

**Common Format for Project/Program Concept Note for the Use of Resources from the  
PPCR Competitive Set-Aside**

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|---|---|--|---|
| <b>1. Country/Region:</b>   | Mozambique  | <b>2. CIF Project ID#:</b>   | [TBD]   |
| <b>3. Project/Program Title:</b>                                      | Lurio Sustainable Forestry Project  |  |   |
| <b>4. Date of Endorsement of the Investment Plan:</b>                 | 29 June 2011  |  |   |
| <b>5. Funding Request (in million USD equivalent):</b>                | Grant: N/A  | Non-Grant (loan, equity, guarantee, etc.):<br>USD 11 million concessional loan                       |   |
| <b>6. Implementing MDB(s):</b>  | AfDB  | <input checked="" type="checkbox"/> Private sector arm<br><input type="checkbox"/> Public sector arm |   |
| <b>7. Executing Agency:</b>   | AfDB  |  |   |
| <b>8. MDB Focal Point and Project/Program Task Team Leader (TTL):</b> | <i>Headquarters- Focal Point:</i><br>Mafalda DUARTE<br>Chief Climate Change Specialist,<br>African Development Bank<br><a href="mailto:m.duarte@afdb.org">m.duarte@afdb.org</a> |  | <i>TTL:</i><br>Neerak VIJ<br>Chief Investment Officer<br>African Development Bank<br><a href="mailto:n.vij@afdb.org">n.vij@afdb.org</a> |

**I. Background**

1. In November 2012, under the Pilot Program for Climate Resilience (PPCR), over USD 70 million in concessional funds were set aside to contribute to the financing of innovative programs and projects that engage the private sector activities associated with reducing countries' exposure to climate risk and uncertainty in the eighteen PPCR pilot countries.

2. At its meeting in November 2013, the PPCR Sub-Committee reviewed the expert group report and prioritized recommendations of project concepts submitted under the first round of the PPCR private sector set-aside, and endorsed six project concepts totaling USD 40.85 million for further development. Out of the six endorsed concepts, two were endorsed for further development for PPCR funding without conditions whereas four project concept notes, including this one, was subject to the incorporation of conditions noted in the expert review and resolution of written comments submitted by the PPCR Sub-Committee.

3. This revised version has been prepared following an appraisal mission to Nampula, Mozambique by an AfDB team and seeks to address all issues raised by both the experts and Sub-Committee members and also to provide information on the revised scope of the project proposed by the sponsor.

4. In order to best address the issues raised by the Expert Group and Sub-Committee, this version includes two annexes that deal with the expected Environmental and Social Impacts of the Lurio Project linked to the use of eucalyptus, including potential risks and proposed mitigation measures. This concept note should be reviewed together with the Issues List prepared by AfDB, in coordination with the sponsor, and submitted as an annex to this concept.

## II. Project/Program Description

5. The project consists in the plantation and maintenance, during a first phase (2014-2018), of a sustainable 24.000 ha forest plantation in an area 126.000 ha through a land lease agreement entered between the Government of Mozambique (GoM) and the sponsor in the Nampula region. Further to the plantation, the project will encompass the design, construction and operation of: (i) a Wood Chip Mill, and (ii) a Medium Density Fiberboard (MDF) Mill. Table I hereunder provides a detailed breakdown of the investment requirements of the project.

Table I: Estimated Project Total Investment Needs

| Activities                              | Investment Needs<br>(in USD million) | Percentage   |
|---|--------------------------------------|--------------|
| Plantation and Maintenance of 24.000 Ha | 70.0                                 | 58.3         |
| Harvesting and Transport Equipment      | 10.0                                 | 8.3          |
| Wood Chip Mill                          | 10.0                                 | 8.3          |
| MDF Mill                                | 30.0                                 | 25.0         |
| <b>TOTAL</b>                            | <b>120.0</b>                         | <b>100.0</b> |

6. Green Resources (GR or “the Sponsor) has started operations in Mozambique in 2008 and so far has spent up to USD 20 million of their own resources in undertaking the following:

- (i) Assessing Potential Areas for the Plantation (2008): Field surveys were carried out to verify land cover classification and ecological sites. An exploratory assessment of afforestation potential covered some 1.2 million ha and a soil survey covered an area of 123,000 “plantable” areas. This was complemented with the analysis of other elements such as population density, rainfall and temperature, and consultations with local community
- (ii) Undertake the feasibility study and environmental scoping (2009), (iii) obtained land use rights from the GoM (2009), (iv) undertake an Environmental and Social Impact assessment, and (v) started planting operations (4.000ha are already planted). The USD 20 million have financed the following activities
- (iii) a Trial Plantation: Consisting of a plantation with 1,666 trees planted in 2012 with the objective of identifying species with higher potential and more resilient to droughts
- (iv) a Nursery: Installed capacity of 6.5 million seedlings per year to be used in GR’s plantations but also in the local market
- (v) 4.000 ha of Plantations: Part of the total plantation targets of GR. These plantations will be among the first ones being harvested and generating revenues to the project

7. Once mature, the plantations will provide wood raw material that shall be processed in the Wood Chip and the MDF mills and in addition sold in the market place. Revenues will be generated through the sale of pulpwood, transmission poles, biomass, wood chips, and wood pellets, among other products. GR will target the export market in Europe, Middle East and/or Asia but the domestic and regional markets will be explored despite being less mature than

others. As part of the due diligence being undertaken by lenders, AfDB will commission a Market Study to independently assess the market absorption capacity.

8. The 126,000 ha Land Concession Agreement for the plantation was granted by the Mozambique Council of Ministers in 2009, in accordance with Mozambique policy and is fully aligned and harmonized with current national legislation. The land currently being developed into forest is mainly abandoned agricultural or degraded land and is being selected according to criteria defined by the Forest Stewardship Council (FSC), an independent NGO promoting responsible management of forests worldwide. The Sponsor has passed through the first stage of certification and one final independent audit will be carried before the end of July 2014. GR is 100% committed to compliance with FSC standards, and it has obtained the certificate for their plantations in Tanzania.

9. Growing conditions in the project area are predicted to yield a growth rate 4 - 10 times faster than in Northern Europe at a cost of development per ha of approximately 1/2 that of comparable locations in South America. Proximity and access to a major port is an additional advantage of the project location. The port of Nacala in Mozambique is the deepest natural port in East Africa and the second largest in terms of capacity in Mozambique. Figure I provides a set of photographs that capture the preparation and planting process of GR's forests.

Figure I: Preparation and Planting Process of GR's Forests in Nampula



10. **Sponsor.** GR is a Norwegian forest management company with 15 years of sustainable forestry and industrial timber harvesting experience in East Africa and is recognized as a leader in the sustainable forestry sector in Africa. The project will be implemented by Lurio Green Resources (LGR), a Special Purpose Vehicle (SPV) fully-owned by GR and registered under Mozambique law, a requirement under AfDB rules.

11. The Lurio Project will contribute positively to the income of rural households by employing up to 500 permanent and 5,000 temporary jobs.

### III. Rationale

12. **Climate Vulnerability.** Mozambique's current climate variability is defined by its seasonal patterns of precipitation and temperature and the frequency with which abnormal, or

extreme weather events occur. The country ranks third amongst the African countries most exposed to risks from multiple weather-related hazards. During the past 50 years, the country has experienced 68 natural disasters which have affected up to 28 million people.

13. Mozambique has around 55 million ha of forest resources for livelihood needs – including food, firewood, charcoal production and grazing. Fuel wood is by far the major source of energy in Mozambique and forest resources also contribute to environmental benefits with direct economic and livelihood value - for example, protecting watersheds, preventing soil erosion and supporting biodiversity. These benefits bring direct economic welfare to local communities and the national economy as a whole. In the medium to long-run, their global public values might deliver significant revenue flows by tapping into emerging global markets for forest carbon. The main drivers of forest degradation are poverty related, although illegal logging is increasingly becoming an issue. For most rural communities, forest degradation is likely to increase vulnerability and decrease resilience to changing climatic conditions. Conversely, increased variability in rainfall and more prolonged dry seasons may increase the frequency of forest fires and pest outbreaks thus contributing to exacerbate forest degradation.

14. According to a SIDA Environment & Climate Change Policy Brief (Wingqvist, GO, 2011), Nampula is one of the regions of concern regarding degraded ecosystem services. UNEP and the International Institute for Sustainable Development (IISD), have in their Connecting Poverty & Ecosystems Services: Focus on Mozambique (2005) report, identified Nampula as having the most threatened levels of ecosystems services and constituents of well-being. These include: (i) food production, (ii) energy resources, (iii) flood regulation, (iv) adequately nourished population, (v) energy for warmth and clothing, (vi) livelihood earning, and (vii) vulnerability to floods and droughts. The Lurio Project, with its out-grower (agriculture) and tree-grower (tree planting) schemes and the Community Development Program (CDP) (see Annex III), over and beyond the direct afforestation activities, should contribute to the alleviation of these threats. UNEP and IISD have concluded that some specific provinces, including Nampula, are highly affected by floods and therefore have similar characteristics to those with a loss in flood regulation ecosystem services, which in turn positively correlates to high rates of deforestation.

15. **Strategic Alignment.** The GoM has developed a number of strategies to address climate risks which align with the proposed project. The “*Action Plan for Poverty Reduction 2011-2014*” focuses on the promotion of sustainable and inclusive economic activity, particularly in the agriculture and fisheries sectors which are the primary income and employment generators for a large percentage of the population. Another relevant strategy is the “*Mozambique National Adaptation Program of Action*” (NAPA) that lays the foundations for a multi-stakeholder adaptation agenda.

