

# **Humbo Community-Managed Natural Regeneration Project**

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## 1.1 Background information

*Ethiopia's natural high forests were believed to have once covered as much as 42 million ha of its total land mass of the 110 million ha. (Last, 1962). With the inclusion of the savanna woodlands, some 66% of the country was endowed with forest and woodland until the late 1800's. In the early 1950's, only about 19 million hectares of the land mass remained covered with forest. In the early 1980's, the coverage was reported at about 3.6%. By 1989, it was estimated at about 2.7% of the total land area. However, some 5 million hectares of savanna woodlands were remaining giving a total estimated forested area of about 7.5 % (EFAP, 1994).*

*Today, remnants of the high forests are seen only around churches and mosques where, by tradition, the trees are not cut. The causes of forest destruction involve many different factors but by far the most important ones are those initiated by human beings. Forests are cleared to satisfy the demand for fuel and construction wood as well as for crop and grazing lands. This in turn has resulted in reduced yields, increased erosion, decrease in stream flow, flooding, wood scarcity, loss of bio-diversity and climate change. Available reports indicate that the rate of forest destruction is estimated at about 150,000-200,000 ha per year. Concurrently, the valuable trees and shrubs used as wood, food, feed and medicine are also cleared during the process of destruction (EFAP, 1994).*

*The Humbo woreda (district) is among the most populated areas in the country. The woreda covers an area of about 86,646 ha (Annex I). The total human population of the woreda is about 135,222 (22,375 HH) of which 15% are female headed and the livestock amounts to about 108,000. The growth of the population is estimated at about 3% per annum.*

*The main crops growing in the Humbo woreda are maize, sweet potato, tef (*Eragrostis tef*) and haricot beans, coffee, cotton, and chickpea. .*

*The population the woredas is predominantly farming communities with a land holding of 0.25 ha (Humbo woreda) and the main stay is subsistence agriculture. Current report shows that the woreda consists of 36 (kebele administrative units (KAs) (Annex II & III)*

*The geologic formations of the woreda belong to the Precambrian rock formation underlain by sedimentary rocks and volcanic ashes. The soils of the woreda is mainly brownish red predominated by clay soil types. The Humbo woreda lies within the kolla agroecological zone and it has a maximum temperature of 320 c and a minimum of 270 c, except at Bolla Wanchie KAs, where the maximum and minimum temperature reaches to about 200c and 250c respectively. As result this kebele lies within the Woina Dega/Dega agroecological zone. The minimum and the maximum rainfall of this woreda is about 200 mm and 600 mm respectively and rarely reaches to about 1200-1300 mm at Bolla Wanchie kebele.*

*The vegetation cover of the woreda has been cleared off long ago and the remaining reduced vegetation stumps are no longer able to supply the highly demanded wood and wood resources, agricultural yields are below subsistence, flood hazards are more recurrent, hydrological imbalance has occurred and many water sources have already dried.*

*Recent information collected from the Agricultural and rural development bureaus of the woreda on the natural forests status showed that there are about 19929 ha of bushes and shrub lands left in the Humbo woreda. In order to restore the degraded ecosystem and protect the remaining few forest patches bushes and shrubs and to achieve a sustainable benefit from the rehabilitated forestlands at the same time, a community-managed natural regeneration project has been proposed for the Humbo woreda. The proposal is set to be realized through the sale of Emission Reduction (ER), silvicultural products and the additional non-forest and forest products to be harvested from the restored forest ecosystem. To this end, four potential sites were proposed initially. But after pre-feasibility study only one site confirmed to be implemented through the “Humbo Forest Management Groups”.*

*In order to assess the viability of the plan, the candidate sites were visited and information was gathered with respect to the agreed terms of references (TOR) twice (Annex VIII). The first trip (January 17-22, 2006), was an exploratory trip done to have an over view of the proposed sites and to collect both secondary and primary data as much as possible while the second (March 16-22, 2006), was to undertake detail biophysical data gathering with much emphasis on biological data as well as exogenous and endogenous forces impacting the plan ahead. In light of these, this final draft working paper on forestry issues was produced.*

