face meeting/ workshop;
- Project email address and telephone number (All stakeholders can email or call to request information, and raise issues/concerns).