16. Agriculture continues to be the most important sector of the Mozambique economy and not surprisingly, one of the four actions outlined in the NAPA concerns the capacity development of agricultural producers to cope with climate risk and climate variability. In the context of this action plan, there are three long-term results which are pertinent for the Project:

- (i) Long-Term Result I: Improved weather and seasonal forecasts, resulting in a reduction in the loss of human lives and damage to property

- (ii) Long-Term Results II: Reduce the degradation of soils due to inappropriate agricultural practices.
- (iii) Long-Term Result III: Establish alternative forms of subsistence.

17. The Lurio Project will contribute to the first long-term result by: (i) promoting farmers associations, (ii) encouraging the local production of seeds, (iii) drilling wells or water boreholes, (iv) disseminate and encouraging the use of drought tolerant crops, and (v) encouraging the local production and plantation of seeds. Considering that the project site falls in categories two and three of the cyclone risk areas, this result is relevant to the Project. Additionally, the referred activities are all covered under the CDP which was developed based on a needs' assessment carried out with the local communities (see Annex III). For instance, the out-grower scheme, which is embedded in the CDP, is encouraging not only the creation of high income generation activities but will contribute to food security. GR produces high quality seeds and distributes them smallholder in the project areas, at the same time it provides technical assistance and facilitates access to the market. GR expects that the out-grower scheme will, by the end of 2014, reach a total of 984 households and lead to a total cultivated are of 330 ha of varied species (e.g. soy, sesame, peanuts, cowpea, soroco beans). These are drought tolerant crops, which will stimulate the local production of seeds as well as supporting the establishment of producers' associations for both agriculture crops.

18. The tree-grower scheme as so far led to a total planted area of 256 ha benefiting a total of 672 beneficiaries. GR has so far supplied these beneficiaries with a total of 400,000 seedlings.

19. Annex III includes a detailed description of the CDP and how the out-grower scheme is being implemented.

20. In connection with the second aforementioned long-term result, the Lurio Project will promote community reforestation activities aimed at producing biomass for energy consumption and forest conservation activities particularly within river basins through its out-grower scheme, which contemplates as a major product, the sustainable production of fuels for local use as well as regional and national commercialization. Part of the project commitment is to provide the farmers' households with the annual fuel needs in charcoal (approximately 1 ton per household) and to improve charcoal cooking stoves. The production of fuel wood products for commercialization beyond the project boundary should also contribute to reducing or avoiding pressure on existing native forest, which nowadays is the main source of fuel wood. It should be noted that the level of deforestation in the province of Nampula is the second highest in the country, including in forest reserves such as Mecuburi, located in the vicinity of the project site.

21. Activities contemplated as part of the Long-Term Result III include: (i) the promotion of sustainable use of natural resources, and (ii) promotion for the planting of species used in the production of biofuels in arid and semi-arid areas. Both activities apply directly to the Lurio Project since GR will provide for sustainable alternatives in the provision of charcoal and fire wood.

22. GR is seeking FSC Certification for the Lurio plantations. GR owns, through other subsidiaries, plantations in Niassa (Northwest Mozambique) and in Tanzania that are FSC certified. As of 2013, Green Resources has 17,475 ha of FSC certified forests in East Africa (Tanzania, Mozambique and Uganda). The company boasts significant experience in this front. In order to obtain the FSC certification, the project needs to fully comply with the 10 principles of responsible forest management. FSC only recognize standards that deliver environmental services to local and global communities, including clean air and water, and contributes to counterattack the effects of climate change. FSC directly or indirectly addresses issues such as illegal logging, deforestation and global warming and applies to projects that have positive effects on economic development, environmental conservation, poverty alleviation and social and political empowerment.

23. The project is closely aligned with the AfDB's "*Mozambique Country Strategy Paper 2011 – 2014*" which highlights the need for jobs and income creation, particularly for rural households and prioritizes enhanced private sector competitiveness through infrastructure development.

24. PPCR resources are expected to play a catalytic role in the development of the project for a number of reasons:

- (i) Further improve transaction risk-profile: Although the project started being developed in 2009, following signature of a land concession agreement and the project sponsor, implementation of the project, particularly in terms of planting targets has suffered delays due to the sponsors' inability to reach financial close in due time. This resulted in scaling-down the project with the objective of improving its risk-profile. AfDB and the European Investment Bank (EIB) - another potential lender - are working with the sponsor to structure a more realistic and bankable transaction. Appraisal Mission has occurred recently.
- (ii) Contribute to maximize project's benefits: PPCR concessional resources would improve the risk-profile for the equity holders and senior lenders by being disbursed pari-passu with equity. One bullet up-front disbursement will also be considered. This will contribute to maximize project benefits due to a quicker scale-up of the project. The Project total investment needs will be 40% financed by an equity contribution from the sponsors which is adequate from a risk management point of view. In the context of the Lurio Project, the PPCR resources will mimic some of the characteristics of Patient Capital.
- (iii) Reduce pressure on cash-flows: PPCR resources would reduce the overall pressure on revenues faced by the project following financial close and until senior debt starts being drawdown, particularly during the first years of revenues when equity drawdowns are quite heavy. This would contribute to enhancing the project's overall bankability over its life. This is especially important given the phased implementation of the project. AfDB will also consider a variable repayment profile for the PPCR resources (applying only for principal) that will play a catalytic role during periods of low cash generation capacity by the project company which are common to forestry projects.

#### IV. Consistency with Investment Criteria

25. Pilot and demonstrate approaches for integration of climate risk and resilience into development policies and planning: Mozambique is one of the most vulnerable countries to climate change impacts. Deforestation is widely known to be a significant contributor to the increase in climate risk, and in particular to vulnerability to flooding. The country has experienced the same pattern of deforestation that has turned other areas of the world into barren ground that will not absorb rain. In addition to lumbering, increasing population drives demand to clear forests, often through destructive slash-and-burn techniques, to grow crops and graze livestock. Without forest, the ground loses its absorptive abilities, and rainwater flows freely down watersheds and engorges rivers. For this reason, long-range planning has to take into account the chief culprit in catastrophic flooding - deforestation. Furthermore, this year alone, the UN has reported floods have claimed a significant number of lives, property and infrastructure in Mozambique, including in Nampula.

26. The Lurio Project is a significant afforestation initiative projected over an area which is presently degraded, or abandoned agricultural land. A recent report<sup>1</sup>, disseminated by the National Climate Change Adaptation Research Facility concludes *“that widespread eucalypts are likely to possess a capacity to respond plastically to a changing climate to some extent, but selection of seed sources to match projected climate changes may confer even greater climate resilience.”* The Lurio Project will benefit from the trial plantation and the nursery, which success is directly linked to meet this target.

27. The Lurio project’s activities directly contribute to mitigating some of the threats to ecosystems services and constituents of well-being (UNEP & IISD, 2005) in the province of Nampula, by reversing deleterious effects of deforestation on environmental systems with concomitant reduction in ecosystem services such as flood control and avoidance of soil erosion, as well as contributing to livelihoods in the afforestation and agriculture sectors, in the most populated province, where high poverty is still present.

28. Strengthen capacities at the national levels to integrate climate resilience into development planning: The planning and development of the project, integration of workers and engagement with regional and local stakeholders will contribute to the development of capacities to integrate climate resilience into land management and forestry practice. The Lurio project already integrates several recommended practices identified in the Plantation Forest Industry Climate Change Adaptation Handbook: Adapting Our Forests to Climate Change, for managing forest projects in the short and long term, involving Spacing and Thinning techniques, Watering, Fire Management, Selection of Genotype and Site Selection. These management practices by local and regional authorities and skilled and semi-skilled workers involved in the forestry management will create new and strengthen existing capacities to integrate climate resilience practices in other forestry projects.

29. Scale-up and leverage climate resilient investment, building on other ongoing initiatives: The present funding contributes to the viability of a series of activities connected to the main

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<sup>1</sup> Byrne, M. et al, 2013, “Adaption to climate in widespread eucalypt species”

forestry project, which directly and indirectly enhance the climate resilience of the land and communities. These include an increase in rural employment, increase in agro-forestry productivity among out-growers, increase in business opportunities for local SMEs through the both growers' schemes. With poverty being a fundamental characteristic of the rural area of Nampula, these activities will boost communities' resilience to climate related shocks, such as crop failure and losses due to storm floods or other environmental consequences. The Lurio project involves good forest management practices.

30. Enable learning-by-doing and sharing of lessons at country, regional and global levels: The Lurio Project will employ, by 2018, 500 permanent and 5000 temporary jobs, of which one third are expected to be women. Workers will be informed of objectives and be involved in learning-by-doing activities. GRA is interested in disseminating the characteristics of its Lurio Project, including on issues pertaining to forestry management and its impact on climate resilience in the implementation area, including lessons learned. In addition to being represented at relevant fairs and exhibitions, and communicating on the project on its own media and reporting, GRA is also open to collaborating with research initiatives with national academic institutions. Indeed, it is intrinsic to Green Resources' Environmental Policy that it *"communicate (...) to the public, government agencies, and other interested parties by making it [Environmental Policy] readily available"*.