*The paper contains two sections. Section one presents the background of the proposed project, description and location of the proposed project site, vegetation classification, characterization/ synthesis result of the site including the strength, weaknesses, opportunities and threats of the proposed project, the various implementation strategies and forest regeneration techniques to be followed while restoring/re-afforesting the degraded forest sites selected for the initial phase of the project and the complimentary activities required. Section two provides the estimation of the available stock, estimation of the total weight and annual biomass yield, the woody biomass growth prediction over time of the selected site, Current and projected demand for wood of the direct forest dependent sector of the community including the estimation of the current grass status and the future trend of project site. The final part of the document gives the conclusion and the recommendations.*

## *1.2. Description and Location of the project site*

*The Humbo Community-Managed Natural Regeneration Project site is located some 430 km south of the capital, Addis Ababa. four independent sites were initially identified one is characterized by massif mountain and the others are chains of hills interspersed with small valleys, gullies, out crops and flat plains. Geologically, the sites belong to the Precambrian origin underlain by basalt rocks. The hills at sites 1, 2, 4 & 5 are*

*predominated of calcareous soil types of volcanic origin, whereas the valleys, the foothills and the plains mainly exhibit clay loam and silt soils.. The project sites lie within the Great Rift Valley that extends from north to south stretching down to the Indian Ocean via the northern Mozambique. In its strict sense the sites lie within the kolla agroecological zone, with the exception of the Bolla Wanchie KAs of the woreda that lies within the Dega & Woina Dega agroecological zone. The altitudes of the area ranges between 1000-1500 m.a.s.l*

### *1.3. Vegetation Classification*

*Broadly speaking, lie within the Mid land relatively low Agroecological zone and the vegetation can be classified as the woodland savannah with dry woodland forest types. There is little variation, in vegetation composition, within and between these sites. Site observation and information gathered from key informants indicated that these sites had been covered by dense vegetation of broad-leaved vegetation types and monatne forests before they were cleared around fifty years ago.*

*However, these forests had been severely reduced both in quantity as well as quality in all the sites during the last three to five decades and what is observed currently are old stumps and remnants of small trees and patches of bushes and shrubs and, grasslands The severity of the forest degradation is also exhibited by the indicator species like *Dodonea viscosa*, and *Acacia dreanlobium* which are already in the process of invading wider spaces in Humbo site.. Despite the degradation, the re-sprouting stumps and the ever reduced vegetation types are still under pressure from the farming communities, residing by the vicinity as well as inside the forestland, who look these forest and woodlands as their only sources of wood and income from charoaling.*

### *3. Characterization Humbo Site*

*This site site lies some 20-30 km southeast of Tebella town, the capital of the Humbo Woreda. It is characterized by a chain of mountains that run from South East to North West rarely interspersed with small hills, valleys and stone. The site is surrounded by 7 peasant associations namely: Abella Longena, Abella Gefetta, Abella Shoya, Bosa Wanchie, Bolla Wanchie Hobicha Beda and Hobicha Bongotta. These peasants associations/Kebeles are settled agriculturalists, and agriculture is their main stay. They mainly grow maize, sorghum, sweet potato, tef (*Eragrostis tef*), coffee, cotton, haricot beans and chickpeas at their own plot of land and do have their own along aged agro-forestry and planting tree at their hedge. The nearby communities consider these hills as their sources of fuel and construction wood, feed, fodder and water despite degradation continued. This site is probably the biggest of all sites visited while pre-feasibility assessment where there are many open places suitable for reforestation purposes as agricultural practices and grazing are mainly localized in the plains of personally owned plot of lands. Historical evidences obtained from elders and key informants indicated that the site has been once covered with dense mixed broad-leaved tree species, shrubs, herbs and grasses of food, feed, fodder and medicinal values that include: *Ficus sur*, *Terminalia ssp.*, *Acacia ssp.* *Balanites aegyptica*, *Croton**

*macrostachys, Grewia flavescens, Erythrina abyssinica, Olea africana, Dodonea viscosa, Oxytenthra abyssinica, Acacia Senegal, Acacia abyssinica, Guizotia abyssinica, Urtica simensis, Brassica integrifolia, pittosporum abyssinica, Asteracantha longifolia, Arundo donax, Commelina benghalensis, Eleusine jaegeri, snowdenia polystachya, Solanum tuberosum, Ricinus communis, Beta vulgaris, and Hyperrhenia rufa.*