## **V. Type of Private Sector Engagement**

31. This project has been designed and will be implemented, and financed solely by private sector.

## **VI. Innovation**

32. GRA takes a direct hands-on approach to business and has small overhead costs. Its planting costs are among the lowest in the world, typically 25-50% of the main countries for new forest plantations. The cost of pruning and thinning, required to produce the highest value 'clear' saw and peeler logs, is the lowest in the world. High-cost northern timber accounts for 80% of world supply, while low-cost southern timber accounts for only 20% of world supply. The steep cost curve supports appreciating timber profits and land values in the south.

33. From a technology point of view, the project will not be much innovative as services, works and goods to be procured have been widely used in other countries and for other purposes. The project will rather innovate with regards to engagement with local communities and with regards to a change in paradigm in local forest management. The implementation of the project will be a long and complex process that will require extensive community involvement and firm demonstrations of GR's commitment. The company has a strong record of land acquisition, typically holding land on 99-year or 50+50-year leases.

34. The project's budget includes an allocation of USD 7 million to finance a CDP being implemented by the sponsor in conjunction with local populations. The program will finance activities that will contribute to: (i) increase in access to health services, (ii) increase in access to potable water, (iii) increase in access to education, (iv) increase in food security, (v) contribute positively to the establishment of the out-grower and tree-grower schemes.

35. The project will be structured as a non-recourse financing transaction with an equity to debt ratio of 60/40 (Equity: GRA and reinvestment of positive net income; Debt: AfDB, EIB and PPCR).

36. The project's financial model includes the development, registration, issuance and commercialization of carbon credits under the regulated or voluntary sector markets. In addition to being an innovative co-financing stream for the projects implementation over time, the process by which carbon credits are generated require the stringent and transparent determination and monitoring of methodologies and reporting on project implementation. Whether for submission to the UNFCCC CDM Executive Board, Voluntary Standards such as Gold Standard or Verified Carbon Standard (VCS) or to the Designated Operational Entities which must audit and verify compliance with rules and methodologies, this volunteer aspect of the business model adds value to the project by providing one further step in the reporting and dissemination of the project, as well as in added recognition and credibility of the project. Given the risk around CDM certification and uncertainties in carbon prices, markets and trading schemes, AfDB and other lenders have decided and agreed with the sponsor that bankability will be pursued without considering these revenues in the financial model. This is expected to put a considerable pressure in the cash-inflows requirements of the project and may reduce the speed (due to limited net income) by which the company will be able to expand its operations over time. PPCR resources will partially mitigate this. Nevertheless, if the revenues materialize at some point in time, the cash-flows will have a positive impact in the project company's financials that will support the demonstration of the project.

37. Last, the project has engaged local communities and will develop an out-grower scheme around the industrial plantation. Lurio Green Resources project is also part of the pilot phase of the Inclusive Industries Program (IIP), which aims at enhancing inclusive features that include: (i) SME linkages, (ii) out-grower schemes, and (iii) community initiatives. In the present project, the out-grower and tree-grower schemes will be strengthened thanks to the IIP. The IIP, is a program by the AfDB aimed at promoting greater inclusiveness around its private sector investments on the African continent by stimulating increased backward and forward linkages between Micro, Small and Medium Enterprises and Large Industrial Enterprises. The Lurio Project is a pilot-project under the IIP and GR is being helped with a view to provide structuring support that may lead to a maximization of the number of small businesses that upgrade their technologies and managerial know-how, achieve higher production efficiency and market diversification, contributing to job creation and income generation.

## **VII. Technology**

38. LGR will be responsible for all the implementation of the project with the support and technical know-how of GR, a leader in the sustainable forestry sector in Africa. It will do so under a limited-recourse financing structure which contributes to the need of a strong contractual structure associated with the project.

39. Main procurement activities associated with the project are expected to consist of construction of facilities such as storage sheds, access roads, forest stations, nursery sheds and a headquarters facility, purchase of vehicles and relevant equipment as well as contracting for

services related to plantation operations and maintenance and the two wood processing facilities. Procurement methods will be in accordance with private sector or commercial best practices that are acceptable to AfDB in accordance with its rules and procedures.

40. The project will be established in accordance with a timeline that provides comfort to the senior lenders and for a better alignment of interest between the project financiers. Project ownership and buy-in from GR is significant and no risk is envisaged. The project's total capital expenditures will be financed by a combination of equity (40%), PPCR senior concessional loan, other senior loans and any resources accruing from positive net income on any fiscal year (over the life of the project this amount is expected to generate up to USD 22.5 million) shall be reinvested.

41. AfDB will ensure that the principle of minimum concessionality is used for PPCR resources by undertaking detailed scenario analysis in the financial model that will occur in parallel to term sheet negotiations with the sponsor. PPCR is expected to play a catalytic role by: (i) contributing to an acceleration in the implementation of the project that has been suffering delays due to an inappropriate risk-return profile, (ii) supporting the ramp-up period of the plantation by accepting a longer-tenor than senior lenders which directly contributes to reduce the pressure on project's revenue, (iii) contribute to the bankability of the project by reducing the burden on equity holders making *pari passu* drawdowns with equity, (iv) reducing senior lenders risk aversion by reducing their exposure to the project, (v) consider a sculpted repayment profile to enhance cash availability for periods of low cash generation capacity.

## **VIII. Market**

42. Southern Africa and Eastern Africa are considered to be two of the best regions on earth for establishing new forestry plantations. Climate, rainfall, low costs and growing conditions are competitive with the leading plantation forestry regions in South America, while natural ports on the Indian Ocean facilitate access to major growth markets for raw and processed timber.

43. Demand for wood products in Mozambique, and the whole of the Eastern and Southern Africa region, has increased in recent years in line with rapid growth in the construction and infrastructure sectors. Mozambique, Tanzania and Uganda are all net importers of timber products, and it is estimated that by 2016 the shortfall could reach 3 million cubic meters per annum. Global demand for wood products is also robust with demand forecast to outstrip supply for the foreseeable future. Drivers of demand, including, emerging market building booms, global population growth and bio-energy uses for wood products are projected to lead to an increase in global wood demand by 44% from 2007 to 2030. Prices for timber products have grown steadily in real terms by 1% annually since 2000 with prices in emerging markets growing even faster. Indeed, timber prices in Eastern and Southern Africa are expected to grow strongly over the coming years and reach par with global prices by 2020.

44. While other forestry companies are present in the region, LGR is a first mover in the Nampula Province and expected to be the largest plantation in the region, thus, benefiting from significant economies of scale in all aspects of its operations. Further analysis of domestic and regional competition will take place during appraisal.

45. GRA identified and selected northern Mozambique as a plantation location for a number of strategic reasons, including: (i) low cost of establishing new plantations; (ii) superior biological growing conditions; (iii) reliable infrastructure for export logistics; and (iv) easy access to major growth markets for forestry products. The placement of a large operation in Mozambique also allows GRA to continue to foster, build and tap into a growing base of experienced local labor.

#### **IX. Financial Plan (Indicative):**

46. The total project cost is estimated at USD 120 million over a 7 year period from 2010 – 2017. This includes: (i) plantation investment costs of approximately USD 70.0 million, (ii) harvesting costs of approximately USD 10.0 million, and (iii) up to USD 40 million for the wood chip mill and MDF mill.

47. The final PPCR report will contain an updated financial plan that breaks down in more detail the use of funds, financing costs and reserve accounts. The indicative sources of funding for this project are presented in the table below.

| <b>Source of Funding<br/>(by type of instrument, equity, debt,<br/>guarantee, grants, credit lines, etc.)</b> | <b>Amount (USD<br/>million equivalent)</b> | <b>Percentage<br/>(%)</b> |
|---|--|---------------------------|
| Equity  | 50.6                                       | 42.0                      |
| AfDB  | 35.0                                       | 29.0                      |
| EIB   | 15.0                                       | 13.0                      |
| PPCR  | 11.0                                       | 9.0                       |
| Reinvested Net Income   | 8.4  | 7.0                       |
| <b>TOTAL</b>  | <b>120.0</b>                               | <b>100.0</b>              |

48. AfDB has been invited to participate as a senior lender by providing a long term project finance loan of up to USD 35 million. This will represent 29.0% of the total project’s cost. The loan is expected to have a 15-year tenor and a 5-year grace period that will be highly catalytic for the ramp up phase of the project. PPCR terms will be determined with a view to maximize project bankability but will likely be disbursed *pari passu* with equity and with a longer tenor than other lenders. In addition to providing funding, AfDB will ensure that the project is compliant with the Bank’s environmental and social safeguards and will carry out a detailed integrated analysis to determine the project’s economic benefits. AfDB will also provide guidance, as relevant, around development of effective out grower and community development programs and ensure a harmonized and coordinated approach with EIB and/or other lenders.

#### **X. Implementation Feasibility and Arrangements**

Expected PPCR Sub-Committee approval date: September 2014

Expected MDB Approval date: November 2014

## XI. Expected Results and Indicators

| Results  | Indicators  |
|--|---|
| [To be assessed during due diligence]  | % change of households (in areas at risk) whose livelihoods have improved (acquisitions of productive assets, food security during sensitive periods of the year) |
| [To be assessed during due diligence]  | # of people supported by the PPCR to cope with the effects of Climate change  |
| 500  | # of Direct Full-Time Jobs Created  |
| 5,000  | # of Seasonal Jobs Created  |
| 6.4 million  | # of tCO2 sequestered over 20 years   |
| [To be assessed during due diligence]  | USD equivalent amount of fiscal revenues generated to the GoM   |
| 10%  | % of carbon credits reinvested in Local Community Initiatives.  |
| <p><i>Development Results(s):</i></p> <ul style="list-style-type: none"> <li>- Development of local SMEs business in rural areas</li> <li>- Development of community Programs</li> <li>- Protection against erosions and improvement of local microclimate and conservation of biodiversity</li> <li>- Increase in GDP</li> <li>- Improved infrastructure in the vicinity of the project</li> <li>- Improved macroeconomic resilience of Mozambique's economy</li> </ul> |   |

## XII. Potential Risks and Mitigation Measures

| Risks                            | Mitigations Measures   |
|----------------------------------|--|
| Political Risk                   | Sovereign Risk in Mozambique is currently seen as low by investors, but strong country's ownership and DFI and PPCR participation in the project will contribute to mitigate this risk.  |
| Plantation and Silviculture risk | <p>Standard agricultural risks apply to the project. Growth yields, rainfall, water resources, pests, disease and fire are all concerns. The success of any forest plantation, however, depends largely on the choice of sites and application of appropriate silvicultural practices. GRA has a track record of successful plantation establishment in the region and will apply best practices in all aspects of the plantation process from choice of species and species-site matching to site preparation, spacing, planting, fertilization, tending and harvesting. A detailed technical review of efforts to mitigate plantation and silviculture risk is expected to take place during appraisal.</p> <p>Fire presents a significant and uniquely destructive plantation risk. Hot, dry weather at certain times of the year, heavy winds and regular use of burning in agriculture and forestry combine to elevate the risk of fire. LGR plantation management is expected to implement all preventive measures to reduce the risk of fire, including, fire breaks, fire lookouts, good forest management practices, and engagement with local communities.</p> |
| Environmental and Social Risk    | See Annex I and Annex II.  |
| Completion Risk                  | Global timber prices have grown consistently since 2001, and domestic and regional demand for timber is surging. However, there is currently no umbrella off-take agreement in place to provide coverage against sales predictions. Absent such an agreement, the sponsor has fixed price assumptions in the project financial model well below industry norms and conducted a preliminary market study of global and regional trends in the timber market. A detailed independent market study is expected to be commissioned in collaboration with the EIB during appraisal to verify preliminary indicators.  |
| Market Risk                      | Global timber prices have grown consistently since 2001, and domestic and regional demand for timber is surging. However, there is currently no umbrella off-take agreement in place to provide coverage against sales predictions. Absent such an agreement, the sponsor has fixed price assumptions in the project financial model well below industry norms and conducted a preliminary market study of global and regional trends in the timber market. A detailed independent market study is expected to be commissioned in collaboration with the EIB during appraisal to verify preliminary indicators.  |
| Carbon Revenue Risk              | Carbon revenues are expected to generate approximately USD 46 million until 2020 and   |

|           |  |
|-----------|--|
|           | <p>represent a source of revenue to the project. The sponsor has established a dedicated internal team to handle carbon credit issues and the CDM process. The team already boasts a track record of success including CDM certification in 2011 for the Firm’s forestry project in Uganda and sales agreements in place with the Government of Norway and the Swedish Energy Agency.</p> <p>However, given the risk around CDM certification and uncertainties around carbon prices, markets and trading schemes, the Bank decided to cancel the revenues from carbon in the financial model. It was expected that nearly 1.7 million tons of carbon credits will be generated by the project until 2020 (CDM and VCS). Without carbon revenues, the project internal rate of return is at 13%, and net present value stand at USD 113 million. Minimum and average debt service ratios respectively total 1.3 and 2.9, which is in line with AfDB’s credit risk standards.</p> |
| Fire Risk | GR will build roads and firebreaks around the blocks and all compartments for access and fire protection. Fire towers to lookout the plantations sites will also be installed.   |

## **Annex I: Background Information on Project's Environmental and Social Impacts**

### **1. INTRODUCTION**

The establishment of a new forest plantation represents a transformation of the landscape and brings with it the potential for negative environmental and social impacts.

The project aims to establish forest plantations of exotic, fast growing species with high commercial value. Currently, species from the genera Eucalyptus, Acacia and Melina are being tested to determine the best fit between commercial viability and environmental and social sustainability.

The following products will be produced on the plantations: paper pulp, sawn timber, posts and panels/plywood. These will be exported to the Middle East, India, China and other emerging markets in Asia.

The project has been planned to be able to achieve FSC (Forest Stewardship Council) certification. One of the criteria required to achieve this, is the requirement that the project does not lead to the displacement of people. Thus the project is being planned to avoid plantations in any small farms and villages within the envisaged project area.

### **2. ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT OF THE PROJECT**

In connection with the implementation of the project, the sponsor has commissioned an Environmental and Social Impact Assessment (ESIA) study. The ESIA was developed in line local legal requirements and has been approved by the GoM and submitted to potential lenders, including AfDB and EIB. Following a thorough gap analysis/review undertaken by the AfDB in line with in-house safeguards, the AfDB has requested the sponsor to undertake an update to the ESIA. The logic behind this request was the need to generate sufficient factual information on which to assess the significance and severity of environmental impacts on the flora, fauna, soil and waters. As such, the following specialist studies were produced: (i) Botanical Specialist Survey Report, (ii) Erosion Assessment, (iii) Hydrology Report, (iv) Surface and Groundwater Quality Assessment, and (v) Terrestrial Fauna Baseline Report. Each report aims at assessing different risks and in proposing mitigation measures, which in case are implemented will lead to a decrease in the severity of all pre-identified negative impacts, including any related to the plantation of Eucalyptus. These reports will inform and support the original ESIA and are currently under review by the AfDB and EIB safeguard specialists. A summary of all identified risks (categorized as very high risk, high risk, moderate risk and low risk) are captured hereunder whereas proposed mitigation measures are presented in Annex II.

#### **2.1 Erosion Assessment**

Soil erosion is a natural process that cannot be completely prevented, but it can be limited to acceptable levels. Anthropogenic influences on the environment can compound the rate of erosion above that which is natural: a storm-water outlet will, for instance, focus the runoff from a large surface area on one spot, thereby accelerating erosion in that particular area. The acceptable level to which soil erosion may be limited, depends on the soil potential and the utilization objectives set for a specific area. Figure 1 provides a summary of impacts identified as part of the Erosion Assessment.

Figure 1: Summary of Erosion Identified Impacts With and Without Mitigation Measures

| ISSUE / IMPACT  | SIGNIFICANCE       |                 |
|---|--------------------|-----------------|
|   | Without Mitigation | With Mitigation |
| <b>LOSS OF SOIL PRODUCTIVITY</b>  |                    |                 |
| Loss of soil from planted areas and consequent loss of soil productivity                          | HIGH - ve          | MODERATE - ve   |
| <b>IMPACTS ON SURFACE WATER RESOURCES</b>   |                    |                 |
| Deposition of sediment into streams, rivers and wetlands from planted areas and during harvesting | HIGH - ve          | LOW - ve        |
| Deposition of sediment into streams, rivers and wetlands from roads and watercourse crossings     | HIGH - ve          | MODERATE - ve   |

## 2.2 Hydrology Report

The first step in evaluating the impact of forestry plantations on the water resources of the project area is to establish a baseline against which to compare the estimate change in flow. The baseline used in this study is theso-called Natural Flow, which is the river flow before any human development or intervention in the catchments. The natural flow was determined using the WRSM2000-rainfall runoff model, which was calibrated against observed flow in the catchment. Figure 2 provides a summary of hydrology-related impacts.

Figure 2: Summary of Hydrology Identified Impacts With and Without Mitigation Measures

| <b>Impact 1.1 Reduction in runoff</b> |                         |           |          |              |                 |              |
|---------------------------------------|-------------------------|-----------|----------|--------------|-----------------|--------------|
| Without mitigation                    |                         |           |          |              | With mitigation |              |
| Temporal scale                        | Spatial scale           | Certainty | Severity | Significance | Severity        | Significance |
| Long term                             | Local and Sub-catchment | Definite  | Low      | Moderate     | Low             | Low          |

  

| <b>Impact 1.2 Reduction in water table</b> |               |           |          |              |                 |              |
|--|---------------|-----------|----------|--------------|-----------------|--------------|
| Without mitigation                         |               |           |          |              | With mitigation |              |
| Temporal scale                             | Spatial scale | Certainty | Severity | Significance | Severity        | Significance |
| Long term                                  | Local         | Possible  | Low      | Low          | Low             | Low          |

  

| <b>Impact 1.3 Increased erosion</b> |                         |           |          |              |                 |              |
|-------------------------------------|-------------------------|-----------|----------|--------------|-----------------|--------------|
| Without mitigation                  |                         |           |          |              | With mitigation |              |
| Temporal scale                      | Spatial scale           | Certainty | Severity | Significance | Severity        | Significance |
| Long term                           | Local and sub-catchment | Probably  | Moderate | Moderate     | Low             | Low          |

## 2.3 Surface and Groundwater Quality Assessment

Surface and groundwater quality is required to be assessed to form the baseline water quality for the proposed project area. This would ultimately inform any water quality impact that the project activities may have on the water quality and security for the area. Figure 3 provides a summary of the identified water related environmental impacts.