*However, these species have been cleared only within the last thirty to fifty years as the demand for energy, construction wood, food, fodder and feed has increased as result of the increase both in human and livestock population.*

*What are seen now in the field are stumps of good sprouting potential, extremely reduced shrubs, bushes and few tell tale trees. The rest are grasslands, outcrops or small farmlands. Paradoxically, little attention was given to restore this ever reducing vegetation during the last two decades from both government and non-governmental organizations despite the interest of the people to reforest the degraded ecosystem with some technical support. As a result, there is no much to observe in the field concerning re-vegetation/reforestation exercises in the area apart from the very few hectares of plantations on public lands out side the Humbo site done by the government and traditional forest management practices and scattered plantations on individual farmlands and homesteads/backyards. The concern of the community to plant trees is, however, explained by the various traditional practices, such as enclosures, home-gardens and tree planting on farm done with farmers' own initiatives. The trees planted are high value trees of economic return, which comprise Moringa stenopetala, Grevillea robusta and Eucalyptus ssp. The soils at the top of the hills (Humbo project site) are shallow and calcareous type predominated with volcanic ashes often dry, whereas those at the base and along river courses and streams are fairly deep and moist, quite good to support the natural regeneration by sprouts as well as by seeds from soil seed banks and replanting with species of unique characteristics i.e drought and stress tolerant tree/shrub species.*

#### **4. Strength, Weaknesses, Opportunities and Threats to the Humbo Community-Managed Natural Regeneration Project**

##### **4.1. Strength**

*It has been the general practice of the farmers of the Humbo woreda either to plant trees around their homes or preserve trees or a lower layer of shrubs in the field to obtain wood, food, feed, medicine, to provide shade for the commercial crops like coffee, shelter for the animals and for the nitrification of annuals of different crops like maize, sorghum and spreading cereals such as wheat and barely. Of the planted or preserved tree species on farm lands as well as grazing lands are found: Faidherbia albida, Podcarpus falcatus, Olea africana, Susbania susban var.nubica, Croton macrostachys, Acacia tortilis, Cordia africana, Acacia nilotica, A.senegal, Terminalia species, Adansonia digitata, Acacia abyssinica, Parkia biglobosa Parkinsonia aculeata, Casuarina equisetifolia, Balanites aegyptiaca, Azadiractha indica, Erithrina abyssinica, Milletia ferruginia, Ficus species, Moringa stenopetela, Ziziphus mauritana, Tamarindus indica, Grevillea robusta, Leuceana leucocephala, Calliandra calothyrsus,*

*Eucalyptus species, etc., including many aromatic and medicinal plants, fruit, nuts, and spice trees, selected by generations of the local people. In fact, the experience that the local people have in planting or preserving of trees is the most demanded and more often a pre-condition for the initiation of regeneration programs such as this. Thus, this experience that the people have at the moment certainly ensures the permanence of the project envisaged. Greater progress can be made since this project idea is accepted and supported by the communities and technical advice and financial incentives will also get appreciation from the beneficiaries as the communities are knowledgeable of the activities. In principle, launching this reforestation/afforestation program where the basic knowledge of tree planting and management are well known to the community, the forest dependent groups in particular, benefits not only the communities involved in the activities but also helps the smooth implementation of the program. The regeneration project will then be the concern of the communities and not the project proponents alone. Indeed, the regeneration project will get acceptance by the community as it provides ranges of benefits for the local forest dependent groups.*

*Thus, the portfolio of the traditional knowledge that exists within the farming community as well as in the Woreda administrations, distinguishably among forest resources reliant groups, regarding trees growing and their management, in consequence, will render the opportunity for the reforestation effort to be recognized by the local people faster than ever before, since the reforestation activities will be done in areas where the community members are well informed of tree planting and the values of trees and forests are understood at all levels.*

*The government policy is also in support of rehabilitating such degraded area in sustainable manner.*