Figure 3: Summary of Surface and Groundwater Identified Impacts With and Without Mitigation Measures

| Without mitigation   |               |           |          |              | With mitigation |              |
|--|---------------|-----------|----------|--------------|-----------------|--------------|
| Temporal scale   | Spatial scale | Certainty | Severity | Significance | Severity        | Significance |
| <b>Issue 1: Habitat alteration and loss of biodiversity</b>                              |               |           |          |              |                 |              |
| <b>Impact 1.1: Disruption of the ecological function</b>                                 |               |           |          |              |                 |              |
| <b>Hand planted</b>  |               |           |          |              |                 |              |
| Medium term  | Regional      | May occur | Severe   | MODERATE     | Slight          | LOW          |
| <b>Mechanical planting</b>   |               |           |          |              |                 |              |
| Medium term  | Regional      | May occur | Severe   | HIGH         | Slight          | MODERATE     |
| <b>Issue 2: Establishment of plantation infrastructure</b>                               |               |           |          |              |                 |              |
| <b>Impact 2.1: Contamination of water bodies</b>   |               |           |          |              |                 |              |
| Medium term  | Regional      | May occur | Severe   | MODERATE     | Slight          | LOW          |
| <b>Issue 3: Improper storage and use of chemicals including used chemical containers</b> |               |           |          |              |                 |              |
| <b>Impact 3.1: Contamination of surface and groundwater</b>                              |               |           |          |              |                 |              |
| Permanent  | Regional      | May occur | Severe   | HIGH         | Slight          | LOW          |
| <b>Impact 3.2: Health impact on employees</b>  |               |           |          |              |                 |              |
| Permanent  | Regional      | May occur | Severe   | VERY HIGH    | Slight          | LOW          |
| <b>Issue 4: Forest operations and management</b>   |               |           |          |              |                 |              |
| <b>Impact 4.1: Disruption of ecological function</b>                                     |               |           |          |              |                 |              |
| Long term  | Regional      | Probable  | Severe   | HIGH         | Slight          | LOW          |
| <b>Issue 5: Soil erosion resulting from maintenance of plantation infrastructure</b>     |               |           |          |              |                 |              |
| <b>Impact 5.1: Contamination of surface water</b>  |               |           |          |              |                 |              |
| Long term  | Regional      | May occur | Severe   | MODERATE     | Slight          | LOW          |
| <b>Issue 6: Improper storage and use of chemicals including used chemical containers</b> |               |           |          |              |                 |              |
| <b>Impact 6.1: Contamination of surface and groundwater</b>                              |               |           |          |              |                 |              |
| Permanent  | Regional      | May occur | Severe   | HIGH         | Slight          | LOW          |
| <b>Impact 6.2: Health impact on employees</b>  |               |           |          |              |                 |              |
| Permanent  | Regional      | May occur | Severe   | VERYHIGH     | Slight          | LOW          |
| <b>Issue 7: Sanitation within local communities</b>                                      |               |           |          |              |                 |              |
| <b>Impact 7.1: Surface and groundwater quality</b>                                       |               |           |          |              |                 |              |
| Long term  | Regional      | May occur | Severe   | HIGH         | Slight          | LOW          |
| <b>Issue 8: Habitat alteration and loss of biodiversity</b>                              |               |           |          |              |                 |              |
| <b>Impact 8.1: Disruption of the ecological function</b>                                 |               |           |          |              |                 |              |
| Medium term  | Regional      | May occur | Severe   | HIGH         | Slight          | LOW          |

### 3. AfDB INTERNAL SAFEGUARDS SYSTEMS

#### Introduction

The environmental and social safeguards of the African Development Bank (AfDB) are a cornerstone of the Bank's support for inclusive economic growth and environmental sustainability in Africa. To better articulate its safeguard policies while improving their clarity, coherence and consistency, the Bank has developed an [Integrated Safeguards System \(ISS\)](#). The ISS builds on the two previous Safeguard Policies - [Involuntary Resettlement \(2003\)](#) and [Environment \(2004\)](#) and on three cross-cutting policies and strategies: [Gender \(2001\)](#), [Climate Risk Management and Adaptation Strategy \(2009\)](#) and the [Civil Society Engagement Framework \(2012\)](#).

The ISS is designed to promote the sustainability of project outcomes by protecting the environment and people from the potentially adverse impacts of projects. The safeguards aim to: (i) avoid adverse impacts of projects on the environment and affected people, while maximizing potential development benefits to the extent possible, (ii) minimize, mitigate, and/or compensate for adverse impacts on the environment and affected people when avoidance is not possible, and (iii) help borrowers/clients to strengthen their safeguard systems and develop the capacity to manage environmental and social risks.

In addition, the Bank has adopted five Operational Safeguards, limiting their number to just what is required to achieve the goals and optimal functioning of the ISS. These are:

1. [Environmental and Social Assessment](#). This overarching safeguard governs the process of determining a project's environmental and social category and the resulting environmental and social assessment requirements.
2. [Involuntary Resettlement, Land Acquisition, Population Displacement and Compensation](#). This safeguard consolidates the policy commitments and requirements set out in the Bank's policy on involuntary resettlement, and incorporates a number of refinements designed to improve the operational effectiveness of those requirements.
3. [Biodiversity and Ecosystem Services](#). This safeguard aims to conserve biological diversity and promote the sustainable use of natural resources. It also translates the commitments in the Bank's policy on integrated water resources management into operational requirements.
4. [Pollution Prevention and Control, Hazardous Materials and Resources Efficiency](#). This safeguard covers the range of key impacts of pollution, waste, and hazardous materials for which there are agreed international conventions, as well as comprehensive industry-specific and regional standards, including greenhouse gas accounting, that other multilateral development banks follow.
5. [Labour Conditions, Health and Safety](#). This safeguard establishes the Bank's requirements for its borrowers or clients concerning workers' conditions, rights and protection from abuse or exploitation. It also ensures greater harmonization with most other multilateral development banks.

In implementing these five operational safeguards, AfDB seek to ensure stakeholders' participation during the consultation process so that affected communities and stakeholders have timely access to information in suitable forms about AfDB's operations and are consulted meaningfully about issues that

may affect them. Furthermore, AfDB ensures that effective management of environmental and social risks in projects during and after implementation.

## **Implementation**

In practical terms, the environmental and social assessment includes the project's area of influence (both upstream and downstream), a comprehensive scoping of the project's components, consideration of alternatives, and assessment of cumulative impacts. The Lurio Project will be attributed a categorization that follows the principle of using the appropriate level of environmental and social assessment for the type of operation in question. Working with Bank operations staff, the borrower proposes a category, providing sufficient supporting documentation and baseline data to allow the Bank's Compliance and safeguards function to review and validate the proposed category. The responsibility of appropriate categorization is therefore shared by the Bank and its borrowers and should be based on reasonably and accurate due diligence material. The ISS contemplates four categories and each project needs to be categorized.

The Lurio Project falls under Category 1 which entails projects "*likely to cause significant environmental and social impacts*". Category 1 projects are likely to induce significant and/or irreversible adverse environmental and/or social impacts, or to significantly affect environmental or social components that the Bank or the client considers sensitive. In some cases, projects are included in Category 1 because of their potential cumulative impacts or the potential impacts of associated facilities. Any project requiring a Full Resettlement Action Plan (FRAP) under the provisions of the Bank's policy on involuntary resettlement is also deemed to be Category 1. Category 1 investment projects require an ESIA, both leading to the preparation of an Environmental and Social Management Plan (ESMP). For a project requiring a FRAP, the ESIA includes, and - if there are no other issues requiring assessment may be limited to, the social assessment needed to prepare the FRAP. All these documents play a key role throughout the life of the project and are carefully monitored and supervised.

## **Involuntary Resettlement**

The term resettlement refers to both physical and economic displacement. Resettlement is considered involuntary when the project-affected people are not in a position to refuse the activities that result in their physical or economic displacement. The objectives of the involuntary resettlement policy to: (i) Avoid involuntary resettlement where feasible, or minimize resettlement impacts where involuntary resettlement is deemed unavoidable after all alternative project designs have been explored, (ii) ensure that displaced people are meaningfully consulted and given opportunities to participate in the planning and implementation of resettlement program, (iii) ensure that displaced people receive significant resettlement assistance under the project, so that their standards of living, income-earning capacity, production levels and overall means of livelihood are improved beyond pre-project levels, (iv) provide explicit guidance to borrowers on the conditions that need to be met regarding involuntary resettlement issues in Bank operations to mitigate the negative impacts of displacement and resettlement, actively facilitate social development and establish a sustainable economy and society, and (v) guard against poorly prepared and implemented resettlement plans by setting up a mechanism for monitoring the performance of involuntary resettlement program in Bank operations and remedying problems as they arise.

The sponsor is highly committed to obtain FSC certification which cannot be obtained if any resettlement, as defined above, is required in relation to the project. Nevertheless, as the project preparation moves along, and should a resettlement plan be demanded by AfDB, the Bank will regularly supervise the implementation of the plan to assess compliance with respect to the plan. These supervision efforts should include independent meetings with affected persons and host communities, and a review of activities under the grievance redress process. AfDB will ensure that compliance problems are addressed promptly, and if resettlement implementation is not in compliance with this policy, the Bank will take immediate steps to halt disbursements or undertake other remedial measures until such time as the project is brought into compliance with this policy and the project-specific resettlement plan.