#### 4.2. Weaknesses

*One of the major weaknesses of reforestation program is that in many instances tree planting or natural regeneration interventions demand different equipment and skills than the crops with which the farmer is familiar. Almost all tree planting techniques or management innovations demand change in labor inputs, and the labor requirement is one item in the package of circumstances which rural people weigh before deciding whether or not to indulge in such activities (Steppler & Nair, 1987). The farming communities/families have an accumulated wealth of experience by which they allocate each member of the family to a specific task. It is only when these cycles of labor of men, women and children are well understood that reforestation practices will be successfully integrated. Additional labor for a person already fully occupied at peak labor seasons is a bit costly. It is frequently criticized that forestry activities overlap with other agricultural cropping seasons, thereby competing with the families' labor force which would have been used otherwise. On top of this, reforestation programs sometimes fail to provide the communities with the types of the trees that meet all the needs of the farming family, and which is not labor intensive at the same time. Furthermore, forest crops which have slow growth rates and a long juvenile phase before the realization of benefits sometimes give farmers a wrong impression on the program envisaged. Farmers might not plant or protect degraded forest areas if they do not benefit within short period of time. Past experiences show that the farming*

*community invests its labor actively on tree planting or regenerating the natural ones only when it assures that the benefits outweigh investment and/or returns are guaranteed. Yet, this project weakness outweighs from the weakness due to designed management structure, ownership place, by-laws in place and a lot of system planned and under going could make this project a kind of its kind due to the carbon benefit incentives too.*

#### 4.3. Opportunities

*The wood and other forest resources deficit around the project sites is too high. This indicates that the volume of wood required by far exceeds the supply, leading to the “mining” of the remaining stumps bushes and shrubs. The impact of loss of forest resources and vegetation cover has also been manifested by high rates of soil erosion. These negative factors, in turn, have adversely affected agricultural production and soil productivity, and the Humbo areas are no exception. At the moment, the shortage of fuelwood is compensated by the use of animal dung and crop residues that would have been used otherwise. The cumulative effect of these chains of events is also reflected in the prevailing, poor economic performance and accelerated poverty.*

*To combat these depressing trends, projects such as this will have opportunities to play their role. Most significantly, over 87% of the total population is living in rural areas where the problems are exacerbated, of which over 45% of these population can be mobilized at anyone time for reforestation, afforestation and land rehabilitation activities. The indigenous knowledge (IK) paired with the long term experiences of the rural people, since 1970s, (the period of greening Ethiopia) particularly in community/social forestry development led themselves to the wider opportunities of restoring, managing and introducing of new reforestation techniques to create forests of sufficient carbon sequestration along with various other multiple uses. Above all, the rooting materials, the rainfall and the soil depth of some of the humbo site is enough for the restoration of the degraded forest from the sprouts of old stumps, wildlings, soil seed banks, seed rains and enrichment planting.*

*There is also a strong support from the farming community to develop some agroforestry in the farming areas themselves and goodwill to participate in the natural resources development and conservation activities. The agroforestry development as a source of fuelwood and other outputs goes back to the 1970 and it helped to alleviate somewhat the pressure on the ever reduced natural vegetations. Introduction of additional agroforestry tree/shrubs and grass species deliberately into the croplands, grazing areas, around homesteads in the form of woodlots, buffer plantation, wind break or shelter belts, etc., would provide not only highly demanded wood and animal feed, but also the exceptional protection against leakages from the rehabilitated forestlands. In addition, there is competence among the development staff of the proponents of the project to undertake this task, and the local governments are also committed to provide any support required of them by the project management.*

#### 4.4. Threats

*The proposed projects belong to the public, where the private individual has the usufruct right to only using the land throughout his lifetime but not to sell. The current land use right policy gives*

the private individual the entitlement to use and transfer his land to his offspring, but not to sell. Because of this, a large proportion of the country's watersheds and degraded lands that are "common property lands" such as forestlands and grazing were been suffering from what is often called the 'Hardin's tragedy of commons' where the common resources are extremely over exploited and unmanaged, although the 'privately' owned resources are in no better condition than the 'common property resources'. The lack of tenure security that the private individuals have over their possessions has detracted the interest of the land users to both protect and maintain their lands against exploitative actions. As a result, the incentives to invest on perennial crops is so low that tree planting by farmers, even on their crop fields, are rarely seen despite the late certification of land ownership and improvement of the land entitlement laws and regulations. Providing security of tenure by changing the land use regime is a key element to enhance the carbon sequestration program. This user right certification is granted. Additionally, innovative programs such as this providing farmers with a package of technical assistance and financial incentives for the the project to remain operational.