### **Compliance Monitoring and Supervision of Safeguards**

AfDB recognizes the importance of working in close co-operation with its borrowers and clients in implementing the operational safeguards, with the aim of strengthening the capacity of the clients' systems to manage the environmental and social assessment process. The Bank monitors implementation through quarterly reports by borrowers and clients and during its own supervision missions, using the proportionality and adaptive management principles to differentiate projects on the basis of the nature and category of the risks. For projects presenting high environmental and social risks, such as the Lurio Project, the Bank may, at its own discretion, perform compliance audits. The Bank's Compliance and Safeguards Division monitors the environmental and social performance of Bank's projects in consultation with borrowers and/or clients. For complex projects or when conflicts with host communities arise, the Bank makes use of independent third parties - independent environmental and social advisers, consultants, monitors and auditors - to monitor compliance. The Bank ensures that the reports of these monitoring exercises are publicly available to all parties in line with the Bank's Disclosure and Access to Information policy. From the deliberations and recommendations on such reports, the Bank's sector department prepares, and agrees with the client on, an implementable action plan, with measurable indicators.

### **Annex II: Proposed Mitigation Measures for Environmental and Social Risks Associated with the Lurio Project**

This annex includes all mitigation measures being proposed under the five specialist studies that are an integral part of the ESIA. These include: (i) botanical specialist survey report, (ii) erosion assessment, (iii) hydrology report, (iv) surface and groundwater quality assessment, and (v) terrestrial fauna baseline report.

| IMPACTS   | MITIGATION MEASUREMENTS   |
|---|---|
| <b>Erosion Assessment</b>   |   |
| I1: Loss of soil from planted areas and consequent loss of soil productivity                          | <ul style="list-style-type: none"> <li>- Land should be prepared for planting during the dry season.</li> <li>- Minimise the total amount of bare soil exposed to erosive forces by (1) controlling the amount of ground that is cleared at one time in preparation for construction, and (2) limiting the amount of time that bare ground may remain exposed before rehabilitation measures are put into place.</li> <li>- Site clearing and construction should be undertaken in a progressive manner (i.e. the entire development area should not be cleared at once, but should rather be undertaken in stages) so as to minimise the area of soil exposed at any one time. Clear only those areas that are necessary for planting to occur.</li> <li>- Disturbance and clearing of natural vegetation should be kept to the minimum required to allow the work to progress.</li> <li>- Disturbed areas (areas that have been cleared of ground cover for the establishment of plantations and construction of infrastructure) should be rehabilitated with indigenous vegetation (i.e. between seedlings established) as soon as the disturbance has been completed.</li> <li>- If ploughing is necessary it should be done along the contours.</li> <li>- Appropriate machinery should be used to minimise soil compaction.</li> <li>- During construction, care should be taken not to compact adjacent soils.</li> <li>- Where necessary, on steep slopes, vegetative cross-slope barriers or terraces should be used.</li> <li>- The organic content of the soil should be increased by applying organic material such as cut grass, compost and other cleared vegetal matter.</li> <li>- Harvesting should not be undertaken during the wet season, or after heavy rainfall events when the soil is saturated.</li> <li>- Harvested areas should, as far as economically practical to do so, be minimised to reduce the area if land exposed to rain and wind. (IFC (2007) recommends a maximum contiguous harvesting area of 50 ha.)</li> <li>- Harvesting machinery should be selected to minimise soil compaction and rutting of the soil surface.</li> <li>- Forest cover should be established as soon as possible after harvesting, and exposed areas of soil should be protected using mulch or slash until vegetation cover is re-established.</li> <li>- Where necessary, on steep slopes, slash or debris should be stacked along contours.</li> <li>- The routes of skid trails should be planned prior to harvesting, and timber removal should be restricted to designated trail routes.</li> <li>- Skid trails should be as straight as possible.</li> <li>- Skidding should be halted in wet conditions.</li> <li>- Landings should be located in well-drained areas, and runoff diverted into adjacent vegetated areas or otherwise filtered on exit from the landing.</li> <li>- Landings should be reinstated and revegetated when no longer required, or not required for long periods between harvesting cycles.</li> </ul> |
| I2: Deposition of sediment into streams, rivers and wetlands from planted areas and during harvesting | <ul style="list-style-type: none"> <li>- Existing vegetation on the margins of planted areas should be retained to trap sediment,</li> <li>- particularly at the downslope margins and points to which sediment-laden water naturally drains. If necessary vegetation should be re-established at possible exit points.</li> <li>- A buffer zone should be established on both sides of watercourses and around wetlands in terms of a Riparian Zone Management Plan. A width of 50m (on riparian areas) and 30 m (around wetland area) is recommended (as per Mozambique legislation) within the overall project area, in which no forestry-related activities of any kind must take place. Existing vegetation must be conserved, and if necessary vegetation should be re-established to trap sediment.</li> <li>- The application of fertilisers and herbicides and/or pesticides should be optimised by means of an Integrated Nutrient Management Programme and an Integrated Pest Management Programme.</li> <li>- A water quality baseline should be established before forestry-related activities</li> </ul>  |

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|   | commence, and subsequently the quality of surface water bodies should be regularly monitored to detect traces of fertilisers, herbicides and pesticides in terms of a Water Quality Monitoring Plan.  |
| I3: Deposition of sediment into streams, rivers and wetlands from roads and watercourse crossings | <ul style="list-style-type: none"> <li>- Maximise the use of existing roads and minimise the construction of new roads as far as possible.</li> <li>- Minimise road gradients.</li> <li>- Road siting and road network layouts are important considerations. To maximize infiltration, natural drainage patterns should be preserved wherever possible.</li> <li>- Low lying areas should be avoided. For example, locate roads / tracks on ridge lines, allowing water to drain naturally downhill.</li> <li>- Ensure roads have sufficient camber to direct surface runoff towards the edges.</li> <li>- Construct and maintain free of obstructions drainage channels along the sides of roads.</li> <li>- Construct mitre drains at intervals along the sides of roads to divert runoff into marginal vegetation.</li> <li>- On steep slopes, especially on roads approaching watercourse crossings, construct low water bars diagonally across the full width of roads to divert water into the side drains and mitre channels.</li> <li>- When constructing new roads routes should be selected, as far as possible, to minimise the need for cuttings and filled embankments.</li> <li>- A programme of regular road inspection and maintenance should be designed and implemented, and damage to road surfaces such as potholes and gullies after heavy rainfall should be repaired as soon as conditions permit.</li> <li>- Where roads are no longer required either for forestry-related activities or public use they should be tilled and revegetated with appropriate native species of vegetation.</li> <li>- Slash barriers or water bars should be installed to prevent erosion while vegetation regenerates.</li> <li>- Temporary drainage structures and watercourse crossings should be removed and the bed and banks rehabilitated.</li> <li>- Measures should be taken to prevent access to closed roads to discourage public use, and to impede unlawful timber harvesting and poaching.</li> <li>- Minimise the number of watercourse crossings.</li> <li>- Optimise stream crossings at locations with hard beds and low banks.</li> <li>- Watercourse crossings should be constructed as nearly as possible at right angles to the direction of flow, preferably on a stable reach of channel that is not subject to meandering or changes in the channel as a result of high flow events, and should not materially disrupt the natural flow patterns or the passage of aquatic species.</li> <li>- Culverts and bridge waterways should be designed to pass high flow events without overtopping.</li> <li>- Low-level culverted crossings should be sufficiently robust and well-compacted to resist overtopping.</li> <li>- Consideration should be given to paving approach roads with compacted crusher run.</li> <li>- If fords are constructed they should be restricted to minor roads with occasional traffic, and sited across hard rock substrate. Forded crossings of alluvial channels should be avoided.</li> <li>- Vehicular movement over the unprotected beds of watercourses must be protected.</li> <li>- If crossings suffer erosion during high flow events immediate measures must be taken to remove eroded material from the river channel.</li> <li>- The vegetation on stream banks at crossings should be retained or re-established, and stabilised using silt fences or straw bales.</li> <li>- Roads must not cross wetlands or riparian management zones.</li> <li>- Skid trails must not cross watercourses, wetlands or riparian management zones.</li> </ul> |
| <b>Hydrology Report</b>   |   |
| I1: Reduction in runoff   | <ul style="list-style-type: none"> <li>- First, not to plant in the riparian zones of rivers or lakes and not to develop over wetlands, around which a buffer (no-plant) zone must be established. Forestry in these areas will use up to three times as much water as forests in non-riparian zones.</li> <li>- Second, not to over-develop in any one sub-basin. A rule of thumb is not to exceed a forestry area of 20% of the sub-basin area.</li> </ul>  |