*The "quick" rehabilitation of these degraded forestlands is entirely dependent upon the factors that work together. These factors include the potentials of the rooting materials; age of the stumps, soil, moisture and temperature etc. The effect of these makes tree planting a long term venture as the results can not be realized easily. The long term return of trees/forests is something that cannot be tolerated easily by the poor farmers. In particular, small farmers who have much reliance on their livestock require fast recovery of the "closed lands" to get access to forage or feed for their livestock. After the start of project the project demonstrated providing more grass than before. The only difference is that the farmers are expected to process cut and carry. This system is practically beneficial both for livestock and natural resource management. The fate of the project is dependent upon the economic return and expected coo benefits that the farmers expect. In fact, the project management handing over to the community and local Government Office Of Agriculture and Rural Development with planned empowering will be the back bone of the project. Thus, In order to safeguard the community and ensure the permanence of the project, the WVE assistance in the area of forest rehabilitation and development, continuous technological and financial support (WV – Australia) and provision of training to the tree growers outside of the project site and motivating them should be continuous. These will make them able to produce wood for own consumption and sustain them as producers of value added forest/tree products, which are locally competitive and label them as sole producers of goods and service that can not be substituted easily. Fire and drought are often threats to the forest. Thus the fire management plan implementation, work on conflict resolution, ensuring ownership and getting benefit from the project could eliminate or at least minimize the risk. ,*

## 5. Project Implementation Strategies and Forest Regeneration Techniques

### 5.1. Implementation Strategies

#### 5.1.1. Forest Demarcation & Protection



*Patrolling is preferred to fencing as this provides full time employment to some very needy individuals of the farming communities and most importantly to those affected by the project, thereby strengthening the ties between the project management and the farming communities. This is justified by the results of the interviews made with the sub-sampled members of the farming communities and during April Sodo stakeholders consultation workshop.*

*It is recommended that the fencing be a live fence composed of various species such as Euphorbia abyssinica, Euphorbia tirucalli, Agave americana, Aloe abyssinica and the like, the cuttings of which are planted directly. Fire control towers made of local materials may also need to be constructed on selected peaks of the hills to keep alert the communities in case of fire outbreaks.*

#### *5.1.2 Forest Regeneration Techniques*

*Field observation revealed that there are potentially good rooting materials, better soils with reasonable depth, good moisture and extremely enthusiastic people living in the Humbo site.*

*The gap filling is aimed to enrich the existing species composition and to increase the project benefits. To this effect, it is required to upgrade the already existing nursery at Abella Longena to raise the demanded amount of seedlings for each year for Abella Longena and Abella Gefetta KAs and expand the nursery at Bosa Wanchie KAs to raise the seedlings required for Bosa Wanchie, Bolla Wanchie and Abella Shoya KAs supplemental planting sites. The establishment of new and yet small satellite nursery will only be necessary for the Obicha Beda and Obicha Bongotta KAs planting sites.*

*Seedling raising in the nurseries as oppose to purchasing is opted as there are no forest seedling dealers within the territory where the project activities will take place. Conversely, the ADP of Humbo can manage nurseries sufficient for the production of the needed quantity of seedlings and the staffs of this project has the skills to operate and produce the kind of seedlings proposed for the planting.*

*The objective of having small satellite nurseries is to reduce cost of transporting seedlings from far distance and minimizing the risk of damaging young seedlings while transporting long distances. Post-supplemental planting assessment will be done twice a year to check for the survival of the seedlings and undertake quick corrective measures. Supplemental planting will continue for a series of years until the optimum level of stocking is achieved. Weeding and cultivation (tending operations) will be done every year to encourage the newly planted seedlings. The seeds of the prescribed tree species can be procured from the National Tree Seed Project of the Forestry Research Center (FRC) in Addis Ababa or private dealers in Awassa and Soddo.*