|   |  |
|---|--|
|   | <ul style="list-style-type: none"> <li>- Limit the proposed area of forestry in the Lurio 3 sub-basin to not more than, say, 5 5000 ha (20% of the sub-basin area)</li> <li>- Plant Acacia in preference to Eucalyptus</li> </ul>  |
| I2: Reduction in the water table  | <ul style="list-style-type: none"> <li>- Provided forestry is kept out of riparian zones, buffers around wetlands and wetlands themselves, the impact on groundwater levels should be negligible. If it is possible to identify geological faults and recharge zones in the project area, then these areas should not be planted.</li> </ul>   |
| I3: Increased erosion   | <ul style="list-style-type: none"> <li>- There are several ways to limit the erosion to within acceptable limits. Firstly, the harvesting of the timber should be on a continuous cycle so that only a small portion of the full area is ever clear-felled at any one time. Secondly, this harvesting should take place during the dry season when rainfall is less likely, and replanting should take place as soon as possible after harvesting. Thirdly, the litter remaining after clear felling should be left in place until the new trees are established to provide cover and reduce erosion.</li> </ul>   |
| I4: Deterioration in Water Quality  | <ul style="list-style-type: none"> <li>- The measures to limit the impact on water quality are the same as that for erosion.</li> </ul>  |
| <b>Surface and Groundwater Quality Assessment</b>                                       |  |
| I1: Disruption of the Ecological Function (habitat alteration and loss of biodiversity) | <ul style="list-style-type: none"> <li>- Develop and implement a Riparian Zone Management Plan (RZMP). Riparian zones are typically established on the border of water bodies and serve to protect and provide a buffer zone for water bodies such as lakes, navigable perennial/intermittent streams, non-navigable streams etc;</li> <li>- Riparian zones should be connected with corridors of natural vegetation across watershed boundaries to allow for the movement of animals and plants;</li> <li>- Manage riparian zones to preserve water quality and wildlife habitat;</li> <li>- Develop and implement a Surface and Groundwater Monitoring Plan that will incorporate both water quality and quantity measures;</li> <li>- Prevent or limit disturbance to water resources during the planning phase;</li> <li>- Chemical toilets should not be used during the forest establishment and operation unless the contents can be disposed off in a manner that does not pose a threat to the environment. Instead, alternatives such as pit latrines, composting toilets or similar should be considered as preferred alternatives;</li> <li>- Water resources should be protected by implementing the recommended guidance contained in the Water Quality section of IFC General EHS Guidelines (2007) and the IFC EHS Guidelines for Forest Harvesting Operation (2007).</li> </ul>   |
| I2.1: Contamination of Water Bodies   | <ul style="list-style-type: none"> <li>- Develop and implement a Surface and Groundwater Monitoring Plan that will incorporate both water quality and quantity measures;</li> <li>- The use of existing roads should be maximized and construction of new roads should be avoided and limited to where is it absolutely necessary;</li> <li>- Road construction and maintenance should not exceed a gradient of 10%, where possible, with 5% being the optimum gradient;</li> <li>- During road construction, effort should be made to minimize cut and fill construction by following natural landscape route contours;</li> <li>- Road approaches to the dambos should be constructed at an upward angle to minimize drainage of road runoff into the dambos;</li> <li>- Considerations should be given to the future use of roads during planning and design phase. This may include adjusting design considerations if roads are intended for longer term use beyond forestry applications;</li> <li>- Consideration should also be given to the type of roads to be constructed based on the intensity of anticipated traffic over the long term;</li> <li>- Design road networks in advance to minimize road length and road density. Road widths should be minimized taking into consideration safety and transport requirements;</li> <li>- Minimize number of stream crossings, and site road crossings in suitable locations (e.g. at stream locations with rocky beds and low banks);</li> <li>- Site roads on soil with good drainage capability, emphasizing high ridge routes and avoiding low valleys when possible;</li> <li>- Roads should be located outside riparian zones and dambos;</li> <li>- Roads should be designed and sited so as not to act as dams allowing water to accumulate</li> </ul> |

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|   | <p>behind embankments. If such embankments are required, suitable culvert systems must be designed to allow for the free flow of water;</p> <ul style="list-style-type: none"> <li>- Road drainage (e.g. water bars, dips, ditches and cross drains) should be constructed at appropriate intervals to drain water away from the road surface and into vegetation;</li> <li>- Drains should not empty directly into watercourses, and should be capable of handling local rainfall and runoff conditions. Drains should be maintained as needed to accommodate expected flows;</li> <li>- Road surfaces should be shaped to ensure water runoff into appropriate drainage channels and vegetation and to eliminate channelling in ruts;</li> <li>- Gravel or other surfacing should be considered on steep road slopes and tight corners;</li> <li>- Burying of debris in the road base should be avoided, as it may result in uneven surfaces and holes leading to erosion and roads should be compacted prior to use.</li> <li>- Where necessary, stream banks alongside road crossings should be stabilized using (e.g. gabions) to prevent bank erosion;</li> <li>- If bridge designs include pilings, ensure that scour countermeasures are incorporated into the design of the bridge.</li> </ul>   |
| <p>I3.1:<br/>Contamination of<br/>Surface and<br/>Groundwater</p> | <ul style="list-style-type: none"> <li>- Develop and implement a Surface and Groundwater Monitoring Plan that will incorporate both water quality and quantity measures;</li> <li>- Standard operating procedures for the use and management of pesticides, fertilizers and hydrocarbon should be developed during the planning phase. The purpose of these procedures is to provide for the proper storage and handling of chemicals, including associated wastes, on site and hence prevent any form of contamination;</li> <li>- Copies of these procedures should be made available at designated facilities where these chemicals are used or stored;</li> <li>- Associated Material Safety Data Sheets (MSDS) for all chemicals should be available at all the sites where chemicals are present within the project facility and copies should be kept at the environment health and safety department;</li> <li>- All responsible personnel should be trained and remain conversant with these management procedures and strictly adhere to its implementation;</li> <li>- Chemicals should be stored in purpose built, waterproof and bunded areas.</li> <li>- All staff must be trained on the correct management of bunded facilities, including the disposal of collected waste chemicals;</li> <li>- Spill kits must be readily available at strategic points throughout the site and staff must be trained on the correct use of these kits;</li> <li>- Pesticides should not be applied close to watercourses;</li> <li>- A Nutrient Management Plan should be developed and implemented to ensure optimal use of nutrients and to reduce the risk of localised concentrations of nutrients far in excess of that which can be used by surrounding plants;</li> <li>- A Nutrient Management Plan should be developed for effective monitoring of the nutrient concentrations in surface and groundwater. This plan should include nutrient monitoring procedures and sampling sites for early detection of increased ground and surface water nutrients such as phosphates and nitrates;</li> <li>- It is recommended that soil contaminated with hydrocarbon should be immediately removed and disposed off;</li> <li>- Mitigation measures should be aimed at reducing contact between storm water and hazardous chemicals;</li> <li>- As per the FAO (2008) guidelines, burning of empty pesticide containers should be strongly discouraged. Specific guidance on the management of empty pesticide containers is provided by the FAO (2008) FSC Recommended pesticides;</li> </ul> |
| <p>I3.2: Health<br/>impact on<br/>employees</p>                   | <ul style="list-style-type: none"> <li>- The Integrated Waste Management Plan for the facility must cover the management of hazardous wastes including used chemical containers;</li> <li>- Prior to safe disposal, all hazardous wastes must be temporarily stored in a secure, dedicated facility. This facility should be designed to include secondary containment lined and covered to protect the contents from weather (sunlight and rain). If wastes are corrosive, the base of the storage facility should be lined with an acid-resistant coating;</li> <li>- Where possible, empty containers for hazardous chemicals will be returned to suppliers.</li> </ul>  |

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|   | <ul style="list-style-type: none"> <li>- Where empty containers for hazardous chemicals (hydrocarbons, pesticides, fertilizer, degreasing agents etc.) cannot be returned to the suppliers, they must be triple-rinsed, punctured and stored in a secure area until such time as they can be disposed of safely. Rinse water may not be discharged directly to the environment;</li> <li>- Empty pesticide containers should be disposed of according to the Food and Agricultural Organisation's Guidelines on Management Options for Empty Pesticide Containers (Food and Agriculture Organisation (FAO) 2008);</li> <li>- As per the FAO (2008) guidelines, burning of empty pesticide containers should be strongly discouraged. Specific guidance on the management of empty pesticide containers is provided by the FAO (2008);</li> <li>- MSDS for all chemicals must be readily available on site and the precautions stipulated in these must be adhered to at all times.</li> </ul>   |
| I4.1: Disruption of the Ecological function (forest operations and management)                        | <ul style="list-style-type: none"> <li>- Develop and implement a RZMP. Riparian zones are typically established on the border of water bodies and serve to protect and provide a buffer zone for water bodies such as lakes, navigable perennial/intermittent streams, non-navigable streams etc;</li> <li>- Where appropriate, slash and debris should be stockpiled above the high water mark to prevent materials from entering lakes, streams, and dambos during forest maintenance activities. This should NEVER be disposed of in stream/river courses or in riparian zones;</li> <li>- Avoid soil exposure and compaction to protect ground vegetation and the duff layer (decaying leaves and branches covering a forest floor) by avoiding the operation of wheeled or tracked harvesting equipment in proximity to the ordinary high-water mark for lakes and navigable perennial streams except on roads or at stream crossings;</li> <li>- Minimize the number and size of stream crossings for vehicle movement within the riparian zones. Where crossings are necessary, international best practice in the use of bridges, hardened fords, pipes and culverts should be adopted. Recommended stream crossing measures should include: (i) minimize vehicular movement over perennial and intermittent streams, and dambos areas. Where crossing is necessary, a right angle approach should be used in addition to use of bridges, fords, pipe culverts, and other techniques to minimize impacts to stream banks, flow, water quality, (ii) crossing structures such as bridges, culverts and fords should be designed to withstand peak flows of high intensity storms, and ensure that movement of aquatic species is not impaired, (iii) vehicle movement over unprotected streambeds should be prevented. Skid trails should not cross streams or gullies. If crossing is necessary, a hard rock stream bottom is preferable, (iv) road drainage should be diverted to vegetation and not into the stream, and (v) approaches to crossing should be stabilized with aggregate to avoid increased sediment entering the stream.</li> </ul> |
| I5.1: Contamination of Surface Water (as a result of plantation maintenance)                          | <ul style="list-style-type: none"> <li>- The environmental monitoring programme for the facility must incorporate water monitoring points that are able to detect a negative impact on the water quality associated with the plantation operations;</li> <li>- Measures should be taken to minimize erosion from bare soil surfaces. Full cultivation should be avoided and ripping, a technique used to break down a hard pan or stone line impediment, if required, should be carried out along the contour;</li> <li>- Road infrastructure maintenance should include: (i) to establish a regular maintenance inspection schedule, (ii) clearing of debris from ditches and other drainage structures, (iii) grading road surfaces to maintain drainage contour, and fill holes promptly, (iv) if dust control measures are applied, ensure that runoff will not adversely impact water quality in surrounding water bodies and groundwater.</li> </ul>  |
| I6.1: Contamination of surface and groundwater (as a result of improper storage and use of chemicals) | <ul style="list-style-type: none"> <li>- The mitigation measures are similar to those presented in impact 3.1 and 3.2.</li> </ul>   |
| I7.1: Surface and   | <ul style="list-style-type: none"> <li>- All employees, many of whom will come from surrounding communities, will need to</li> </ul>  |