*Erosion prone places, small rills and gullies will be identified and treated. Soil erosion control structures such as terraces will be constructed on erosion prone areas. Check dams will be constructed on gullies and rills will be plugged with live vegetation with species like Euphorbia abyssinica, Euphorbia tirucalli, Agave americana, Aloe abyssinica to arrest the soil erosion and control further expansion of gullies and rills. Hardpans and severely compacted soils created as a result of severe soil erosion or frequent trampling by animals will be scarified, hoed and stirred to encourage regeneration from the seed bank. Planting pits will be mulched to conserve moisture using grass or small branches and twigs right before and after planting and the pits will be enclosed in small trenches/ditches or micro-basins or eye brows prepared in a staggered fashion. These will allow the maximum harvesting and the optimum conservation of the moisture for the seedlings. Small trails and footpaths used for transporting seedlings and supervision purposes will be prepared as deem necessary. Both the trails and footpaths and site preparations for the planting will be done manually. Generally the techniques of regeneration involve: supporting natural regeneration, enrichment planting and basic cultural practices.*

Other silvicultural interventions such as coppicing, pollarding, cleaning and thinning of trees will commence based on tree growth of the regeneration program. Basically, cleaning the forest floor by cutting matured grasses, herbs and dead shrubs helps to reduce the accumulation of fuel which otherwise will be a cause for fire hazard. However, the intensity of grasses, herbs and dead shrubs cleaning and cutting including the seasons of harvest need to be regulated to allow the species to reseed. Such regulatory activities will be prescribed in the management plan developed later at the validation of the project.

The Humbo are receive about 700 mm rainfall. As a result, the rate of growth of the tree will be optimum using goodness of soil and other environmental factors.

#### 7. Complementary activities

The forests on the project sites have been depleted mainly because of excessive cutting of wood for fuelwood and construction both for household consumption and sale. The remaining stumps, bushes and shrubs are still under pressure despite their inability to provide the direly demanded wood and wood products by the farming community living around and inside the areas.\*

*\*Incidentally, fuelwood is the main source of energy around the project areas. It is also the most freely available commodity. A study on the Ethiopian energy consumption pattern by source of energy also indicates that woodfuel constitutes over 90% of the total energy consumed. According to the report, the per capita consumption of fuelwood and construction poles in Ethiopia is about 1.1 m<sup>3</sup> per year.*

Thus, closing the sites without providing options for wood collection and grazing will accentuate the potential for illegal fuelwood harvesting and grazing that will eventually impact the permanence of the project. In this regard, the following mitigation measures are suggested:

- It is believed that the proposed coppicing and pruning method to be introduced will allow for selective wood harvesting each year and the degree to which this compensates for lost opportunity from uninhibited access will be monitored. In addition. Based on original FMNR principle this practice is going on. It is suggested

*that the project will assist in setting up community woodlots used for fuelwood and construction poles and posts collection at the periphery of the closed forested areas, farm boundaries, and homestead etc, composed of the fast growing species such as Eucalyptus camaldulensis, Grevillea robusta, Acacia saligna, Eucalyptus globulus etc. This will serve as an alternative source of forest products for the community lost as a result of the restriction of access to the forests as well as protection against leakage.*

- *Thus, it is suggested that the project establishes a high density planting of mini-woodlots at the periphery of the closed areas or around homestead or farmlands at a density of 10 plants per 1.25 m<sup>2</sup> to produce approximately 4.5 kg of biomass per tree after two years. Some of these trees can be retained for another two or more years to provide posts or poles required for construction purposes. The species may include forage legumes such as Vernonia amygdalina, Leucanea leucocephala , Eucalyptus spp.etc <sup>1</sup> . This recommendation is accepted and implementation underway.*
- *It is also proposed that not all the forestland will be closed at one time: since the restriction of the forest will be done progressively, grazing, collection of grasses and forest products will still be appropriate until the complete closure of the forestland set aside for reforestation program. This has been negotiated and worked out accordingly. At this stage all the project site closed with full agreements of community.*
- *It is anticipated that the project provides a series of extension services to help the affected communities develop improved pasture and fodder along with the establishment of woodlots, use energy conserving devices such as more efficient stoves, employ improved charcoal making methods, and to expand activities such as beekeeping for value added income generation. This recommendation is also undergoing as most of them described in the mitigation action plan.*
- *The project shall also assist the communities in the development of off-farm income generating schemes. This one is also going well.*

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<sup>1</sup>The numbers of hectares of land required for the establishment of the woodlots can be estimated from the standard per capita consumption figure given above, once the total numbers of households that will be affected by the project are known).