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| grouwndwater quality (sanitation within local communities)                       | <p>be trained on the importance of sound waste management and good sanitation. This knowledge will most likely be transferred to the larger communities;</p> <ul style="list-style-type: none"> <li>- The importance and use of low-cost sanitation options such as septic tanks and soakaways, pit latrines, etc, which should be located at a minimum of 50m from a water course should be promoted during community meeting;</li> </ul>   |
| 18.1: Disruption of the Ecological Function (as part of forest decommissioning ) | <ul style="list-style-type: none"> <li>- A Closure plan which will include a Rehabilitation plan should be developed and implemented;</li> <li>- In addition, see mitigation measures associated with forest establishment.</li> </ul>   |
| 19.1: Surface and groundwater quality (plantation establishment and operations)  | <ul style="list-style-type: none"> <li>- Drinking water sources, whether public or private, should at all times be protected so that they meet or exceed applicable national acceptability standards prescribed in Ministerial Diploma of 18/2004 (See Appendix B-1).</li> <li>- Wastewater effluents, oil and hazardous materials, and wastes should be managed according to the guidance provided in the respective sections of the IFC General EHS Guidelines (2007) with the objective of protecting water resources;</li> <li>- Where the project includes the delivery of water to the community or to users of facility infrastructure (such as camp accommodations and host community), where water may be used for drinking, cooking, washing, and bathing, water quality should comply with required standards;</li> <li>- Any dependency factors associated with the delivery of water to the local community should be planned for and managed to ensure the sustainability of the water supply by involving the community in its management to minimize the dependency in the long-term.</li> </ul> |

### **Annex III: Stakeholder Consultations and Community Development Program**

GR's position on Stakeholders' participation is seen as crucial for the success of any long-term business such as plantation operations. The process is therefore perceived as an ongoing one with consultations carried on a regular basis and whenever deemed necessary. In order to manage stakeholder engagement, GR has a Community Liaison unit within its Community Development Department. The department is led by the Community Development Manager, assisted by Community Liaison Officers, which lead directly with issues raised by local communities on matters related to the implementation of the project.

#### **1. Stakeholder Consultations**

In accordance with national laws, GR needs to undertake a number of compulsory consultations in different moments of project implementation. These are in addition to the ongoing ones and entail three types.

### 1.1 Stakeholder Consultations for Land Acquisition

These consultations have been conducted in all districts selected for the project implementation and include Mecuburi, Ribae, Nampula, Murrupula and Erati. A total of 61 consultation meetings were carried with a total of 4,690 participants of which 32% were women. The table below provides more insights on these consultations.

| District     | Number of Consultation Meetings | Number of Participants | Number of Interventions |
|--------------|---------------------------------|------------------------|-------------------------|
| Mecuburi     | 27                              | 2,248                  | 271                     |
| Ribae        | 22                              | 1,450                  | 237                     |
| Nampula      | 4                               | 340                    | 51                      |
| Murrupula    | 4                               | 214                    | 41                      |
| Erati        | 4                               | 438                    | 33                      |
| <b>Total</b> | <b>61</b>                       | <b>4690</b>            | <b>633</b>              |

The objective of these consultations was to listen the perception, views and opinions of the communities in relation to the project and at harmonizing the rights and interests of all parties as well as in building trust with a view to reduce potential conflicts.

### 1.2 Stakeholder Consultations for Environmental and Social Impact Assessment

These consultations for the Environmental and Social Impact Assessment were carried out in different stages. First, for the identification of potential socio-economic impacts of the project and secondly, to ensure that the interested and affected parties were informed about the project and provided with an opportunity to comment on the findings before submission of the final report to the appropriate governmental authorities. Thus, these consultations have preceded the provision of a license to GR by the GoM.

Figure 4: Environmental and Social Impact Assessment Consultations



### 1.3 Stakeholder Consultations for the Preparation of the Community Development Program

To better understand the socio-economic context of the project area and allow for realistic planning of the project interventions, GR has commissioned a socio-economic assessment in the selected areas. This assessment involved interviews with various stakeholders and allowed for characterization of the project

areas in terms of existing conditions and infrastructure. The assessment concluded that large parts of the project's activities would take place in remote rural areas with under-developed infrastructure and services, little economic activities, extensive land use tradition, low-technology based subsistence agriculture and very little production of cash crops. The key problems identified were in the area of education, health, and low-technology based subsistence agriculture.

Consultations followed to understand specific community needs at different project areas with a view to allow the project in their vicinity. In each area, interviews and auscultation meetings were carried out with local communities and key stakeholder from the local government (e.g. District Administrators or Permanent Secretaries, NGOs, private sector companies). In each area, men and women were separated into two distinct groups.

Communities, traditional leaders, local government's representatives and GR have actively participated in the planning of the Community Development Program. A Technician from the Provincial Land Cadastre Service (SPGC) participates in the demarcation process.

#### **1.4 Stakeholder Consultations for Land Demarcation**

The land demarcation consultations started in October 2011 and are still being carried out on a number of areas within the concession granted by the GoM. These consultations consist of guided visits to the field (reconnaissance surveys) where local community leaders and the local government's representatives identify and show to GR the limits of the areas that the local communities are willing to concede for the plantations.

Every consultation process has been documented.

## **2. Community Development Program**

The Community Development Program (CDP), currently ongoing, will be implemented as part of LGR social responsibility, with the aims to: (i) improve the living standards of communities in areas of the project, (ii) improve the working environment in the area of intervention between the community and the GR, and (iii) minimize the negative effects on the community resulting from the implementation of the project, particularly the use of land for plantations. GR believes that community participation is key for a successful and sustainable long term business like a forest plantation operation. GR has developed a master document explaining the design, implementation and supervision of the CDP.

The CDP will start small and will gradually increase in parallel with the increase in the number of total ha planted. This approach is not only the more economical but will allow for the incorporation of lessons learned. Based on the needs expressed by local communities during stakeholder consultations, the specific objectives of the CDP are: (i) increase the level of education of local communities, (ii) improve the access to healthcare and water supply to local communities, and (iii) enable through capacity building the creation of higher income generation activities. The CDO entails therefore four main components as explained hereunder.

## **2.1 Income Generation Component**

Consists in the creation of employment and business opportunities for the local communities i.e., assisting in the establishment of SMEs based on forest plantation and NTFPs (e.g. promotion of honey production and beekeeping, sustainable charcoal production, out-grower scheme) as well as other non-forestry related enterprises (e.g. bricks production) in the project areas. GR is supporting and will continue to do so the establishment of these activities as well as promote food security through the improved agriculture production techniques, promotion of family/community out-grower schemes and agroforestry, supply of agriculture inputs and implementation, technical assistance and establishment of harvesting and post-harvesting infrastructures. The implementation of these activities is done individually or in groups and/or associations. Additionally, the activities promoted should aim at income generation while contributing for the natural resources conservation, specifically, as a means to avoid uncontrolled burnings and deforestation.

As part of this program, GR has distributed acacia seedlings to a significant number of schools and the Provincial Forest and Wildlife Authority. Furthermore, during the rainy seasons, GR has started agriculture plantation programs by distributing soybean and other seedlings that have benefited up to 350 farmers (out of which 60 were women) and lead to the plantation of 150 ha of soybean. GR. Over time, this program will lead to agriculture plantations of up to 500 ha.

## **2.2 Education, Recreation and Alphabetization Program**

Aims at building and/or restoration primary and secondary school infrastructure, supply of equipment and school materials with the objective of promoting alphabetization and other support that cover cultural activities such as recreation and sports. Furthermore, capacity building sessions will be implemented from time to time and shall target community members in aspects related to environment management legislation (e.g. environmental education for improvement of land and other natural resources uses practices), fire prevention and control and business management.

## **2.3 Healthcare and Water Supply**

Consists in the construction and restoration of health facilities (health centers) and water facilities (boreholes). The supply of basic healthcare equipment and materials, as well as the implementation of awareness campaigns on endemic diseases and epidemics (e.g. HIV, malaria, etc.) and the creation and training of committees for water management infrastructure are an integral part of this program.

Figure 5: Health Care Awareness Raising Section in 2009



## **2.4 Registration and Identification Cards Issuance Program**

The program consists in providing birth certificates and identification documents for the population living within and in the vicinity of the project areas. This USD 5 million program for which GR has provided up to USD 1 million is being implemented in partnership by GR, UNICEF and the local authorities and will target a total of 500,000 persons. Spillover benefits of such program include: (i) ability to vote, (ii) ability to run for public office, (iii) ability to work for GR, (iv) ability to register in national social security scheme, (v) own a bank account, and (vi) own a simcard for mobile connectivity.